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Study of Land Resources Used for Boating in Galilee, Rhode Island

Donald Anthony Sikorski
University of Rhode Island

A STUDY OF LAND RESOURCES USED FOR BOATING IN GALILEE, RHODE ISLAND

BY

DONALD ANTHONY SIKORSKI

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OF

DONALD ANTHONY SIKORSKI

Approved:

Thesis Committee:

Chairman Carol J. Thomas

Jack Sanders

Dieter Hammerschlag

Robert C Spencer

Dean of the Graduate School

UNIVERSITY OF RHODE ISLAND

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ABSTRACT

An increase in boat ownership and participation in boating since the early 1950's has caused problems along waterfront property in small-craft harbors. The commercial, sports fishing, and pleasure boats create problems in the harbor and along waterfront property such as congestion and mixed land uses which affect the quality of the harbor environment. The purpose of this study was to establish criteria which, if met, would reduce or possibly eliminate problems on the land related to boating. Two examples of the criteria which can be applied to reduce waterfront problems related to boating are: (1) supporting land uses should be largely dependent upon the harbor's function and (2) commercial establishments should be located according to the services they provide, the needs which they demand, and access required by boaters.

The land resource criteria developed in this study and the water resources criteria developed by William R. Onosko in "Criteria for Boating," the "counterpart" to this study, could be useful in understanding and planning of land-water activities.

A small-craft refuge harbor at Galilee, Rhode Island, was selected as the study area for the applicability of the

land resource criteria. This area is a multifunction harbor and has several evident problems related to boating. Thus it is a sound test area for hypothetically applying the land resource criteria to plan the harbor land area according to the various boating activities.

It was concluded that the criteria established could be beneficial for the development of land areas in similar harbors. Application of the criteria could result in a greater maximization of land utilization and arrangement of complementing land-water uses for maximum benefit to boaters and people who visit the harbor. Furthermore, the criteria could be useful in determining and guiding development of the facilities needed for the various boating activities and day-to-day harbor functions.

By applying these criteria to harbor areas, benefits also would be evident to a community. Improvements in the harbor should enhance the value of nearby property, and boating enthusiasts interested in residing near a boating area would probably settle close to the harbor. An increased number of visitors in the harbor utilizing their leisure time on boats probably would increase local business opportunities. All of these factors would tend to benefit the community by attracting new business to meet the demands of boatsmen and tourists, by increasing employment, and by increasing the tax base.

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CHAPTER I

INTRODUCTION

In the zone where land meets water there are many complex problems which relate to water pollution, soil erosion, bathing, and boating. Each of these problems affects the quality of the environment along the waterfront and could be investigated.

I. THE PROBLEM

Statement of the Problem

For the purpose of this research, boating and its effect upon land use in harbor areas was selected as the major area of study. The many boating types and a great boating demand create waterfront land-use problems in the harbor areas such as congestion, blight, mixed uses, and underutilized land. Therefore, where the problems that affect the environmental quality are evident, criteria can be established which should reduce the problems in harbor areas.

Galilee, Rhode Island, a small-craft refuge harbor, was selected for study to show how criteria can be applied to a waterfront area. This harbor area served as an ideal tool because it is located close to the University of Rhode Island, is contained by water bodies and a salt marsh, has a number of problems which can be identified, and is used by many boating types.

Importance and Justification of the Study

The problem was selected for its timeliness and importance in waterfront planning where land-water relationships have been unplanned or haphazardly arranged. Incompatible uses and facilities and increasing demands for shoreline and boating have resulted, in many instances, in congested and underutilized waterfront property. Therefore, it is necessary to establish criteria that will reduce the conflicts of the land resource uses in relation to boating.

II. METHOD OF THESIS ARRANGEMENT

The thesis has six chapters. Chapter I is the introduction. Chapter II, "Inventory of the Problem Area," describes the location and boundaries of the study area, land ownership, existing water and shoreline use analyses, utilities, circulation, and a population estimate.

Chapter III, "Marine Resources Criteria," is a summary of the water resource criteria established in the counterpart of this thesis entitled "Criteria for Boating."[1] Chapter IV, "Land Resource Criteria," covers the existing problems related to boating, harbor functions, existing boating types, supporting land facilities, and criteria for efficient land uses relating to the harbor functions. Chapter V,

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[1]Robert Onosko, "Criteria for Boating" (unpublished Master's thesis, The University of Rhode Island, Kingston, 1968).

"Application of Criteria to Galilee, Rhode Island," applies the criteria developed in Chapter IV and includes a schematic design of the study area.

Chapter VI is an over-all conclusion and summary of the study.

III. SOURCE OF DATA AND PRESENT STATUS OF THE PROBLEM

Extensive library research was carried out at the University of Rhode Island, University of Massachusetts, and Harvard University. Additional material was requested from other libraries and agencies through the University of Rhode Island Interlibrary Loan Program. Also, agencies and individuals contacted by letter provided information related to this study.

A survey of the related literature revealed no similar studies of this or closely related problems. The existing reports were preliminary in nature and dealt with a broader range of problem areas than the selected study area. The Rhode Island Development Council's reports and studies were very useful in supplying some quantitative data related to boating in Rhode Island and the study area. Studies done by various consultants for the State, concerning the study area, were used as a source of background information and in identifying many of the existing problems.

Information regarding boating and its relationship to land-use requirements and activities was not readily available. Little has been written, and those few references which dealt with the particular problem are a major contribution to the research.

CHAPTER II

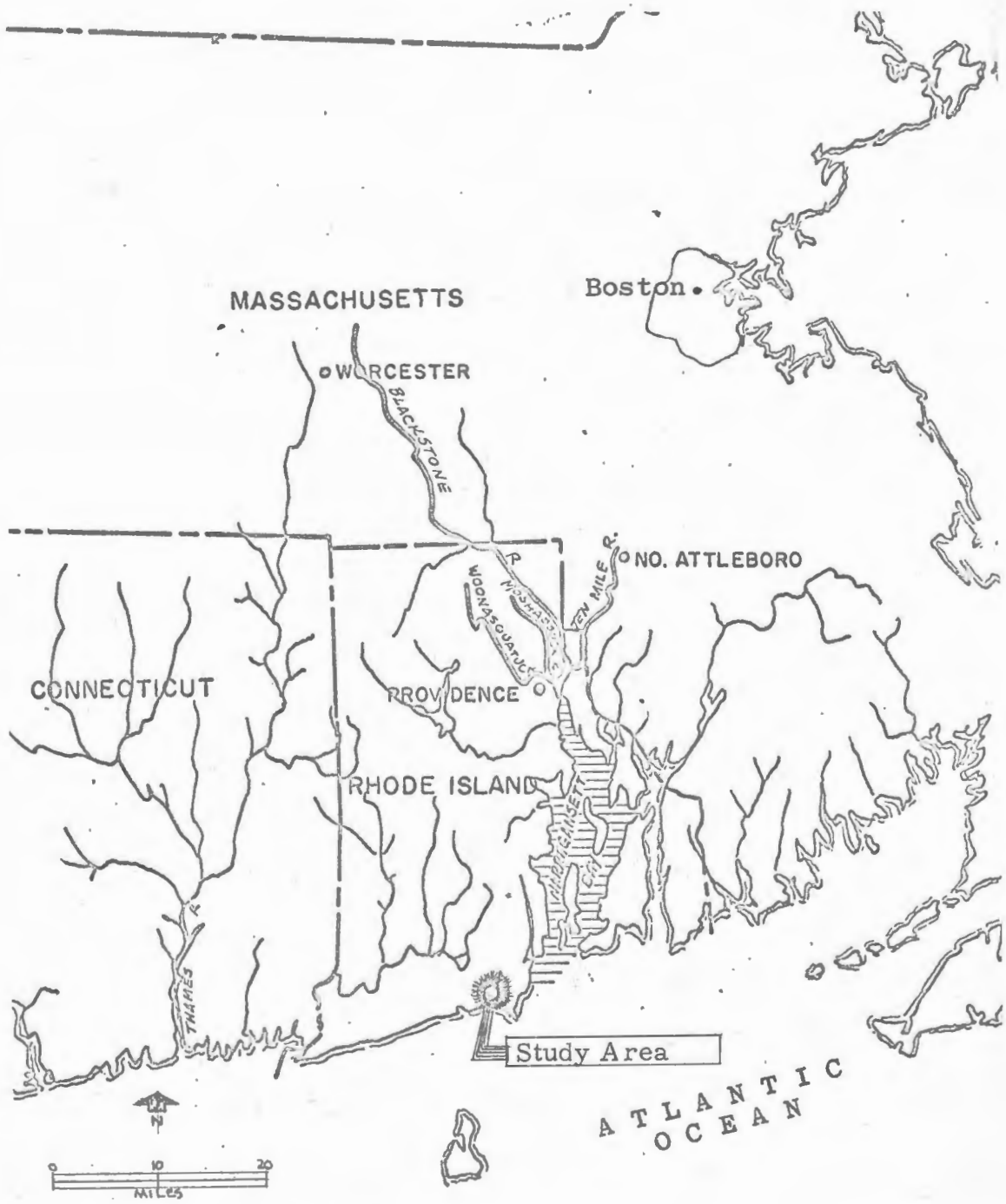
INVENTORY OF STUDY AREA

I. LOCATION AND BOUNDARIES OF STUDY AREA

The study area, Galilee, Rhode Island, is a small-craft refuge harbor where there is an active commercial fishing industry. The land area of the study area is about 75 acres and is located in the Town of Narragansett on the Rhode Island sea coast about 40 miles south of Providence (see Figure 1).

The area is served by good, local, hard-surface roads and U.S. 1, a limited-access highway, passes approximately four miles to the north of Galilee. The main line of the New York, New Haven and Hartford Railroad passes about seven miles to the northwest through the village of West Kingston. A branch line for freight, only about four miles to the north of Galilee, serves the village of Wakefield. A mail, passenger, and freight ferry-boat service to Block Island has a public docking area at the State Pier in Galilee. A bus line operates between Galilee and Providence, and commercial air transportation is available at the Theodore Francis Green Airport at Warwick, about 30 miles to the north.

The study area is located at the southern end of Point Judith Pond in Narragansett, Rhode Island, and is bordered on the north by Great Island, the east by Bluff Hill Cove and a



SOURCE: Naninni G. Martucci, "Coastline and Oceanographic Zoning: Use of Marine Resources and Hydrospace" (unpublished Master's thesis, University of Rhode Island, Kingston, 1967), p. 37.

Figure 1. Regional location

large salt marsh, the south by the Atlantic Ocean, and the west by the village of Jerusalem in the Town of South Kingstown (Figure 2).[1]

The harbor area is entered by a breachway from the Harbor of Refuge which extends outward into the Atlantic Ocean. This harbor area provides a safe and spacious area for boat docking and anchorage of commercial and pleasure craft (see Figure 3).

At present there are facilities which accommodate the following activities: commercial fishing vessels, the Block Island Ferry Service, party boats for deep-sea fishing, charter boats for sports fishing, privately owned pleasure boats, a fish-processing plant of the Fishermen's Cooperative, and a fish meal plant. Also, there are a number of small restaurants and shops in Galilee as well as a small, congested residential area.

II. LAND OWNERSHIP

The land area within the study area is under both private and state (public) ownership. However, as seen in Figure 4, very little of the land is under private ownership. This portion contains most of the worst structures.

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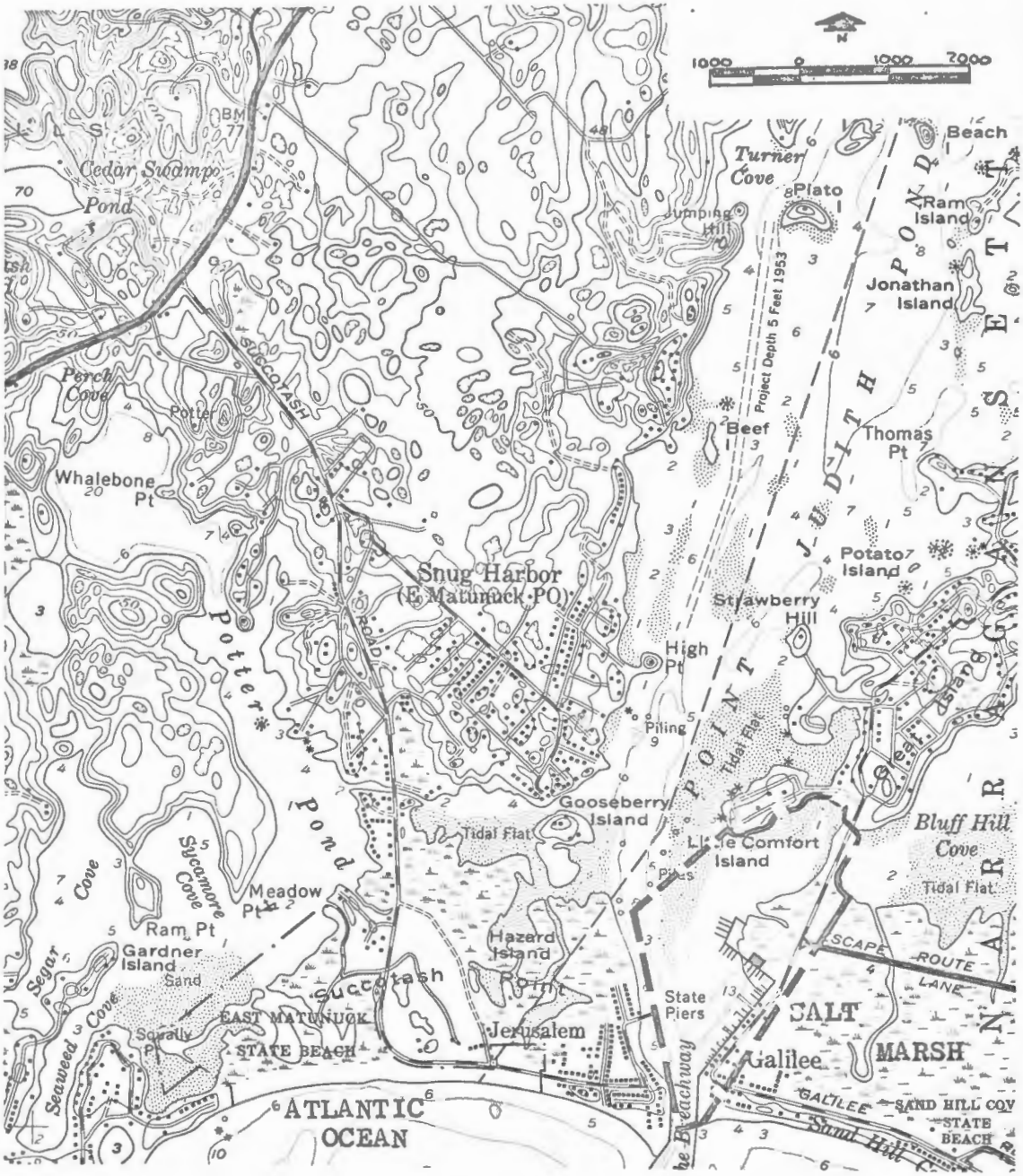
[1]The swamp area within the study area on the map no longer exists except in the low tidal flat area of Bluff Hill Cove.



US Highway 1

Study area boundary

SOURCE: U.S.G.S. Topographic Map
Kingston Quadrangle

Figure 2. Study area location

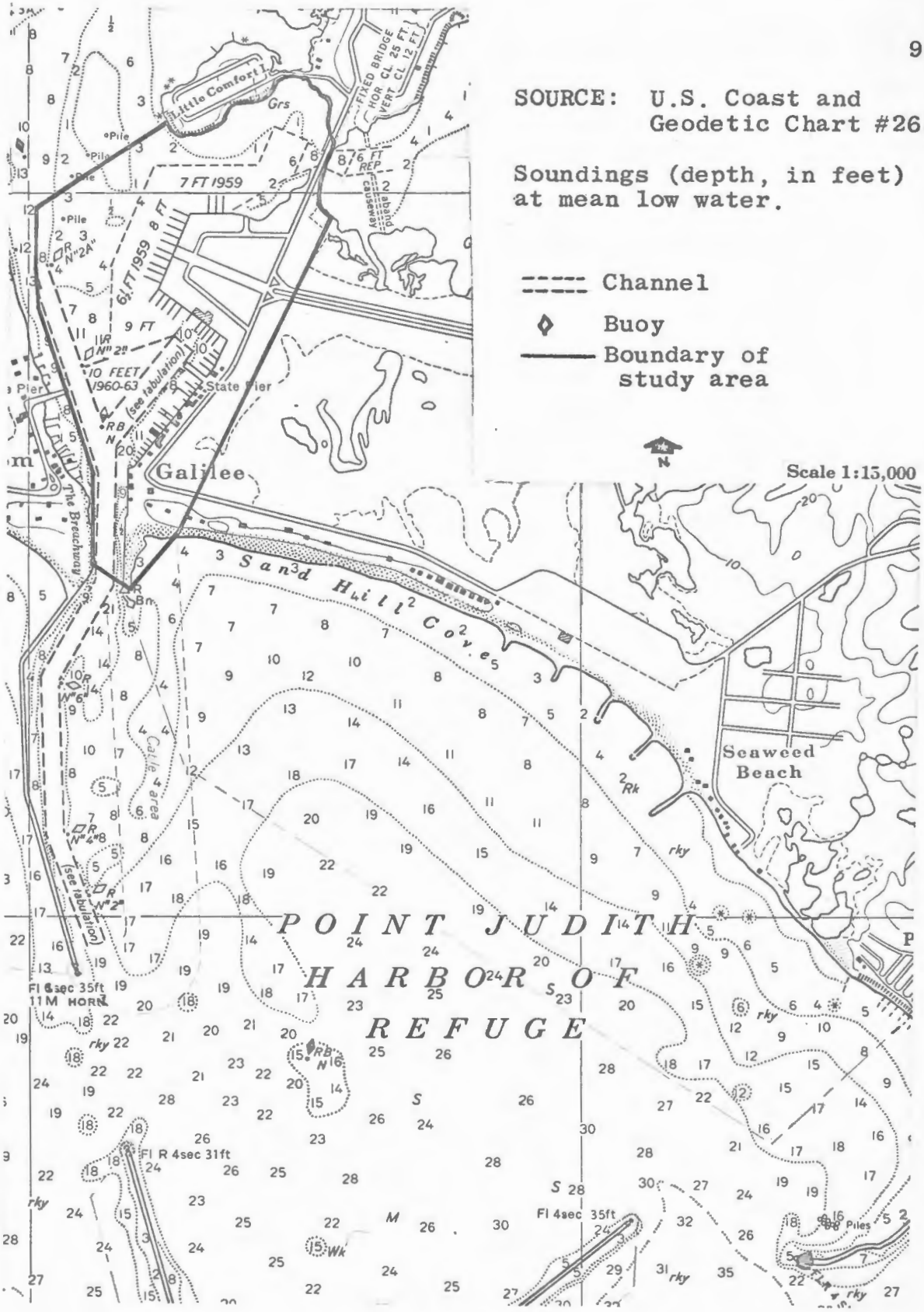


Figure 3. Refuge harbor

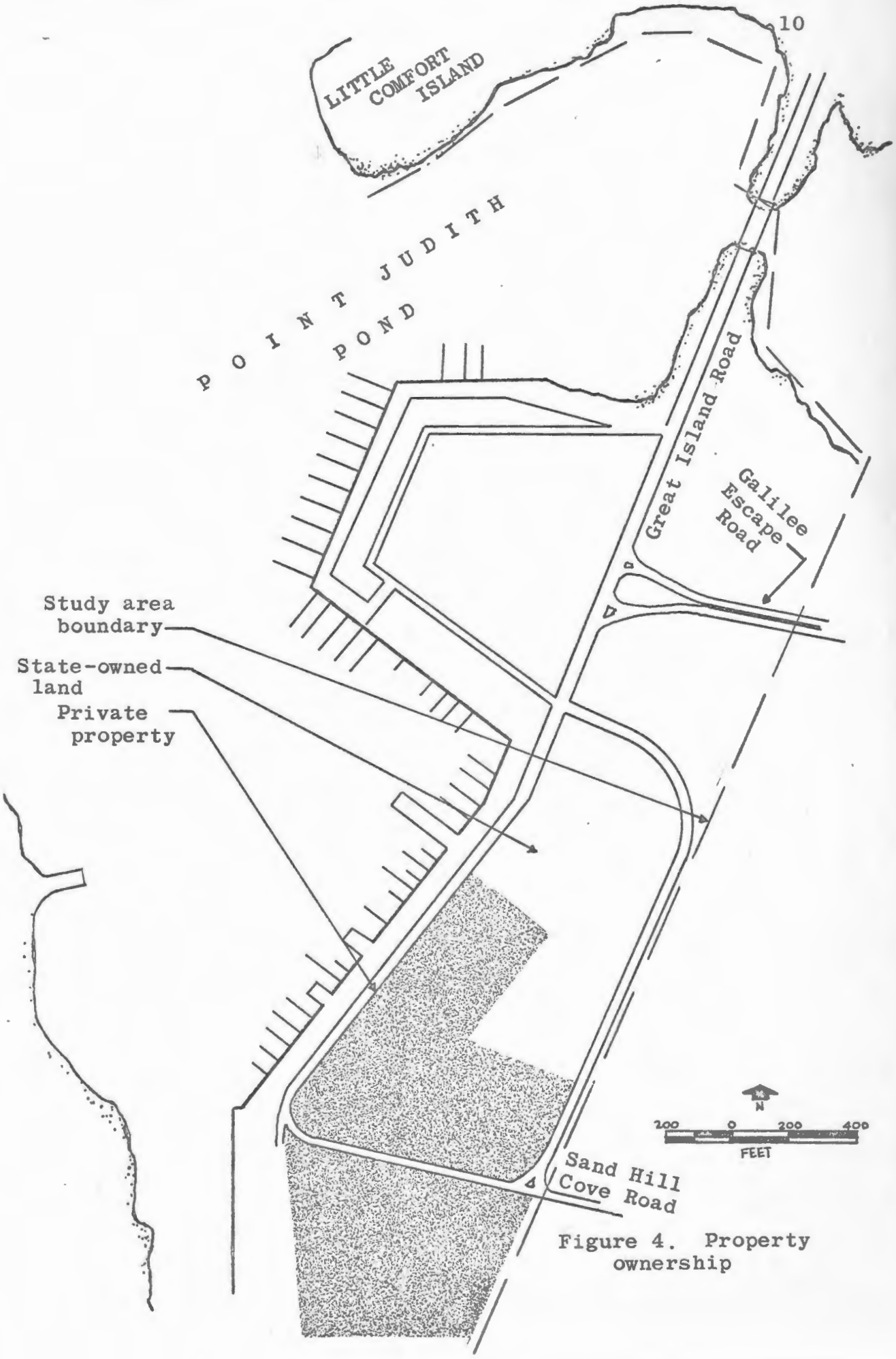


Figure 4. Property ownership

III. EXISTING WATER AND SHORELINE USES

Galilee has a diversification of shoreline land uses. Residential uses are congregated on a small, privately owned parcel of land at the southern portion of Galilee. The commercial uses are scattered throughout the area and are developed both on waterfront and inland parcels of land, primarily unrelated to the water. Manufacturing is limited to the commercial fishing industry and a machine shop which repairs boat engines. These are located on State-owned waterfront land.

The land uses within the study area can be grouped into five categories--residential, commercial, industrial, public, and vacant land. The residential uses consist of both year-round and summer homes. Commercial uses represent retail and service business. Industrial uses represent manufacturing and storage. Public uses represent State-owned facilities (see Figure 5).

The existing boating facilities were developed with State funds allocated to Galilee and are leased to the commercial fishermen, sports fishing fleet, and pleasure boaters. Also, State Pier #3 is controlled and maintained by the State as the docking area for the Block Island Ferry. Located on the south side of State Pier #3 is a U.S. Coast Guard Station which occupies one building and two docks. In summary, the docking areas can be grouped into five use categories: the

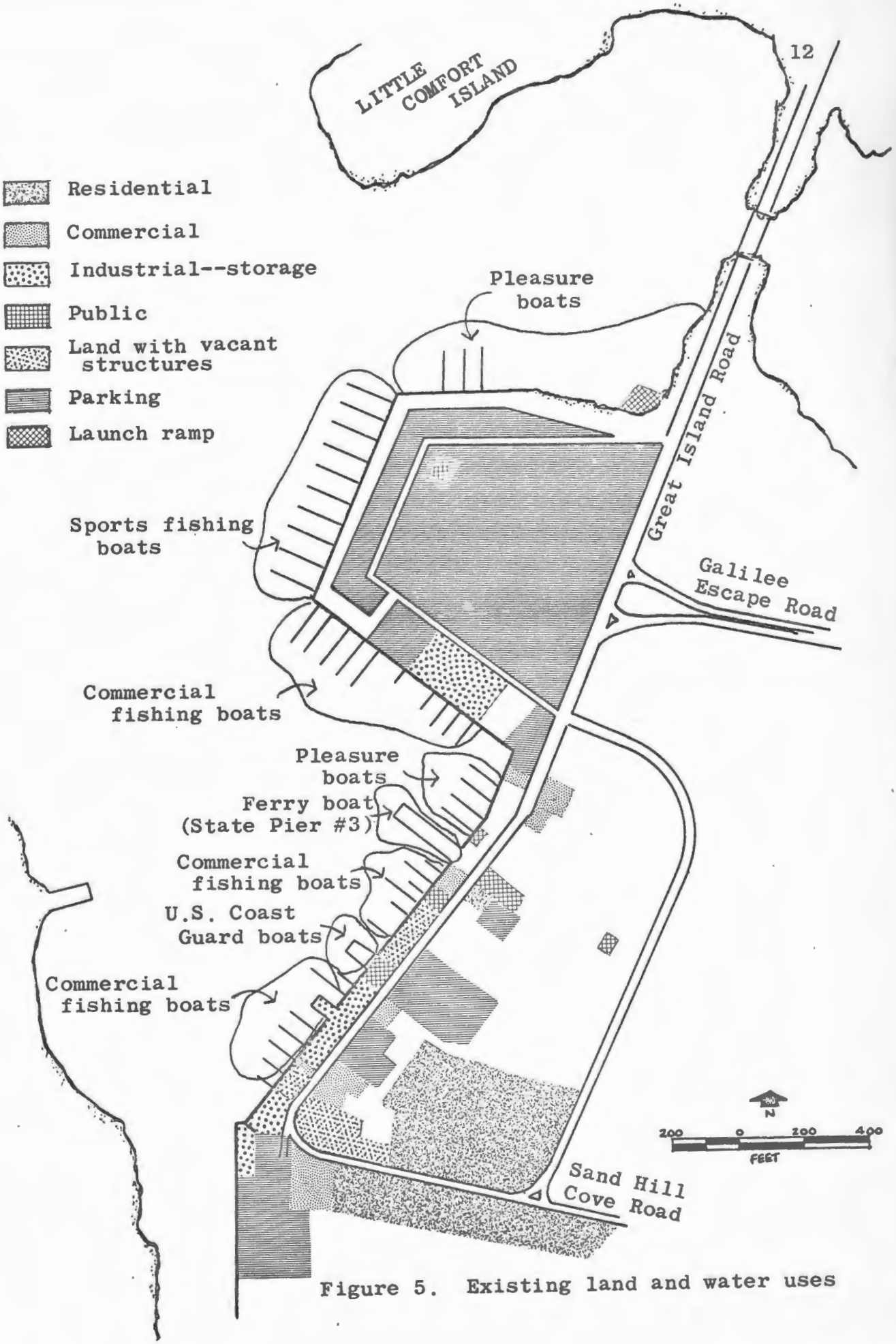


Figure 5. Existing land and water uses

Block Island Ferry, the U.S. Coast Guard Station, commercial fishing, charter fishing boats, and pleasure boating.

IV. UTILITIES

Galilee is served with electricity from the Narragansett Electric Company and with public water from the Town of Narragansett system. There are no public sewer lines serving the area, which makes it necessary to install individual septic tanks. A volunteer fire station is located in Galilee to serve both land and water needs.[2]

V. CIRCULATION

There are two access roads to the study area, Sand Hill Cove Road, a two-lane street in the southern part, and Galilee Escape Road in the northern part. Of these two roads the latter provides the best access because it is a four-lane divided highway that extends easterly about one mile to where it links with State Route 108.

Sand Hill Cove Road becomes a one-way loop street system at its southeastern intersection with Great Island Road. Two-directional traffic movement is allowed north of the intersection. This road also connects Galilee with Little Comfort and Great Islands via a bridge. Traffic volumes

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[2]Rhode Island Development Council, Town of Narragansett--Community Facilities Study (Providence: Rhode Island Development Council, 1966), p. 3.

across this bridge are light except during the summer months when the seasonal dwelling units are occupied by vacationers.

The major through roads in the study area are Sand Hill Cove and Great Island roads. These two roads serve the residents of Great and Little Comfort islands and the activities within the study area. Also, a road to the west of Great Island Road serves the commercial fishing, sports fishing, and pleasure boats (see Figure 6).

VI. POPULATION TO BE SERVED

The study area, as defined by its boundaries, comprises about 75 acres of gross land area. In order to apply a scale to the analysis of this area, the writer attempted to arrive at the population served.

Figures that reflect what the writer was attempting to do were not readily available in any resource. Therefore, a population-to-be-served figure was determined by applying the following data:

150--employed in two fish-processing firms.[3]

120--commercial fishermen.[4]

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[3]Development Counsellors International, Ltd., A Survey to Determine the Feasibility of a Port Authority for the Point Judith-Galilee Area of Rhode Island (New York: Development Counsellors International, Ltd., 1965), p. 22.

[4]Ibid.

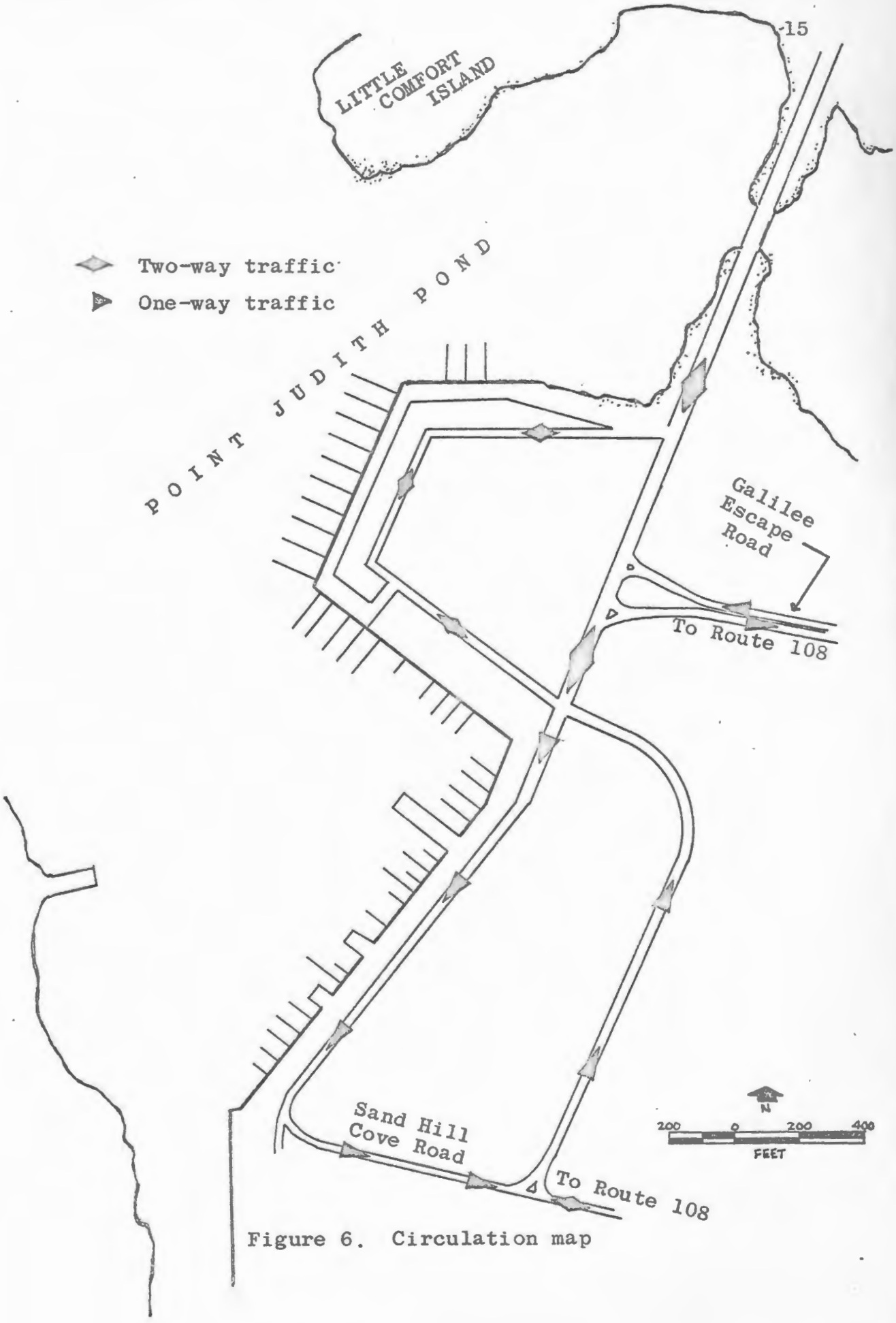

Figure 6. Circulation map

400--capacity of charter and party boats.[5]

400--average per day visits to Block Island.[6]

240--persons generated from two launch ramps, figuring 3 persons per boat and 40 boats at one ramp.

2500--tourists on an average summer day when 300,000 visit Narragansett during the summer.[7]

3830--total persons to be served on an average day.

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[5]Rhode Island Development Council, Boating in Rhode Island (Providence: Rhode Island Development Council, 1967), pp. 17-18.

[6]Opinion expressed by Mr. John Fish, a local merchant-fisherman, February, 1963.

[7]Lewis M. Alexander, Narragansett Bay: A Marine Use Profile (Washington, D.C.: Office of Naval Research, 1966), p. 65.

CHAPTER III

WATER RESOURCES CRITERIA

This chapter is the summary of the criteria established in "Criteria for Boating," a counterpart of this study.[1] The author, Robert Onosko, stated that, for the sake of efficiency and safety, water resources planning must accommodate small pleasure craft, fire and rescue boats, excursion boats, harbor sanitation craft, and floating marine construction equipment. This diversity requires some form of water zoning to accommodate these different craft. As an example, it would be most practical for repair boats to moor near or alongside waterfront boat repair companies, and for fireboats to be located according to fire-fighting standards. Commercial fishing boats often have scattered mooring areas. Separate sections should be provided for similar activities for mutual advantage.

It is reasonable to expect the fishing fleet to be moored near processing plants for several reasons--boats need to unload their catch and take on new supplies such as ice and fuel. Some catches such as lobsters are fragile and intermediate loading-unloading areas may be harmful. Fish

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[1]Robert Onosko, "Criteria for Boating" (unpublished Master's thesis, The University of Rhode Island, Kingston, 1968).

processing also includes freezing, which necessitates rapid removal from boat to plant to avoid spoilage.

Small-craft areas accommodate boating enthusiasts by providing mooring, berthing, service, and storage. It is important that these areas have safe water depths so that an owner need not wait for a high tide to remove his boat. The small boat is vulnerable to such water hazards as wind, waves, flood or high tides, large boat wakes, and ice. These dangers to the small boat could be eliminated by some form of breakwater to separate it from the commercial fishing fleet.

The criteria that were developed were an attempt to create harmony between land and water use and to reduce conflicts that frequently arise. It also was hoped that such criteria, if applied, would provide efficient facilities for both commercial and recreational boaters. The following is a summary of those criteria.

1. WHEN DEVELOPING WATER RESOURCE AREAS (SUCH AS GALILEE) THE PRIMARY REASON FOR THIS DEVELOPMENT MUST BE ITS FUNCTION.

Functions of a water resource area may be a storm or emergency haven; a convenience harbor, such as used for overnight stops or temporary tie-ups; a commercial fish boat moorage; or a recreation center for pleasure boats. Few of these water areas will be exclusively any of the aforementioned categories, and most will involve some combination of

these functions. In any case, when starting his work, the planner should determine those functions, and develop his plans so that functional purposes can best be accomplished.

2. THE LOCATION OF WATER RESOURCE AREAS TO BE PLANNED AND DEVELOPED SHOULD CLEARLY RELATE TO FUNCTION.

To be successful in its purpose, location must suit a demand. As an example, it would usually be in error to locate a deep-sea commercial fishing harbor 20 miles up a narrow river. On the other hand, that might be an ideal location for a commercial venture or a recreational center. An emergency haven must be accessible from traveled marine lanes; otherwise it might not be able to serve its function.

3. WATER SITE SELECTION FOR BOATING FACILITIES SHOULD BE DETERMINED BY THE NUMBER AND SIZE OF BOATS TO BE ACCOMMODATED AND SHOULD BE ACCESSIBLE BY LAND AND WATER.

Efficient accessibility rules out a course through treacherous channels with very strong currents or an obstacle course of submerged boulders and shoals; accessibility from a large body of water is most desirable. Three major factors that have a bearing on access to boating installations from the water are the depth and fluctuation of the water level, existing or proposed bridges, and proximity to open water. Finally, a site to be developed without regard to potential

use could soon experience congestion and the need to duplicate facilities at additional cost.

4. WATER RESOURCE SPACE REQUIREMENTS FOR BERTHING AND MANEUVERING SHOULD BE DETERMINED BY THE NUMBER AND SIZE OF BOATS TO BE ACCOMMODATED.

Space requirements must not be considered in terms of present needs alone, but future needs as well. Twelve years ago the Rhode Island Development Council anticipated that 300 new pleasure boats would be added to the fleet in Rhode Island each year. Seven years ago the National Association of Engine and Boat Manufacturers suggested that a 10 per cent annual increase could be anticipated. It is also apparent from observation that pleasure boats are being made wider, and such craft as houseboats and catamarans are becoming more popular.

5. IN ACCOMMODATING TRAILERED BOATS ONE LAUNCH LANE SHOULD BE PROVIDED FOR EACH 40 TRAILERED BOATS.

The U.S. Army Corps of Engineers has recommended that sufficient launching ramps are required to prevent not more than one hour's delay in launching. One launch lane for 40 trailered boats would be sufficient to avoid such delays on peak summer days.

6. IN PLANNING WATER RESOURCE AREAS THERE SHOULD BE ONLY ONE WATERSIDE ACCESS TO RECREATIONAL BOATING FACILITIES.

To assure orderly marine traffic control, the American Society of Civil Engineers recommends one waterside access to recreational boat docking areas. One waterside access not only would provide orderly traffic control, but also would reduce vandalism in the docking area.

7. IN ORDER TO EXERCISE CONTROL OVER MARINE TRAFFIC, HARBOR MASTER'S FACILITIES SHOULD BE SO LOCATED AS TO BE ABLE TO OBSERVE AND REGULATE THIS TRAFFIC AND ALSO PROVIDE SECURITY FOR MOORED CRAFT.

While boating is increasing at a phenomenal rate, more inexperienced operators are using the waters. Just as one would give care to locating a police station, it is obvious that the Harbor Master's facilities must be integrated with the water resource area.

8. IN PLANNING BERTHING AREAS, SUCH AS SLIPS FOR BOATS OF ALL TYPES, CLEARANCE BETWEEN OPPOSITE SLIPS SHOULD BE BEYOND THE BEAM (WIDTH) AND LENGTH OF THE BOATS.

When dealing with boats one must consider the great variety of sizes, plus different means of power such as sails, oars, propellors (one or two)--all having unique characteristics in maneuverability. In the interest of

safety and ease of maneuverability for skilled and unskilled boat operators, this criterion would be reasonable.

9. THE ENTRANCE TO A HARBOR OR BERTHING AREA SHOULD BE SO LOCATED AND WIDE ENOUGH TO PERMIT THE SPEEDY AND SAFE PASSAGE OF BOATS IN TIME OF STORMS, FIRE OR OTHER EMERGENCY.

A narrow harbor entrance could create congestion and cause the grounding of boats. A sufficiently wide channel is a necessity for the inexperienced boat operator and is a definite safety factor.

10. IN PLANNING FOR THE SAFETY OF MOORED CRAFT, PARTICULARLY SMALL RECREATIONAL CRAFT, BREAKWATERS OR FLOATING BAFFLES ARE GENERALLY NECESSARY TO PROTECT THESE CRAFT FROM ROUGH WATER DAMAGE.

The design of a small craft area requires some measure to protect craft from wave action caused by wind or other boats. Measures to provide protection from wave action also will reduce the amount of debris and floating ice that could be damaging to small craft.

11. WATER RESOURCE PLANNING SHOULD INCLUDE ZONING OF THESE WATER AREAS WITH RESPECT TO FUNCTION SUCH AS COMMERCIAL OR RECREATIONAL BOATING.

Segregation of commercial fishing activities and recreational boating activities would encourage fuller

utilization of the facilities available to each activity and would protect and promote the successful operation of commercial and recreational development. Water resource areas have become subject to intensive use. We live in a world of controls and regulations. These are necessary so that we may enjoy some individual freedom and that all may have equal opportunity to benefit from those things which are in the public domain.

12. IN PLANNING WATER RESOURCE AREAS FOR BOAT FACILITIES THE WATER AREA SHOULD BE COMPLEMENTED BY AT LEAST AS MUCH LAND.

Since boating is increasing at a phenomenal rate, planners with foresight should plan for maximum rather than minimum land accommodations wherever possible. Boaters require land for parking, storage, and sometimes repairs. Obviously, a large water area alone is insufficient for both commercial and pleasure boaters.

CHAPTER IV

LAND RESOURCE CRITERIA

I. INTRODUCTION

The waterfront is linked to the mainland by numerous and complex ties and becomes, in a world of reality, both a physical and visual connecting zone between the land and the water.

In Galilee, the waterfront serves as a viable connecting zone where some of the greatest material resources of the Atlantic Ocean are received from fishing vessels; where passengers and vehicles to and from Block Island depart and land; and where recreationists, sports fishermen, and tourists enjoy many of their leisure hours on land and water.

A community may find that its waterfront has become a victim of change, which creates many of the problems. For example, an increase in the number of boaters using a harbor area can become a problem to many communities, unless they plan for the increased usage and demand. Since only recently has private enterprise made substantial investments in harbor development and government taken a more responsible position in improving boating facilities, many of the problems in Galilee have been of a political and economic nature. Primarily, these pertain to approving repairs and improvements and their funding. Since State appropriations have been inadequate

to support major improvements and repairs at Galilee harbor, the local commercial fishermen are hesitant to update and modernize their facilities in the harbor.[1]

The remaining sections of this chapter are devoted to a discussion of the problems related to boating, followed by an analysis of the supporting land facilities used for boating. Having done this, criteria will be established to reduce the problems related to boating.

II. PROBLEMS

Commercial Fishing

Within Galilee are many problems that are directly or indirectly related to boating. Some of these are common only to Galilee and some may be common to other small-craft harbors throughout the United States.

Offshore commercial fishing is one unique industry of Rhode Island. Its close proximity to deep offshore waters which are abundant with various types of edible and trash fish makes Rhode Island coastal waters a major magnet for

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[1]Stephen M. Olko, "Marinas and Yacht Clubs--Planning and Financing," Civil Engineering (June, 1959), p. 59. See also, Development Counsellors International, Ltd., A Survey to Determine the Feasibility of a Port Authority for the Point Judith-Galilee Area of Rhode Island (New York: Development Counsellors International, Ltd., 1965), p. 22.

fishing boats from all over the world. In Galilee there are about 45 commercial fishing vessels docked at the State-built facilities, making it a home base for a large portion of the local fishing fleet.

Economically, Galilee becomes even more important as a contributer to the local economy because two major fish-processing plants for both trash and edible fish provide employment for 150 people and attract many tourists. A Rhode Island Development Council Study in 1955 mentioned the trends of the fishing industry: "Improved and increased facilities for these fishermen will be necessary if the industry is going to contribute to the local economy."[1]

Since that study little has been done to accommodate the fishing fleet. Docking facilities and bulkheading have been allowed to deteriorate to the point of being unsafe. The fish-processing plants have been unable to handle all of the fish offered and must frequently turn away fishing boats offering to sell their catch. Not only are the facilities deficient in amount of fish which can be processed, but also commercial craft requesting docking space have been unable to obtain desired spaces.

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[1]Rhode Island Development Council, The Rhode Island Shore, A Regional Guide Plan Study, 1955-1970 (Providence: Rhode Island Development Council, 1955), p. 16.

Probably one of the major problems that plague the fishing industry in Galilee is the inability to keep up with changing times. Technological changes to modernize the fish plants would increase the efficiency of the fishing industry, but little has been done in Galilee. A study for Galilee revealed that in 1965 the Point Judith Fishermen's Cooperative paid out nearly $3 million in wages to fishermen and workers ashore. The figure is approximately 30 percent of Narragansett employees' wage earnings. Furthermore, it was estimated in the study that modern, centralized fish plant facilities could increase this gross volume to $6-$7 million per year.[2]

The study also showed that since 1948 the fishing industry has steadily increased local employment, and that it has contributed to the expansion of the tourism business as vacationers enjoy seeing the activities of a commercial fishing fleet.[3] If the fishing industry is to remain an economic asset to the local economy and competitive with other fishing industries in the country, it would be desirable to plan for growth and additional facilities.

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[2]Development Counsellors International, Ltd., op. cit.

[3]Ibid.

Ferry Transportation

The ferry, which travels between Block Island and Galilee, creates some problems. It serves as a year-round water transportation facility between the island and the mainland for people, automobiles, and goods, but peak demands are placed upon it during the summer months.

During the summer on an average day approximately 400 pedestrian and vehicular passengers are moved between the two points of departure. Those wishing to take their automobiles to Block Island cause confusion and problems. Vehicular traffic boarding the ferry often is backed up from the pier onto the road, creating hazardous conditions for both through-traffic and pedestrians. Those who wish to leave their automobiles for even a short period of time must park in the large State-owned parking lot, which is about 400-500 feet north of the ferry landing (see Figure 5, page 12).

Sports and Charter Fishing Boats

Sports and charter fishing boats have their own docking facilities located adjacent to the commercial fishing docks. This area, which is a magnet for many avid sea fishermen, has adequate lighting and electricity, but has some problems. One of these is the decentralization of facilities; e.g., docking facilities are located apart from

the fish weigh-in station. Inadequate parking facilities near the boat docking area create an additional problem.

Recreation Boating Problems

The activities at commercial and charter boat docking areas differ substantially from activities at recreational boating areas.

> Shoreline boating facilities within a small craft dock or morring area may be used for daily launching and retrieving of trailered boats. These facilities with launching ramps serve as terminals and transition points in transporting boats for recreational purposes. Where cruising in cabin boats is popular, the facilities may take on a transient residential quality with people staying either on-board or in hotels or motels as boats put into port for the night.[4]

Since recreational boating requires facilities for recreational purposes and may take on a transient residential quality, it may or may not be compatible with other harbor land uses. Recreational boating activities also generate problems due to little or no advanced planning for increases or improvements in supporting facilities. The success or failure in solving the problems of recreational boating requires necessary supporting land facilities which should be

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[4]"Recreational Boating Facilities," Information Report No. 147, Planning Advisory Service (Chicago: American Society of Planning Officials, 1959), p. 9.

segregated if they are not compatible with other boating types. Reasons are given to support this assumption in a later section.

Other Related Problems

The ability of private landowners to maximize the profits received from boat owners, sports fishing enthusiasts, and tourists without restrictive land and building control regulations has resulted in a mixture of unrelated residential, commercial, industrial, and public land uses. This has created an uneconomic and unhealthy atmosphere of deterioration. The principal waterfront street in Galilee is unsightly and lined with vacant and dilapidated buildings, and a blighted, congested summer residential area presents the viewer with a "shantytown" appearance.[5]

The unplanned growth has resulted in many serious deficiencies. Waterfront land in the hands of owners unconcerned with esthetics has resulted in poor arrangements on potentially attractive sites. Buildings have been constructed hastily on the waterfront, blocking the view of the water and hampering free public access. This has caused the waterfront to become unattractive and nearly inaccessible.

Harbor areas and boating draw many tourists who come to watch the activities of the commercial fishing boats, the

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[5]Development Counsellors, op. cit., p. 23.

sports fishing boats returning from their fishing trips, and just to be near the water away from the heat and noise of the city. Ideally, these tourists need parking areas, areas from which to watch boating activities, and good restaurants. There is only one modern, moderate-priced restaurant at Galilee that serves good seafood, and it has long waiting lines in the summer.

The population of Narragansett, a summer resort town, more than doubles in the summer as compared to fall, winter, and spring. Vacationers visit Narragansett on week ends and week days, and in all probability many of these Narragansett summer residents and week-enders also visit Galilee. Therefore, there is a great demand on the facilities at Galilee.

III. SUPPORTING LAND FACILITIES

Commercial Fishing

The types of boating activity common to the harbor dictate, to a large extent, the types of supporting land facilities necessary for their successful operation. First and most important are the commercial fishing aspects of the harbor usage.

The commercial fishing industry is a special type of installation which is usually a result of the type of usage, the characteristics, and habits of commercial fishermen, and equipment requirements. Usually the fisherman wants utility

to supercede appearance:

> A commercial fishing boat is a work boat, not used for recreation. The operator works while in port preparing his craft and equipment for the next trip. This is his means of livelihood. Repairs are made to boat and gear, provisions are acquired and stored, nets are repaired, and tackle is renovated. The commercial fisherman's requirements for harbor facilities place utility ahead of appearance. They must be clean, safe, and substantial, but without the frills necessary for recreational developments. He resents paying for the superficial.[6]

Accommodations for commercial fishing must be considered and planned for in the harbor area. Also, because commercial fishing requires some specialized installations not suitable elsewhere, the area should be effectively separated. Ideally, the following land facilities are recommended for supporting the commercial fishing industry: net sheds, net repair yards, marine supply and provisions store, equipment for unloading and loading fish and gear, drydocking and repair facilities, machine shop, instrument and radio shop, electrical and water services, toilets and showers, restaurant and bar, long-period and day automobile parking, fish handling and processing buildings, and cold storage and icing facilities.

Sports Fishing Industry

People travel to water areas on week ends, vacations, and holidays to utilize the recreational opportunities

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[6]American Society of Civil Engineers, "Small Craft Harbors Development," Journal of the Waterways and Harbors Division, XC, No. WW3 (August, 1964), 26.

provided by the water. Readily available recreational activities related to salt water boating, swimming, fishing, and the like become significant not only in providing recreation for them, but also income and employment for many people.

Galilee is a prime location along the excellent fishing grounds of the Atlantic coast, and provides the avid sports fisherman with a chance to test his fishing skills. These fishermen pay for the available services of many charter and party fishing boats which leave for the fishing grounds at sunrise and return by midafternoon.

The sports fishing industry is also an important factor in the local economy and the recreation business generally. Swordfish, tuna, and other species provide an excellent challenge for the fisherman, an income for boat owners and crew, and recreational benefits. A report entitled "The Rhode Island Shore" mentions the significance of the sports fishing industry: "Income and employment are provided directly in bait and tackle shops and charter boat services. Both are receiving increased patronage in the state."[7]

This growing industry needs good supporting land facilities to insure that the sports fishermen who are paying for the charter boats get the type of service and facilities

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[7]Rhode Island Development Council, loc. cit.

they expect. Ideally, if adequate conditions are to exist the following facilities would be desirable: good access to charter boats, a parking lot close to charter boats, a marine supply and provisions store, drydocking and repair facilities, fueling services and utilities, an instrument and radio repair shop, electrical and water services, toilets, restaurants and bars, a motel or botel, and a bait and tackle shop.

Recreational Boating Industry

The ease of transporting a small craft behind an automobile has given the recreational boater the opportunity to bring his boat to water areas where he desires to boat. Therefore, the recreational boater may travel great distances overland with his trailered boat to reach his ultimate destination.

The Rhode Island Development Council has identified two major market areas of the shore. One part of the market is the tourists and vacationers who come to the shore for extended periods of time. They are principally from the middle Atlantic states of New York, Pennsylvania, and New Jersey, or other areas generally located within 500 miles of the Rhode Island shore. The other part of the market consists of the day-trippers who usually live within a 2.5-hour, one-way drive of the shore.[8]

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[8] Ibid., Ch. 5, p. 2.

These market areas contribute greatly to the increase in usage of recreational craft. However, the latter probably generates more boating trips than the former, but nonetheless the former would have some significance in boat rentals or pleasure craft which might need mooring facilities.

> It is estimated that about 300 new pleasure boats are added to the fleet in Rhode Island each year. As the total number of boats continues to increase in the state, a greater demand for facilities will be felt.[9]

Any supporting land accommodations should provide conveniences and services to make them attractive to potential users:

> The attractiveness of the facility may be based on comparison; that is, if there are no other harbors in the vicinity only the bare necessities for moorage are necessary. If, on the other hand, there are or might be developed other adequate facilities in the vicinity, then the standard of conveniences and services provided must be raised to or above the level of the other to attract patronage. For these reasons, the protections, moorages, facilities, conveniences, and services provided by a harbor of this type may well be dependent upon the circumstances of each independent situation.[10]

Therefore, pleasure boating needs are dictated by the particular situation in which the activity exists, and any supporting land facilities best suited for its function should be developed. Ideally, those facilities best suited to that function are: a deluxe restaurant, a pleasant bar,

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[9] Ibid., Ch. 5, p. 5.

[10] American Society of Civil Engineers, op. cit., p. 17.

concessions, a boat sales store, marine supply store, boat repair facilities, a public launching ramp, car and trailer parking, fueling services and utilities, and a bait and tackle shop.

IV. CRITERIA

Problems Related to Boating

Many of the problems in Galilee that are related to boating were mentioned at the beginning of this chapter. These problems have been neglected in Galilee and similar waterfront areas and can be eliminated only by short and long-range planning. Planning could be used to minimize the problems and reduce the conflicts evident in Galilee. Planning would guard against snap decisions based upon pressures of the moment and faulty speculative action. Also, planning would promote reasonable land-use plans that would provide over-all benefits to harbor users and uses.

The problems in Galilee were identified and the ideal supporting land facilities were described for each boating type: commercial fishing boats, ferry boat service, sports fishing boats, and recreational or pleasure boating. These four boating types obviously are placing demands upon the waterfront area and create either directly or indirectly most of the problems. Therefore, the remainder of this chapter

presents the criteria that will help reduce the evident problems.

CRITERION 1. THE SURROUNDING SUBENVIRONMENTS SHOULD BE CONSIDERED WHEN DETERMINING THE LOCATION FOR A SMALL-CRAFT HARBOR.

In locating a small-craft harbor, its relationship to the surrounding land uses should be considered. The harbor may have either beneficial or detrimental effects upon the surrounding land uses. Small-craft harbors generate considerable traffic, require extensive parking areas, and attract numbers of sightseers and boating enthusiasts. In essence, the harbor is in commercial use even though it may be publicly owned. Also, in some harbors commercial fishing may be a justifiable feature which is more of an industrial use than a commercial one.[11] Consequently, a small-craft harbor may be incompatible with a single-family residential district unless development is well planned and controlled in advance. For instance, landscaping can be used to create a physical and visual barrier which will reduce noise and shield unsightly areas. It is possible for many small-craft harbors to become a source of pride in the community, but

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[11]Reuben J. Johnson, "Small Boat Harbor Development on the Pacific Coast," Journal of the Waterways and Harbors Division, LXXXVII, No. WW1 (February, 1961), 3.

some ill-conceived, poorly constructed, and neglected harbors have remained eyesores and incompatible with the surrounding subenvironments.[12]

Usually, a good harbor facility will increase nearby property values and yet, if it is well planned and designed, be compatible with its surrounding area. For example, in the Town of Hempstead, New York, carefully conceived harbor facilities have proven beneficial to nearby areas. The new facility has paid dividends in recreational value and has increased nearby property values.[13]

CRITERION 2. SMALL-CRAFT HARBORS SHOULD HAVE A SUFFICIENT AMOUNT OF LAND TO ACCOMMODATE SUPPORTING LAND FACILITIES.

A harbor area that has a large water area for commercial and pleasure boats can be inadequate unless there is enough land readily available to develop supporting land facilities. An insufficient amount of land would make the harbor less desirable for boat owners.

Numerous successful existing boating areas and studies prepared for new harbors of all types that were reviewed by

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[12]Olko, op. cit.

[13]Lyman M. Forkes, "From Marsh to Marinas," Boating Facilities File, Vol. 14 (Chicago: Outdoor Boating Club of America, October 1, 1961), 10.

Charles A. Chaney indicated a minimum of one acre of land should be provided for each acre of water.[14] This amount will provide sufficient area for streets, driveways, parking for automobiles and boat trailers, boat storage and service, all types of supporting buildings, and other areas for sidewalks, buffers, landscaped areas, and waterfront promenades.

CRITERION 3. SUPPORTING LAND USES SHOULD BE LARGELY DEPENDENT UPON THE HARBOR FUNCTIONS.

The first consideration in harbor planning should be to determine the harbor's function or functions so as to provide appropriate supporting land facilities. Basically, there are two types of harbors--deep-draft and small-craft harbors. The small-craft harbor can be defined as an area of water naturally or artificially protected to a degree sufficient to provide safe berthing and mooring for small water craft which have a maximum draft of less than 15 feet and are less than 60 feet in length.[15] The deep-draft harbor would refer to those harbor areas which accommodate water craft that have a greater draft and length than small craft.

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[14]Charles A. Chaney, Marinas--Recommendations for Design, Construction and Maintenance (New York: National Association of Engine and Boat Manufacturers, 1961), p. 204.

[15]Interim Report on Coastal Harbors of Refuge (Los Angeles: Leeds, Hill and Jewett, Inc., 1963), p. 28.

The small-craft harbor usually has distinguishing functions, some of the most common being: recreation, fishing, and refuge.[16] A harbor that has two or more combined functions might properly be categorized as a multipurpose harbor and requires supporting land facilities of mixed and, in some cases, unrelated uses.

In a study of small-craft harbor development, their functions were divided into the following categories: refuge harbors, convenience harbors, commercial harbors, commercial and recreation harbors, and yacht clubs.[17] Each of these categories is described in detail in the section that follows.

Harbor Functions

Refuge harbor. A refuge harbor is a temporary haven for small craft in distress or seeking shelter from approaching storms; a safe place for rest and replenishment for transient boaters. A refuge harbor must offer anchorage or moorage protected from hazardous waves, must be accessible by land, and must have some means of obtaining aid, supplies, or assistance. The entrance to a refuge harbor must be safe for navigation by small craft and the entrance channel must

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[16] Ibid.

[17] American Society of Civil Engineers, op. cit., pp. 16-17.

have adequate depth and width to allow for maneuvering by the small craft using the harbor. In summary, the primary purposes of this harbor type are to provide a place of safety to prevent loss of life and property for boaters cruising along the coast and refuge when sea conditions become hazardous.[18]

Convenience harbor. A convenience harbor should give boaters a minimum of services and usually serves transient, overnight boaters or those who need temporary docking to obtain supplies. For convenience purposes there should be availability of food, fuel, and amusement; these usually can be limited services.

Commercial fishing harbor. Commercial fishing harbors can be considered as special types of installation. These harbors vary in size and activities and can be of two types. The first type is one that only offers moorage for commercial fishing boats. This installation would require docking facilities and equipment to unload fish to be transported by truck to fish-processing plants. The second type of installation would offer both moorage for the commercial fishing boats and fish-processing plants. Commercial fishing harbors of this type require special equipment to support the fishing industry.

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[18]Interim Report, op. cit., p. 28.

Commercial and recreational harbors. The functions of commercial and recreation harbors are similar, and for convenience can be grouped together. Some harbors, both public and private, can be classed as both commercial ventures and recreation centers. These harbors can be developed by both public or private agencies and usually are established basically as revenue-producing installations. Therefore, to be financially successful they must offer sufficient conveniences and services to make them attractive to potential users.[19]

The recreational center as well as the commercial venture is a facility for recreational boaters. People come to enjoy their vacations, week ends, and holidays. Boating enthusiasts desire good facilities for berthing boats and also land facilities during leisure hours spent away from the boat. Therefore, the harbor will need the best of storm protection and landside facilities that are best suited for its functions.

These two types of harbors also can be supported by a large number of nonboat visitors who come for the atmosphere, a view of the boats, and for a seafood dinner.

Yacht club. When boating enthusiasts group together they usually join private clubs which are open only to

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[19]American Society of Civil Engineers, op. cit., p. 17.

members and their guests. Yacht clubs vary in size and can be quite "plush" and expensive:

> Some are composed largely of boating enthusiasts who talk and live "boats" and who cruise together frequently, while others may be more of the social type with boating primarily a reason for gathering. These clubs are not ideally suited for development in multifunctional harbors with commercial, sports fishing, and pleasure boats.[20]

According to this criterion, the above five functions should determine the kinds of supporting land facilities. Supporting land facilities considered ideally suited for each boating type were mentioned in an earlier section. Some of these facilities obviously are common to each boating type and others are specialized; that is, they are only necessary to a particular boating type. Therefore, the following would be desirable features for the five functions: good access roads, net sheds, net repair yards, equipment for unloading and loading fish and gear, a fish handling and processing plant, cold storage and icing facilities, a marine supply and provisions store, toilets and showers, restaurants and bars, a deluxe restaurant and bar, long-period automobile parking, parking for charter boats, parking for tourists, a motel or botel, a bait and tackle shop, concessions, a boat sales store, a public launching ramp, and car and boat trailer parking.

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[20] Ibid., p. 18.

Also, in all harbors certain land facilities are essential to the successful operation of the harbor. These are supervisory in nature and insure the general public and harbor users a certain degree of public security and welfare, i.e., supervisory headquarters, which serves primarily as an information center and facility for the general public; harbor master's headquarters; and a first aid station.[21]

CRITERION 4. COMMERCIAL FACILITIES SHOULD BE LOCATED ACCORDING TO THE SERVICES THEY PROVIDE, THE NEEDS WHICH THEY DEMAND, AND ACCESS REQUIRED BY BOATERS.

There are a number of supporting commercial facilities which thrive in the waterfront atmosphere and may not succeed at all elsewhere. These include fish markets, marine supply stores, bait and tackle shops, curio shops for tourists, and the like. "These businesses cannot survive if they are either transplanted away from the waterfront or separated from each other."[22]

Boating and fishing are tourist magnets which attract many people and, as usual, where tourists gather there will

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[21] Ibid., p. 23.

[22] Waterfront Renewal--Technical Supplement (Madison: Wisconsin Department of Resource Development, 1964), p. 69.

undoubtedly be a demand for commercial establishments that primarily provide food and lodging. Deluxe restaurants that serve good quality seafood also are desirable and can benefit from waterfront sites. Another supporting commercial facility associated with boating is a "botel," a lodging unit that caters to boaters by offering overnight or week-end accommodations. A botel needs a waterfront site so both the boat and tourist trade can be "tapped." However, the need for such a facility should be determined by a study of the distances between this and other overnight accommodations, current traffic volumes and patterns, possible traffic the facility might generate, and availability of commercial facilities.[23]

Botels and similar lodging units should be well designed since such developments tend to string out along the street. It is important that the buildings afford the guests a view of the water and be attractive from the highway. Special treatment is needed to insure adequate parking and to obtain sufficient yard space and landscaping so that the area retains its attractiveness.[24]

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[23]Joe Brown and David G. Wright, Marinas, Management aids Bull. No. 54 (Wheeling, W. Virginia: American Institute of Park Executives, 1965), p. 27.

[24]"Waterfronts: Planning for Resort and Residential Uses," Information Report No. 118, Planning advisory Service (Chicago: American Society of Planning Officials, 1959), p. 14.

Another major activity that attracts boaters is salt-water fishing. Therefore, it is desirable to provide commercial establishments that offer a good supply of fishing gear, tackle, and bait.

A major consideration in locating commercial facilities which attract numbers of people is their relation to manufacturing uses, which create certain incompatibility problems of undesirable maintenance or nuisance. For instance, a commercial fish plant emits an unpleasant odor that would be objectionable to people in a retail area downwind from the fish plant:

> Some of these problems can be reduced. Buffer strips containing open space, parking facilities, or marinas can be used to separate commercial areas from industrial areas. Also, these buffers permit full view of the water while reducing noise and dust problems.[25]

However, all supporting commercial facilities that serve the boating enthusiasts need not be located directly on the waterfront. They may receive just as many benefits by locating in close proximity to the waterfront where they may be easily reached from the major access roads to the waterfront.[26]

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[25]Waterfront Renewal, op. cit., p. 38.

[26]"Waterfronts," loc. cit.

When selecting locations for commercial facilities, six principles should be considered[27]:

1. Stores should be relatively close to berthing facilities to insure easy access for boaters.
2. A sufficient amount of land should be retained between the retail establishments and slips so that access to boats is not impeded, spectator areas are provided, and landscaping is planted.
3. Preferably, establishments should be constructed on relatively level land to reduce cost of construction and to facilitate easy access.
4. The commercial area should be in such a location that it is easily accessible from the main entrance to the facility and other parts of the site.
5. The establishments should be visible and readily accessible from the highway.
6. Stores should be grouped according to selling power, visual access requirements, and service roads.

CRITERION 5. ALL LAND USES ALONG THE WATER SHOULD BE ARRANGED TO MAKE BEST USE OF THE SURFACE WATER.

The types of land uses which exist along the waterfront are industrial, commercial, residential, and recreational.

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[27]"Recreational Boating Facilities," op. cit., p. 18.

Waterfront industry consists of two types--industries that locate along the water to receive raw materials and those requiring an unusually large quantity of water for their industrial processes.[28]

This can be further broken down into the reasons why manufacturing firms need waterfront locations[29]:

1. Availability of raw water for manufacturing or processing purposes.
2. Need for disposal of wastes created in the manufacturing process.
3. Firms which extract resources from the sea, such as commercial fishing firms.
4. Firms which make water-related products, such as ship builders.

Waterfront locations are beneficial to commercial establishments. Basically there are two types of benefits evident from waterfront locations which are not so for inland areas. One type is derived from using the esthetic appeal of the water in attracting customers. The other type deals with

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[28]"Municipal Waterfronts: Planning for Commercial and Industrial Uses," Information Report No. 45, Planning Advisory Service (Chicago: American Society of Planning Officials, 1952), p. 5.

[29]Waterfront Renewal--Technical Supplement, op. cit., p. 20.

those whose products are related to the sea, such as seafood, marine supply stores, and botels. In arranging these two selected types of commercial establishments along the waterfront it is necessary to consider which needs to have a site directly at the waterfront.

Zoning[30] waterfront property restricts the uses of the land and buildings in order to achieve a generally safe and economic future waterfront land development pattern.

To provide the most desirable land use arrangement in harbor areas, some zoning ordinances suggest three commercial districts.[31] A "harbor-front commercial" district is suggested for those commercial uses which require waterfront sites, such as marinas and fishing piers. A "harbor-oriented commercial" district would provide land area for commercial uses that are directly oriented to the harbor but do not require harbor-front sites directly adjacent to the water. This district would include such activities as motels,

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[30]Zoning is the division of a community or other governmental unit into districts and further regulation of those districts to control: (1) the height and bulk of buildings and other structures, (2) percentage of lot coverage and size of required yards and other open spaces, (3) density of population, and (4) use of buildings and land.

[31]"Waterfronts," op. cit., p. 18.

restaurants, and recreation and marine supply stores. A third commercial district, "general commercial," would contain other retail businesses associated with resort development.

When the waterfront is in public ownership, zoning problems are simplified since the only private landowners affected are those adjacent to or near the area in public ownership. In such situations it is easy and desirable to establish a "park district." This classification permits construction of water-related facilities and marinas, and provides for waterfront uses that would not usually be permitted in downtown commercial districts.[32] For example, fishermen, boaters, and tourists need certain commercial uses along the waterfront such as bait and tackle shops.

CRITERION 6. IN THE WATERFRONT AREA IT IS IMPORTANT TO STRIVE TOWARD MAXIMUM ACCESS TO THE WATER.

This is important because it allows the tourists who come into the harbor area to reach the water's edge and become visually involved with waterfront activities. What a disappointment one would receive if the visibility were hampered and one could not get to the water. Intimate contact with the water and shoreline activities is essential to hold the interest of harbor visitors and tourists. Therefore,

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[32]Olko, loc. cit.

waterfront walkways can be built through commercial fishing areas and the rest of the harbor area, offering the walker a close physical and visual contact with a world different from the usual.[33]

CRITERION 7. ROADS SHOULD BE DESIGNED TO PERMIT EFFICIENT TRAFFIC MOVEMENT AND ELIMINATE CONGESTION.

It is essential to have direct road access to all facilities for delivery and service trucks. A main road should lead into the harbor. Within the harbor the number of intersections should be held to a minimum and steep grades, especially toward the water, should be avoided. A grade of 5 percent or less would be desirable.

Other potential causes of traffic problems relate to unchannelized vehicular traffic and ferry transportation. Vehicular traffic channelization in a one-way or two-way direction is imperative for smooth traffic flow.

The ferry can cause traffic problems: "Automobile ferry docks need space to accumulate automobiles while waiting for the ferry as well as traffic control devices which allow automobiles leaving the ferry to feed quickly into the street."[34]

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[33]Donald Wood, "Renewing Urban Waterfronts," Land Economics, XLI, No. 2 (May, 1965), 147.

[34]Waterfront Renewal, op. cit., p. 40.

CRITERION 8. PARKING AREAS SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO BOAT DOCKING AREAS AND LAUNCHING RAMPS, AND ADEQUATE SPACE SHOULD BE PROVIDED FOR PARKING VEHICLES WITH BOAT TRAILERS.

The first part of this criterion is for the convenience of boat owners, which is referred to in Chaney's book, Marinas: Recommendations for Design and Construction:

> Owners going aboard their boats prefer parking space nearby to reduce the amount of walking, particularly when they wish to transfer personal possessions and supplies between cars and boats.[35]

At other times it may be preferable to park one's automobile close to the salesroom, restaurant, or other buildings in the area.

It is also desirable to locate car and boat trailer parking space as near the boat launching ramp as possible. The design of this parking area is important because many boat owners are not skilled in handling a boat and trailer. Therefore, the design should allow the driver to pull his car and trailer from the launching ramp into a parking space and simply drive out of the space when leaving, thus eliminating the need to back up or turn around in the parking area.[36]

According to the Planning Advisory Service, one water access unit with a facility capable of launching one boat at

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[35]Chaney, op. cit., p. 209.

[36]Brown and Wright, op. cit., p. 19.

at a time and serving 125 trailered boats or storage facilities, berthing, mooring, and the like for 100 nontrailered boats could accommodate 50 to 75 operating boats per day. Of this number about 30 would be classified as nontrailered boats and the remainder would be trailered boats.[37] Other standards suggest that an average of 40 boats per day can be launched from one launching ramp.[38]

Information prepared for the State of Wisconsin indicated that launching or recovering a boat takes from 5 to 15 minutes, depending upon the ramp design, congestion in the area, and skill of the driver.[39] Using an average of 20 minutes for both launching and recovery, and assuming that there are 12 hours of daily use, a single ramp could handle about 36 boats per day.

The space requirements for parking both boat and trailer will, of course, be larger than that required for just an automobile. It is a commonly accepted standard that one automobile needs 300 square feet of space to maneuver and park. The additional length of a boat trailer requires extra square footage. Most cars with a boat trailer will require

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[37]"Recreational Boating Facilities," op. cit., p. 14.

[38]Bureau of Outdoor Recreation, Outdoor Recreation Space Standards (Washington: U.S. Government Printing Office, 1967), p. 25.

[39]Waterfront Renewal, op. cit., p. 31.

approximately twice as much square footage as that required by automobiles. Therefore, 600 square feet would be desirable for automobiles with trailers.

According to Chaney, it is essential to have adequate room for approach strips on launching ramps:

> Maneuvering and approach strips in parking areas should have a minimum width of 23 feet for automobiles and 35 feet for automobiles with boat trailers or they may be modified to meet local codes.[40]

Parking requirements for persons who reside on-board boats, local residents who berth their boats at the facility, tourists, employees, and spectators are: 1 space for each transient boat; 1.5 spaces for permanently moored boats; 1 space for 3 seats on a sightseeing or fishing boat; 1 parking space for each 2 employees working in the fish-processing plants; and 3 square feet of parking space for each 1 square foot of retail floor space.[41]

Other parking standards would apply to the commercial fishermen who work on-board fishing boats. Parking spaces at the commercial fishing area should be provided at a ratio of 2.5 spaces per boat.[42] Also, there should be an area reserved for long-period parking. This is essential because some of the boats will remain at sea for periods of up to seven days.

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[40]Chaney, loc. cit.

[41]"Recreational Boating Facilities," op. cit., p. 21.

[42]American Society of Civil Engineers, op. cit., p. 24.

CRITERION 9. LAND FACILITIES FOR LAUNCHING SAILBOATS SHOULD BE LOCATED ACCORDING TO THE VARIOUS WATERCRAFT AND MARINE TRAFFIC IN THE HARBOR.

This criterion is important because it is in the interest of public safety and welfare. The sailboat can create a conflict in small-craft harbor areas if it is not kept clear of heavy marine traffic within the boating areas. Many operators of sailboats have insufficient experience to appreciate the fact that large watercraft have limited maneuverability. Even though sailboats have certain rights-of-way, they nor the larger craft can always provide the control necessary to avoid conflict. Therefore, a location away from heavy harbor traffic and large craft is desirable for launching and/or mooring sailboats.

CRITERION 10. THE HARBOR MASTER'S HEADQUARTERS SHOULD BE LOCATED ALONG THE WATER AND IN VIEW OF BOAT TRAFFIC WHICH ENTERS AND EXITS THE HARBOR.

In a multipurpose harbor with many and varied boats and boating types it would be highly desirable to have control of boat traffic in the harbor area. With the harbor master's headquarters in view of boating activities, many problems arising from crowded traffic conditions might be eliminated through better control from the headquarters. Also, it would be easier to enforce rules and regulations designed to reduce hazards and inconveniences. From a point

with good visual access of the harbor entrance, more rigid control can be maintained over violators, thereby reducing the chances of boating hazards.

The need for good visual and physical access to land and water is desirable from a security standpoint. Security personnel employed in the harbor area also should be housed in the harbor master's headquarters. These personnel would have two fronts to protect, since the harbor is vulnerable from both land and water.[43]

CRITERION 11. SUPERVISORY HEADQUARTERS SHOULD BE LOCATED IN THE AREA WHERE AUTOMOBILE TRAFFIC ENTERS AND EXITS.

Supervisory headquarters requires a location which has a vantage point of all incoming and outgoing traffic since its purpose is to give help and guidance to the harbor user or visitor. Also, it might be desirable to combine an information office with this facility, if it does not interfere with the administrative duties in the office. The ideal location would be one which is close to an entrance and exit point which might also have a water view.

CRITERION 12. ADEQUATE PUBLIC SANITARY FACILITIES SHOULD BE PROVIDED IN THE HARBOR AREA.

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[53]H. A. Bruno, Marina Operations and Service (New York: National Association of Engine and Boat Manufacturers, Inc., 1967), p. 39.

Sanitary facilities should be provided in the harbor area which would be convenient to use and easily reached from the dock areas as well as from the various land areas. The objective is to encourage the use of these land facilities rather than the portable units on board boats.

In a study by the National Park Association, a common myth was identified that tidal movements were enough water action to cleanse a harbor.[44] The study indicated that this was not true, and if effluent is dumped into the harbor there is danger of pollution. Therefore, suitable disposal is important.

Various studies indicate that there should be one sanitary facility for each 25 boats and that they should be located at a maximum distance of 500 feet apart. In addition, some standards require a minimum distance between boat docks and shore. According to Arthur G. Well, Director of the Department of Small Craft Harbors for the County of Los Angeles, California, regulations require that the distance between dock and the nearest restroom on shore should not exceed 350 feet.[45]

The requirements for complete public sanitary facilities for a harbor are based not only upon the number of boats

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[44]Brown and Wright, op. cit., p. 20.

[45]Ibid., pp. 20-21.

but also upon an estimate of flow per hour per fixture. The following data indicated suggested sewage flow quantities in gallons per hour per fixture open to the general public to be: flush toilets, 36; urinals, 10; showers, 100; and faucets, 15.[46]

In addition to the fixtures, adequate collection, treatment, and disposal of effluent is important. If there is no available municipal sewer system, methods of treatment and disposal ranging from individual septic tanks to prefabricated package plants serving a group of buildings to larger, more sophisticated plants may be adequate. However, the final selection of the process and type of treatment system will vary according to the individual harbor needs. The selection, design, and detail of the system should be referred to a qualified sanitary engineer who can design an economical and efficient system.

CRITERION 13. IN THE HARBOR AREA IT IS ESSENTIAL TO HAVE ELECTRICAL LIGHTING SERVICE FOR THE BOATERS' SAFETY AND CONVENIENCE.

A supply of electricity at the docks is essential because boats need current to operate equipment which is

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[46]Public Health Service, Manual of Septic Tank Practice (Washington: U.S. Government Printing Office, 1957), p. 38.

similar to that in a home. Lighting installations on the harbor will enable boating enthusiasts to spend more time boating and at the same time provide safety and security. Because boaters are spending more hours on the water and are using their boats more during the evening hours, modern systems of illumination for docking and berthing areas are now being installed at a number of harbors.[47]

Not only does lighting provide additional boating hours, but it will make a safe harbor area. In active boating areas night lighting will assist the boatman in finding the docks after dark and to make a safe approach or exit, aid tie-up problems and transferring equipment from boats to automobile and be a deterrent to vandalism.[48] A well-planned night lighting system for the harbor can also outline walkways on land and water, allow safer pedestrian and boat movement, and adequately illuminate objects within the harbor.[49]

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[47]James H. Winchester, "More Hours, More Revenue," Boating Facilities File, Vol. 3 (Chicago: Outdoor Boating Club of America, January 1, 1963), p. 51.

[48]Marinas: Their Planning and Development, Tech. Bull. No. 143 (Seattle, Washington: Urban Land Institute, 1950), p. 17.

[49]R. L. Henderson, "Marina Lighting," Boating Facilities File, Vol. 6 (Chicago: Outdoor Boating Club of America, February 1, 1964), p. 28.

CRITERION 14: IT IS BENEFICIAL TO INSTALL SEPARATE FACILITIES CLOSE TO COMMERCIAL DOCKING AREAS FOR THE COMMERCIAL FISHERMEN.

As mentioned earlier, commercial fishermen place utility and cleanliness ahead of appearance and "fancy frills." Therefore, an area where commercial fishing activities assume a dominant role should have its own sanitary facilities, showers, restaurants, bar, and the like. Deluxe restaurants and bars that are patronized by pleasure boaters and tourists may not be patronized by commercial fishermen. What is important to the commercial fishermen would be a practical restaurant or bar where there would be no attached cost for fancy decor. They desire a simple, clean facility where the day's business can be discussed with other fishermen without the added noise and congestion of tourists.

Also, it should be remembered that it is important to centralize fish-processing operations, employ new techniques and facilities, and provide sufficient room for future expansion of the area.

CRITERION 15. SERVICE YARDS AND BOAT REPAIR FACILITIES SHOULD BE DEVELOPED ACCORDING TO THE SERVICE NEEDED AND ADEQUACY OF NEARBY FACILITIES.

Boat service yards and repair facilities may or may not be provided in the harbor area; however, they usually are located within the boat-docking area. Also, because it

is desirable to fence these facilities to exclude spectators and to prevent vandalism, the best location is away from the main activities of the harbor but close to the shoreline.

Whether or not these facilities are provided would be dependent upon the ability to supply this service, the number of pleasure craft in the fleet, and the adequacy of nearby facilities. The operations of a service yard require trained personnel and should be undertaken only when a study has been made to insure that expenses involved in building and operating a service yard will be justified by enough use to pay for the facility.[50]

Furthermore, Pennsylvania uses a standard that could be applied elsewhere in the country. Before a boat service facility would be economically feasible a minimum of 300 pleasure boats in the fleet would be necessary.[51] Also, if service yards and boat repair facilities are located nearby, construction of an additional facility would probably be unnecessary.

In some cases boat repairs by the boat operators are permitted in harbor areas. However, this practice should be discouraged unless provisions have been made for a special

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[50]Brown and Wright, op. cit., p. 23.

[51]Park Planning Guidelines: Boating Facilities (Philadelphia, Pennsylvania: Department of Forests and Waters, 1966), p. 2.

repair area. If a special area is not provided and there are no existing regulations, two problems may be encountered: (1) the docks and shore may become cluttered and littered and no longer attractive and (2) the docks may become dangerous and slippery due to an accumulation of grease and oil.[52]

V. SUMMARY

To summarize, the following criteria should be applied in planning to eliminate waterfront problems related to boating.

1. The surrounding subenvironments should be considered when determining the location for a small-craft harbor.
2. Small-craft harbors should have a sufficient amount of land to accommodate supporting land facilities.
3. Supporting land uses should be largely dependent upon the harbor's functions.
4. Commercial establishments should be located according to the services they provide, the needs which they demand, and access required by boaters.
5. All land uses along the waterfront should be arranged to make best use of the surface water.

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[52]Brown and Wright, op. cit., p. 22.

6. In the waterfront area it is important to strive toward maximum access to the water.
7. Roads should be designed to permit efficient traffic movement and eliminate congestion.
8. Parking areas should be located as close as possible to boat docking areas and launching ramps, and adequate space should be provided for parking vehicles with boat trailers.
9. Land facilities for launching sailboats should be located according to the various watercraft and marine traffic in the harbor.
10. The harbor master's headquarters should be located along the water and in view of boat traffic which enters and exits the harbor.
11. Supervisory headquarters should be located in the area where automobile traffic enters and exits.
12. Adequate public sanitary facilities should be provided in the harbor area.
13. In the harbor area it is essential to have electrical lighting service for the boaters' safety and convenience.
14. It is beneficial to install separate facilities close to commercial docking areas for the commercial fishermen.

15. Service yards and boat repair facilities should be developed according to the service needed and adequacy of nearby facilities.

CHAPTER V

APPLICATION OF CRITERIA

The criteria presented in Chapter IV will serve as guidelines for developing a harbor area. The problems in Galilee and other harbor areas usually result from little or no planning of facilities and, as discussed in Chapter IV, there are many problems dealing with the supporting land facilities.

I. INTRODUCTION

In this chapter the criteria will be applied to Galilee in order to develop a schematic plan showing the arrangements of land and water areas. The schematic plan is shown in Figure 17, page 94.

II. APPLICATION OF THE CRITERIA

CRITERION 1. THE SURROUNDING SUBENVIRONMENTS SHOULD BE CONSIDERED WHEN DETERMINING THE LOCATION FOR A SMALL-CRAFT HARBOR.

The study area is abutted by three water bodies: the Atlantic Ocean on the south, Point Judith Pond on the west, and Bluff Hill Cove on the upper northern portion (see Figure 2, page 8). The western boundary is abutted by a large salt marsh which is owned and maintained as a bird sanctuary

by the State of Rhode Island. This marsh area extends about one-half mile in an easterly direction.

The only nearby residential areas which adjoin the study area are on Great and Little Comfort islands. These residential areas, where the majority of the housing is seasonal, are linked to the study area by a bridge on Great Island Road. Therefore, although the residential area is immediately adjacent to the study area, little encroaching development will occur because it is separated from the study area by water, which serves as a natural buffer. Also, the remaining three sides have natural buffer zones which are water and a large salt marsh.[1] These conditions make Galilee a good location for a small-craft harbor because the nuisance problems of noise, heavy traffic, and large parking areas should not be detrimental to nearby land uses. In addition, Galilee is a good study area because it is contained by natural buffer zones--water bodies and a salt marsh.

CRITERION 2. SMALL-CRAFT HARBORS SHOULD HAVE A SUFFICIENT AMOUNT OF LAND TO ACCOMMODATE SUPPORTING LAND FACILITIES.

According to the discussion of this criterion in Chapter IV, a small-craft harbor should have at least as much

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[1]The Rhode Island State Legislature recently passed a law which protects all marshlands from dredging, filling, or development.

land area as there is water area for docking and maneuvering boats; a 1:1 ratio. If there were 10 acres of water area, 10 acres of land area would be desirable to provide sufficient land area for the supporting facilities.

At Galilee there are about 60 acres of water in the anchorage area, and within the study area there are about 75 acres of land area. This land-to-water ratio is sufficient for developing the land area within the harbor.

CRITERION 3. SUPPORTING LAND USES SHOULD BE LARGELY DEPENDENT UPON THE HARBOR'S FUNCTIONS.

As described earlier, there are five harbor functions which will be referred to again in the order presented in Chapter IV. Also, two other functions will be introduced which are unique to Galilee. The functions are: refuge harbor, convenience harbor, commercial fishing harbor, commercial and recreation harbors, yacht club, transportation center, and aid and rescue center.

Refuge Harbor

It is apparent from the definition of a refuge harbor on page 39 that the following major components are necessary: (1) a protected entrance with adequate width and depth for safe passage under storm conditions, (2) navigation aids, (3) protected anchorage area reserved for emergency shelter of

transient boaters, (4) public landing, (5) land access, and (6) communication facilities.

Galilee is a coastal refuge harbor because it has these major components. The Army Corps of Engineers' 1954 harbor study led to the development of three large breakwaters to protect the entrance at Galilee from storms or high winds. These breakwaters provide a large water area which is used as a boat refuge, anchorage for transient boaters, and an area for other water-associated recreational activities.

Convenience Harbor

A convenience harbor offers minimal services for boaters who need temporary mooring or docking to obtain supplies. Galilee is a convenience harbor primarily because it has the components of a refuge harbor and has public docking space for temporary boat tie-up.

Commercial Fishing Boat Harbor

The Fishermen's Cooperative, located in Galilee, is one of the largest employers in the local area. As of 1965 approximately 150 persons were employed on the day and night shifts at the fish-processing plants. About 150 fishermen work on the 43 commercial fishing boats now in the Galilee docking area, bringing the total employment in the Galilee

fishing industries to approximately 300 persons.[2] In terms of economics, the fishing industry in Galilee operates year-round and has an approximate gross volume of about $3 million per year. However, as mentioned earlier, this volume could be doubled with modern plants and centralization of facilities.[3] It is obvious from these statistics that Galilee is an established commercial fishing harbor and a significant industry.

Commercial and Recreation Harbors

Commercial and recreation harbors usually function basically as revenue-producing installations because they are oriented toward the potential boat users who are day-trippers or on a week-end visit or vacation. These harbors usually have protected mooring and docking areas and other facilities, conveniences, and services catering to the recreational boater.

A large number of recreational boaters pass through Galilee's harbor area in order to reach the excellent fishing waters of the Atlantic Ocean. As mentioned earlier, the enthusiasm and demands of these pleasure boaters in Galilee has

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[2]Development Counsellors International, Ltd., A Survey to Determine the Feasibility of a Port Authority for the Point Judith-Galilee Area of Rhode Island (New York: Development Counsellors International, Ltd.), p. 22.

[3]Ibid.

created some problems, because this fast-growing harbor function has had little if any thoughtful planning.

Yacht Club

Currently, Galilee does not have a yacht club. The organizing of a yacht club in Galilee is not recommended because its activities would conflict with the commercial fishing, sports fishing, and pleasure boats.

Transportation Center

The great desire for trips to and from Block Island, which is 10 miles south of Galilee, has made Galilee a departure point for both pedestrians and their vehicles. The ferry operates on a year-round basis and experiences passenger volumes of about 400 persons per day during the summer and approximately 25 persons per day during the winter. Its importance as a boating use is evident because this is the only ferry making the trip from the State of Rhode Island. Another ferry leaves out of New London, Connecticut.

Air and Rescue Center

Galilee has the added advantage of having a U.S. Coast Guard aid and rescue facility consisting of a boat shed and two rescue boats. Emergency calls are received at the Point Judith Lighthouse located about one mile east of Galilee. The well-trained men stationed there respond quickly to emergency calls out at sea.

It is obvious from the above functions that Galilee is a multifunction harbor and requires many supporting land facilities. Also, each harbor function creates a need for facilities that are not directly related to boating; i.e., commercial fishing is apt to attract trouists and create demands for parking, a need for public access to the water, and good restaurants.

CRITERION 4: SUPPORTING COMMERCIAL FACILITIES SHOULD BE LOCATED ACCORDING TO THE SERVICES THEY PROVIDE, THE NEEDS WHICH THEY DEMAND, AND ACCESS REQUIRED BY BOATERS.

The facilities that become desirable were listed in a previous section. For purposes of clarification they are shown in diagrammatic form in Figure 7. Each circle in the figure represents the dominant boating types and within each circle are the specialized supporting land facilities. Where two circles overlap, the facilities could be used by the two boating types. The shaded area where all circles overlap represents facilities common to all three boating types.

The existing establishments have not been planned with the boater or pedestrian in mind. Access to these establishments from the water has been cut off by poorly relating the structure to the water. Placement of structures in waterfront areas should be oriented to both the land and water in order to utilize their access advantages.

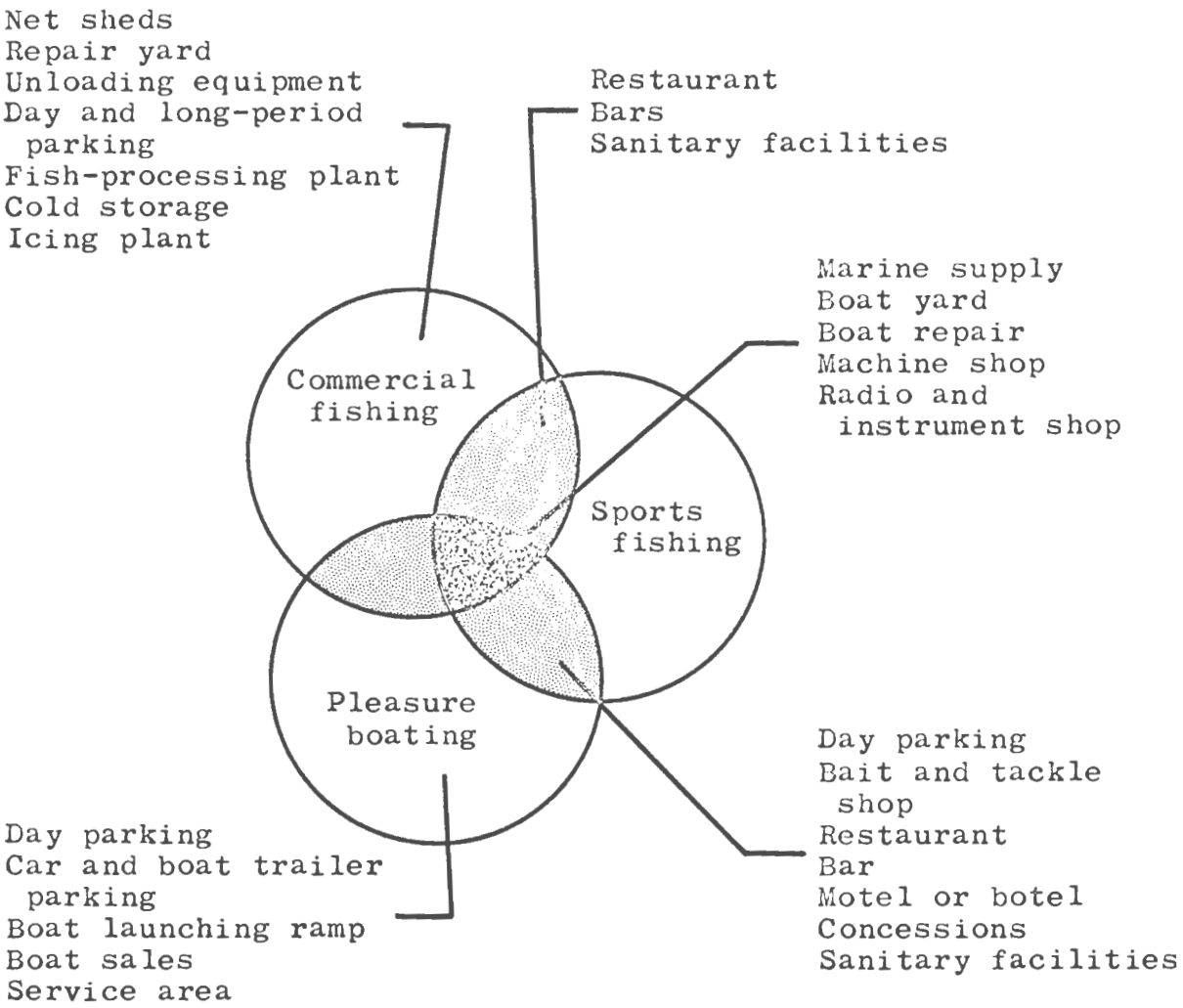


Figure 7. Supporting land facilities

Good access to the establishments would require not only a setback from the street, but also one from the water's edge. This water-to-building setback should allow access for vehicles in times of emergency. Therefore, a lane of about 15 feet would be adequate (see example, Figure 8). Also, this strip would give the pedestrian greater access to the water by serving as a waterfront walkway or promenade.

Figure 8. Sketch of a 15-foot promenade

The commercial buildings within the harbor area constitute one of the harbor's main features, for it is these

buildings which boaters utilize once they dock their boats. With more boats, owners want more facilities such as restaurants or available merchandise. Also, boating areas attract many tourists who want to use these facilities. Therefore, a reasonable and justifiable amount of floor space should be allocated for the commercial establishments in the harbor area. There is no fixed standard for computing the floor space allocations for commercial buildings, but the data in Table I regarding floor space allowances for some commercial buildings will serve as a guide.

TABLE I

SQUARE FEET OF SPACE REQUIRED FOR COMMERCIAL FACILITIES ACCORDING TO SIZE OF FLEET[a]

Facility	Number of boats in fleet				
	250	255	281	601	735
Restaurant	1,530	1,630	1,480	7,365	6,485
Office	450	300	480	300	600
Snack bar	925	--	510	1,460	--
Boat sales	2,200	2,250	2,150	2,700	2,800
Accessory sales	1,530	1,590	1,700	1,650	1,725
Boat sales	480	600	520	900	625
Assembly room	550	1,100	1,120	1,600	3,750
Totals	8,665	7,470	7,960	15,975	15,985

[a]All space figures have been rounded off.

SOURCE: Charles A. Chaney, Marinas--Recommendations for Design, Construction, and Maintenance (New York: National Association of Engine and Boat Manufacturers, 1961), p. 218.

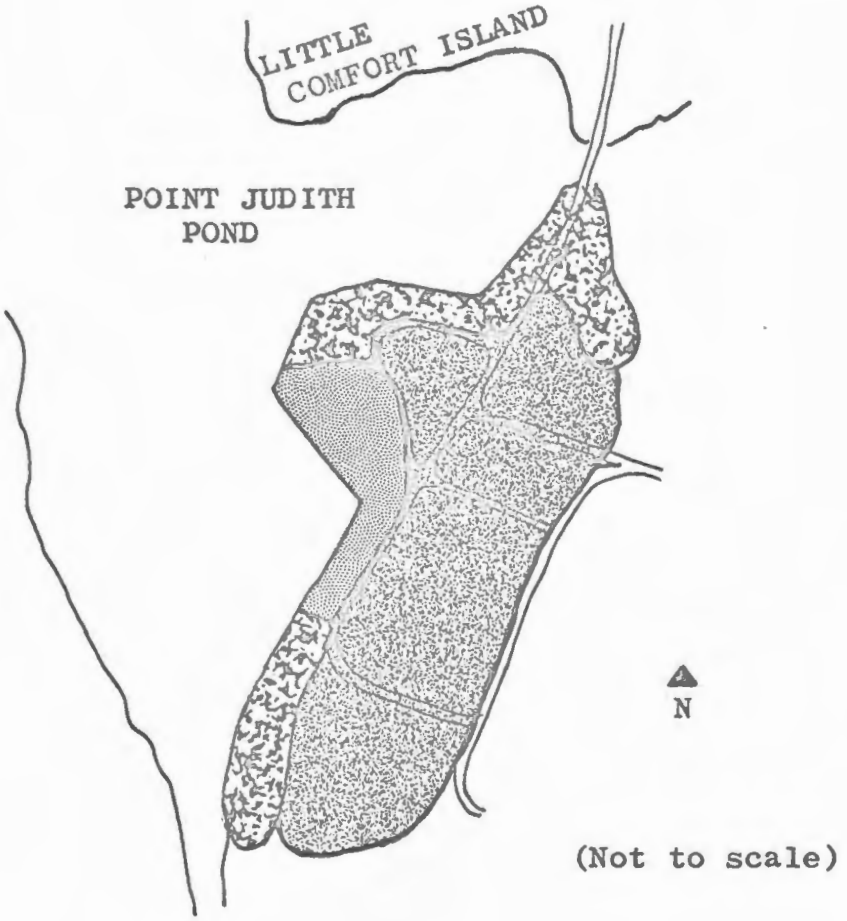
The fish plant will occasionally produce obnoxious odors which make it very unpleasant for people who are downwind from the plant. Summer ocean breezes are from a southwesterly direction, which would mean that any odors emitted by the fish plant would be blown north of the plant. Because the land area south of the fish plant would not normally receive any evidence of odors from the plant, it would be desirable for commercial establishments. Also, regulations should be enforced to eliminate fish plant odors.

CRITERION 5. ALL LAND USES ALONG THE WATER SHOULD BE ARRANGED TO MAKE THE BEST USE OF THE SURFACE WATER.

Some of the supporting land facilities need to be located on the water's edge because they use the water for transportation, shipping, or for a readily available supply of water. Others do not need locations directly on the waterfront, but nonetheless could benefit from a waterfront location. These would be motels, restaurants, and bars.

Arrangement of land uses along the waterfront would result in a higher degree of land utilization in the harbor area. To apply this criterion, it is recommended that three harborfront districts be established as shown in Figure 9.

District 1 should be the area where the commercial fishing facilities will be developed. This area needs a



District 1

District 2

District 3

Figure 9. Harborfront districts

waterfront location because fish are unloaded from commercial fishing boats at docks on the waterfront. Fish processing includes freezing plants, plants which process fish, and canneries. Presently, there is a facility for processing and freezing fish. Expansion into a cannery operation is being contemplated. This area should be located adjacent to the commercial boat docking area.

District 2 should be a "harborfront" commercial district, which is suggested for commercial uses that would require a waterfront site. Uses which might fall into this category are commercial facilities such as retail fish markets which need fresh salt water for keeping tanks of live seafood. Waterfront pleasure boating facilities might also be included in this area.

Other uses which might fall into this category are ones which might use the water to attract clientele, i.e., restaurants and bars. Waterfront establishments could be designed in a manner which takes advantage of access from both the land and the water.

District 3 should be a "harbor-oriented" district consisting of uses which are directly oriented to the harbor yet do not require waterfront sites directly adjacent to the water. This district would have uses such as motels, marine supply, boat sales, and concessions.

Because of the nature of the different districts and because the harbor is multifunctional and a tourist attraction, residential uses should be excluded. This land use, unless it is classified as a commercial use, i.e., motel or hotel, should not be allowed in the harbor area. Four reasons to substantiate this assumption are:

1. There is no absolute necessity for housing to be on the waterfront because water is not needed in the sense that industry needs it.
2. Noise, smell, and climatic problems exist along the harborfront which result in a physical environment generally unsuitable for residential uses.
3. Industrial uses in close proximity to residential uses may be unpleasant to view or smell.
4. Residential areas should not be allowed in areas prone to flooding.[4]

CRITERION 6. IN PLANNING THE WATERFRONT AREA IT IS IMPORTANT TO STRIVE TOWARD MAXIMUM ACCESS TO THE WATER.

This criterion relates to the esthetic appeal of water. Good access means good visual and physical contact with the boating activities in the harbor. Physical access means that land must be crossed to reach the water's edge. If fences, buildings, or other immovable objects are in the

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[4]Waterfront Renewal--Technical Supplement (Madison: Wisconsin Department of Resource Development, 1964), p. 97.

physical path, the movement becomes blocked. The present physical access to Galilee is poor because there is no strip along the waterfront or strips leading to the waterfront except the State overlook on the east side of the breachway.

View protection means that space has been left between or through buildings to create a view of the waterfront. Again, if solid obstacles line the waterfront a walled effect is created. View protection can best be controlled through zoning to regulate the height, bulk, and spacing of buildings. Height of buildings can be restricted for preserving views as the distance from the shoreline increases.[5] For example, those buildings along the waterfront may have lower height restrictions than those set back from the waterfront. Bulk of building also is important because one building erected in a solid mass may block views, whereas a structure on pillars would allow for open view areas (see Figure 10).[6]

Building spacing becomes another critical factor:

> View protection requires that buildings be placed in such a manner that they do not obstruct each other's view, but this is essentially a matter of good site

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[5]Many municipalities, counties, and states have proposed or adopted view-protection regulations in their zoning ordinances by controlling building heights. Many of the ordinances reviewed in "View Protection Regulations," Information Report No. 213, Planning Advisory Service (Chicago: American Society of Planning Officials, 1966) restricted height for the express purpose of preserving views.

[6]Mission Bay Park Design Principles (San Diego, California: City Planning Department, 1965), p. 10.

planning, and while conventional yard requirements may ameliorate the problem of proper spacing, they do not necessarily solve it. Only where view protection includes provisions for administrative review of site plans can the spacing of buildings be given adequate attention.[7]

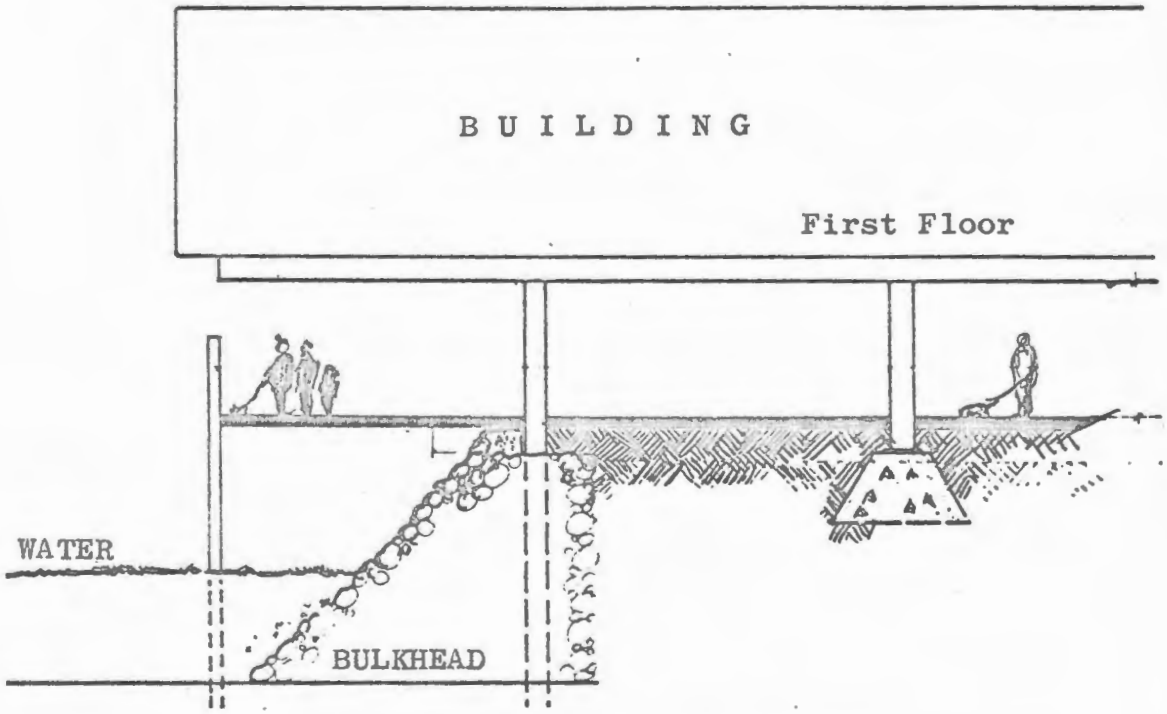

Figure 10. Structure on pillars

Architectural features also may be introduced to improve visual and physical access to the water. Examples of these features and their functions are:

1. Esplanades, which are flat, paved walkways that follow the edge of rivers and provide access

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[7]"View Protection Regulations," op. cit., p. 5.

to waterfront locations for pedestrians and service vehicles (Figure 11).[8]

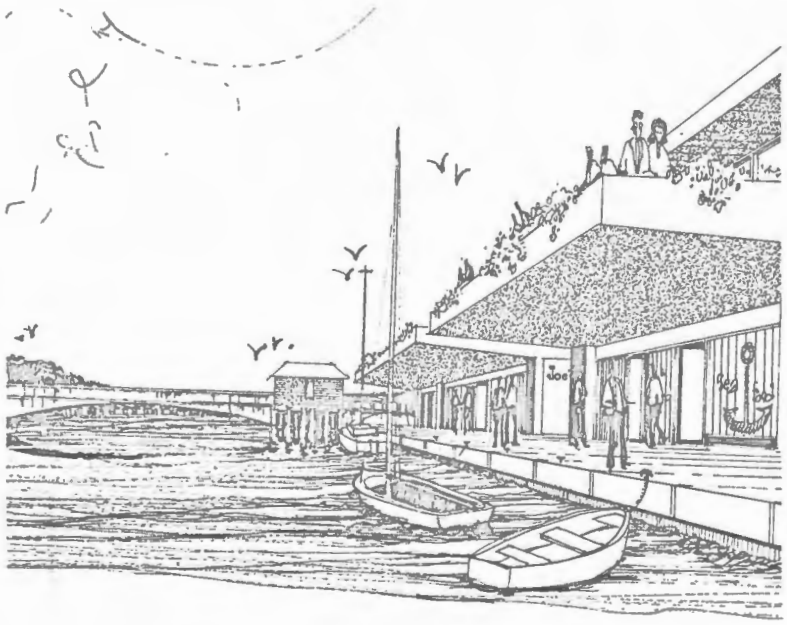

Figure 11. Esplanade

2. Lookout towers either over land or cantilevered over the water can improve visual access (Figure 12).[9]

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[8]Waterfront Renewal (Madison: Wisconsin Department of Resource Development, 1966), pp. 32-34.

[9]Ibid., p. 35.

Figure 12. Lookout towers

3. Bridges can be incorporated for pedestrians to include observation areas out over the water. They also can become an important pedestrian link between two sides of a harbor (Figure 13).
4. Embarcaderos or wharves that parallel the shore except at access points can be used to increase berthing space and give pedestrians greater access to the water (Figure 14).[10]

CRITERION 7. ROADS SHOULD BE DESIGNED TO PERMIT EFFICIENT TRAFFIC MOVEMENT AND ELIMINATE CONGESTION.

The need for efficient circulation of traffic in an area that can easily become congested is implied here. The

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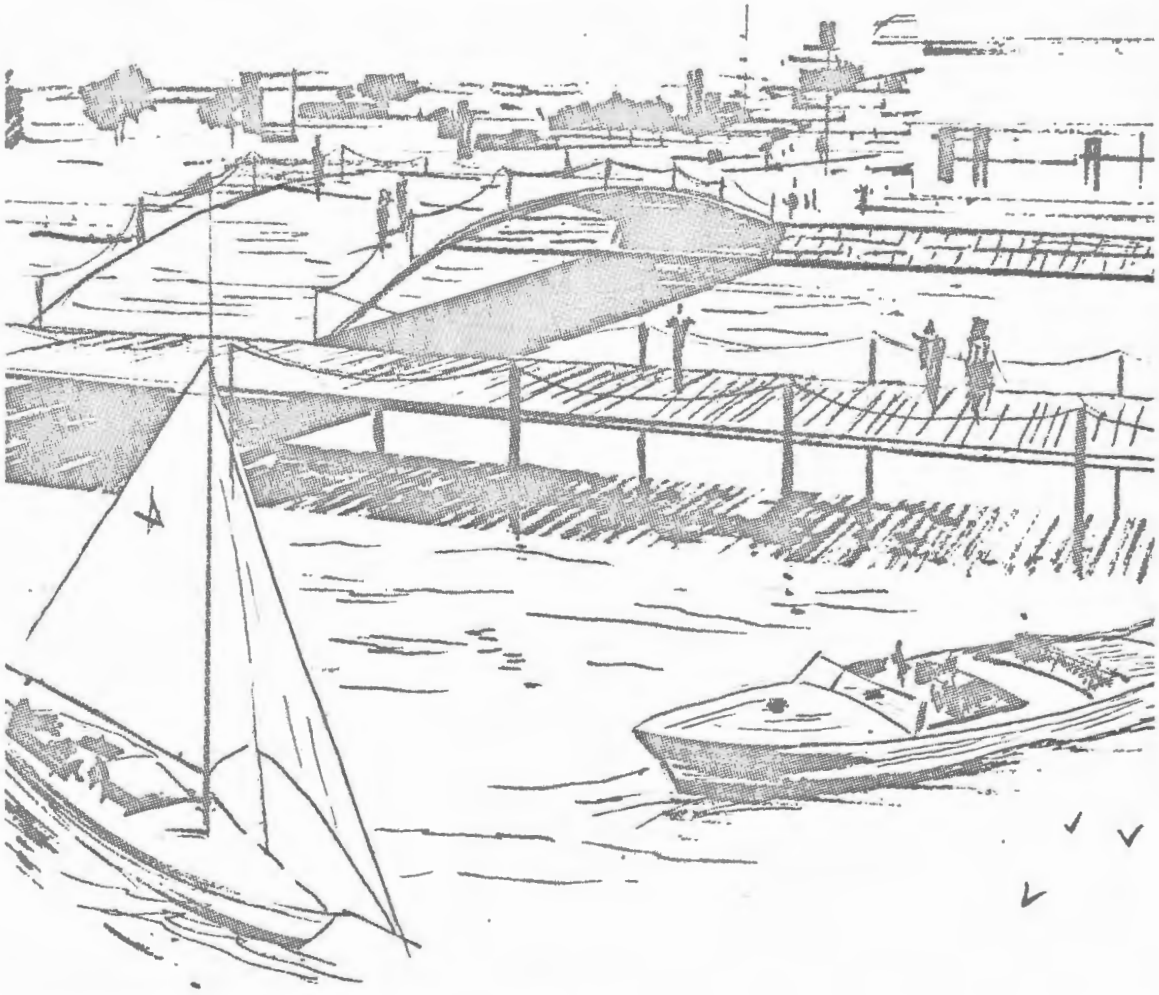
[10]Elgin White, "Up and Down Boat Slip," Boating Facilities File, Vol. 2 (New York: Outdoor Boating Clubs of America, June 1, 1959), 43.



SOURCE: Mission Bay Design Principles (San Diego, California: City Planning Department, 1965), p. 12.

Figure 13. Bridges

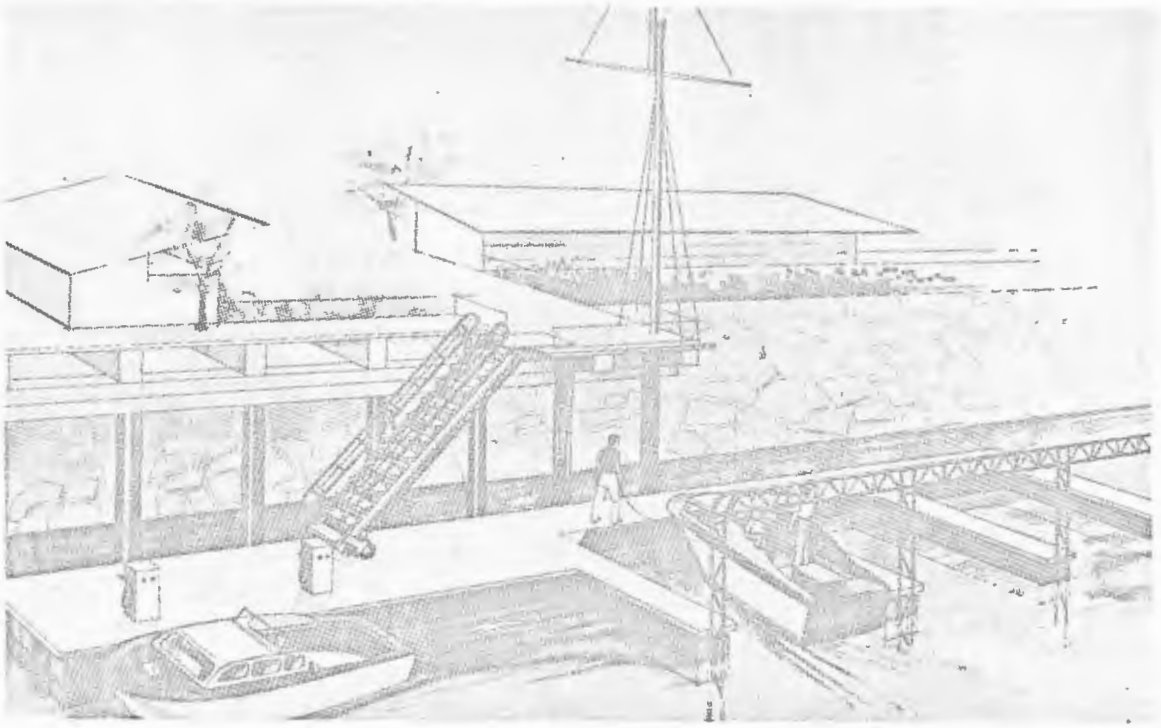


Figure 14. Embarcaderos

one-way main waterfront street allows for good vehicular movement except at the intersection in front of the fish plant that must be utilized by all traffic. This road should continue straight through and merge with Galilee Escape Road, in order to direct those vehicles leaving Galilee away from the main waterfront street.

Also, large central parking areas should be developed adjacent to the commercial area to provide a central pedestrian mall area extending in a southerly direction to the waterfront.

Ferry traffic creates more conflicts and should have a lane off the main street where vehicles can back up as they wait for the ferry.

The basic consideration which will govern the street pavement width is that there be one free and and clear traffic lane open at all times. There are no hard and fast standards which will best achieve this consideration, but some minimum requirements selected from Planning the Neighborhood should be followed.[11] They are: one-way service streets should have a minimum curb-to-curb width of 18 feet to allow for a free lane of moving traffic. When parking is permitted on one side of a one-way street, the width should be at least 20 feet (Figure 15). Streets with two-way traffic and curb parking on both sides should have a minimum pavement width of 36 feet, permitting two 8-foot parking lanes and two 10-foot driving lanes. This would be adequate to permit passage of fire trucks and ambulances even with vehicles that make occasional service stops (Figure 16).

CRITERION 8. PARKING AREAS SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO BOAT DOCKING AREAS AND LAUNCHING RAMPS, AND ADEQUATE SPACE SHOULD BE PROVIDED FOR VEHICLE AND BOAT TRAILER PARKING.

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[11]The American Public Health Association, Planning the Neighborhood, A Report Prepared by the Committee on the Hygiene of Housing (Chicago: Public Administration Service, 1960), p. 51.

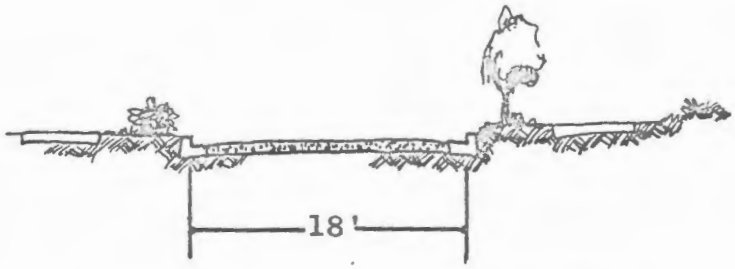

Figure 15. An 18-foot street

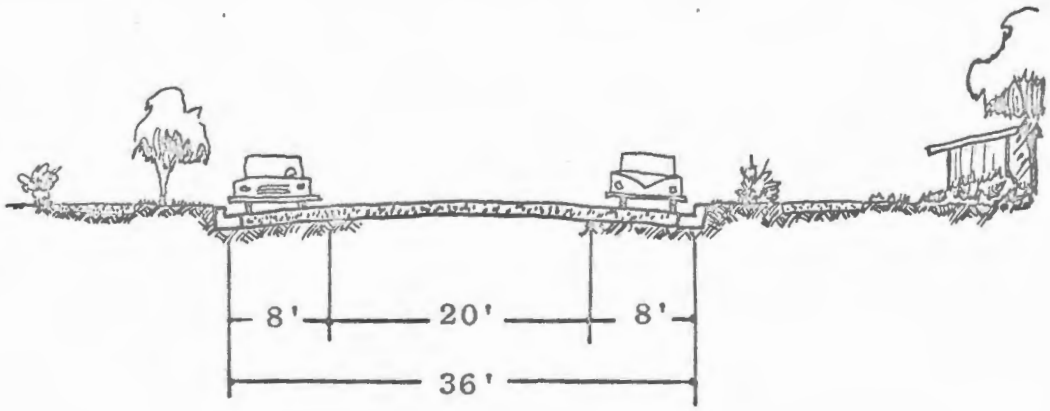

Figure 16. A 36-foot street

Parking automobiles is an extremely difficult problem along the waterfront where land is valuable and a limited natural resource. Each boating type needs a parking area close by to facilitate easy access. The boat launching facility needs a parking system so the backing and turning of trailered vehicles does not create congestion in an otherwise efficient parking system. Also, the parking area for trailered vehicles requires a larger land area than normally devoted to the same number of nontrailered vehicles.

An additional area for parking without trailers should be provided. Experience has shown that this area should be about 10 per cent of the expected total capacity of the boat-launching facility.[12]

Assuming the maximum use of a ramp to be 40 boats per day, an additional 4 parking spaces should be provided for nontrailered vehicles. Assuming that 600 square feet are needed for each trailered vehicle and 300 square feet for each nontrailered vehicle, the total parking area required for a single ramp would be 25,200 square feet or a little more than 1/2 acre.

Two boat-launching ramps will be recommended for Galilee. According to the above calculations, two ramps would be able to accommodate 80 trailered vehicles and 20 nontrailered vehicles per day. Therefore, 50,400 square feet would be needed for parking or a little more than one acre.

The square footage required for the other areas would be dependent upon the moored boats and the number of people who can be accommodated on the boats. The sports fishing boats require about one parking space for each three seats. The total fleet can accommodate about 267 people per day. Therefore, 90 vehicles would require a parking area of about 27,000 square feet or a little more than 1/2 acre.

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[12] Waterfront Renewal--Technical Supplement, op. cit., p. 31.

The commercial fishing fleet consists of 43 draggers and 12 lobster boats, bringing the total to 55 boats. On the average, each boat carries a crew of three men. Therefore, if 1.5 vehicle spaces per boat are allowed, 21,750 square feet or more than 1/2 acre of parking area would be required for the commercial fishing boats, with an area reserved for long-period parking.

The fish-processing plants employ about 150 administrative and processing personnel. Based on 1 space for every 2 employees, 22,500 square feet or about 1/2 acre of parking area would be required.

The off-street parking areas in Galilee currently are inadequate to handle the automobiles. Some of the existing establishments do not provide any or enough off-street parking. Therefore, land located away from the waterfront should be used for parking. The area should have two central parking areas for tourists, located adjacent to the commercial establishments and commercial fishing industry as shown in Figure 17, page 94.

The ferry service also requires parking. The standard used here would be one space for every three ferry seats. There are 150 seats on the ferry. Therefore, 15,000 square feet or a little more than 1/3 acre of parking area would be required.

The pleasure boating area will have the majority of its land area devoted to parking. A five-acre water area is planned for pleasure boats and also five acres in terms of land area. Charles Chaney, an authority on marina design and construction, recommends that a small facility which for the most part receives fishing traffic requires about one acre of land for each acre of water.[13]

CRITERION 9. LAND FACILITIES FOR LAUNCHING SAILBOATS SHOULD BE LOCATED ACCORDING TO THE VARIOUS WATERCRAFT AND MARINE TRAFFIC IN THE HARBOR.

The location of the small-craft launching area will influence, to a large degree, the types of boats that will use the facility. If it were located in an area with easy access to open waters, most trailered watercraft could be launched from that facility. However, some locations may restrict boat launchings to only certain types of watercraft, and this could be beneficial in resolving water traffic conflicts as described under this criterion in Chapter IV. For example, bridge clearances may restrict passage for certain boats.

The proposed launching facility will easily accommodate most trailered boats. However, its location on the east side of the bridge on Great Island Road, which connects Great Island to Galilee, restricts its use to watercraft with

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[13]Chaney, op. cit., p. 204.

sails, because at mean high tide the bridge clearance is about 12 to 14 feet. This clearance requirement will not allow easy passage of most sailboats with a mast height greater than the bridge clearance. Therefore, sailboat launching from this facility will be minimized and the water traffic conflict in the harbor reduced.

CRITERION 10. THE HARBOR MASTER'S HEADQUARTERS SHOULD BE LOCATED ALONG THE WATER AND IN VIEW OF BOAT TRAFFIC WHICH ENTERS AND EXITS THE HARBOR.

From a harbor security and law-enforcement standpoint, it is important to locate the harbor master's headquarters in an area close to the water, offering good visibility of all boat traffic. Also, good land access is important because some of the harbor master's duties are land-oriented.

The present harbor master's headquarters does not meet this criterion. Not only are the water entrance and exit screened from view, but most of the harbor area is not visible. Therefore, from this poor vantage point it is difficult to enforce the boating regulations.

A suggested location would be on the water's edge between the commercial fishing and pleasure boating areas. From here one would have good visibility of the water and physical access to land.

The present headquarters has sanitary facilities for men and women which should be retained. The office, itself,

could be used to advantage as an indoor area with vending machines to serve the public.

CRITERION 11. SUPERVISORY HEADQUARTERS SHOULD BE LOCATED IN THE AREA WHERE AUTOMOBILE TRAFFIC ENTERS AND EXITS.

The only existing building housing a supervisory office is the harbor master's headquarters, which is located opposite the State Pier. The supervisory building should be located nearer the main entrance of the harbor area and, as recommended, the tourist information office also might be housed in the building. In this way visitors could be easily accounted for and information would be readily available to them. Also, adjacent parking should be provided for visitors or those wishing information.

CRITERION 12. ADEQUATE PUBLIC SANITARY FACILITIES SHOULD BE PROVIDED IN THE HARBOR.

According to the standards listed earlier, every 20 to 30 moored boats requires one sanitary facility. This particular standard does not apply in the commercial fishing area, because there is no female personnel on the fishing boats and there is an average of three to four employees per boat. About 43 boats have on the average 150 deck hands. Therefore, if 30 boats with an average of 3 people on each require 1 facility, then 43 with 3 to 4 employees would

require 2 sanitary facilities for the commercial fishing area.

There are about 14 charter and party boats and 4 docks for pleasure boats (about 16 boats could be tied up along 4 docks). These figures indicate that one grouped facility should be provided for both the sports fishing and pleasure boats.

Sanitary facilities in the pleasure boating area will have to be provided for about 200 boats. According to the standard used herein, about eight facilities would be required for males and eight for females. The writer proposed an 80-boat capacity launching area for Galilee. Again, by applying the standard, about six sanitary facilities would be required, three each for males and females.

Currently the only public sanitary facility is located in the harbor master's building and, as suggested earlier, should be retained. Additional facilities should be located within the maximum distances described earlier of 350 feet from the shore and 500 feet apart.

Of considerable importance also would be a suitable means of sewage disposal. Galilee does not have a municipal sewage system. Individual septic tanks currently are used for the disposal of sewage. But as Galilee grows, this method of disposal will have to be replaced by a more sophisticated method of disposal. A detailed engineering

survey of the Galilee area and the subsequent design of the area would be used to determine what disposal method would best meet the requirements of producing a treated effluent at an optimum cost.

CRITERION 13. IT IS ESSENTIAL TO HAVE ELECTRICAL LIGHTING SERVICES FOR THE BOATERS' SAFETY AND CONVENIENCE.

This criterion is important because it not only is convenient to have night lighting, but it also will make a safer harbor and, in some instances, may even be a deterrent to vandalism. These facilities have been installed in Galilee, are adequate for the fishermen's and boaters' safety and convenience, and are being utilized by them.

CRITERION 14. IT IS BENEFICIAL TO INSTALL SEPARATE FACILITIES CLOSE TO COMMERCIAL DOCKING AREAS FOR THE COMMERCIAL FISHERMEN.

Again, this criterion results from the desires of the commercial fishermen for good, substantial, clean facilities with no "fancy frills." The area of commercial fishing will support facilities such as restaurants or bars.

CRITERION 15. SERVICE YARDS AND BOAT REPAIR FACILITIES SHOULD BE DEVELOPED ACCORDING TO THE SERVICE NEEDED AND ADEQUACY OF NEARBY FACILITIES.

The need for these services in the harbor area would be dependent upon the number of pleasure boats and the adequacy of nearby facilities.

According to the standard in Chapter IV, a minimum of 300 pleasure boats would be necessary in the fleet before it would be practicable or feasible to develop a boat service facility. There will be a planned area for 200 pleasure boats in Galilee, which is less than the suggested standard. Therefore, this type of installation would not be necessary.

Also, about 0.3 mile to the north of Galilee, on Point Judith Pond, are located marine railways, service yards, and dry dock areas which can adequately service boats needing these facilities. Because there are nearby facilities and because the 300-boat standard is not met, no provision will be made for these services.

A schematic plan of the proposed application of the criteria established herein for the Galilee area is presented in Figure 17.

CHAPTER VI

CONCLUSION

The schematic plan shown in Figure 17, page 95, served to test the hypothesis that criteria can be established in small-craft harbors to reduce or eliminate land-use problems related to boating. In Galilee, Rhode Island, land uses that are unrelated to boating types or poorly arranged in the harbor have created problems of conflicting uses. For example, the docks for pleasure boats are located on both the north and south sides of the commercial and sports fishing boat areas, which creates conflicts among the three boating types. In the proposed plan, this problem was eliminated by consolidating the pleasure boat docking and corresponding land-use area north of the sports fishing boat area.

The plan developed herein was not conceived as a development plan for Galilee. Rather, it was used as a guide to show how the proposed criteria could be applied to improve the land-use pattern in the harbor. An economic feasibility study and a detailed development plan would need to precede implementation. However, these are not within the scope of the present study.

In "Criteria for Boating," the counterpart of the present study, criteria were developed that could be used to

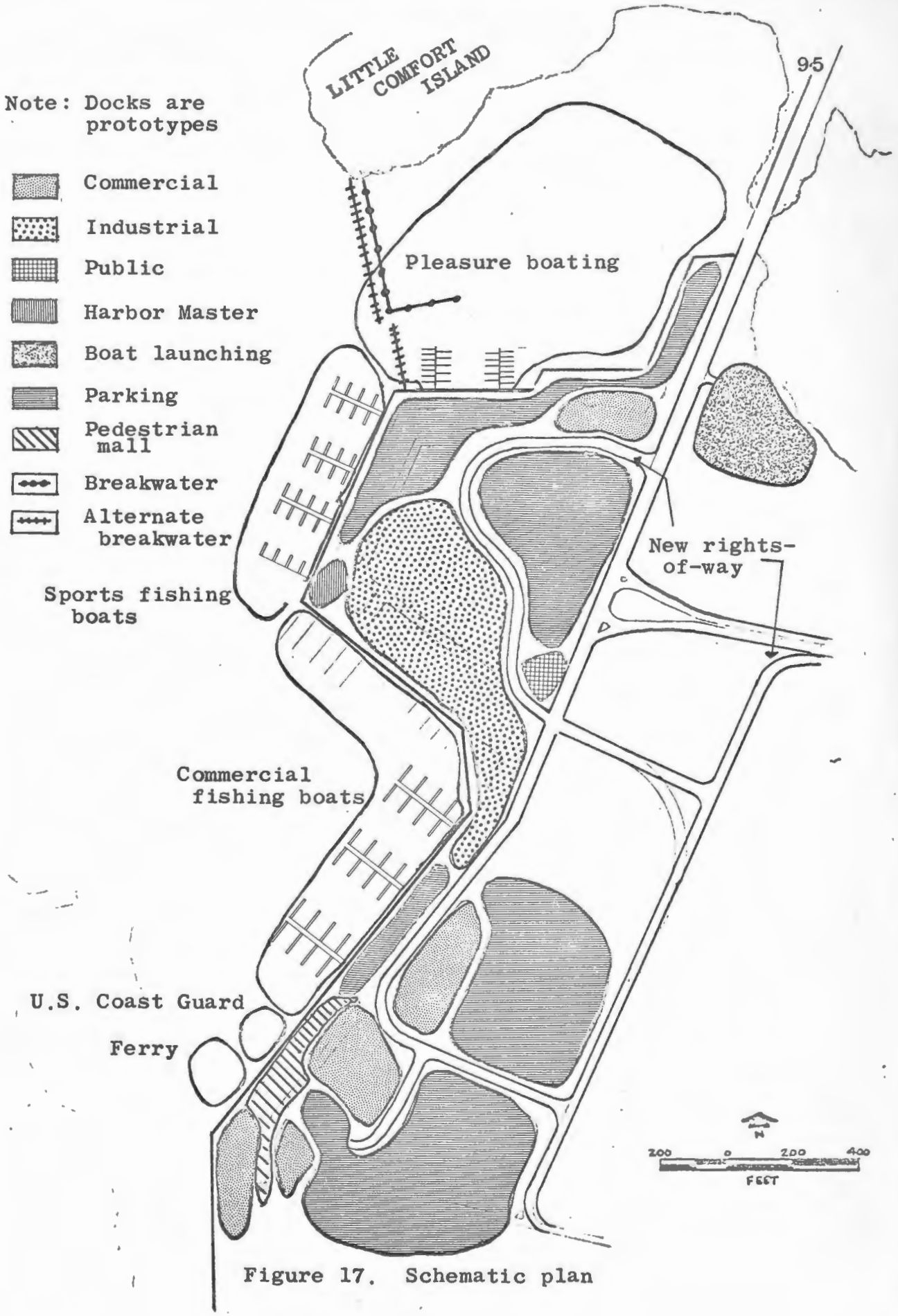

Figure 17. Schematic plan

reduce problems pertaining to water resource areas.[1] The criteria postulated by Onosko should provide a better understanding of the requirements for water resource development, increase the chances of utilizing many wasted water space areas, and provide maximum safety for all boating interests. Onosko's criteria are potentially useful tools to apply in developing small-craft water areas that are subject to congestion and conflicting uses, as exemplified by the harbor at Galilee.

When the criteria for small-craft harbors established in Chapter IV of this study were applied to the Galilee harbor, certain problems were either reduced or eliminated. (1) The problem of the existing decentralized fish plant facilities was reduced by combining the facilities into one area where commercial fishermen may unload their catch; (2) inadequate vehicular circulation and parking is a major problem in the study area--the improved circulation system shown in the plan would reduce vehicular traffic in the main waterfront street; (3) the elimination of vehicular through-traffic in the commercial area would create a safe, uncongested mall for pedestrians; and (4) additional off-street parking areas should reduce congestion in the streets.

Suggested replacements and additions for pleasure boating include:

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[1]Robert Onosko, "Criteria for Boating" (unpublished Master's thesis, The University of Rhode Island, 1968).

1. An expanded small-craft docking area with waterfront parking facilities should replace the currently inadequate facility.

2. The addition of a new small-craft launching area would adequately handle the demands of the pleasure boaters using the launching ramps.

Therefore, the writer believes that these criteria could be applied successfully in the selected study area and that they would be useful in improving or developing other small-craft harbors.

In the future, community planners working in waterfront localities will become increasingly involved with harbor development because the rapid increase in boating has emphasized the need for the proper development of existing and additional harbors. The criteria established herein should aid in particular community planners involved with developing small-craft harbors. These criteria will aid the planner to select a land area for a harbor and ultimately provide well-designed boating facilities. Application of the criteria should result in a greater maximization of land utilization and arrangement of complementing land-water uses for maximum benefit to boaters and people who visit the harbor. Furthermore, the criteria could be useful in determining and guiding development of the facilities needed for the various boating activities and day-to-day harbor functions.

By applying these criteria to small-craft harbor areas, benefits also would be derived by the adjacent community. Improvements in the harbor should enhance the value of nearby property, and boating enthusiasts interested in residing near a boating area would probably settle close to the harbor. An increased number of visitors in the harbor utilizing their leisure time on boats probably would increase local business opportunities. All of these factors would tend to benefit the community by attracting new business to meet the demands of boatsmen and tourists, by increasing employment, and by increasing the tax base.

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