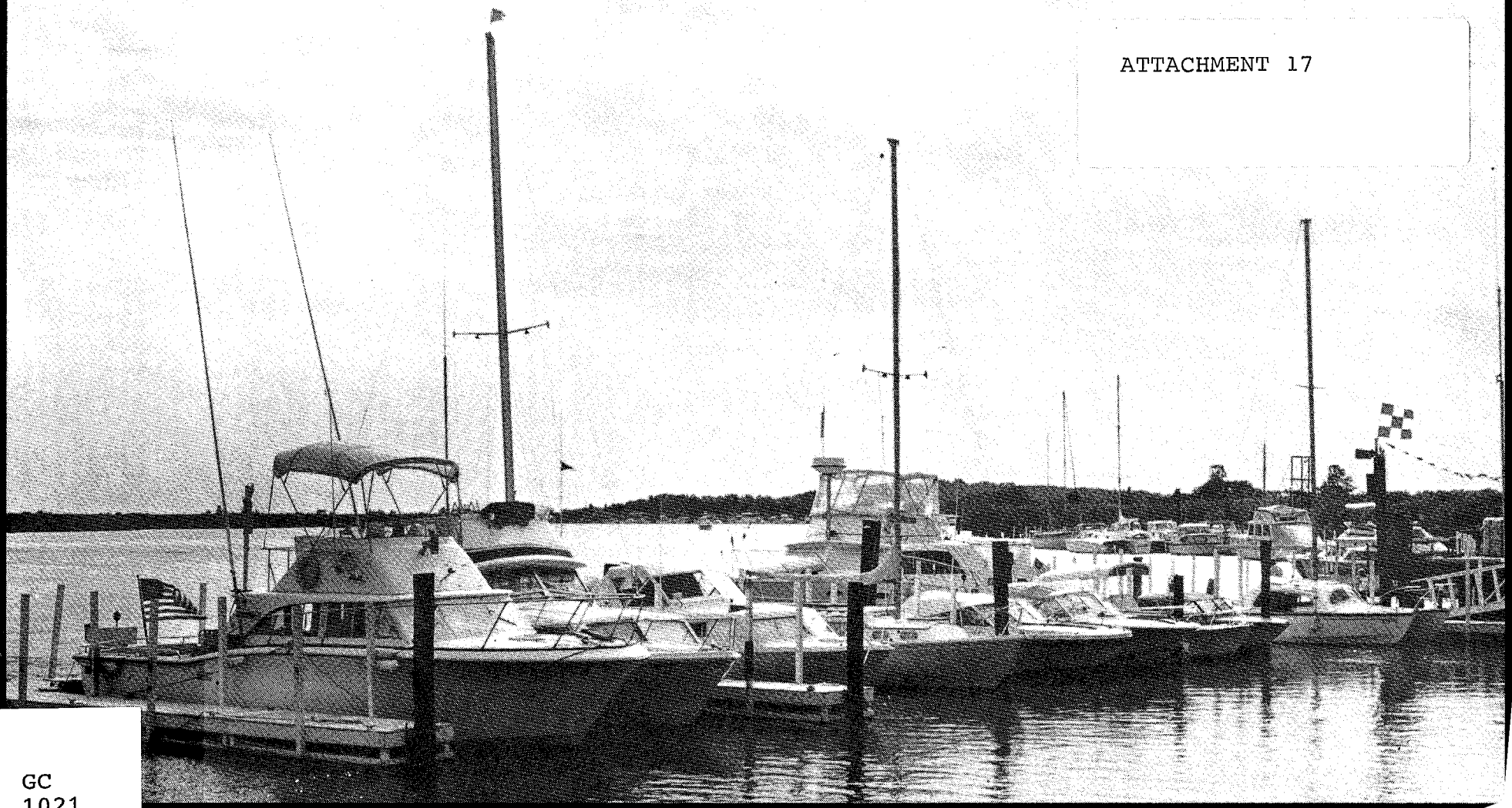
Developing a Marina in New Jersey: A Handbook

ATTACHMENT 17



GC
1021
.N5
D48
1982

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION

ersey Department of Environmental Protection
n of Coastal Resources
Rogers, Golden & Halpern

September 1982

DEVELOPING A MARINA IN NEW JERSEY: A HANDBOOK

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Prepared for

New Jersey Department of Environmental Protection
Division of Coastal Resources

Prepared by

Rogers, Golden & Halpern
1427 Vine Street
Philadelphia, Pennsylvania 19104

GC1021.N5 D48 1982
8996376
MAR 17 1997

Property of CSC Library

September 1982

This document was prepared under contract with the New Jersey Department of Environmental Protection, Division of Coastal Resources, Bureau of Coastal Planning and Development. The report was prepared with financial assistance of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management, under the provisions of the Federal Coastal Zone Management Act, P.L. 92-582, as amended.

TABLE OF CONTENTS

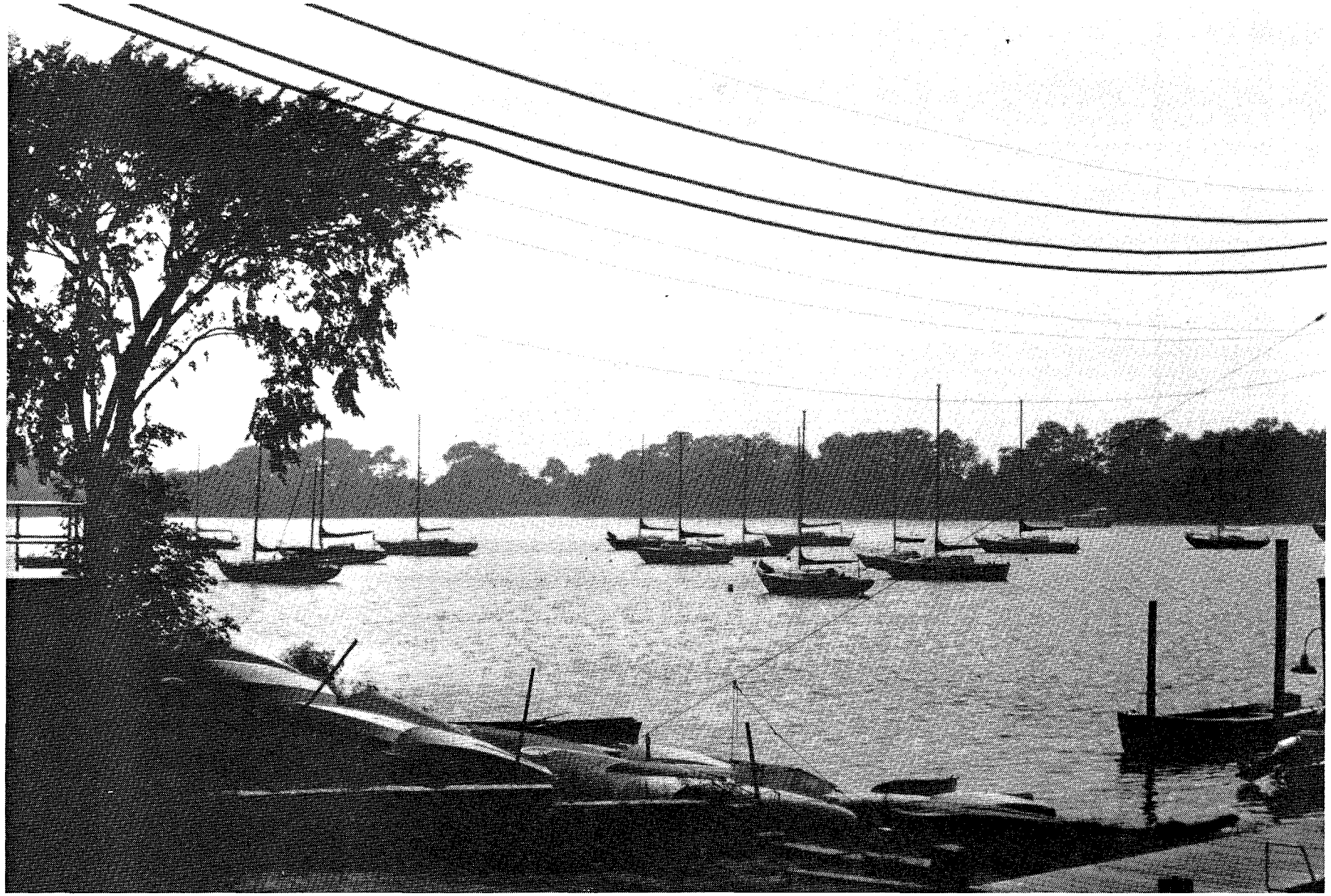
Introduction 1
Analyzing the market 13
Market strategy and marina concept 21
Siting a marina 25
Feasibility analysis and preliminary design 35
Designing a marina 39
Further reading on marinas 57
Appendix A - Public funding sources for new marinas A-1
Appendix B - Permits and approvals required for marina construction B-1

LIST OF FIGURES

Figure 1. Marina distribution in New Jersey 3
Figure 2. Income sources of U.S. marinas 5
Figure 3. Marina locations by type of water body 6
Figure 4. Typical marina development process 9
Figure 5. Steps involved in finding a suitable marina site 26
Figure 6. The influence of tidal fluctuations on marina dock type 27
Figure 7. Space allotment considerations for marina siting 27
Figure 8. Site feasibility analysis 36
Figure 9. Example timeline for obtaining permits for marina development . . 38
Figure 10. Filled sheet piles 42
Figure 11. Riprap mound 42
Figure 12. Masonry units for breakwater construction 42
Figure 13. Floating breakwaters 43
Figure 14. Fairway and finger pier spacing 43
Figure 15. Offshore layout showing basic marina components 43
Figure 16. Boat slip width depends on boat length and type of pier 44
Figure 17. Mooring arrangements 44
Figure 18. Ramp 45
Figure 19. Floating walkway 45
Figure 20. Fixed walkway 45
Figure 21. Pile covers 46
Figure 22. Wood preservatives for marine environments 46
Figure 23. Fueling dock arrangements 47
Figure 24. Fuel dock for both boats and autos 47
Figure 25. Roller ramp 48
Figure 26. Fork lift 48
Figure 27. Hoist 48
Figure 28. Boat storage 49
Figure 29. Simple painted timber storage racks 49
Figure B-1. The Coastal Area as defined by the Coastal Area Facility Review Act B-3
Figure B-2. Wetlands and waterfront development permit application processes B-14
Figure B-3. CAFRA permit application process flow chart B-17

LIST OF TABLES

Table 1. Summary of marina facilities in New Jersey by vacation region . . . 4
Table 2. Profit sources of the average U.S. marina 5
Table 3. General requirements of marinas by marina type 8
Table 4. Marina boat berths in New Jersey 14
Table 5. Characteristics of marinas at which interviews were conducted 17
Table 6. General factors to be considered in analyzing site potential for marina development 25
Table 7. Summary of New Jersey policies on marina-related facilities and activities in General Water Areas 31
Table 8. Guidelines for conditionally acceptable marina-related facilities or activities. 32
Table 9. Water areas to avoid in marina development 33
Table 10. Water's edge areas to avoid in marina development 33
Table 11. Water areas that are conditionally acceptable for marina development. 34
Table 12. Water's edge areas that are conditionally acceptable for marina development 34
Table 13. Permits, approvals, and certificates to be considered during the planning of a marina. 35
Table 14. Boat-handling equipment 50
Table 15. Marina environmental impact matrix. 53
Table B-1. How to obtain more information and assistance on coastal permits in New Jersey B-5



INTRODUCTION

This handbook is intended to provide an overview of marina activity in New Jersey and to present material on marina concepts, siting, and design that will be of interest to potential marina developers in both the private and public sectors.

A marina can be defined very simply as a "waterfront facility for recreational boat use" which is sited to allow quick and convenient access to a water body and designed to provide safe and secure boat moorings. Marinas also receive occasional use by commercial fishing vessels. Although marinas typically conjure up images of harbors, boat slips, mooring buoys, piers, and docks, the concept also includes dry land stack storage systems designed for quick dispatch and retrieval of boats by fork lift or crane. Virtually all marinas include provisions for automobile parking as well. In catering to public demands, many marinas have expanded to offer a wide range of additional services and facilities. These include off-season dry storage areas, boat and motor sales and repair service, launching ramps, gas and oil, fresh water, electrical hookups at slips, ice, telephones, holding tank pumpout stations for marine toilets, bathrooms, showers, clubhouses, hotels, restaurants, and even tennis courts and swimming pools.

In New Jersey, the Division of Travel and Tourism (NJDTT) in the Department of Commerce and Economic Development lists 297 marinas that responded to its 1980 questionnaire. Although this list is fairly complete, there are known to be more marinas in the state. Those listed range in capacity from fewer than 10 boat slips to the 700 slips found in the Wildwood Yacht Basin. The NJDTT marina guide lists all New Jersey marinas except those owned or operated by municipalities. It is now being updated and will be republished in 1982. Another source of information on marinas is the National Ocean Survey's small craft charts.

Marinas in New Jersey can be grouped by location into five different areas: Skylands, Gateway, the Shore, the Cape, including Atlantic City, and the Delaware River region (NJDTT, 1980). The Skylands area extends from the upper Delaware River inland to include Lake Hopatcong and Swartswood Lake (Sussex County). The Gateway area contains Greenwood Lake (Passaic County, along the New York border), the Hudson River bordering New Jersey, and tributaries leading to the river. The Shore area extends along the Atlantic coast, including the shoreline, saltwater bays, and their tributaries in Monmouth and Ocean Counties. The Cape area includes marinas on the Atlantic and Delaware Bay shorelines, bays, and rivers

from Atlantic County west to Cumberland County. The Delaware River area extends from Salem County north to Mercer County. These vacation regions are mapped on Figure 1.

There are some major differences of concern for facilities and boaters in each area. On inland lakes and waterways, marinas must contend with a limited resource that is prone to overuse and pollution. The coastal boating facilities must contend with tides, destructive ocean forces, and increasing real estate values. Atlantic City marinas are faced with a metropolitan area in a state of flux. All areas--inland, coastal, and riverine--have problems with siltation.

Marinas in New Jersey are overwhelmingly concentrated along the Atlantic coast. According to the NJDTT (1980), there are 157 private and two public marinas in the Shore area alone, and another 87 on the Cape, all but two being privately operated. The other three regions have the remaining 51 marinas; 10 along the southern Delaware River basin, 25 in the northeast corner of the state (Gateway); and 16 in the northwest (Skylands), most of which are found around Lake Hopatcong. Figure 1 illustrates the distribution of marinas in the state by number of slips. The general characteristics of marinas by region are shown in Table 1.

Marinas are one of the few land uses for which a waterfront location is absolutely necessary. Their development and expansion must contend with high competition for these sites from other uses, many of which do not require the land/water edge. Some waterfront municipalities like Pennsauken Township, Lacey Township, and West New York, may slow this trend because they have passed ordinances reserving waterfront areas for water-related uses. Environmental constraints also affect marina siting, particularly the extensive presence of protected wetlands in areas otherwise ideal for marinas. Among the environmentally damaging activities associated with marina development are dredging and disposal of dredged material, filling, alteration of water circulation, and release of water pollutants such as petroleum derivatives, sewage, copper and lead, and land runoff. Overall, the most serious negative impacts of marinas are their alteration of water circulation patterns and disruption of natural areas.

However, there is evidence that marinas can be constructed in a manner that produces positive environmental, economic, and social impacts on the areas in which they are located. Such a result depends upon proper site selection, careful

Figure 1. Marina distribution in New Jersey

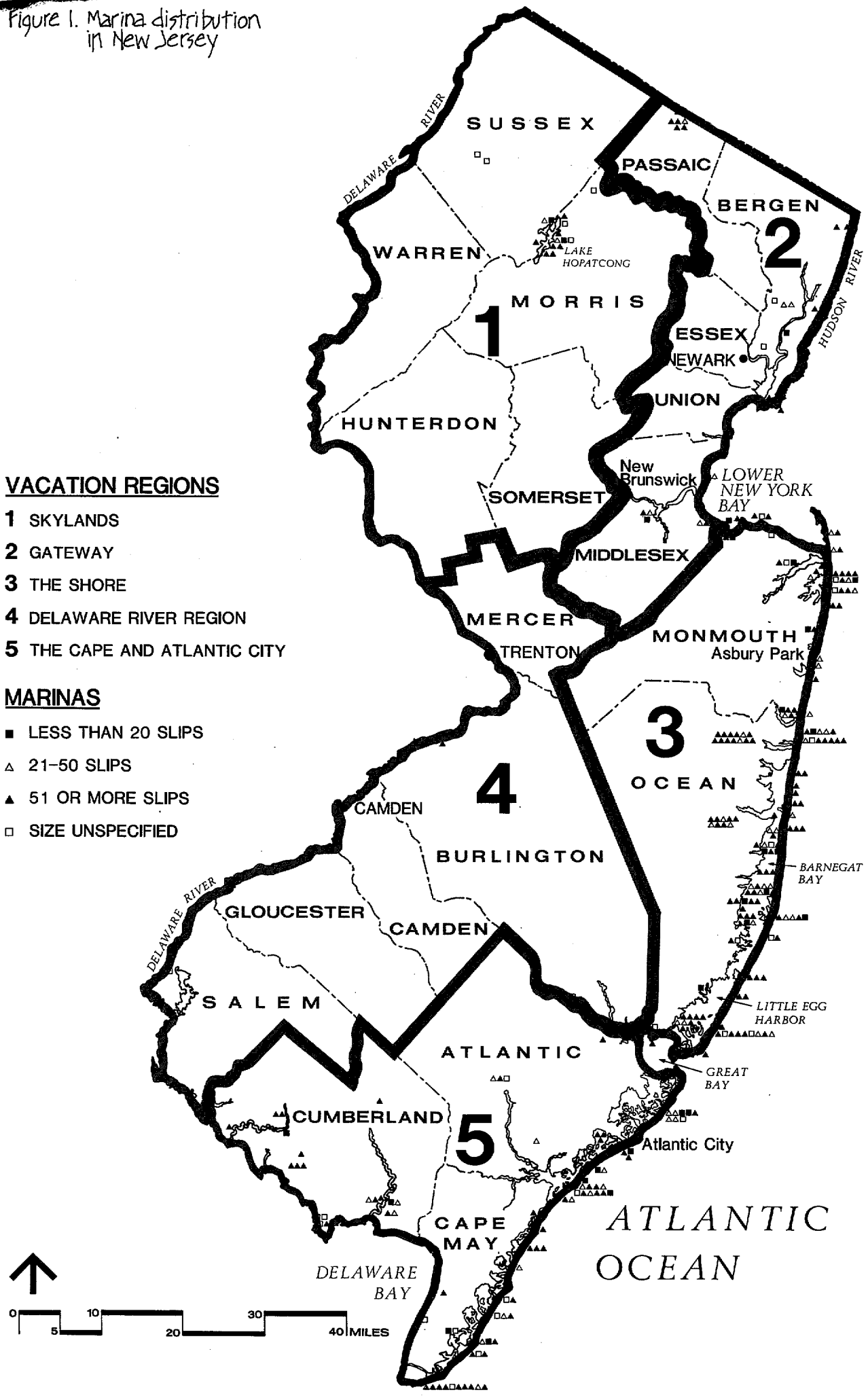


Table 1. Summary of marina facilities in New Jersey by vacation region

VACATION REGION	Number of marinas in region	Average number of boat slips per marina	FACILITIES: Fuel	Repairs	Supplies	Launch	Dry storage: Indoor	Dry storage: Outdoor	Sewage pumpout	Water	Ice	Restrooms	Showers	Watchman	Restaurant
SKYLANDS	16	83	●	●	●	●	●	●	○	◑	◒	●	○	◑	●
GATEWAY	25	104	●	●	●	◑	◒	●	○	●	◒	●	◒	◒	○
THE SHORE	159	95	●	●	●	◑	◒	●	○	●	◒	●	◒	◒	○
DELAWARE RIVER	10	99	●	●	●	◒	○	●	○	●	◑	○	◒	◒	◒
THE CAPE and ATLANTIC CITY	87	101	●	●	●	◒	○	●	○	●	●	●	◒	◑	◒

Marinas offering facility:

- ● most
- ◑ many
- ◒ some
- ○ few

Source: New Jersey Division of Travel and Tourism, 1980.

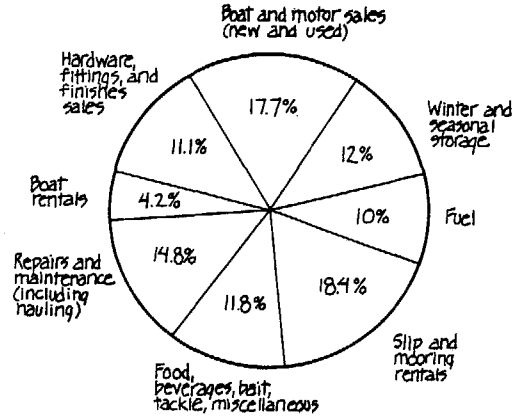
design and construction, and good management practices (Nixon et al., 1975; Adie, 1975).

Future recreational boating demands in New Jersey can be met, to a point, through expansion and modification of existing marina layouts. If the long-range needs for these facilities are to be met, however, advance planning that considers the expanding demand for recreational boating, the competition for sites, and the environmental impacts of marinas is necessary. This planning must also consider residential and commercial development that frequently accompany marina development; economics; boat congestion and safety; coastal aesthetics; and other aspects of coastal management.

The economics of new marina development today are dramatically different than a generation ago, when a number of "Mom and Pop" type marinas got their start. Many marinas are large, capital-intensive businesses. If maximizing profits is the investor's sole objective, there are other, more immediately profitable enterprises than marinas. "The ideal attitude for a marina developer would consist of 80 percent business acumen and hard work, 10 percent interest in boats, and 10 percent instinct for gambling" (Adie, 1975). While the industry has considerable overtones of romance, it is a difficult business that requires a hard-headed approach. It can, however, provide substantial benefits to investors. Sources of income and profits for marinas are illustrated in Figure 2 and Table 2.

The marina industry in New Jersey, like that of other coastal states, is experiencing difficulties on all fronts. The tax incentives for patrons to invest in boats in the early 1970s caused expansion of the industry. Many marinas faced with rising costs have so far been able to absorb recent losses, but if current economic trends continue, marina industry leaders feel that many struggling marinas will cease operations within several years as their financial reserves are depleted. From the viewpoint of private marina owners and operators, the industry's troubles are due mainly to high interest rates, which have stifled capital improvements and salability of marinas, overzealous regulation, an inadequate state dredging program, unfair competition by state-subsidized marinas, and high taxes and maintenance costs. Some marinas wishing to expand their services are constrained by site limitations or poor initial site planning. Nearly all recently approved DEP permits for marina activity have been for expansion of existing facilities. Another type of waterfront proposal involving marinas is conversion of the marina operation to townhouse or condominium use with the elimination of

Figure 2. Income sources of U.S. marinas



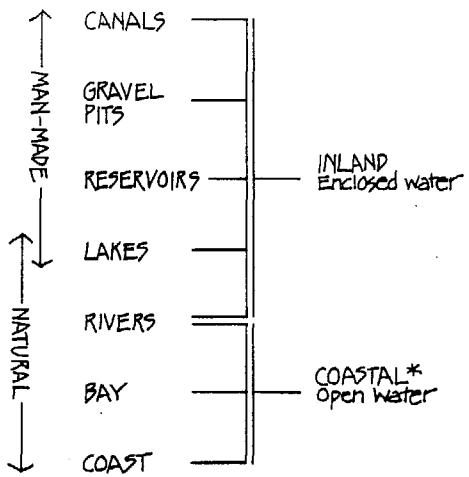
Source: Adie, 1975.

Table 2. Profit sources of the average U.S. marina

FACILITY	PROFIT OF FACILITY AS PERCENT OF GROSS INCOME
Slip rentals	40%
Winter storage	27%
Repairs and maintenance	27%
Sales	
New boats and motors	17%
Used boats and motors	9%
Hardware and supplies	23%
Fuel	15%
Boat rentals	15%
Restaurant and bar; Groceries, ice, vending machines; Fishing tackle, bait	15%

Source: Adie, 1975

Figure 3. Marina locations by type of water body



* Water body classes have been defined for coastal areas by the New Jersey Department of Environmental Protection (NJDCR, 1981).

Source: Adie, 1975.

boat slips and marina-related functions in the uplands. This illustrates the intense pressure against private construction of new marinas.

The variety of factors that influence marina development make it difficult to establish a clear-cut functional classification of marinas. However, it is possible to view marina types from several perspectives, if only to illustrate the wide range of possibilities inherent in marina development and operation. Marinas can be classified according to ownership, development concept, location, and boat size and type.

Ownership of marinas in New Jersey can be public, private, or some mixed form. In the latter case, the public involvement ranges from state lease of riparian land to public agencies playing the role of developer, with private interests contributing to the marina design and leasing the facility. The terms of the lease are based on the amount of money required to service the debt on bonds raised by the government to construct the marina. State or local government involvement is likely if a marina is part of a total waterfront development plan.

Due to the current market pressures against private marina development in New Jersey, there may be a shift toward design and construction of marinas by New Jersey municipalities as part of their plans to revitalize waterfront areas.

Some development concepts are single-purpose: e.g., yacht clubs, boat rental centers, and marinas renting boat slips. Other developments integrate the marina function into larger projects to create an image for marketing residential and commercial space, even if the marina itself loses money. As part of an urban renewal project, a marina can give purpose to the historic preservation and reuse of docks in abandoned waterfront areas.

The land and water locations of marinas provide another way to classify them. The land setting can be either rural, suburban, or urban. Within these three broad categories, setting is definable by the immediate land use (forest, farm, residential, commercial, industrial, or abandoned). The water body giving purpose to the marina may be an inland lake, river, reservoir, canal, or water-filled mineral extraction pit, or the marina may have a coastal location on a river mouth, a bay, or along the open coast (Figure 3).

Although ownership, development concept, and location provide a background for categorizing marinas, a more direct, functional approach is to consider boat type and size. The design and construction of marina facilities are determined largely on the basis of boat type and size.

The range of repair and accessory services available at marinas is affected by boat size and propulsion method, while trip purpose determines the type of human services to be found at a marina. Boat types can be combined with trip purpose to obtain a general classification of marina types. Table 3 illustrates the general requirements of marinas by facility type.

Depending upon the site, the boat types served, and the trip purposes of boats moored at a marina, the following facilities or activities could be found:

- o access channel
- o boat basin
- o piers and docks
- o boat moorings
- o launching ramp
- o bulkheads
- o pumpout facility
- o fuel decks
- o storm sewer outfalls
- o dredging
- o spoil disposal
- o access (loads)
- o parking lot (and cars)
- o dry storage area
- o clubhouse, restaurant
- o motel or hotel
- o boat and accessory sales
- o boat and accessory repair and maintenance
- o other supplies and services.

The prospective marina developer may be pursuing financial independence in small business, looking for an amenity to increase the appeal of a condominium package, or simply seeking a profitable use for previously underutilized waterfront property. In each case, adhering to sound development principles can minimize the developer's risk, enhance the potential of the venture, and contribute to the quality of the state's recreational opportunities and coastal environment. Often these principles form stages in a loosely sequential process of marina development, as shown in Figure 4.

Analyzing the market is often the first step a developer takes. This is followed by formulating a marketing strategy, refining the original concept of the services to be offered and number and sizes of boats accommodated, and making an initial assessment of profitability and cash flow. A third, and crucial, item is identifying the best site for the marina and taking an option on the land. After these initial stages, the feasibility of developing a marina on the given site can be investigated in depth, regulations can be explored, and a preliminary design worked

Table 3. General requirements of marinas by marina type

MARINA TYPE	WATER BODY TYPE							WATER ACCESS NEEDS							MINIMUM CHANNEL DEPTH			SPECIAL ATTRIBUTES NEEDED	
	Canal	Gravel pit	Reservoir	Lake	River	Bay	Coast	Open ocean or bay within 5 miles	Suitable fishing waters within 5 miles	Inlets, islands, beaches for safe anchorage within 20 miles	Inlets, islands, beaches for safe anchorage within 10 miles	Access to suitable open water within ½ mile	Pond or channel at least 1 mile wide	Pond or channel at least 5 miles wide	4 feet	6 feet	8 feet	Relatively protected waters	Few shoreline hazards
Commercial fishing and deep sea charter dock					●	●	●	●								●			
Long-distance powerboat cruising					●	●	●	●		●							●		
Long-distance sailing					●	●	●	●			●						●		
Estuarine and freshwater fishing	●	●	●	●	●	●			●						●				
Local powerboat cruising				●	●	●	●	●		●						●		●	●
Day sailing Ⓢ and racing Ⓡ	●	●	●	●	●	●	●				●	●	Ⓢ	Ⓡ		●			●
Water-skiing and water sports			●	●	●	●	●					●	●		●			●	●

Figure 4. Typical marina development process

1/ANALYZE THE MARKET

- Consider the area's economy
- Factor in demand
- Factor in supply
- Assess current market conditions

2/DEVELOP A MARKET STRATEGY AND MARINA CONCEPT

- Determine services to be offered
- Define boat sizes and mix
- Specify number of wet slips and dry storage spaces
- Identify funding sources
- Calculate fees
- Estimate cash flow

3/IDENTIFY THE SITE

- Compile and map data
- Scrutinize development potential factors
- Select several alternatives
- Investigate state and federal policies controlling proposed uses at site
- Select a superior site
- Take an option on land

4/PERFORM FEASIBILITY ANALYSES AND PRELIMINARY DESIGN

- Assess financial feasibility in depth
- Determine preliminary design and technical feasibility
- Address local zoning and building permits
- Analyze cash flow

5/DESIGN AND DEVELOP THE MARINA

- Draw up detailed construction plans
- File for and obtain permits
- Secure local approvals
- Obtain construction bids
- Secure construction loan from funding source
- Exercise land option

out. If a feasible site is found, the final design is then decided, permits are filed, funding and construction bids are obtained after permit approval, and the option is exercised.

The sequence is iterative; in other words, some of the actions taken at one stage may be expanded later in light of further information or refinement of the initial concept of the desired type of marina development. The key considerations are the locational, financial, and technical feasibility of a site, as well as the regulatory requirements of federal, state, and local agencies.

Location has to do primarily with the local and regional market. From a marketing standpoint, a location is feasible for marina development if demand for a boating facility of the type contemplated exceeds supply. In New Jersey, a prime location would also:

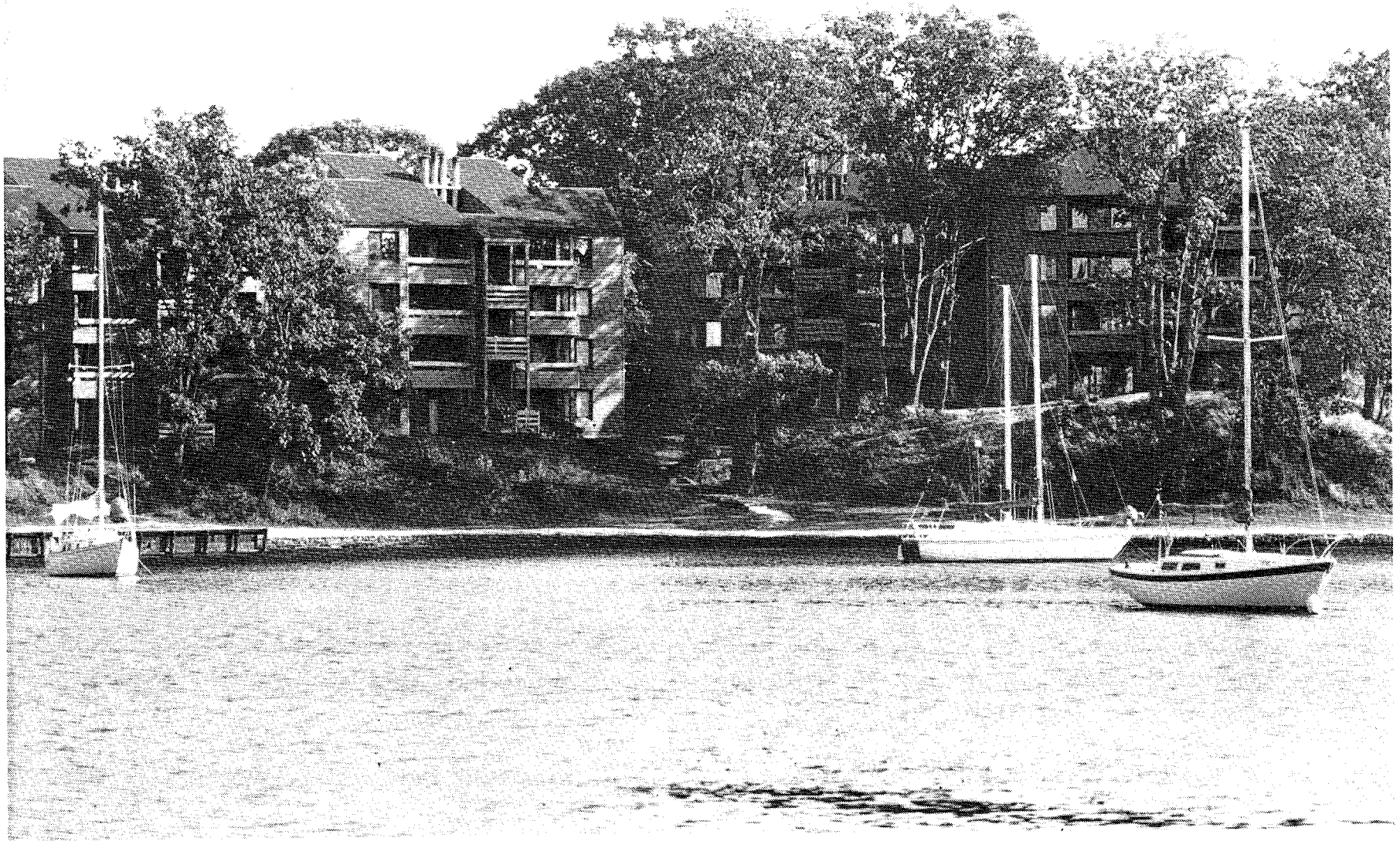
- have good water access (4- to 7-foot channel near shore, depending on the size of boats),
- be directly accessible to open water or be along a channel that is frequently dredged by the state,
- be outside large contiguous wetland areas, and
- be in a marine commercial setting with low crime risk.

An important factor not listed is distance to major urban centers. The rule of thumb for the market area for marinas is 1-1/2 hours driving distance, but because most, if not all, of New Jersey is close to or within this distance of the New York and Philadelphia metropolitan areas, this factor is not as important to marina siting as others listed above. Evidence presented in the next chapter confirms this: demand for marinas appears to exceed supply in all New Jersey's vacation regions, although data for the Delaware River region is insufficient to make this statement.

Financial feasibility relates to not only income and expense projections, but also details on tax rates, land costs, building costs, likely funding sources and lenders, and development timing (i.e., time between taking an option on the land to the moment the first slip is rented).

Technical feasibility is concerned with site engineering and design. Mitigation of environmental impacts and physical concerns resulting in the most efficient site design are the major technical foci.

Regulatory concerns can be environmental, such as loss of wetlands, or policy-related, such as zoning and use of riparian lands.



ANALYZING THE MARKET

The marina developer's market or demand analysis is to determine if there is a sufficient number of people in a given area who can afford boats--and what types of boats the population desires or can afford. This in-depth analysis allows the developer to rely on more than simple judgment--the "gut reaction" of the entrepreneur. New Jersey's geographic location in the Metropolitan Corridor between New York and Philadelphia does allow marinas in the state to draw from a large population.

The marina developer must be sure that what is built will be marketable when it comes time to open the project. The key is to develop a marina that meets the design, management, and maintenance standards held by the people of the area. For the real demand is not just for the facility in which to store one's boat: "In every boating center it will be found that some marinas will be filled to capacity with local long-term customers, while others will always have a few slips empty and will have a high turnover rate--in other words, its customers are waiting to move to another marina as soon as possible" (Chamberlain, 1980).

A market evaluation always starts with statistics (market research), even though the game is not all numbers. These figures must be carefully sifted and sorted to be of value in addressing the questions of where, for whom, and even when to build. The analysis is not strictly a mathematical formula that produces a final or certain answer; it is a process against which intuitive judgment can be tested.

In broad terms, marina market analysis is concerned with topics such as

- the area's economy - principal economic activities, basic resources, economic trends
- demand factors - employment centers, income levels, seasonal and permanent population within 1-1/2 hours' drive
- supply factors - marina inventory of the area, facilities, services offered, boat sizes

Table 4. Marina boat berths in New Jersey

VACATION REGION	NUMBER OF BOAT BERTHS		
	Private Marinas	State Marinas	Total
SKYLANDS	912	0	912
GATEWAY	2,403	0	2,403
THE SHORE	13,608	289	13,897
DELAWARE RIVER	790	0	790
THE CAPE and ATLANTIC CITY	7,123	482	7,605
	24,836	771	25,607

Source: NJDTT, 1980.

Note: The 1982 Boating Almanac lists 33,500 slips in 550 New Jersey marinas (Boating Almanac Co., 1982); Figley reports that in 1979, New Jersey marinas had the capacity to store 38,563 boats outside and 6002 boats inside (Figley, 1980).

- current market conditions - waiting lists, vacancies, prices for slip rental, boat sales and rents

- qualitative demand factors - desired mix of boat types and sizes, the auxiliary facilities such as restaurants, swimming pools, and tennis courts, boat sales and service.

In the case of qualitative demand analysis for marinas, some caution is merited. Developers seeking to determine demand trends should realize that making the decision to own a boat is not always a rational process. Surveys of people who are not already boat owners may be unreliable in that they reflect the survey population's lack of first-hand experience with the subject. Nevertheless, demand analysis can be very informative and is particularly effective in revealing the design, management, and maintenance standards of boaters in a given area.

To present a general picture of the New Jersey marina market for this handbook, telephone interviews were conducted with owners and operators of 74 of the 297 marinas listed for New Jersey by the Division of Travel and Tourism (1980). This sample reflected distribution of marinas by vacation region (as displayed in Figure 1): using an alphabetical listing of boating facilities by region (NJDTT, 1980), interviewers polled marina owners and operators until approximately 25% of the group within each region had been surveyed. This research presents a basic synopsis of the current status of marina demand and development in New Jersey. It was not intended to address the needs of any one developer. Rather, it serves as a general aid for detailed market analyses that can clarify the options for particular development projects.

With ocean and bay shorelines as well as inland lakes and rivers available, opportunities for recreational boating across New Jersey are numerous. The Eagleton Institute, in its 1977 poll, showed that approximately 25% of New Jersey's residents went boating in bays or coastal waters of the state. Water-based recreation is a popular recreational activity: 1.5 million residents of the state participated in saltwater fishing, totaling 13 million person-days, in 1976. The National Marine Fisheries Service indicated that 1.2 million nonresidents also went saltwater fishing in the state (Durand and MacDonald, 1981). New Jersey boating facilities and activities attract people from Pennsylvania, New York, and Delaware. Table 4 presents the number of private and state marina boat berths in New Jersey's vacation regions.

Data compiled by the Hunting and Fishing Wildlife Association show that $39 million is spent annually in New Jersey for charter and party boat fishing, and $9 million for boat rentals. To run and maintain a 27-foot boat, an average of $2,850 per year is spent on hauling, launching, storage, dockage, repairs, fuel, oil, insurance, and other boating needs (Tinari, 1980).

Marina industry growth in the state was greatest in the 1950s and 1960s, and total capacity peaked in the early 1970s, according to the Marine Trades Association of New Jersey (MTA). Almost all marina owners interviewed in this study indicated that the number of slips in marinas around the state was decreasing and that this constituted a serious problem. MTA indicated that the state's functional marina slip capacity may have decreased by up to 50% over the past decade. The decrease is due to the following factors:

- silting in slips to the point at which they are not usable
- lack of available sites for disposal of spoil from private dredging
- lack of dredging of harbors, channels, and inlets
- the increase in permitting requirements
- inflation affecting land, labor, and material costs
- increase in interest rates.

Over the past two decades, a growing public awareness of the importance of wetlands, water quality, and other environmental concerns has come to be formally recognized by the state in its review of projects that are planned for sensitive areas or that have a high potential to damage coastal ecosystems. While permitting requirements undoubtedly have resulted in the protection of coastal environments, marina developers are now faced with the need to do expensive site analysis studies and with longer lead times in site development than they were a decade ago.

Land, labor, financing, and material costs increasing due to inflation have exacerbated the situation, and high interest rates have forced boat dealers to reduce inventories. Fewer models in stock mean lost sales to many dealers who cannot show potential customers the exact boat type or features sought.

The lack of dredging has resulted in loss of many slips and the closing of marinas in some areas. It has also increasingly limited both channel and marina access, causing problems for large-draft boats. Marina owners indicated in

interviews that the shallow water and poor marina conditions have discouraged not only New Jersey, New York, Delaware, and Pennsylvania boaters, but also people traveling through the state on the Intracoastal Waterway.

While the total number of marinas and slips has decreased, demand for boating and marina services in New Jersey has not. Where the boat owner generally buys supplies, seeks maintenance, and participates in recreation is also where his or her boat is stored. Demand for marinas can be interpreted in terms of need for storage or slip space (in or out of water). In general, demand for marinas is fairly inelastic. Boating enthusiasts seem to be willing to pay whatever it costs to pursue their sport, for which no substitute exists. Therefore, storage space at marinas with good or adequate water access is at a premium. However, operators of marinas with major siltation problems are understandably reluctant to raise slip fees to levels that could be justified with deeper slip water depths. Clients cannot be asked to pay higher slip fees when they can only use the marina at high tide.

Table 5 shows the characteristics of marinas at which interviews were conducted. The major thrust of each interview was to determine the marina's use. The study was predicated on the following assumptions. If all the marinas were operating at full capacity, and informants indicated lists of people requesting slips but unable to obtain them, it would be assumed that there was an unmet need for marina facilities in that area, and therefore within the state. If, however, marinas were not operating at capacity, a series of conclusions could be made, including a decrease in boating popularity, high expenses, and poor boating conditions.

In the interviews conducted, 51 owners and operators, or 70% of the informants, indicated 100% use of their marinas and boat rental facilities. In many instances, informants claiming 100% use ignored slips made unusable by silting. Thirty-nine of these 51 had waiting lists of one season or more. Another 19% were operating at 90-99% capacity.

Three major causes for less than capacity use at the remaining marinas were recent expansion, aversion to the permitting process, and poor water access. Although the majority of marina owners had no plans for expansion, several had recently added to their facilities. The owners indicating a recent expansion anticipated capacity use within two years. What had prevented some of them from making the slips usable again was an involved and costly permitting procedure, which one owner described as "not worth the effort." However, this problem has

Table 5. Characteristics of marinas at which interviews were conducted

LOCATION	MARINA DATA							BOATING TRENDS					DISTANCES TRAVELED BY MARINA USERS		
	Number of Marinas	Number of Interviews	At Capacity	With Waiting List	Plan to Expand		Plan to Sell Out	Smaller Boats	Larger Boats	Sail-boats	Other	None	Local	50 miles or less	50-100 miles
					Yes	No									
SKYLANDS	16	5	3	3	0	4	0	0	2	2	0	1	2	3	0
GATEWAY	25	8	7	7	4	2	1	1	2	0	0	0	2	5	2
THE SHORE	159	38	25	17	6	29	3	6	7	6	3	10	14	22	35
DELAWARE RIVER	10	3	1	1	0	2	1	0	0	1	0	1	0	1	1
THE CAPE and ATLANTIC CITY	87	20	15	11	4	14	3	7	1	1	3	8	6	10	14
TOTAL	297	74	51	39	14	51	8	14	12	10	6	20	24	41	52

been partially resolved by the State Legislature. A bill introduced by Senator Zane (P.L. 1981 C.315), which was signed into law by the Governor on December 7, 1981, exempts repairs to docks, wharfs, piers, and bulkheads existing before 1981 from the permitting process and enables owners to return some unusable slips to service without first obtaining a permit. The bill does not, however, apply to expansions of marinas or boating facilities, to dredging or dredge disposal, or to resolving the ownership of riparian lands upon which marinas are built. Finally, five of the marinas are operating below capacity because of a shallow inlet at Barnegat Bay. Normally, locating near an inlet increases the popularity and use of a boating facility. However, the Barnegat Bay inlet has become so silted, and the dredging so infrequent, that passage through the water body is difficult. Marina owners contend that if channels and inlets were dredged regularly, these marinas could easily be operating at capacity also.

If the majority of marina owners are operating at capacity and have waiting lists for additional boaters, why haven't owners expanded? Overriding all comments on this question was the consensus of marina owners that the current economic climate was not favorable for expansion. Of the marina owners who answered the question, 80% had no plans to expand. The owners of marinas not operating at capacity saw no merit in expansion. Several of the informants indicated a lack of available space in which to expand. Dry land area for parking and out-of-water storage and water area for additional slips was being used to capacity. Two informants on Lake Hopatcong also indicated township ordinances restricting expansion. Many more anticipated no plans for expansion because of the involved permitting process: owners of some marinas had waited more than two years for federal permit approval, and several interviewees indicated that the cost of the application process was prohibitive. Review of DEP marina development files from 1978 to 1981, however, indicate that the average time to obtain state permits is about 4-6 months, delays being due mainly to incomplete applications. Representatives from the New Jersey Marine Trades Association expressed concern about the delay and cost of the permitting process and the effect on the marina owner. The MTA also indicated that lack of coordination between state and local agencies resulted in further delays.

Dredging is a key issue for marina owners and users. Marina owners and operators interviewed felt that the state has not met its responsibility to keep waterways in a usable condition. Silting of channels leading to marinas and to slips can result in loss of water access for larger boats, loss of slips, and "downgrading"

of slips to shallower-draft boats. To prevent a significant loss of business, marina owners must periodically dredge the area. Yet marina owners and operators often have a difficult time obtaining permits to dredge because of the difficulty in finding approved dredge disposal sites. Furthermore, those who lease riparian land from the state must pay the state for each cubic yard of state-owned sediment removed.

In an effort to anticipate types of boating demand, interviewers asked marina owners about boat trends. Most marinas cater to all types of boats (with the exception of large sailboats) and many marina owners are also boat dealers, so key informants were knowledgeable of boat trends. Of the 61 interviewees who answered the question, 33% said they noticed no trends in the types of boats people were using or buying. Twenty-three percent of the key informants indicated a trend toward smaller boats, which are overall more economical to purchase, maintain, and operate.

An additional 16% of the marina owners indicated increasing numbers of sailboats. They attributed this trend primarily to the desire of boaters to avoid paying higher gas prices. It is interesting to note that marinas, except those for sailboats only, have traditionally had a low percentage of sailboats--usually below 10%. This low percentage is attributed to the deeper water needed for moorings and to marina owners limiting sailboat space because sailboat owners use few marina services other than storage; they do not purchase fuel or supplies or need repairs as often as powerboat owners.

Twenty percent of the marina owners indicated that boats were getting larger, citing two reasons in particular: that boaters continue to build onto their investment with "bigger and better" boats; and that a large enough boat can become a second home. Ten percent of the marina owners indicated other trends, probably reflecting very local conditions, including more diesel-powered boats, increasing numbers of boats with less horsepower, and a decrease in boating activity.

The final question posed to marina owners was where the majority of their users lived. In the Skylands and Gateway regions, nearly all marina users traveled 50 miles or less, while nearly half of the users of marinas in the Shore and the Cape and Atlantic City regions travel over 50 miles.

Demand for marinas and boat storage facilities may increase in the future as the supply diminishes. Of the 74 marinas at which interviews were conducted, 8 were closed or closing. Five of these former marina sites will be developed into townhouses or condominiums, some with private marinas. One marina owner was hoping to sell to another marina operator but did not eliminate the possibility of a sale to another type of developer. These marina owners indicated a difficulty meeting maintenance costs and taxes. Although the low rate of success for some marinas may be due to poor location or management, at least ten informants, in addition to these selling out, realized the value of their prime real estate and did not discount the option of selling out in the future.

In conclusion, there is a statewide demand for additional boat storage, and for new marinas. The majority of marinas are operating near or at capacity, with more than half of them having waiting lists of prospective boaters, particularly in the Skylands and Gateway regions. Storage space at marinas with good or adequate water access is at a premium. However, due to economic conditions, siltation, and increasing real estate values, the supply of slips and marinas is diminishing. Although users from New Jersey and neighboring states will be the first to suffer poorer boating conditions, boaters passing through New Jersey from other states via the Intracoastal Waterway may also be denied easy access to the state's boating facilities.

MARKET STRATEGY AND MARINA CONCEPT

The process by which the facts may be gathered is market research, and the method by which the facts are sifted and interpreted is market analysis. The plan of action that stems from the research and analysis constitutes the developer's market strategy. For marina developers, market strategy revolves around the following profit factors.

- o number of wet slips and dry storage spaces
- o boat sizes and mix of sailboats and powerboats
- o services
  - boat and accessory sales
  - boat repairs
  - boat rentals
  - restaurants, hotels, clubs
  - general store for supplies, hardware, groceries
  - swimming pool, tennis, other facilities
- o funding sources
- o fees
- o cash flow ability.

The developer may come to the point of devising a market strategy with a firm concept of the type of marina desired. For instance, an entrepreneur with a lifetime interest in deep sea fishing, ten years' experience in powerboat repairs, and five years of selling cabin cruisers might want to stress these aspects of the business. At the other extreme are developers with no previous boating experience and no preconceived concept of the type of marina to buy or build.

A relatively new concept in marina development is the Marina Condominium. The idea is that in a condominium marina the boat owner buys the space above the water and has common ownership, with the other slip owners, of the main dock, parking lot, service facilities, etc. This idea began in Florida and has been used in Minnesota, Wisconsin, Maryland, and recently Long Island. The concept could be part of a market strategy for private developers in New Jersey. It could also be applied to existing marinas as an economic alternative to conversion to a nonmarina use.

In any case, the developer needs to devise a strategy that balances the existing market, profitability factors, and the developer's own inclinations and particular talents. The emerging marina concept will likely change in the siting and feasibility analysis stages, and market strategy will eventually focus on what price per square foot of slip, what buildings, and what services will be provided, given the existing market.

In the 1980's, funding sources and interest rates are the key to marina development feasibility. Studies done in Texas (Crompton and Ditton, 1975) indicate that new marina development will probably require some form of public funding. There are several indications that this trend may be true in New Jersey as well. Several marinas are being proposed in Middlesex County that will probably involve private interests operating marinas built with public funds under some form of lease arrangement.

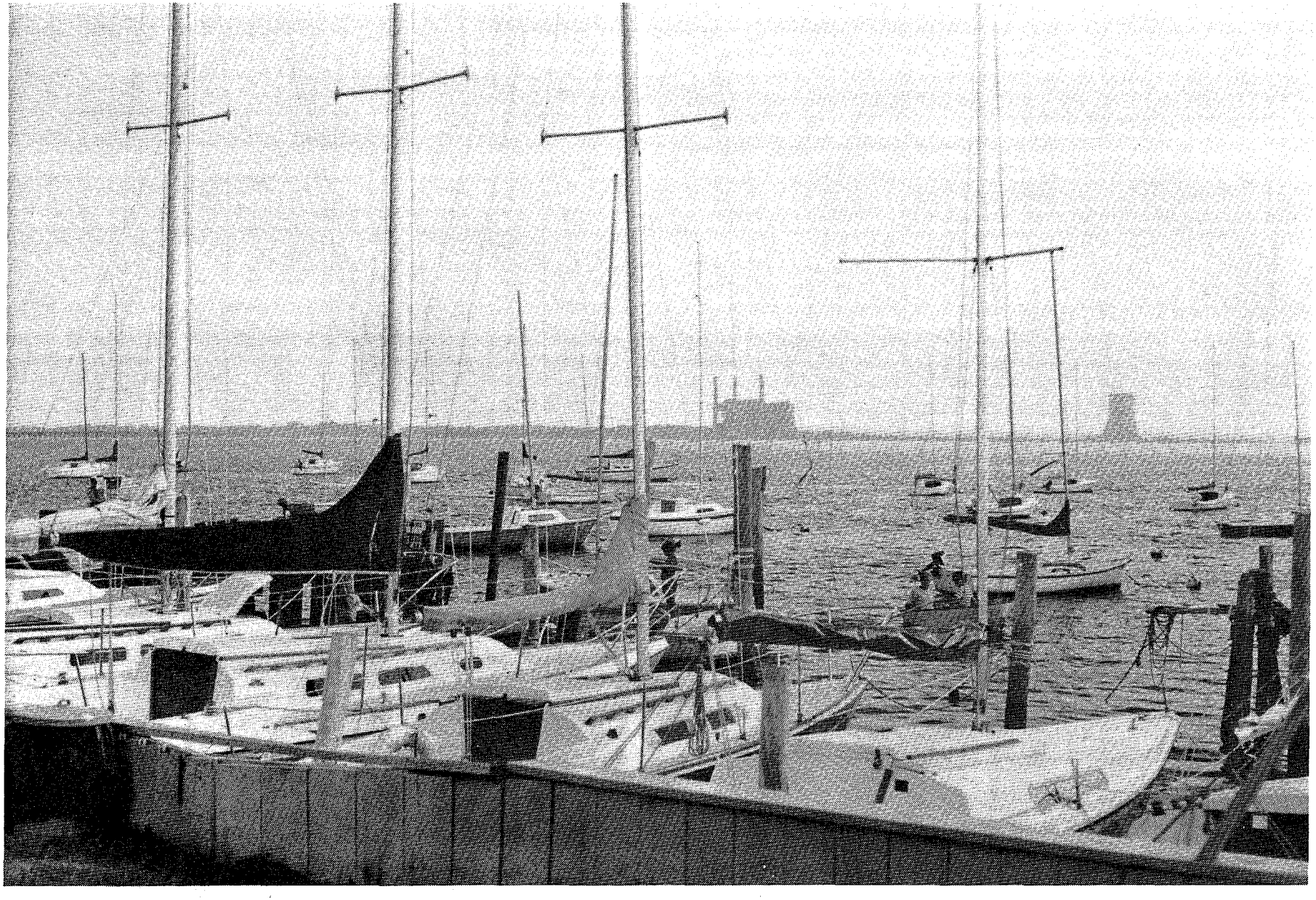
Due to the high costs of land and construction, particularly if bulkheads are required, a municipality can apply its strong borrowing capacity to construct and maintain the entire marina, then lease the facility to a private operator. Alternatively, the municipality could build just the land components of the marina and negotiate a lease with private interests to construct the offshore components and then operate the marina. The terms of the lease arrangement differ in each situation, but basically the operator pays a rental fee and/or a fixed or escalating percentage of gross or net receipts. The municipality can offer a longer-term lease in exchange for capital improvements made by the operator.

If the municipality finances and constructs both land and basic offshore facilities, an initial short-term lease can be used to establish a basic working relationship with an operator, and, if all goes well, a longer lease can be offered with capital improvement requirements specified in the lease agreement.

Despite a reduction in federal recreation programs, there are two programs that may aid the development of new private or municipal marinas: the Green Acres Program of the New Jersey Department of Environmental Protection (for municipal marinas only), and the Urban Development Action Grants of the U.S. Department of Housing and Urban Development. These are discussed in Appendix A. Under the policies of the Green Acres Program, marinas are eligible for funding only as a component of a public waterfront park development scheme. Green Acres will consider demand for a proposed marina as one factor in its review of an

application. The State Comprehensive Outdoor Recreation Plan (SCORP) presents estimates of demand for marinas that should be referenced in applications for Green Acres funds.

As market strategy is developed and funding sources are identified, a preliminary estimate of cash flow on a month-to-month basis should be projected. This will be refined during the course of the final site feasibility analysis.



SITING A MARINA

Once a market has been identified, and the strategy and concept explored, the plan of action hinges upon finding a site that will serve the developer's purposes. The site analysis process is essentially a look at a series of qualifications. The ideal site seldom exists.

In selecting a site, a developer can either search real estate listings of available waterfront locations or do a preliminary siting study to establish the best areas in which to look for land that fits the market concept and strategy. The former approach is commonly taken and is relatively unorganized. A site may be available for any number of reasons. The new developer may think that a good business deal can be made on the property, but a marina in a poor location is never a good deal.

The alternative is to find a suitable marina location by a process similar to the way a commercial shopping center or an industrial park is sited. This methodical search requires the collection of maps and data before any funds are committed for land purchase. The siting study itself may be costly, but the results can make the difference in profits or losses.

A marina siting study moves from a general overview of the study region to identification of specific sites by progressively narrowing criteria and evaluating specific data. The siting process can be seen as having twelve steps (Figure 5). It begins with the marina concept established during the market analysis and strategy phases. Starting from this preliminary idea of the desired marina type, the developer or siting consultant identifies a set of criteria that all potential locations should meet in order to carry out the marina concept. These criteria must reflect specific factors important to the location and operation of the marina (facility-related concerns), as well as factors that are of concern to the public and to the federal, state, and municipal government officials that represent the public interest (Table 6). The last section of this chapter reviews New Jersey's coastal policies that are important in marina siting.

Facility-related criteria for marina selection vary according to the marina type desired. Nonetheless, several principles that apply to most marinas can be discussed here to aid the developer in understanding where to site a marina.

Table 6. General factors to be considered in analyzing site potential for marina development

FACILITY-RELATED CONCERNS

- Access to water resource
- Proximity of interesting boating destinations
- Channel depth
- Dredging frequency, priority, and disposal sites
- Adequacy of water flow
- Seasonal and tidal water level fluctuations
- Amount of usable water area adjacent to land
- Adequacy of land area
- Protection of site
- Setting/Neighborhood
- Proximity to population and service centers
- Competition
- Road access
- Availability of public water, sewers, electricity
- Land ownership
- Land costs
- Labor and material costs

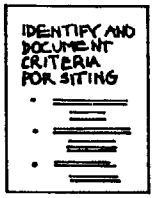
PUBLIC CONCERNS

- New construction/dredging
- Proximity to tidally influenced mapped wetlands
- Proximity to unique or valuable habitats
- Location on state-owned lands
- Construction in conjunction with CAFRA-related facility
- Encroachment on streams or 100-year floodplain
- Discharges into waterways
- Dredging or filling of wetlands or water body
- Water diversion
- Soil erosion and sediment control
- Public water and sewer use
- Well drilling
- Fuel storage
- Transportation

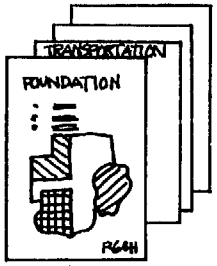
Figure 5. Steps involved in finding a suitable marina site

1/ Identify marina concept

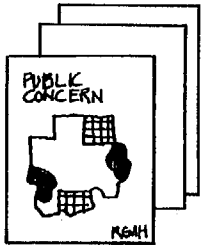
2/ Formulate siting criteria and discuss with NJDEP/DCR



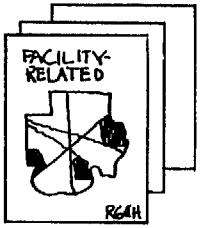
3/ Compile and map data



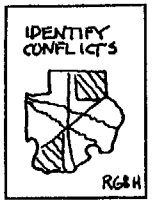
4/ Identify and map public concerns



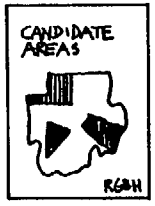
5/ Identify and map facility-related concerns



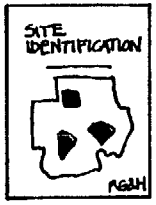
6/ Overlay maps and identify conflicts between public and facility-related concerns



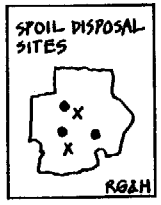
7/ Identify candidate areas



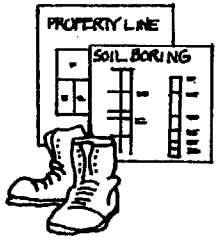
8/ Identify sites within candidate area



9/ Identify spoil disposal sites

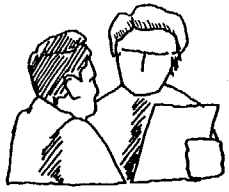


10/ Assess identified sites



11/ Elect superior site(s)

12/ Hold preapplication conference with NJDEP Division of Coastal Resources



A good site will be located close enough to open water to allow participation in the desired water uses (fishing, cruising, sailing, etc.). Another access consideration is the ease of navigation along channels to the open water. Interesting mooring areas (e.g., beaches, swimming, fishing, and birding areas, and scenic outlooks) add attractiveness to the site.

Channel depth and dredging are also important considerations. Water depths should be 4 to 7 feet at mean low water, depending on the desired boat types. The state dredges specified channels, and anyone siting a new marina should first check to see which channels are dredged and the priority for that area. As siltation is a problem in New Jersey, private marina dredging will probably be required, and a location near a suitable private dredge disposal site will save on maintenance dredging costs. The importance of locating a nearby acceptable site for dredged spoil cannot be overemphasized.

To ensure adequate water flow, the developer should look for a site with a high flushing rate. This will maintain water quality and reduce shoaling. Areas with high tidal exchange or river flow have naturally high flushing rates.

In areas that have high tidal fluctuations, floating docks are usually prefered by marina operators and users, even though they are more expensive than fixed docks (Figure 6). Seasonal water level fluctuations should also be taken into account in selecting the dock type for a marina.

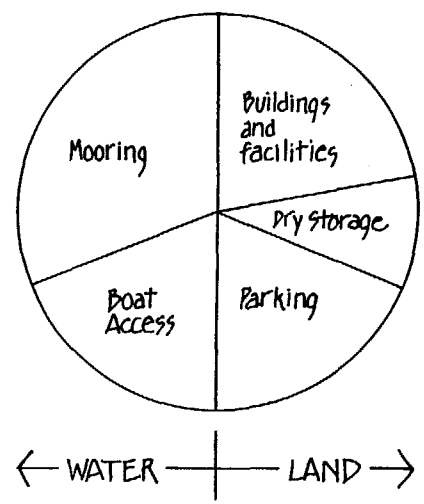
Adequacy of land and water areas and allotment of space are also factors vital to the marina developer. Wet storage marinas require open water adjacent to land for slips. A very general rule of thumb for wet storage marinas is that the land area be one to one and one-quarter times the size of the water storage area. For dry storage marinas, the open water adjacent to land need only be large enough to launch a boat and to accommodate a small dock with tie-up space.

Ideal sites are those with ground above the area prone to the 100-year flood. The minimum parcel size depends on the type of marina, whether it will be dry storage or wet storage, and what services are available. Approximately 5 acres appears to be a minimum parcel size. The parcel should allow for placement of buildings, facilities, parking lots, and other shore-based components (Figure 7). Based on experience of New Jersey marina owners, the parking area should be based on a ratio between 0.6 and 0.8 cars per slip.

Figure 6. The influence of tidal fluctuations on marina dock type

TIDAL FLUCTUATION (feet)	SUITABLE DOCK TYPE	
	Fixed	Floating
0-3	●	
3-5	●	●
5+		●

Figure 7. Space allotment considerations for marina siting



Many good marina sites also feature sheltered mooring locations: a facility located in an embayment or behind a breakwater protects boats from wind and waves. Such a site may be difficult or expensive to obtain, however.

Most clubs and users of municipal basins prefer sites within or adjacent to parks or rural settings. Developers of commercial marinas generally prefer sites more centrally located, closer to supply houses. Where boat sales are part of the business, locations visible from an arterial road are preferred. Proximity to heavy industry and similar land uses is injurious to finely finished boats and generally detrimental to business.

As well as the marina's immediate neighborhood, the developer must consider its proximity to population and service centers. Even a marina with a prizewinning design will fail if it is not located near a sufficiently large population and near the shopping areas, restaurants, and other services its customers patronize. A general rule of thumb for marinas is that they should be within one-half mile of other services, although a more isolated marina would certainly be feasible if it included most essential services.

While nearby competition is a siting factor that often concerns developers, market analyses have demonstrated that it is not crucial. In New Jersey, as in other parts of the nation, well-designed marinas with high maintenance standards are usually filled to capacity regardless of the number of nearby competitors.

Existing and planned access to the marina should be carefully considered in the siting phase of development. Ideally, at least two all-weather access roads suitable for automobile access, truck delivery, and boat trailering should be present in the final design. Convenient access for people arriving from buses and rail lines should also be considered.

Available water and sewer lines for a property are a bonus. While wells, septic tanks, and holding tanks can be used, available infrastructure cuts down on capital and maintenance costs and may shorten the permitting time schedule.

Financial and legal factors playing a part in siting include land ownership, land costs, and labor and materials costs. When considering purchasing an existing marina or a piece of shorefront land, the developer should be sure to determine the ownership status of riparian lands on the site. The developer should also request

preapplication conferences with agencies regulating the site or marina activities to determine if there are any site conditions that are likely to preclude permit approvals. The general rule of thumb for land costs is that fees for wet slips and dry storage spaces should pay the mortgage. In considering labor and materials costs, the prospective developer should be aware that these costs vary by location and are generally higher in northern New Jersey than in the southern part of the state. Bulkheading and dredging may cost three times as much in northern locations.

Public concern factors important to marina developers often involve a certificate, permit, or approval. These are discussed in greater detail in the next chapter and Appendix B.

In summary, one of the most common mistakes a developer can make is to buy a piece of land and then figure out what to do with it. There should be three stages to land purchase: (1) finding a suitable site and tying it up by purchase agreement, or option, (2) feasibility investigation that includes an assessment of potential riparian ownership and permit problems, and finally, (3) land purchase if the site is free of serious problems.

Coastal Policies Affecting Marina Siting

New Jersey's Rules on Coastal Resource and Development Policies (NJAC 7:7E-1.1 et seq.) express the state's policies for development in the coastal zone. Under these policies, development is reviewed for acceptability in terms of its location, the use it proposes, and the resources it will impact. Location policies divide the coastal zone into three location types:

- general land areas
- general water areas
- special areas.

General areas are broad categories that classify the whole coastal zone except the water's edge, which is entirely made up of special areas. In practice, policies for general land areas do not apply to marinas. Special area policies apply to areas that are so naturally valuable, important for human use, hazardous, sensitive to impact, or particular in their planning requirements as to merit focused attention.

Policies for special areas override policies for the general areas in which they are found if there is a policy conflict.

General Water Areas. There are eight categories of general water areas defined by state policy (NJDCR, 1982):

- ocean
- open bay
- semi-enclosed back bay
- tidal gut
- large river
- medium river, creek, or stream
- lake, pond, or reservoir
- man-made harbor.

Table 7 summarizes New Jersey policies on various facilities or activities commonly associated with marina development in general water areas. In this table, a facility or activity is shown as being either prohibited, discouraged, or conditionally acceptable, depending upon its proposed location in general water areas.

Marina developers should avoid "prohibited" and, in most cases, "discouraged" combinations in seeking sites for marina development. In order to give an idea of "conditionally acceptable," Table 8 lists conditions that the Division of Coastal Resources may impose upon permit applicants for marina-related facilities and activities.

Special Areas. For marina development, special areas can be separated into those that should be avoided and those that may be conditionally acceptable. Wetlands, due to their extensive occurrence in the coastal zone, are the largest single concern during permit application review. Marina development may be allowed in wetlands, but only after the developer has satisfied four conditions laid down in the coastal policies. Tables 9 through 12 list special areas in the water and water's edge areas to avoid and others that are conditionally acceptable for marina development. The reader can obtain a good idea of state policies for special areas from these lists; a more detailed presentation can be found in the full text of the Rules on Coastal Resources and Development Policies, issued by the New Jersey Department of Environmental Protection (NJDCR, 1982).

Table 7. Summary of New Jersey policies on marina-related facilities and activities in General Water Areas

	Ocean		Open bay			Semi-enclosed back bay		Tidal gut	Large river	Medium river, creek, stream	Lake, pond, resevoir	Man-made harbor
	18'+	0-18'	18'+	6'-18'	0-6'	6'+	0-6'					
Boat ramps		■										
Docks and piers												
Maintenance dredging												
New dredging			▨	▨	▨	▨	▨	▨				▨
Dredged spoil disposal					▨		▨	■		■		■
Filling	▨	▨	■	▨	▨	▨	▨	▨	▨	▨	■	▨
Piling	▨		▨								▨	
Mooring												

□ Conditionally acceptable see table 8 for review of conditions
▨ Discouraged
■ Prohibited

Source: Adapted from NJAC 7:7E-4.2.

Table 8. Guidelines for conditionally acceptable marina-related facilities or activities

Facility or Activity	Conditions
Boat ramps	o demonstrate need o minimize disturbance to intertidal flats or subaqueous vegetation o construct with environmentally acceptable materials o give priority to public use ramps
Docks and piers	o demonstrate need o minimize adverse impacts during construction o location must not interfere with navigation or overhead transmission lines o minimum interference with natural water flow o float or place on pilings; avoid fill
Maintenance dredging	o dependent on an acceptable dredge disposal site o control turbidity o limit dredging to specified season to minimize impacts to aquatic life o use of spoil for beach nourishment is encouraged if spoils suitable
New dredging	o all conditions under Maintenance Dredging o demonstrate need o adjacent water areas are used for boating o dredged area does not disturb Special Water or Water's Edge Areas o minimum adverse environmental impacts o no adverse impacts on ground water resources
Dredge spoil disposal	In water: o prohibited or discouraged in moving or shallow water o clean spoil can be used for beach nourishment or to create new wetlands in any General Water Area or borrow pits
Dredge spoil disposal (continued)	o spoil can be placed in lakes, ponds, and reservoirs if it is contained On land: o dredge spoil should be covered with clean material o dredge spoil must not pollute groundwater or surface water o dredge spoil must not degrade landscape or release objectionable odor o clean dredge spoil can be used for: -landscape restoration -enhancing farmland -creating recreation sites -building islands -capping contaminated spoil areas -making new wildlife habitats
Filling	o generally prohibited or discouraged below mean high water, but filling may be considered if 7 conditions are met: -use is water-dependent -existing facilities do not meet need -no feasible or practical alternative site on water's edge -minimum practical area is filled -compensate in-kind for loss of aquatic habitat -minimum feasible interference to Special Areas -pilings or floating structures are unsuitable for engineering or environmental reasons
Piling	o acceptable if associated with water-related marine facility such as dock or pier
Mooring	o acceptable in all General Water Areas provided mooring area is marked and is not a hazard to navigation

Table 9. Water areas to avoid in marina development

Water Area	Reason
Shellfish beds	economic and recreational resource
Surf clam areas	economic resource
Submerged vegetation and adjacent uplands	valuable habitat and food source for marine organisms; natural sediment trap
Navigation channels	no structures in channels; however, maintenance dredging is permitted (see Maintenance Dredging for conditions)
Canals	(see Navigation Channels, above)
Inlets	strong tidal currents are hazardous
Ports	potential interference with large boat traffic, conditionally acceptable if access to marina is independent
Submerged infrastructure routes	protection of large capital investment
Shipwrecks and artificial reefs	habitat for game fish
Intertidal flats	habitat and food source for benthic organisims

Table 10. Water's edge areas to avoid in marina development

Water's Edge Area	Reason
Wetlands	wetlands are stringently protected for their ecological and hydrologic functions; to use wetlands developer must demonstrate -use is water-dependent -no prudent or feasible alternative site exists -minimum feasible alteration of tidal circulation -mininum feasible alteration of natural contour and vegetation
Beaches	unrestricted beaches are vital to state's resort economy
Dunes	dunes are protected for their geological, recreational, scenic, and protective values
Wetlands buffer	a buffer should be maintained around wetlands for protection from runoff and other impacts; the required buffer will vary in width depending on its nature and the nature of the adjacent use

Table 11. Water areas that are conditionally acceptable for marina development

Water Area	Condition
Prime fishing areas	acceptable if fishing is not impacted
Finfish migratory pathways	marina structures should not block pathways
Marina moorings	marina moorings are already used for recreational boating

Table 12. Water's edge areas that are conditionally acceptable for marina development

Water's Edge Area	Condition
Filled water's edge	marinas are acceptable
Existing lagoon edge	developer must show o reclamation not feasible o compatibility with adjacent uses o stabilization of slopes with vegetation o adequacy of retaining structures
Natural water's edge-floodplain	marinas are acceptable in absence of filled water's edge
Alluvial flood margins	developer must demonstrate that facility is directly related to marina use
Wetland buffers	developer must protect natural vegetation that connects upland to wetland and not do anything to jeopardize wetland
Wet borrow pit margins	minimize disturbance to wildlife habitat
Erosion hazard area	development possible if measures are taken to stabilize area
Coastal bluff tableland	development allowed if tableland is not in erosion hazard area

FEASIBILITY ANALYSIS AND PRELIMINARY DESIGN

For the most part, the development process to this point has been a preliminary market, technical, and environmental report. Many of the factors considered so far have been general in nature. Once a site or several alternative sites have been selected, the marina developer will have a more definite marina concept and design. It is at this point that the developer can determine if it is really technically, financially, and environmentally feasible to build a marina.

Feasibility analysis involves the collection and analysis of detailed site information to produce a realistic, quantitative estimate in dollars and time of the technical (design), financial, and environmental (permits and approvals) justification for building a marina. Figure 8 is a schematic diagram of the process of analyzing development feasibility.

The analyses of water and land suitabilities and financial perspective feed into preliminary designs and eventually a final design. While this can be an involved process, an experienced planner and designer should be able to recognize fatal flaws early on and prevent the need for unnecessary studies. This is an interactive process with many exchanges of ideas and refinements to the concepts.

Using information on the permitting process (Table 13) and statistics on time to construct facilities, a time line for development should be prepared. Next, cash flow should be analyzed. Income should be compared to upfront costs and expenses on a monthly basis from the end of the feasibility study through the first three years of operation. Seasonal differences in income and expenses will be important: nearby operating marinas can be consulted for reliable estimates of fluctuation. The project should be timed so that construction and permitting are completed just before or early in the next boating season.

This analysis of feasibility can be long and tedious; however, it does not pay to take short cuts or make less conservative assumptions. Optimism and desire being the new developer's fatal enemies, the "worst case" should be considered as a baseline. Again, experienced marina owners recommend that a project is feasible only if the fees from summer and winter storage pay the mortgage.

Before construction of a marina can begin, or in some cases, before the facility can be operated, applications for permits and certificates must be

Table 13. Permits, approvals, and certificates to be considered during the planning of a marina

FEDERAL PERMITS AND APPROVALS

Army Corps of Engineers
- Department of Army Permit

Environmental Protection Agency
- Fuel Storage Permit

NEW JERSEY PERMITS AND APPROVALS

Department of Environmental Protection

Division of Water Resources
- N.J. Pollutant Discharge Elimination System Permit
- Stream Encroachment Permit
- Water Diversion Permit
- Well Drilling Permit

Division of Coastal Resources
- Waterfront Development Permit
- Wetlands Permit
- Coastal Area Facility Review Act Permit

Department of Agriculture
- Soil Erosion and Sediment Control Plan Certification

Department of Transportation
- Transportation Permits

REGIONAL PERMITS*

Delaware & Raritan Canal Commission
- Review of Construction Plans

Hackensack Meadowlands Development Commission
- Construction Related Permits

Pinelands Commission
- Review of Construction Plans

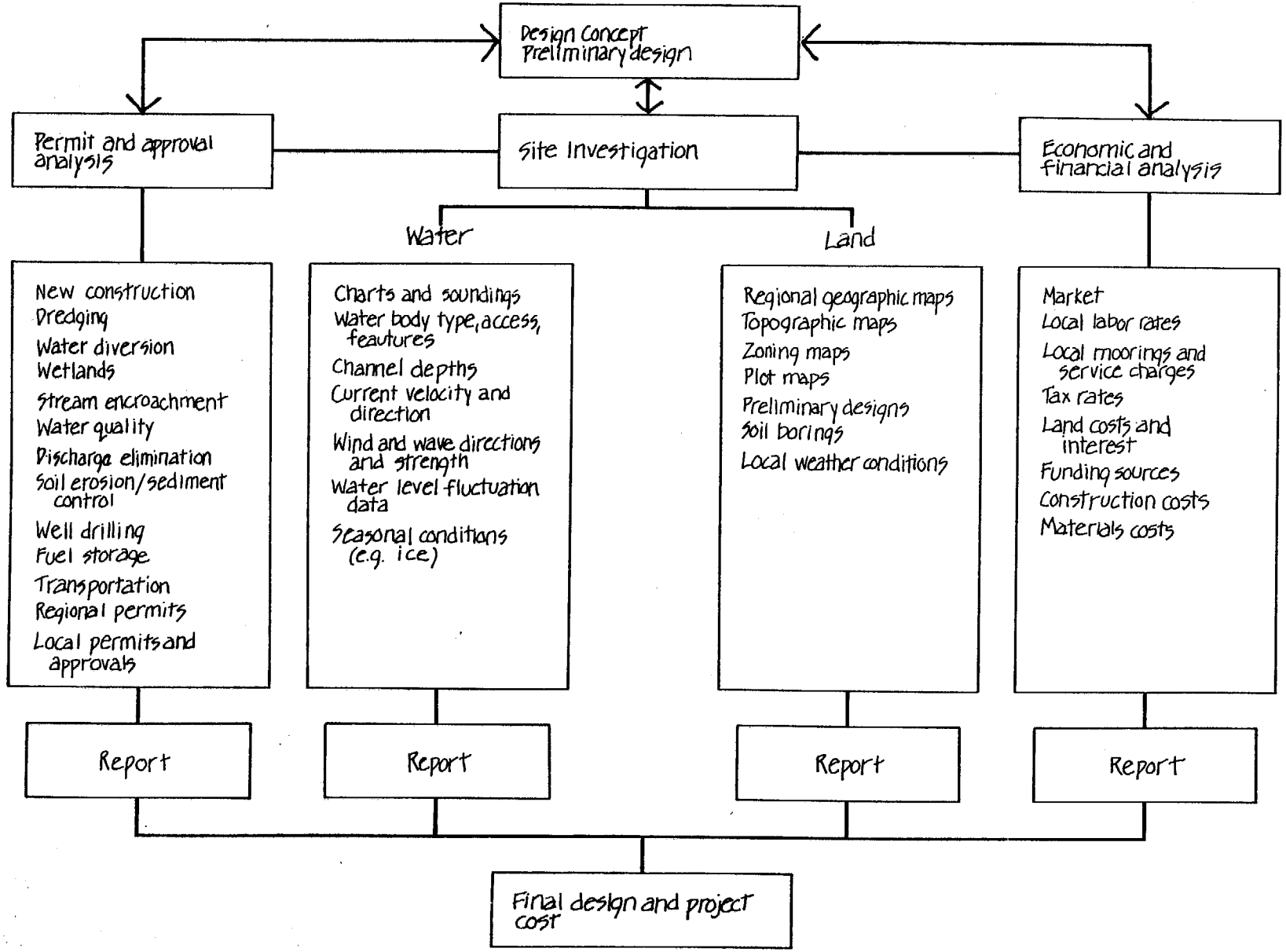
Delaware River Basin Commission
- Review of Construction Plans

LOCAL PERMITS AND APPROVALS

Municipality
- Site Plan Approval
- Public Water Use Approval
- Sewer Plans and Tie-in Approval
- Building Permit
- Certificate of Occupancy

*Regional permits are required for marinas located in certain areas of the state.

Figure 8. Site feasibility analysis

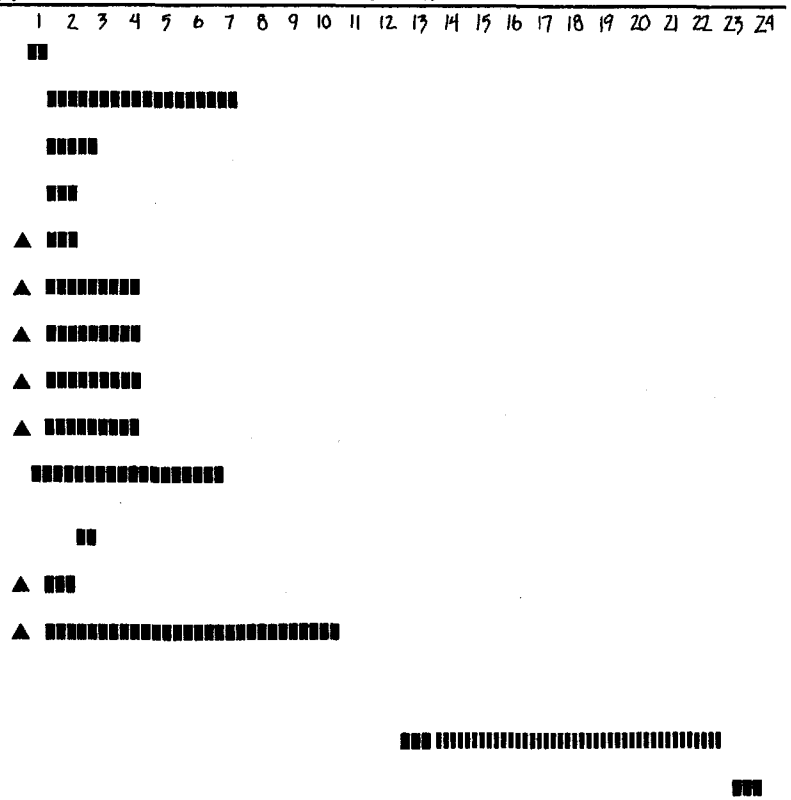


approved by local, state, regional, and federal agencies. Through public hearings incorporated in the permitting process at the local level, citizen participation is encouraged. Informed residents who have had the opportunity to participate in this process and to shape the proposed development can make good neighbors for a marina. Complete and detailed applications and a close working relationship with government agencies will aid in completing the permitting process in the shortest time possible.

The exact permits and approvals required can only be determined when the location has been identified and a physical description of the specific facility has been developed. As well as construction approvals, permits are also needed for activities related to facility development such as water access, dredging of slips, and disposal of dredged material. Table 13 provides a list of permits, approvals, and certificates that should be given consideration during the planning of a marina facility. Appendix B provides a description of each permit and an explanation of the application process. Figure 9 is an example timeline for the permitting process.

Figure 9. Example timeline for obtaining permits for marina development

PERMIT NAME	CONTACT AGENCY	AVERAGE TIME REQUIRED
Master Permit Information Form	Office of Business Advocacy	14 days
Tidelands Grant, Lease or License	DEP Division of Coastal Resources	6 months
Site Plan Review	Municipal Planning Board	45 days
Sewer Tie-in Approval	Sewer Authority (County or Local)	30 days
Soil Erosion and Sediment Control Plan	Regional Soil Conservation District	30 days
Waterfront Development Permit	DEP Division of Coastal Resources	90 days*
Wetlands Permit	DEP Division of Coastal Resources	90 days*
Stream Encroachment Permit	DEP Division of Water Resources	90 days*
Well Drilling Permit	DEP Division of Water Resources	90 days
New Jersey Pollutant Discharge Elimination System	DEP Division of Water Resources	6 months
Public Water Use Approval	Local Water Company or Utility	14 days
Access Driveway Permit	Department of Transportation	30 days
Dredge and Fill Permit (Sec. 404 or Sec. 10) (non-EIS actions)	Army Corps of Engineers	9 months
Fuel Use Permit	EPA	
Building/Construction Permit	Local Building Inspector	30 days
Certificate of Occupancy	Local Building Inspector	30 days



Time required

Construction

▲ Optional preapplication meeting (could speed the permitting process along)

* Maximum time for review of complete application as required by state law

NOTE: Most marina projects will require only some of the above permits

DESIGNING A MARINA

Marina design is concerned with the onshore and offshore arrangement of facilities for boats, their owners, and marina operators. Good design is workable and attractive to clients, provides safe harbor for boats, reduces maintenance costs, lessens environmental impacts, and allows for future expansion. It should create a strong waterside atmosphere with pleasing views of water and piers.

As noted earlier, before site design begins, a design concept must be defined. The design concept states the approximate number and sizes of boat slips, the mix of boat types, and the onshore support facilities that the market analysis indicates are viable. The design concept should include all basic marina components:

- breakwater (if needed)
- fairways and channels
- piers and mooring slips
- boat launching system
- marina office
- parking
- access road.

Depending on the scale of the venture and its setting, the design may also include various boating-related facilities:

- boat repair
- boat and accessory sales
- boat rental
- boat equipment and supplies sales
- fuel depot
- fresh water and ice supply
- sewage pumpout and solid waste disposal
- telephone and electric hookups
- grocery store
- clubhouse
- locker room
- dry storage area.

Larger development projects may also include one or more marina-compatible land uses:

- o restaurant
- o shops
- o trade center
- o community center
- o convention center
- o selected industry
- o offices
- o exhibition center
- o museum
- o historic vessel display
- o sports and other recreation facilities
- o hotels, motels
- o residential development.

The ratio of land to water area is roughly 1 to 1 for the basic marina and increases above that as more land-based facilities are included. As the design is refined, site constraints will necessarily modify the original design concept.

In its layout and selection of materials, the final marina design should reflect its setting. Marinas in rural locations should strive for soft edges, and urban marinas can appear bolder, with the hard edges found in urban environments. The setting will also strongly influence the selection of marina-compatible land uses. Urban marina sites with a full complement of these uses nearby may not need them as part of the design; rural sites may not be able to support them. Marinas developed as part of municipal parks must be designed to fit the overall scale and purpose of the park. As part of a public park, a marina should include public fishing piers and be designed to assure boat security.

Wherever a marina is located, it should be a welcome sight and should offer a place to relax for those who have spent a long day at sea or in the factory or office. Recreation facilities such as a beach, a play area for children, or a fishing pier can increase the interest of a marina by providing activities for family members not involved in boating preparations.

This chapter presents design guidelines that are generally applicable to marinas. The sections that follow describe each of the basic marina components, certain of the boating-related facilities, and guidelines that relate the various components and facilities to each other. In the last section of the chapter, various environmental impacts of marina development and ways to reduce them are discussed.

In order to proceed rationally with the design of a marina, data specific to the site must be collected. Each sketch design must be tested against these data to attain the best tradeoffs in use of water and land areas and maintenance costs.

Offshore Layout

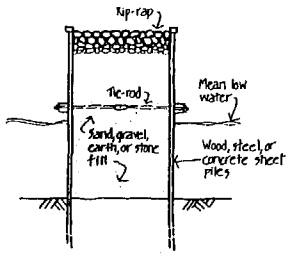
Maximum use must be made of the water area to provide berthing space for boats of various sizes and safe, convenient access to boat slips from the marina entrance. Various tradeoffs will have to be made among the following factors:

- channel dimensions
- slip dimensions
- fairway widths
- turning areas
- fueling facilities
- variations in water depth
- direction and intensity of normal and storm currents
- position and type of breakwater.

In creating a layout plan for the offshore area to serve the anticipated number of boats, the developer should be mindful of the possibility of expansion. It is wise to set aside usable water areas for future walkways, fairways, channels, and turning areas, as well as to consider the relationship of these to onshore facilities. The best way to achieve this is to design for the whole site, then construct only the part of it that is needed to fulfill current expectations.

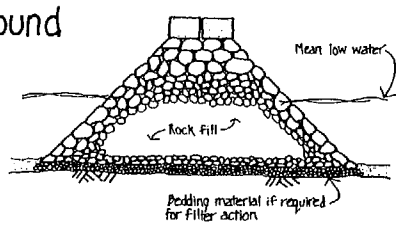
One very important guideline for the entire offshore area of the marina is that the water should deepen gradually from nearshore through the fairways and channel and thence to the entrance, which is the deepest point. The entrance, in turn, should not be deeper than the open water outside the marina. This gradient is important to minimize costly maintenance dredging.

Figure 10.
Filled sheet piles



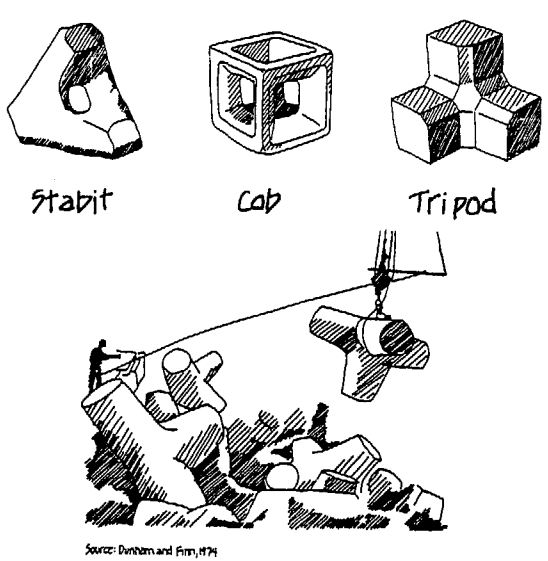
Source: Chaney, 1961

Figure 11.
Riprap mound



Source: Chaney, 1961

Figure 12. Masonry units for breakwater construction



Source: Dunham and Finn, 1974

The cost of offshore work and facilities needed for marina development in New Jersey is influenced by regional differences in tidal variation, bottom type (hard vs. soft), dredging costs, availability of dredged spoil sites, and sheeting and piling costs.

Breakwaters. Breakwaters reduce waves entering a marina by absorbing and reflecting wave energy away from the marina. They can be either floating or fixed. Fixed breakwaters are more expensive and their cost increases rapidly with water depth. They are used most effectively where long wavelength waves are a problem: they prevent transmission of hydrostatic differences created by these waves to the marina. Fixed breakwaters can be made of rubble mounds or of timber, steel, concrete sheet pile, or specially shaped masonry units.

Floating breakwaters are only effective for wavelengths shorter than twice the width of the breakwater, and they are not effective on the open coast. They offer certain advantages over fixed breakwaters.

- They are generally preferred by the New Jersey Department of Environmental Protection.
- Their cost is nearly independent of water depth.
- They can be used where soft or unstable bottom precludes the use of fixed breakwaters.
- They can be easily relocated.
- They do not interfere significantly with shore processes, fish migration, or natural water currents.

Flexible assemblies such as scrap tire breakwaters are inexpensive and can reduce four-foot waves to one foot.

Breakwaters should be perpendicular to the primary direction of wave approach.

To the greatest extent possible, the layout of fixed breakwaters should preserve the flow of currents that are needed to flush out the marina basin. This

can often be accomplished by providing an opening at each end of the enclosure. Not only does the constant flushing action dilute and carry away pollutants generated by the marina, but it also lowers maintenance dredging costs by keeping silt from settling out.

Entrance. The entrance to the marina should be wide and deep enough to allow boats using the marina to enter it safely in all weather conditions in which the craft can navigate. It should be located so as to avoid direct normal and storm waves. It should be four to five times as wide as the beam of the widest boat expected to use the marina, or a minimum of 60 feet. The minimum depth of the entrance and the channel leading to the fairways should be the draft of the deepest-draft boat using the marina, plus half the expected wave height and one or two feet of extra clearance for soft or rock bottom. If fire-fighting or other emergency boats serve the area, the dimensions of these boats should be accommodated in the entrance and channel design.

Channel. The channel connects the marina entrance to the berthing areas. It should be about twice as wide as the entrance. If sailboats are to be significant users of the marina, a wider channel should be considered and it should be oriented perpendicular to the prevailing winds to allow for tacking.

Fairways. Fairways are the stretches of water between rows of boat slips that lead from the slips to the channel. Fairways should be 1.5 times wider than the length of the longest slip. However, if the current runs parallel to the slip and even briefly may exceed 2 to 3 knots, the fairway should be made twice as wide as the longest slip served by the fairway.

Turning Areas. Turning areas should be provided wherever significant transient traffic must make turning maneuvers, such as around the fueling pier. Another situation where turning is necessary is in long, angled fairways. At the angle, the fairway should be wider by layout of the walkways, shorter slips adjacent to the turn, or both. Double-screw powerboats and sailboats need less room to turn. Where these boat types predominate, the turning area can be as narrow as 2 times the length of the longest boat frequenting the area. If there is either a high proportion of single-screw boats or frequent onshore winds, this ratio should be 2.5 to 2.75. Limited available space will influence the ratio at the lower end. Concern over lost revenues and wave generation over wide stretches of open water within the marina will govern design at the upper end of these guidelines.

Figure 13. Floating breakwaters

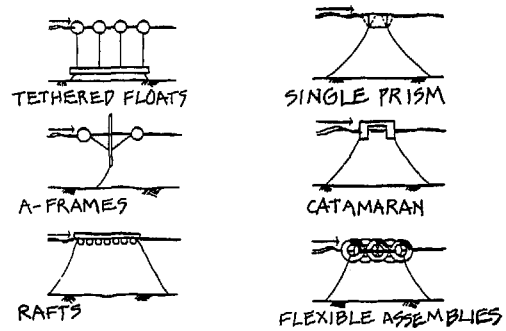


Figure 14. Fairway and finger pier spacing

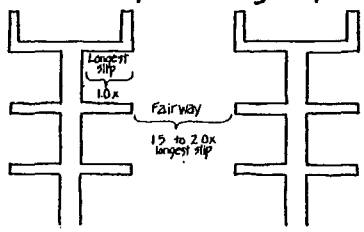


Figure 15. Offshore layout showing basic marina components

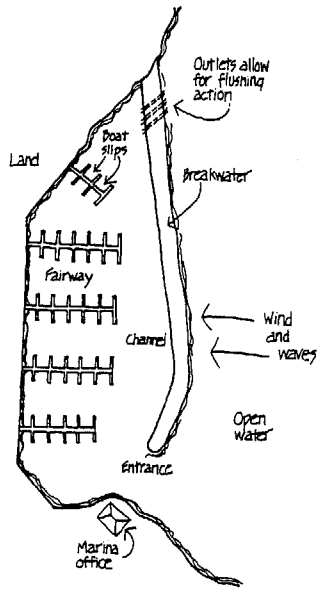
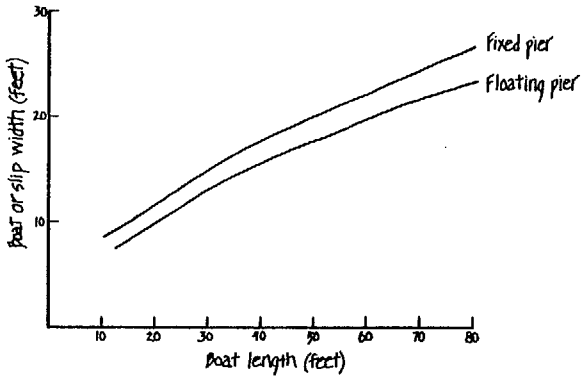
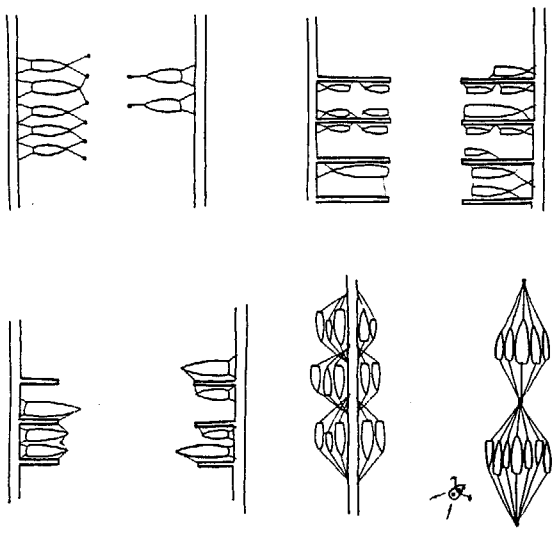


Figure 16. Boat slip width depends on boat length and type of pier



Source: Adapted from Cheney, 1961 Chamberlain, 1979.

Figure 17. Mooring arrangements



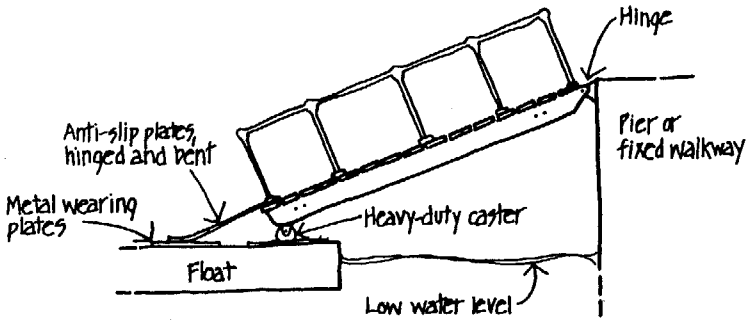
Boat Slips. Boat slips provide in-water storage of boats when they are not being used and during trip preparations. Most commonly, slips are adjacent to walkways in one of various arrangements (see diagrams), although circumstances may require that boats be moored in clusters reachable only by dinghy. When a boat is berthed in a slip, all four corners of the boat should be tied to the pier structure or pilings unless fewer ties are clearly sufficient. Freestanding spring piles and fender piles can be used to help restrain moored boats from moving in the water. Slips should be oriented at right angles to the direction of short wavelength waves in the marina basin and at right angles to the adjacent main walkway. Slips of the same size should be arranged symmetrically on each side of the walkway. Larger slips for deeper-draft boats should be placed nearer to the channel, and smaller slips, closer to shore. The width of the slip is related to the boat width, to the tidal fluctuation, and to whether or not floating piers are used.

Mixed-use marinas should provide separate berthing areas for commercial and recreational craft. Slips for rental boats should be placed near charter boats, the harbor entrance, and the rental office. Sailboats should be berthed in slips that open to leeward of prevailing winds.

Water depth at low tide should accommodate the moored boats assigned to the slips. With soft bottoms, allowing additional depth will decrease bottom mixing from prop wash and the unpleasant turbid water that results.

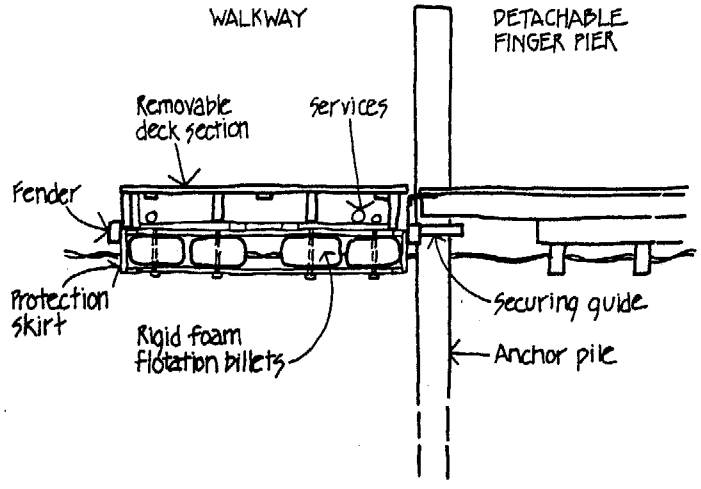
Walkways. Walkways give pedestrians access across water to moored boats and can carry services such as electricity and fresh water to boatside. The main walkway leads from the shore to finger piers (catwalks) and tee walkways at its offshore end. Main and tee walkways should be a minimum of 6 feet wide. If motor traffic on them is anticipated, 8 feet is the minimum. Even wider walkways may be needed if large amounts of nonuser pedestrian traffic are anticipated. However, walkways should be kept narrow: each unnecessary square foot of walkway will cost the marina operator $2.25/year (1979) in unrealized income. It is better to spend money making narrow walkways sturdier than making wide walkways. Walkways less than 200 feet long should be straight; those longer than 300 feet should have an angle introduced about halfway to reduce the apparent length. Walkway layout, integrated with pedestrian ways on shore, should provide the user with ever-changing views. However, curved walkways should be avoided because they are more expensive to build and maintain, are conducive to boat damage, and waste valuable water area.

Figure 18. Ramp



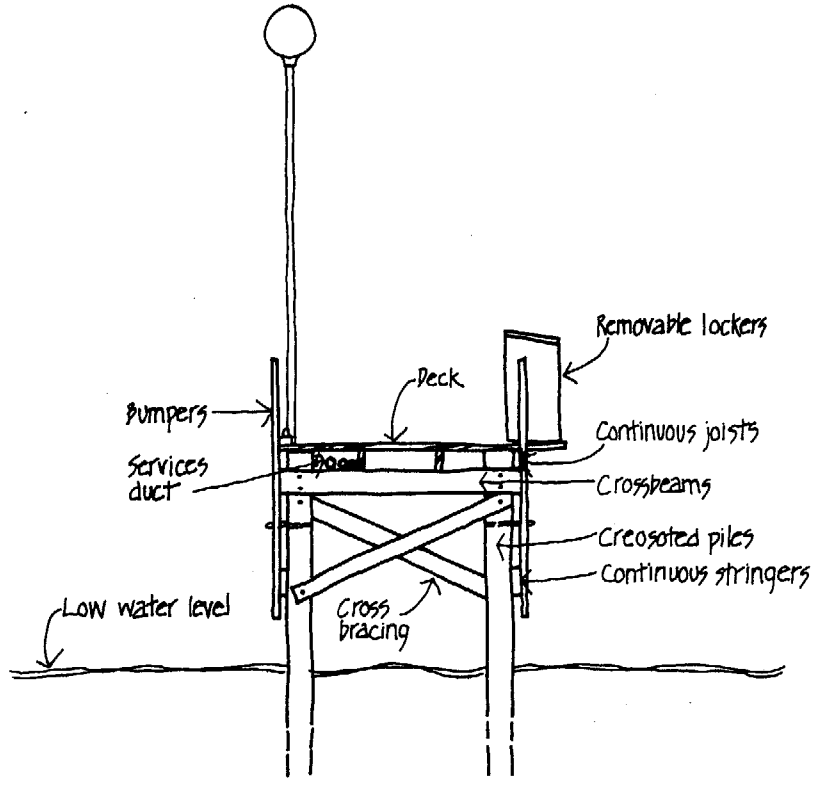
Source: Chaney, 1961.

Figure 19. Floating walkway



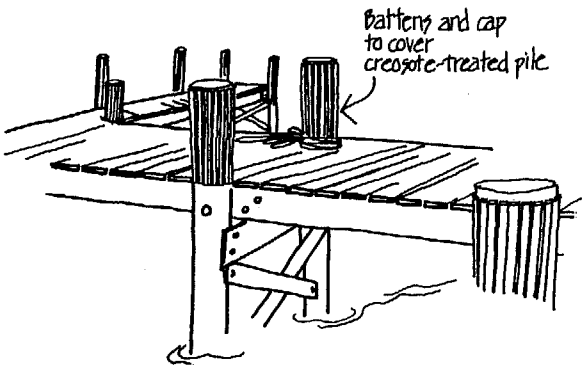
Source: Adie, 1975.

Figure 20. Fixed walkway



Source: Adie, 1975.

Figure 21. Pile covers



Source: Adie, 1975.

Figure 22. Wood preservatives for marine environments

PRESERVATIVE	PURPOSE
Creosote	For pressure preservative treatment of all piles used in waters heavily infested with marine borers
Pentachlorophenol	For pressure preservative treatment of timber and timber products where cleanliness and paintability are required
Copper Napthenate	For pressure preservative treatment of timber and timber products where cleanliness, but not paintability is required
Copper and zinc salts	For pressure preservative treatment of timber products above tide level where cleanliness and paintability are required

Source: Cheney, 1961.

Finger piers, which join the main walkway at right angles, run alongside the boat slips to provide access to people boarding the boats. Finger piers can be short or eliminated altogether if stern-to mooring is used, because many boats can be boarded near the back or over the stern. In this case, wider slips are needed to allow for more difficult maneuvering during berthing. Usually, though, bow-to mooring is used, and this requires a finger pier that runs the full length of the slip. Bow-to mooring allows easier docking, has greater user acceptance, and results in fewer accidents due to carelessness.

The most common use of finger piers is to have one pier provide access to two boats, one on either side of the pier, although a more convenient but more expensive arrangement would allow one finger pier for each boat. Double-wide slips give greater mooring flexibility and save water space, and therefore are more cost-effective. However, this arrangement is more damage-prone, as boats are difficult to protect from each other. Double-wide slips should not be used for boats longer than 35 feet due to the possibility of costly damage. Finger piers under 15 feet long can be as narrow as 2 feet, but longer ones should be at least 3 feet wide.

Walkways can be floating or fixed. Fixed walkways are commonly used in areas with a tidal fluctuation of 4 feet or less and floating ones, when the tide varies 7 feet or more. Floating walkways are made buoyant by a variety of constructions: polystyrene floats, precast concrete tubs, and fiberglass polyethylene shells, filled or unfilled with polystyrene.

Floating walkways are secured to piles by a hole or extension to the pier that allows them to ride up and down on the piles as the tide changes. Detachable finger piers are fastened to the walkways where needed. Floating walkways connect to the shore by a ramp that pivots from the shore and rolls back and forth on the walkway as the tide fluctuates.

Wooden piles and other wooden members constantly or intermittently exposed to sea water must be chemically treated under pressure to prevent attack by termites, marine borers, and fungus. Creosote-treated wood is the most resistant to decay but is objectionable where people and boats can come in contact with it. Wooden battens are often used to cover creosote-treated piles in areas they can be touched.

Pile-supported structures can be severely damaged by ice action, as ice grips the piles and lifts them from their positions when water levels increase. There are few easy solutions to this problem. Piles can be coated with heavy grease at the freeze line. Another very effective solution is to create a bubble curtain around pile structures by means of submerged perforated tubing and an air compressor. The bubbles lift warmer water from below to prevent the surface from freezing. Offshore structures can be protected from ice flows and ice grating action by strategically placed ice breakers and sheet-metal sheathing around piles.

Onshore Facilities

Marina office. The administrative center of the marina should have a good view of the whole marina and be located near both water and road approaches. It should contain the manager's office, staff space and information center and restrooms. A map of the marina, showing slip assignments, should be on display. The marina office can include public telephones, a boat sales office with adjacent outdoor display area, a boat accessory shop, and other shops in or near the same structure. A boat launching ramp should be located nearby for use by boat sales people. A dock is also necessary near the office so that new clients or transients approaching by boat have easy access to information and marina services.

Fueling dock. Fuel supply for both boats based at the marina and transient craft can be offered for sale at a fueling dock within the marina. The fueling dock should be located near the entrance to the marina and should be isolated from other harbor structures and boat slips, both for fire control reasons and to reduce the impact of fuel odors on marina users. The fuel pumps can be at the end of a pier structure or on shore, where they can serve both boats and cars. The fueling dock should be located a short walk away from the marina office. If this is not possible, a small enclosed shelter should be built as part of the fueling station. In larger marinas, two fueling docks can be considered: one close to the marina office for periods of low activity and one more remote, with shelter, continuously manned during holidays and weekends. The area selected for the fuel dock must be accessible to fuel delivery trucks. Two hundred feet of unobstructed pier is recommended for fueling docks.

Other services such as an ice dispenser, fresh water supply, sewage holding tank, and lubricating oil, sewage holding tank, recharge chemicals, and bottled gas

Figure 23. Fueling dock arrangements

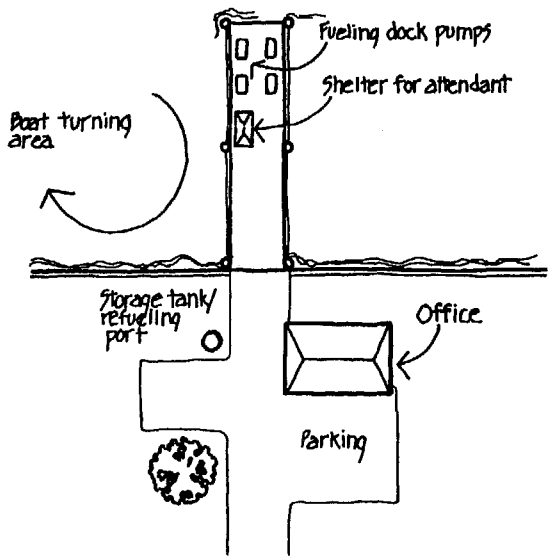


Figure 24. Fuel dock for both boats and autos

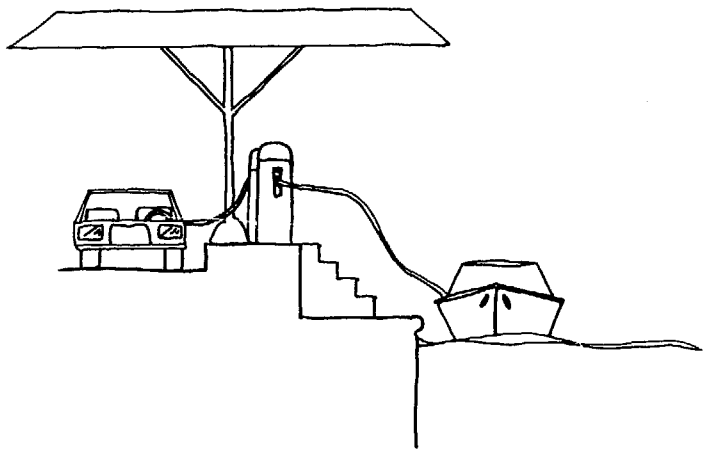
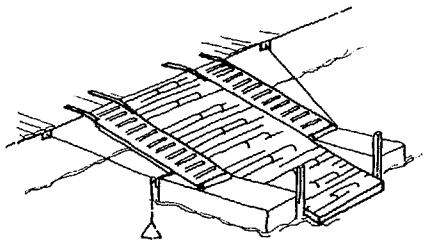
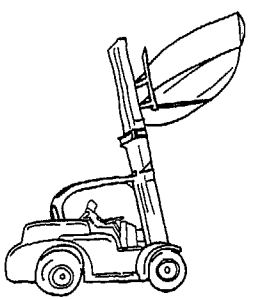


Figure 25. Roller ramp



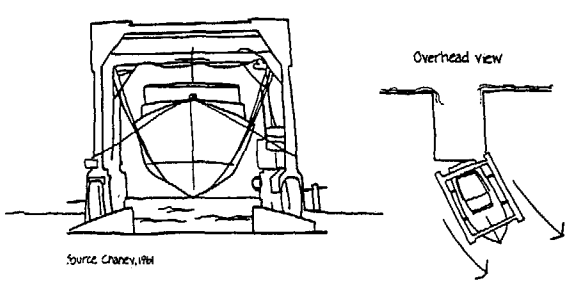
Source: Adie, 1975

Figure 26. Fork lift



Source: Chaney, 1981

Figure 27. Hoist



Source: Chaney, 1981

sales areas can be located on the fueling dock. A sewage pumpout station and solid waste receptacle could also be part of this service complex.

Parking. Convenient parking must be provided to marina users. For every boat slip there should be 0.6-0.8 parking spaces. No parking space should be more than 500-600 feet from the head of the pier served. For reasons of appearance and safety, the main parking area should be set back from the waterfront. Additional parking for other marina facilities should be provided and segregated by purpose:

- cars with trailers
- club visitors
- marina office
- boat sales
- marina-compatible development (restaurant, shops, museum, etc.).

Parking areas should be landscaped and screened if possible, particularly car/trailer parking areas. They can be arranged close enough to each other so that spillover parking is convenient. Parking areas can be used for onshore storage of boats during the off-season if access routes from boat retrieval facilities are provided. Parking areas for boat trailers should be laid out to minimize backing maneuvers.

Boat Launching and Retrieval. Some form of boat launching and retrieval facility is found in every marina. In marinas serving small craft, a ramp from land or a dock with idlers or winch into the water by which trailered boats can be launched and retrieved may be adequate. However, if a large marina is planned and includes berths for large craft, a more mechanized boat-handling system may be called for. Before a decision is made concerning the boat-handling equipment to be used, a careful analysis of the range of purposes and boat sizes served should be done. A major influence on the decision concerning boat-handling systems will be plans to provide off-season dry storage for the boats of marina clients. Boat-handling equipment for large craft may eventually be needed, but often such an investment cannot be justified until the marina has proven itself. In this case, provision should be made in design and construction for foundation work that anticipates the installation of this equipment.

Whatever the boat-handling system selected, the launching/retrieval site should be in water deep enough to accommodate the largest boat expected to use it. The site should be accessible to vehicles transporting water craft and should

include adequate maneuvering area: a minimum paved width of 35 feet is recommended. Table 14 lists the boat-handling equipment commonly used at marinas.

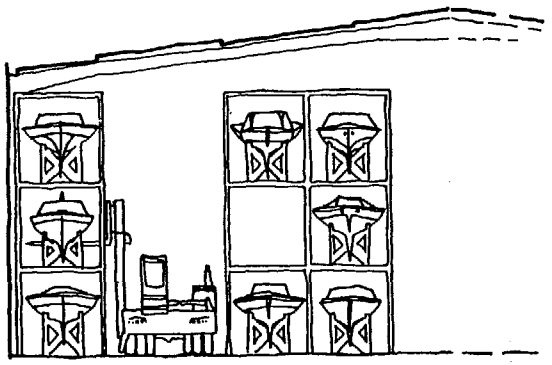
Boat Storage. Recent trends toward dry storage of boats are due to two necessities: one, to increase the number of boats served by a marina that has no more room for additional in-water moorings; and two, to extend the season for the marina by allowing boats to remain at the site throughout the year. An efficient boat-handling system provides service for owners who want their land-stored boats launched and retrieved without undue delay. Boats larger than 18 feet are usually stored year-round in the water unless the marina is equipped with heavy-duty boat retrieval machinery. Most marinas in New Jersey remove boats from the water in winter unless they are equipped with a bubbler or a water pump system that prevents freezing by constantly mixing the water column. Bubbler systems selected should be resistant to animal damage to tubing.

Land storage can be open or covered. Off-season boat storage can make effective use of car parking lots. Covered storage is a more expensive proposition and is only suitable for motorboats and sailboats with stepped masts. Covered storage can be either at ground level or stacked with a fork lift, hoist, or gantry. Covered storage is usually not economical for boats less than 15 feet. However, some off-season storage provision should be made for smaller boats, because many of their owners will eventually purchase larger craft. Boat storage areas should have good paved surface access to the boat launching/retrieval area.

Boat Repair. As part of its service to patrons, particularly motorboat owners, a marina may establish a boat repair facility. Such a facility should be connected to the service entrance and be located near the edge of the marina, away from the clubhouse and moorings, if possible.

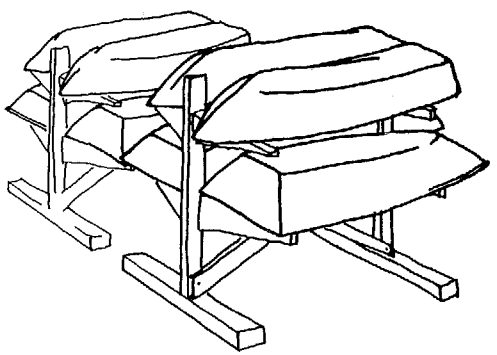
It may or may not have access to open water independent of the usual launching and retrieval areas. It need not be on the water's edge; if not, it should have road access to the boat launching/retrieval areas by whatever boat conveyance system is used. However, in marinas serving larger boats, economies may dictate that boat launching and retrieval equipment be shared by the boat repair shop and the remainder of the marina.

Figure 28. Boat storage



Source: Adie, 1975.

Figure 29. Simple painted timber storage racks



Source: Adie, 1975.

Table 14. Boat-handling equipment

TYPE	BOAT SIZE, TYPE	LOCATION/RANGE	VEHICLE USED	COMMENTS
Launching ramps, slopes, slipways	Any	Water's edge	Variable	Ramps can be used by trailers or dollies or by hand with rollers, rails, winches, or pulleys; can be fixed or floating; fixed ramp slope range 5° to 15°
Winches	Any	Water's edge	Trailers or cradles	Used in conjunction with a ramp; simple and inexpensive to operate
Gantries	Any	Water's edge	Slings under craft	Boats hoisted from water and placed on trailer or linked directly to overhead rail to storage and repairs area
Railways	Larger, masted boats	Variable	Cradle with rail wheels	Winch used to pull boat from water; low visual profile
Platform and lift	Any	Vertical at water's edge	Cradle on platform	Suitable for deep water with steep banks and bulkhead walls; boat transferred to trailer or dolly
Hoists	14-70 foot length	Wherever paved surface is wide enough	Slings under craft	Motorized wheeled hoist straddles wet dock, lifts boats from water, then drives to destination
Cranes	Up to 20 tons	Within radius of crane arm	Slings under craft	Crane can be fixed or mobile
Fork lifts	Up to 6½ tons	Fixed or mobile on paved surface	Forks with adjustable spacing	Lift mechanism can be mounted into bulkhead; mobile lift can move boats about on land; particularly useful with stacked storage
Tractors and trailers	Any	Anywhere on paved surface	Trailer with cradle	Operates on a ramp with 1:10 slope

Source: Adapted from Adie, 1975.

Clubhouse. The clubhouse has the potential to become the social heart of a marina. It may turn a profit on its own if it is well received by the community of marina users. It should be located on the waterfront, fairly close by foot to both parking areas and boat moorings. If possible, the main views of water from inside the clubhouse and from its roof decks and terraces should be oriented to avoid glare from the sun. There should be a dock near the clubhouse, with connecting walkway, for unloading passengers and equipment from boats. Similarly, there should be an unloading area next to the clubhouse for automobile passengers and their equipment. The clubhouse can be close to marina-compatible development such as hotels, shops, and apartments, but it should be remote from noise sources. It should have a user entrance separate from the entrance used by service and staff vehicles.

The basic clubhouse has a clubroom and washrooms with showers, lockers, and dressing areas. Other features that can be included in a clubhouse are a bar, snack bar or restaurant, boat gear store, kitchen, library, committee rooms, and various indoor sporting areas such as tennis, volleyball, or badminton courts, swimming pool, game rooms, and exercise rooms. The marina office could also be located in the clubhouse. Committee rooms in the clubhouse or elsewhere on the marina grounds can form an excellent community focus that will inevitably bring attention and publicity to the marina. These rooms can be made available to boaters for organization meetings and courses on water safety, and to the larger community at a nominal fee for various social and civic functions. Marina operators can actively maintain community use of the clubhouse by sponsoring activities that draw people to the marina throughout the year.

Clubhouses in private marinas generally have 20-50 square feet of floor space per boat slip; municipal marinas have 10-30 square feet per slip. Men's locker rooms should have a toilet, urinal, sink, and shower for every 80-100 boat slips. On the same basis, womens' locker rooms should have two toilets and one sink and shower.

Circulation. Generally, land access to and circulation within the marina is first divided on a functional basis. For the most part, the social and service areas of a marina should be separated, each having its own entrance but having interconnections where function or interest provides a reason. Marina patrons and owners enter from the main road by one entrance, and service vehicles by another.

Parking areas for boat trailers should have reasonably direct access from boat launching areas. However, apart from access to the launching area and to passenger and gear unloading areas near pier heads, motor traffic should be kept back from the water's edge for practical, safety, and aesthetic reasons. The patron access road should lead directly to the club, parking areas, and boat launching areas. Parking areas should be functionally sized and located--club, boat launching area, shops, marina office, etc. Large car-parking areas should be broken up and screened by plantings, and by variations in level and materials used at edges to avoid the visual monotony of large, barren surfaces. Grassed areas or gravel surfaces can be specified for boat trailer parking: boat trailers do not need a paved parking surface. Road design should take into account the circulation patterns and parking facilities needed by patrons arriving by automobile (with or without trailer), public transport, motorcycle, or bicycle. Drivers of the latter two vehicle classes will tend to ride right up to the destination and secure the cycle to whatever is handy, so providing close-by parking for them will reduce clutter at building entrances.

Pedestrian paths should be segregated from motorways with as few crossings as possible. They should also provide the pedestrian with changing and interesting vistas.

Environmental Protection. The guidelines for facilities provided above for marina design are primarily for functional and aesthetic purposes. Protection of the natural environment has not been considered due to the impossibility of anticipating in each instance the particular environmental conditions that may be encountered. A more rational basis on which to discuss the environmental impacts of marinas is to focus on the various activities of marina construction and operation that can cause environmental degradation. Table 15 presents eleven possible impacts and the activities that can lead to these impacts (NOAA, 1976).

Environmental impacts from marina operations can usually be reduced to an acceptable level or eliminated altogether by good management. This includes clear rules for marina patrons to follow concerning sewage and solid waste disposal, boat speed limits in the marina, and well-maintained repair areas. Well-established techniques to reduce runoff from contaminated surfaces and to trap or filter water pollutants in this runoff should be part of the overall marina design:

Table 15. Marina environmental impact matrix

FACILITY COMPONENTS* / IMPACTS**	Alteration of natural areas	Alteration of water circulation patterns***	Turbidity	Release of sewage	Oil spills	Land runoff	Erosion	Shoaling	Dissolved oxygen depletion	Air pollution	Copper pollution
Access channels	●	●	●				●	●	●		
Boat basins	●	●	●				●	●	●		
Piers and docks	●	●	●								
Boat moorings											
Launching ramps	●					●	●				
Bulkheads	●	●	●				●	●			
Breakwaters	●	●	●				●	●			
Marine sanitation devices				●					●		
Pumpout facilities	●			●					●		
Fuel docks	●				●						
Boats			●	●	●		●	●	●	●	●
Access roads	●	●				●	●				
Parking lots and cars	●					●	●			●	
Dry storage areas	●					●	●				
Clubhouses	●					●					
Storm sewer outfalls	●		●	●	●	●			●		
Septic tanks				●					●		
Dredging	●	●	●				●	●	●		
Spoil disposal	●	●	●			●	●	●	●		
Boat repair and maintenance areas	●				●	●					●

* All facility components are not necessarily involved in each marina.

** All impacts are not necessarily produced at each marina.

*** Impacts may be either positive or negative.

Dots indicate a potentially significant relationship between the facility component and impact category during either construction or operation. The component may be either a source or a cause for that impact.

Source: U.S. Department of Commerce, 1976.

- minimize impervious surfaces; use various types of porous pavement where feasible
- separate "clean" surface water runoff from contaminated surface water runoff
- direct contaminated surface water runoff to vegetated areas for infiltration
- avoid direct discharge of contaminated runoff in surface waters; use retention basins
- if runoff is discharged directly, introduce to well-flushed waters.

For the offshore environmental impacts associated with marina development, there are guidelines that can be applied to many situations. Overall, the marina developer should be concerned with maintenance of the biological productivity of the site. To this end, the following guidelines apply to many marina situations (Giannio and Wang, 1971):

- design the marina for high flushing rates to promote water circulation, which cycles nutrients and prevents stagnant conditions from developing

- use dredged spoil to establish new productive marshes elsewhere

- provide contact areas within the marina so that fouling communities, an organic food source, can prosper

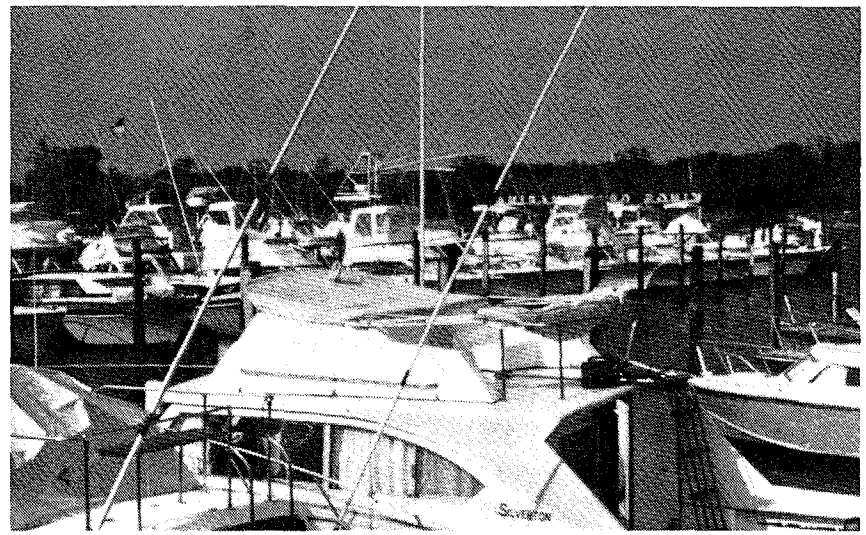
- control water quality so that estuarine species can thrive in the marina.

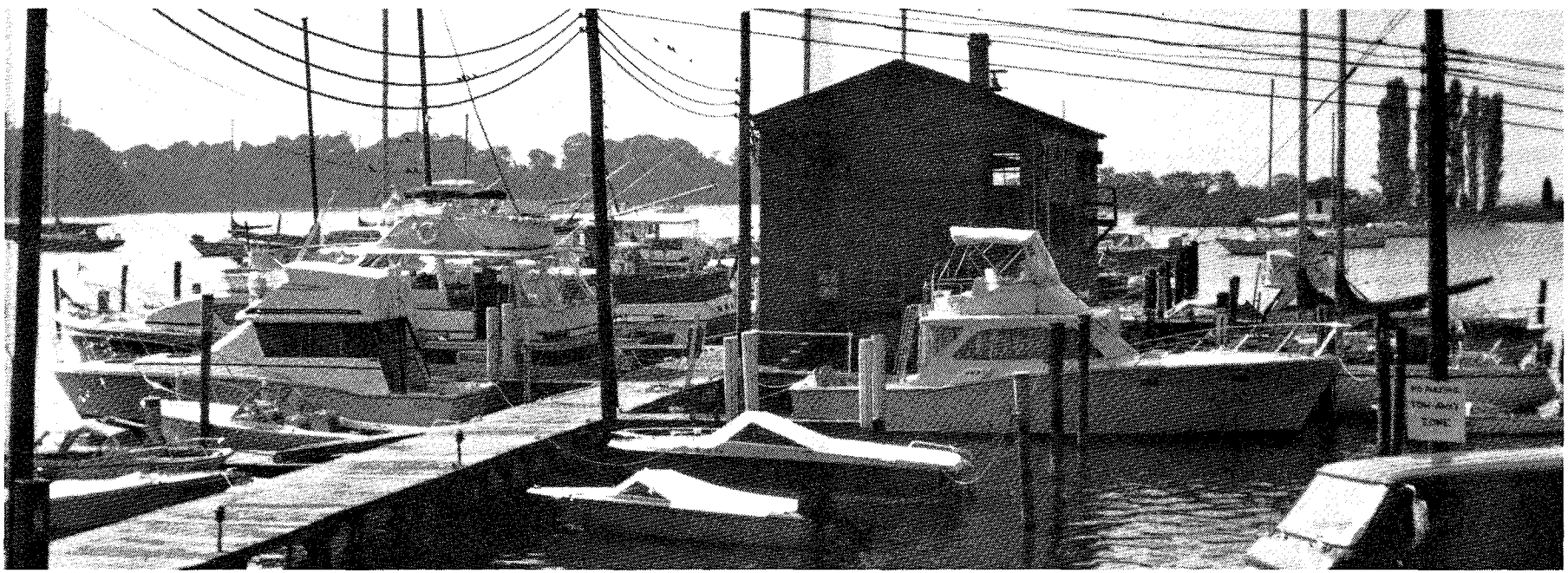
In order to minimize dredging, bottom topography should be studied so that the moorings of small boats can be placed in naturally shallow water and those of larger boats, in deeper water. The marina should never be deeper than its entrance: deep areas of stiller water that will trap sediments and require frequent maintenance dredging should be avoided. The natural water circulation patterns should be maintained to the extent possible. Floating breakwaters should be used whenever possible: they are cheaper than solid ones and interfere very little with natural currents. Marsh edges should not be bulkheaded. Low, sloping riprap should be used instead of vertical walls when possible because slopes provide greater surface for productive fouling communities as well as absorbing wave energy to reduce moored boat movement. Access roads to piers should be mounted

on pilings instead of solid fill to reduce the impact on marshes and water circulation.

To reduce the turbidity resulting from dredging, silt screens and bubble curtains can be used in calm water. They are not effective in rough water, however. Spoil must be disposed of at state-designated or approved sites. If agency approval is given, dredged spoil could be used to create an artificial marsh.

Boat speed limits should be set and enforced to reduce the erosive action of waves on exposed shorelines and to reduce the turbidity caused by prop wash in shallower waters. The latter can also be minimized by assuring that the depth of the channel is at least 2-3 feet deeper than the draft of the boats using it.





FURTHER READING ON MARINAS

Adie, Donald W. 1975. Marinas: A Working Guide to their Development and Design. Cahners Books. Boston, Massachusetts. 336 pp.

Presents comprehensive overview of marina development from a brief history of demand to marina management. Chapters analyze essential planning considerations: site selection factors, types of development, problems specific to inland situations, general design principles for onshore and offshore facilities, engineering concerns, landscape planning, necessary public utility services, boat-handling and storage considerations, bunkering facilities, pollution control concerns, economic and legal considerations. Subject bibliographies conclude each chapter. Aspects of materials covered are presented for British audience.

Chamberlain, Clinton J. 1979. "The Marina: Site Requirements, Layout of Facilities and Functions." In The Design of Facilities for Small Craft Harbors and Marinas, Proceedings of a conference sponsored by the Extension Sea Grant Program, December 3-5, 1979. Boston, Massachusetts.

First part of the document evaluates factors necessary in choosing a marina site, identifies the phases in the site selection process, and analyzes exterior factors of marina selection (water access, neighborhood quality, people access). Also illustrates feasibility analyses and evaluates environmental considerations. Second part focuses on the layout of water areas. Recommendations given for slip arrangement and sizes, walkway and fairway dimensions and layout, use of mooring piles, and mooring design. Channels and entrances, turning areas, and location and sizing of fueling facilities also discussed. Concludes with a set of guidelines for the layout of shoreside facilities.

Chaney, Charles A. 1961. Marinas: Recommendations for Design, Construction and Maintenance. National Association of Engine and Boat Manufacture, Inc. New York, N.Y. 247 pp.

Manual of construction methods and materials for marina development. Discusses site investigation and master planning for the marina. Detailed

information presented on construction materials: timber and wood piles, concrete, structural steel, and miscellaneous items such as wrought iron, aluminum, rubber, and plasters. Also discusses design of bulkhead walls, dredging considerations, pier and walk structures, and design of floating equipment. Describes types of boat-handling equipment. Considers offshore protective measures and methods of fire prevention and protection. Presents detailed analysis of water supply systems, sewage, stormwater and waste disposal systems, fuel supply systems, and electrical systems. Concludes with suggestions for ground development, building design and construction, financing and financial feasibility, maintenance and operation concerns.

Crompton, J.L., and R.E. Ditton. 1975 (September). A Feasibility, Management and Economic Study of Marinas on the Gulf Coast. Texas A & M University Sea Grant Program. TAMU-SG-76-201. College Station, Texas. 51 p.

Presents results and conclusions from a series of interviews with 29 public and commercial marina operators along the Texas coast. Considers the effects of restricted supply of marinas, profitability, construction costs, location factors, environmental controls, physical planning, management constraints, economic impacts, and other considerations. Identifies and explains problems restraining marina developments during the present period of increasing pressure for more boat-mooring facilities.

Durand, James B., and Walter MacDonald. 1981 (September). Guidelines for a Master Plan for Dredging in Navigable Waterways in New Jersey. Final Report. Center for Coastal and Environment Studies, Rutgers University. 102 p.

Develops a methodology for preferentially ranking possible dredging projects on navigable waterways in New Jersey. A group of 101 channels is ranked for dredging. Special case status is given to inlets, major commercial use, and major thoroughfare channels. Standard channels ranked next in importance. Relative importance index and relative cost index also developed. Environmental aspects of dredging, dredged spoil, and aquatic and terrestrial dredged spoil disposal areas analyzed, with recommendations given for lessening impacts. Includes bibliography.

Giannio, Steven P., and Hsiang Wang. 1971 (November). Engineering Considerations for Marinas in Tidal Marshes. College of Marine Studies. University of Delaware. Newark, Delaware. 105 p.

Describes the economic, social, and natural values of estuarine settings in which marinas are placed, with an emphasis on coastal marshes. Brief review of negative environmental impacts of developments in these settings. Examines problems, impacts, and potential solutions for locating marinas in a marsh environment. Concludes with a composite marina design that would permit a marina to be constructed in a marsh system yet retain or even enhance its environmental value. Design not tested.

Mitre Corporation. 1975 (May). Guidelines for the Environmental Impact Assessment of Small Structures and Related Activities in Coastal Bodies of Water. For the U.S. Army Corps of Engineers, New York District. The Mitre Corporation. McLean, Virginia. MTR-6916.

Presents information to assist in the identification and analysis of impacts related to permit applications for riprap, bulkheads, groins, mooring piles, dolphins and ramps, dredging, outfalls, submerged lines and pipes, and aerial crossings. For each of the above headings there is a detailed definition, description of main uses, analysis of construction methods, and hypothetical composite case study describing typical impacts. Tables and information permit analysis of magnitudes based on the size of the project. Detailed description of environmental factors precedes the impact assessment segments. Several useful appendices on erosion, runoff, water and air quality, and navigation.

Nixon, S.W., C.A. Ovaitt, and S.L. Northby. 1975. Ecology of Small Boat Marinas. University of Rhode Island Sea Grant Program. Marine Technical Report Series No. 5. Kingston, Rhode Island. 20 p.

Compares basic environmental parameters (nutrients, productivity, biotic diversity, etc.) of two similar neighboring coves in a New England estuary. One is developed into a marina and the other is left in a natural marsh condition. Analyzing the results, the report concludes marinas can be compatible with the productivity of natural coastal environments. Recommends the encouragement of fouling communities at marinas.

OTHER MARINA REFERENCES

Anonymous. 1976 (January). "The Boating Business." 1975. In Boating Industry Magazine. January 1976. Cahners Publishing Co. New York, New York.

Boating Almanac Company. 1982. The Boating Almanac, volume 3. Severna Park, Maryland.

Boating Industry Association and U.S. Environmental Protection Agency. 1972. Analysis of Pollution from Marine Engines and Effects on Environment. Summary Report. Chicago, Illinois. 62 p.

Boating Industry Association. 1973. Information Kit Pleasure Craft Noise Control. Collection of articles. Chicago, Illinois.

Bowerman, Frank R., and Kenneth Y. Chen. 1971 (December). Marina Del Rey: A Study of Environmental Variables in a Semi-Enclosed Coastal Water. University of Southern California Sea Grant Program. Sea Grant Publication No. USC-SG-4-71. Los Angeles, California. 59 p.

Boyd, M.D., et al. 1972 (November). Disposal of Dredge Spoil Problem Identification and Assessment and Research Program Development. U.S. Army Engineer Waterways Experiment Station. Technical Report H-72-8. Vicksburg, Mississippi. 121 p.

Brandsma, M.G., Jiin-Jen Lee, and F.R. Bowerman. 1973 (June). Marina Del Rey: Computer Simulation of Pollutant Transport in a Semi-Enclosed Water Body. University of Southern California. Sea Grant Publication No. USC-SG-1-73. Los Angeles, California. 113 p.

Camp, Coleen M. 1978. The Supply and Demand for Small Boats and Associated Services in Northeastern New Jersey. Masters thesis, Stevens Institute of Technology.

Chaney, Charles A. 1961. Marinas: Recommendations for Design, Construction and Maintenance. National Association of Engine and Boat Manufacturers, Inc. Chicago, Illinois.

Clark, John. 1974 (March). Coastal Ecosystems. Ecological Considerations for Management of the Coastal Zone. The Conservation Foundation. Washington, D.C. 178 p.

Dunham, James W., and Arnold Finn. 1974 (December). Small Craft Harbors: Design Construction and Operation. Special Report No. 2. U.S. Army Corps of Engineers. Coastal Engineering Research Center. Fort Belvoir, Virginia. 375 p.

Figley, W. 1980. An Inventory of Boating and the Boating Industry in New Jersey. New Jersey Department of Environmental Protection--Division of Fish, Game and Wildlife.

Florida Coastal Coordinating Council. 1971. Florida Coastal Zone Management Atlas. State of Florida. Department of Natural Resources. Bureau of Coastal Zone Planning. Tallahassee, Florida.

Florida Coastal Coordinating Council. 1971 (December). Coastal Zone Management in Florida - 1971. State of Florida. Department of Natural Resources. Tallahassee, Florida.

Florida Coastal Coordinating Council. 1973 (April). Recommendations for Development Activities in Florida's Coastal Zone. State of Florida. Department of Natural Resources. Tallahassee, Florida. 20 p.

Florida Coastal Coordinating Council. 1974 (July). Florida Keys Coastal Zone Management Study. State of Florida. Department of Natural Resources. Tallahassee, Florida.

Florida Coastal Coordinating Council. 1975 (March). Coastal Zone Management in Florida - 1974. Newsletter. Volume V, Number 5. State of Florida. Department of Natural Resources. Tallahassee, Florida. 4 p.

Johnson, L.E., and W.V. Mcguinness. 1975 (January). Guidelines for Material Placement in Marsh Creation. Draft Final Report. Center for the Environment and Man, Inc. CEM Report 4165-519. Hartford, Connecticut.

Keeley, J.W., and R.M. Engler. 1974 (March). Discussion of Regulatory Criteria for Ocean Disposal of Dredged Materials: Elutriate Test Rationale and Implementation Guidelines. U.S. Army Engineers Waterways Experimental Station. Miscellaneous Paper D-74-14. Vicksburg, Mississippi. 13 p.

Kowalski, T., Editor. 1974. 1974 Floating Breakwaters Conference Papers. University of Rhode Island Sea Grant Program Marine Technical Report Series No. 24. Kingston, Rhode Island. 304 p.

Marcelius, K.L., G.M. Dawes, and G.M. Silberhorn. 1973 (April). Local Management of Wetlands--Environmental Considerations. Virginia Institute of Marine Sciences. Special Report No. 35. Glouster Point, Virginia.

McCoy, M.P., and Carla Walecka. 1975 (August). Marina Del Rey Subregional Plan. University of Southern California. Sea Grant Program. Sea Grant Publication No. USC-SG-A53-75. Los Angeles, California. 112 p.

New Jersey Department of Environmental Protection. 1977. Statewide Comprehensive Outdoor Recreation Plan. 378 p.

New Jersey Division of Coastal Resources. 1982 (April). Coastal Resource and Development Policies (N.J.A.C. 7:7E-1.1 et seq.).

New Jersey Division of Travel and Tourism. 1980. Your 1980's Marinas & Boat Basins Guide. Trenton, New Jersey. 24 p.

Noden, Richard, and Thomas Brown. 1975 (September). The New York Commercial Marina and Boatyard Industry. 1972. State University of New York Sea Grant Institute. NYSSGP-RS-75-020 and Cornell University. Ithaca, New York. 92 p.

Outboard Boating Club of America. Facilities Files...Small Boat Launching Ramps, Piers and Dockage, Marinas, Public Access. (A collection of reprints). Chicago, Illinois.

Boating Facilities. Volume Number 6. February 1964. 29 p.
Boating Facilities. Volume Number 8. March 1967. 33 p.
Boating Facilities. Volume Number 10. May 1970. 33 p.
Boating Facilities. Volume Number 11. June 1973. 29 p.

Outboard Boating Club of America. N.d. Launching Ramps and Piers. Outboard Boating Club of America. Chicago, Illinois.

Rood, M.V., and Robert Warren. 1974 (January). The Urban Marina: Managing and Developing Marina Del Rey. University of Southern California. Sea Grant Program. Sea Grant Publication No. USC-SG-5-74. Los Angeles, California. 124 p.

Ruedisilli, L.C. 1974 (August). Annotated Bibliography of the Effects of Water on the Design and Management of Lake and River Marinas. University of Wisconsin Sea Grant Program. Sea Grant Advisory Report No. 7. Madison, Wisconsin. 65 p.

Schultz, G.P., M.P. McCoy, and K.J. O'Brien. 1972. Marina Del Rey Study Working Paper 1B: The Development of the Marina. University of Southern California Sea Grant Program. Sea Grant Publication No. USC-SG-5-72. Los Angeles, California. 114 p.

Tinari, F.D. 1980. The New Jersey Recreational Boater: A Pilot Study. Division Report No. 10, Seton Hall University, South Orange, New Jersey.

U.S. Army Corps of Engineers. 1971 (August). Shore Protection Guidelines. A Part of the National Shoreline Study. Washington, D.C. 59 p.

U.S. Army Corps of Engineers. 1973. Shore Protection Manual. Volumes I, II, and III. Washington, D.C.

U.S. Department of Commerce. 1976 (August). Coastal Facility Guidelines. National Oceanic and Atmospheric Administration. Washington, D.C.

U.S. Department of the Interior. 1969 (November). The National Estuarine Pollution Study. Volumes I, II, and III. Water Pollution Control Administration. Washington, D.C.

U.S. Senate Committee on Interior and Insular Affairs. 1974 (September). The Recreation Imperative: A Draft of the Nationwide Outdoor Recreation Plan Prepared by the Department of the Interior. U.S. Government Printing Office. G.P.O. No. 38-67-0. Washington, D.C. 389 p.

WAPORA, Inc. 1979 (September). The Estuarine Study. Volume I. New Jersey Department of Environmental Protection, Division of Coastal Resources. Trenton, New Jersey. 383 p. and appendices.

Wulfsberg, Rolf, and Darryl A. Long. 1974 (October). Recreational Boating in the Continental United States. U.S. Coast Guard. Washington, D.C.

Zarling, J.P. 1974 (November). Ice Engineering in Small Craft Marinas: An Annotated Bibliography. University of Wisconsin Sea Grant Program. Sea Grant Advisory Report No. 8. Madison, Wisconsin. 124 p.

APPENDIX A. PUBLIC FUNDING SOURCES FOR NEW OR EXPANDING MARINAS

Despite a reduction in Federal recreation grant programs beginning in Federal Fiscal Year 1982 (starting October 1, 1981), there are two programs that may aid the development of new private or municipal marinas.

1. Green Acres Program

Purpose: Green Acres grants may be used for the acquisition and development of lands and waters for public outdoor recreational purposes.

Restriction: Available only to municipalities or counties. Lands acquired or facilities constructed with Green Acres funds must be open to the general public. Marina slips must not be leased for periods of more than three years, and a fair and equitable lottery system must be used to allocate new leases. Publicly owned marinas may be operated by a private concessionaire selected by competitive bid. Applications for Green Acres grants for marina construction are reviewed by the Marine Trades Association to ensure that the demand for marina facilities cannot be met by the private sector before public funds are spent on a marina.

Type of Assistance: Grants covering 50 percent of project costs, including engineering and construction.

Authorization: Green Acres and Recreational Opportunities Bond Referendum of 1978 and subsequent appropriations bills.

Funds Available: $200 million; of which half are reserved for urban recreational facilities. Approximately $53,000,000 has been appropriated as of September 1981.

Application Procedure: Apply to:

Green Acres Program
Department of Environmental Protection
CN-404
Trenton, New Jersey 08625

The first step in the application process is submission of a Program Participation Interest Form listing the marina and any other projects for which a local government intends to seek Green Acres funds. Program Participation Interest Forms are due March 31 of each year and complete applications are due by March 31 of the following year. Funding decisions are made between April 1 and June 30 for funding to occur in the following fiscal year (July 1 to June 30).

2. Urban Development Action Grants

Purpose: To stimulate private development in distressed cities and counties.

Restriction: Application must be submitted by municipalities or counties that are classified as distressed based upon recent socioeconomic data.

Type of Assistance: Funds are available for low-interest loans for private development, and aid to municipalities to acquire land for commercial development. Eligible activities include:

1) acquisition, rehabilitation, and construction of commercial, industrial, and residential buildings,

2) construction of parking facilities, public utilities, street improvements, water and sewer facilities, foundations and platforms for air rights, and pedestrian malls and walkways,

3) demolition and clearance, and

4) relocation.

In the case of marina construction, a municipality could use UDAG funds to acquire waterfront property and then secure a UDAG low-interest loan to allow a private concern to develop a marina.

Authorization: Title I of the Housing and Community Development Act of 1974, Public Law 93-383, 42 U.S.C. 5301-5317, as amended by Title I of the Housing and Community Development Act of 1977, Section 110, Public Law 93-128, 42 U.S.C. 5304.

Funds Available: Total amount available in Federal FY 1982 is $500 million, and it appears that this program will continue.

Application Procedure: For more information contact:

U.S. Department of Housing and Urban Development
Gateway No. 1
Newark, New Jersey 07102
201-645-2600

Dredging of navigable waterways in the state is a responsibility of both NJDEP's Bureau of Coastal Engineering and the U.S. Army Corps of Engineers. The Corps has Congressional authorization for the maintenance of 37 of New Jersey's most important channels, while the Bureau of Coastal Engineering is responsible for the maintenance of over 300 channels comprising over 500 miles of waterways.

For further information about Corps dredging activities north of the Manasquan River, contact:

Chief, Navigation Branch
U.S. Army Corps of Engineers
New York District
26 Federal Plaza
New York, NY 10007 (212) 264-0164

Concerning Corps dredging activity in the Delaware River area or along the Atlantic Coast from the Manasquan River southward, contact:

Chief, Navigation Branch
U.S. Army Corps of Engineers
Philadelphia District
Customs House
Second and Chestnut Streets
Philadelphia, PA 19106

Concerning the dredging of state channels, contact:

Mr. Bernard Moore, Chief
Bureau of Coastal Engineering
Division of Coastal Resources
Department of Environmental Protection
1433 Hooper Avenue
Toms River, NJ 08753
(201) 341-3986

APPENDIX B. PERMITS AND APPROVALS REQUIRED FOR MARINA CONSTRUCTION

This appendix presents a discussion of the permits and approvals that may be required for marina construction in New Jersey. It explains the coastal permits programs administered by the Division of Coastal Resources, tideland conveyances, and other state and federal permits that regulate activities on the waterfront. Addresses and phone numbers of the government offices that provide information or review permit applications are also listed. This appendix is based in part on the New Jersey Coastal Development Handbook (NJDEP, Division of Coastal Resources, 1982).

Do I Need a Permit?

The Three Coastal Permits

The New Jersey Coastal Management Program is based on the regulatory activity of NJDEP's Division of Coastal Resources under the Waterfront Development Law, the Wetlands Act, the Coastal Area Facility Review Act (CAFRA), and its stewardship activity under the Tidelands statutes. The three corresponding coastal permits are:

1. Waterfront Development Permit
2. Wetlands Permit
3. CAFRA Permit

To determine if you will need to obtain one or more of these coastal permits or a Tidelands conveyance from the Division of Coastal Resources before commencing a development project, ask yourself the following questions:

1. Is any portion of the proposed project situated within tidally influenced wetlands in one (or more) of the following counties: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Middlesex, Monmouth, Ocean or Salem?

If you answered yes, then you will need a Wetlands Permit, **unless** the site has not been delineated as a wetlands by NJDEP. Wetlands delineation maps are available

from the Division's Bureau of Coastal Planning and Development in Trenton and from the clerk of each coastal county.

2. Is your project within, or bordering upon, a tidal waterway?

3. Is your project situated within one of the following counties: Bergen, Burlington, Camden, Essex, Gloucester, Hudson, Mercer, Middlesex, Passaic, Salem, Somerset or Union,

   AND

   within 100 feet of the existing mean high water line of a tidal water body, within 500 feet of a tidal water body with no paved public road, railroad, or property line between the project site and the water body, or between 100 and 500 feet of a tidal water body but waterward of the first paved road, railroad, or property line?

If you answered yes to 2 **or** 3 then you probably need to obtain a Waterfront Development Permit, unless your project is limited to the repair, replacement, or renovation of a legal waterfront structure associated with a residence or with recreational boating.

4. Is your project located in the Coastal Area as defined by the Coastal Area Facility Review Act (Figure B-1)?

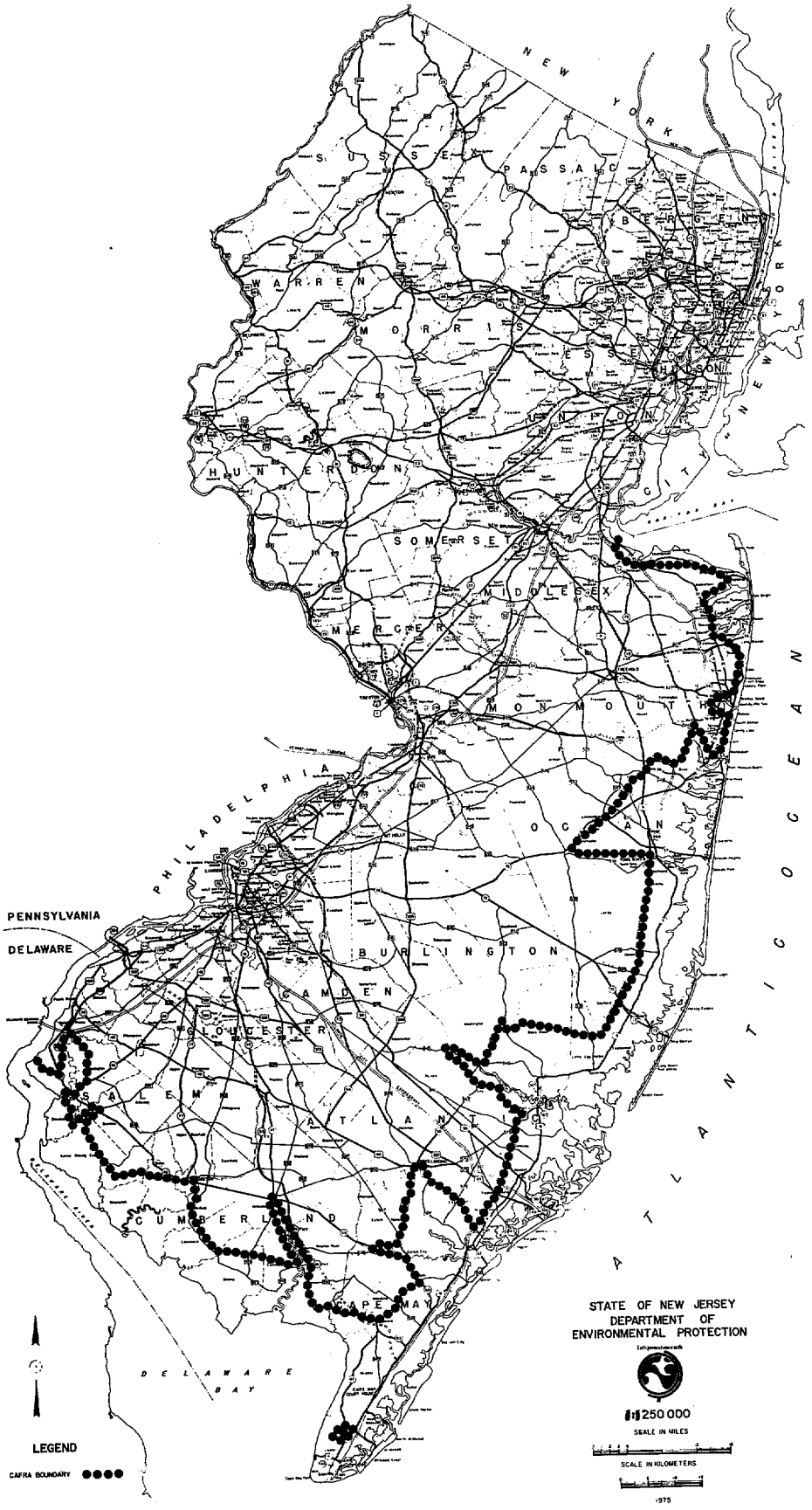
5. Does your project involve the construction of 25 or more dwelling units?

6. Does your project involve the construction of 1,200 or more linear feet of roadway or pipeline designed for transport of petroleum, natural gas, or sewage in a single municipality during one year?

7. Does your project involve the construction of 300 or more parking spaces for motor vehicles?

If you answered yes to 4, **and** to either 5, 6, or 7, you probably need to obtain a Coastal Area Facility Review Act (CAFRA) Permit.

Figure B-1. The Coastal Area as defined by the Coastal Area Facility Review Act



8. Is your project situated on lands that are now or have formerly been flowed by the mean high tide?

If your answer is yes, you may need to obtain a grant, lease, or license from the Tidelands Resource Council before a coastal permit can be issued.

The Bureau of Coastal Enforcement and Field Services has the authority to determine if you will need to obtain a coastal permit and the Bureau of Tidelands has the authority to determine the need for a grant, lease or license. You should write or call these Bureaus if you are not sure whether you need to obtain a permit or tidelands conveyance.

The Division of Coastal Resources is responsible for holding preapplication conferences and accepting and reviewing applications for the permits. Table B-1 indicates the addresses and phone numbers of the Bureau in the Division where you can write or phone to obtain further information on coastal permits. Contacts for information on tidelands, the Coastal Management Program in general, and Division publications on the coastal zone are also given in this table.

Exemptions

You may request an exemption from the requirement to obtain a Waterfront Development Permit if the proposed facility is in an upland area and on-site construction or site preparation began on or before September 26, 1980.

Activities requiring a Wetlands Type A Permit that were in progress at the time that a wetlands area was designated may be exempt from the requirement to obtain a Wetlands Permit. Activities requiring a Type B Permit, however, must obtain a Wetlands Permit.

The Division, by administrative rule, is no longer accepting requests for exemptions from the CAFRA permit requirement.

If you believe that a proposed facility is exempt from a coastal permit due to prior on-site construction, you should request in writing a determination of exemption from the Division's Bureau of Coastal Enforcement and Field Services (See table B-1).

Table B-1. How to obtain more information and assistance on coastal permits in New Jersey

	COASTAL AREA		
	NORTH SHORE REGION Monmouth Co. Ocean Co. Middlesex Co. (Old Bridge Twp.) Burlington Co. (Washington, Bass River Twps.)	SOUTH SHORE REGION Atlantic Co. Cape May Co. Cumberland Co. Salem Co. (south of Pennsville)	ALL OTHER COASTAL AREAS
TO DETERMINE NEED FOR A COASTAL PERMIT	Bureau of Coastal Enforcement and Field Services North Shore Region 1435 Hooper Avenue Toms River, New Jersey 08753 201/341-3977	Bureau of Coastal Enforcement and Field Services South Shore Region P.O. Box 188 Pomona, New Jersey 08240 609/652-0004	Bureau of Coastal Enforcement and Field Services Waterfront Region CN 401 Trenton, New Jersey 08625 609/292-8203
TO ARRANGE FOR A PREAPPLICATION CONFERENCE OR TO APPLY FOR A COASTAL PERMIT	Bureau of Coastal Project Review North Shore Region CN 401 Trenton, New Jersey 08625 609/292-0062	Bureau of Coastal Project Review South Shore Region CN 401 Trenton, New Jersey 08625 609/292-0061	Bureau of Coastal Project Review Waterfront Region CN 401 Trenton, New Jersey 08625 609/292-2895
TO DETERMINE TIDELANDS OWNERSHIP OR TO APPLY FOR A RIPARIAN GRANT, LEASE OR LICENSE	Bureau of Tidelands CN 401 Trenton, New Jersey 08625 609/292-2573		
TO FIND OUT MORE ABOUT THE COASTAL MANAGEMENT PROGRAM IN GENERAL, THE LOCAL COASTAL GRANT PROGRAM, THE SHORE PROTECTION MASTER PLAN, OR THE FEDERAL COASTAL ZONE MANAGEMENT ACT OR TO OBTAIN WETLANDS DELINEATION MAPS	Bureau of Coastal Planning and Development CN 401 Trenton, New Jersey 08625 609/292-9762		
TO OBTAIN THESE DIVISION OF COASTAL RESOURCES PUBLICATIONS: 1. RULES ON COASTAL RESOURCE AND DEVELOPMENT POLICIES (JUNE 1981). 2. SUMMARY OF N.J. COASTAL MANAGEMENT PROGRAM (1981). 3. COASTAL ENERGY CONSERVATION POLICY GUIDELINES (1982).	Coastal Information Center Division of Coastal Resources CN 401 Trenton, New Jersey 08625 609/292-9760		

Other State and Federal Permits

Many proposed development activities will require the issuance of a permit from Divisions in NJDEP other than Coastal Resources, or from state agencies other than NJDEP, or from a federal agency.

The Planning Group in NJDEP Room 803, Labor & Industry Building, Trenton ((609) 292-2662) coordinates the review of major development proposals likely to require more than one NJDEP-administered permit, of applications circulated through the A-95 procedure (a discussion of the A-95 procedure occurs later), and of state agency projects costing more than one million dollars. This coordinated review helps speed the permit review process and ensures the application of consistent policies.

The Office of Business Advocacy, in the Department of Commerce, CN 380, Trenton, NJ 08625 ((609) 292-0701) helps developers determine which state permits they need. A list of state and federal permits commonly needed for coastal development follows:

STATE AGENCY	PERMIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION	
Division of Environmental Quality CN 027 Trenton, NJ 08625 (609) 984-3032 (Air Pollution Permit) (609) 292-0417 (Solid Waste Registration)	Air Pollution Permits for incinerators in dwellings with 7 or more units. Permit for the excavation or reuse of a sanitary landfill.
Division of Water Resources Bureau of Floodplain Management 1474 Prospect Street CN 029 Trenton, NJ 08625 (609) 292-2402	Stream Encroachment Permits for any construction within the 100-year floodplain of any stream.
Municipal Waste Management 1474 Prospect Street CN 029 Trenton, NJ (609) 984-4429	Sewerage Extension Permits for municipalities and developments.
Permits Administration 1474 Prospect Street CN 029 Trenton, NJ 08625 (609) 292-5262	Permits for point source discharge of pollutants into waterways under the New Jersey Pollutant Discharge Elimination System (NJPDES).
Water Allocation Office 1474 Prospect Street CN 029 Trenton, NJ 08625 (609) 984-6831 (well drilling) (609) 292-2957 (water diversion)	Permits for well drilling, purchasing water, diverting a water supply, diverting subsurface or percolating waters, and water lowering.

FEDERAL AGENCY	PERMIT
DEPARTMENT OF DEFENSE	
Army Corps of Engineers For activities north of the Manasquan River: New York District Engineer 26 Federal Plaza New York, NY 10007 (212) 264-0182	Permits for the dredging or filling of any wetlands or water body under Section 404 of the Clean Water Act. Permits for dredging, stream channelization, excavation, filling or any other work affecting a navigable water body under Section 9 10 of the Rivers and Harbor Act of 1899.
For activities in the Delaware River Basin, or along the Atlantic Coast from the Manasquan River southward: Philadelphia District Engineer Custom House 2nd and Chestnut Streets Philadelphia, PA 19106 (215) 597-4723	

Permit Coordination

For activities on or along the Delaware River, the Philadelphia Urban Waterfront Action Group (UWAG) provides assistance in permit application coordination. For information and assistance, contact:

Mr. Ronald Petrofsky
Philadelphia Port Corporation
1020 Public Ledger Building
6th & Chestnut Streets
Philadelphia, PA 19106
(215) 928-9100

Federal Consistency

If your development project requires a federal permit or is federally funded, and is in or affects New Jersey's coastal zone, you will also need to obtain a federal consistency certification from the Division of Coastal Resources. This is a requirement of the federal Coastal Zone Management Act and can be satisfied by receipt of a coastal permit from the Division.

A-95 Review

If you apply for funding or mortgage insurance under a federal program, you must comply with the state A-95 review procedure. The New Jersey State Clearinghouse in the Department of Community Affairs is responsible for ensuring that all applications are reviewed by the relevant agencies of New Jersey state government. Other levels of governmental review are performed through a network of areawide clearinghouses.

You must submit to the State Clearinghouse the following information:

1. A completed application for Federal assistance summary (Standard Form 424);

2. A budget breakdown;

3. A location map; and

4. A statement of goals and objectives.

The address of the State Clearinghouse is:

A-95 Review
Division of State and Regional Planning
Department of Community Affairs
329 West State Stret
Trenton, NJ 08625
(609) 292-2963

How Do I Apply?

Waterfront Development Law (N.J.S.A. 12:5-3)

The procedure for applying for a Waterfront Development Permit is similar to that for applying for a CAFRA permit, although there are fewer informational and no EIS requirements. For a major project, you are encouraged to request a preapplication conference prior to applying for a Waterfront Development permit. To apply, you must submit the following items:

1. A completed application form (a sample DEP Form CP-1 is included at the back of this appendix);

2. An application fee, determined by the 90-Day Construction Permit Regulations;

3. Sixteen copies of a development plan (including one reproducible transparency); and

4. At least two recent color photographs of the site.

The development plan must show the following:

1. The lot;

2. All existing waterfront structures on the lot and immediately adjacent lots;

3. Distances and dimensions of areas, structures and lots, including wetlands delineation and mean high water line, upland property, roads and utility lines;

4. The proposed work outlined in red;

5. The general site location of the development (photoreduced USGS 7½' quadrangle);

6. The scale of the survey or map, and a north point;

7. The name of the person who prepared the plan (state law requires that the plans be prepared by a professional engineer);

8. The name of the applicant;

9. The lot and block number; and

10. Evidence that the applicant has obtained the right to use or occupy the tidelands.

To simplify the permit process, the Division of Coastal Resources has issued a General Permit under the Waterfront Development Law for minor new construction in man-made tidal lagoons. The General Permit does **not** apply to activities that involve dredging or filling. If you are applying for a project covered by the General Permit, you only need to submit six copies of the development plan and no reproducible copy.

The fee for a Waterfront Development Permit for new construction is one percent of the construction cost or a minimum of $100. The fee for a Waterfront Development Permit for minor maintenance and/or repair is one percent of the construction cost or a minimum of $25. The maximum fee is $10,000.

Under a 1981 amendment to the Waterfront Development Law, a permit is no longer required for the valid repair, replacement, or renovation of waterfront structures associated with a residence or with recreational boating. Substantially new construction or reconstruction will, in most cases, still require a permit. All

final determinations on whether a permit is required are made by the Division's Bureau of Coastal Enforcement and Field Services.

After receiving the application, the Division of Coastal Resources has 20 working days to review it for completeness. At this time, the Division may request additional information to complete the application. You will receive notice within 15 days of receipt of additional information if the application is complete for filing. Once the application is accepted as complete for filing, the Division must make a permit decision within 90 days. General Permits are processed in far less time than the mandatory 90 days. If a decision is not made within 90 days, your application is automatically approved.

A public hearing is not required for Waterfront Development Permit applications, but may be scheduled if the Division feels there is sufficient public interest to justify a hearing.

Wetlands Act (N.J.S.A. 13:9A-1 et seq.)

Before you apply for a permit to conduct a regulated activity on coastal wetlands, you are encouraged to request a preapplication conference. If you need a Wetlands Permit, you must next determine whether you need a Type A or a Type B permit. Type A permits are required for minor projects, including excavation of small boat mooring slips, maintenance or repair of bridges, roads or highways, and construction of piers, catwalks, docks, landings, and observation decks. The permit requirement does not pertain to emergency repairs necessitated by a natural disaster or sudden and unexpected mechanical, electrical, or structural failure. Type B permits are required for the installation of utilities, excavation for boat channels and mooring basins, construction of impoundments and sea walls, water diversion, and the use of pesticides.

For both Type A and Type B permits, you must submit the following:

1. A completed application form (DEP Form CP-1);

2. A plan of the proposed project;

3. A map showing the proposed structures and boundaries of the project area;

4. A list of the names and addresses of adjacent property owners; and

5. Evidence that the applicant has obtained the right to use or occupy tidelands; and

6. An application fee, determined by the 90-Day Construction Permit Regulations. The fee for a Type A Permit is 1/2 of one percent of the construction cost or a minimum of $100. The fee for a Type B Permit is 1/2 of one percent of the construction cost or a minimum of $300.

If you are applying for a Type B permit, you must also submit an Environmental Impact Statement and notify the U.S. Army Corps of Engineers and the local County Planning Board of your intent to file an application by sending them a copy of the CP-1 Form.

After receiving the application, the Division has 20 days to review it for completeness. During this time, the Division may request additional information. If additional information is submitted, you will receive notice within 15 days or receipt whether the application is now complete for filing. Once the application is accepted as complete for filing, the Division has 90 days in which to make a permit decision. If a decision is not made within 90 days, your application is automatically approved.

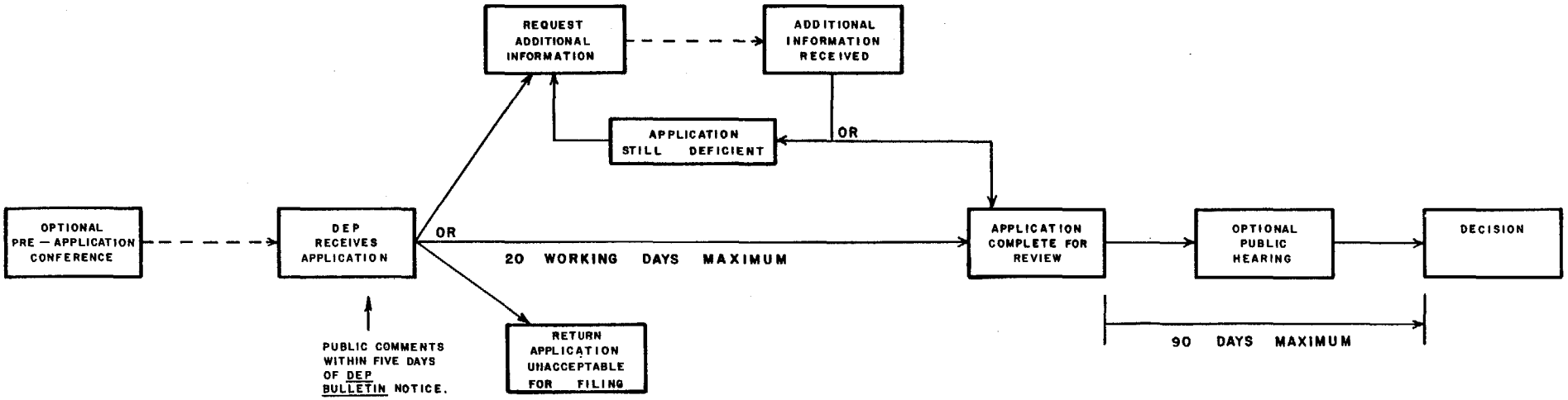
A public hearing is not required for Wetlands Permit applications, but may be scheduled if the Division feels that public interest justifies a hearing.

Figure B-2 is a flow chart of the Waterfront Development and Wetlands Permits application process.

Coastal Area Facility Review Act (CAFRA) (N.J.S.A. 13:19-1 et seq.)

If you are planning a development project that requires a CAFRA Permit, you are encouraged to request a preapplication conference with the Division of Coastal Resources before seeking municipal approval of your project. The purpose of the optional preapplication conference is to inform you of the Division's application procedures, policies, and guidelines. The Division will also discuss your proposal's apparent strengths and weaknesses relative to the coastal policies, but cannot

Figure B-2. Wetlands and waterfront development permit application processes



NOTE:

A WATERFRONT DEVELOPMENT PERMIT APPLICATION IS NOT DECLARED COMPLETE FOR REVIEW WITHOUT A LAWFUL RIPARIAN OCCUPATIONAL OR USE INSTRUMENT SUCH AS A RIPARIAN GRANT, LEASE, OR LICENSE.

– – – – INDICATES THAT THE TIMETABLE IS SET BY THE APPLICANT.

commit itself to approving or rejecting it until the complete application is reviewed.

The preapplication conference can save you time and money by advising you at an early stage whether the proposal is likely to be approved and what modifications may be necessary to obtain permit approval.

You should present a conceptual proposal for the facility at the preapplication conference, including the following:

1. A short written description of the site and proposed facility;

2. The number and uses of proposed structures; and

3. Maps indicating the site's location and rough internal plan of development.

If you decide to file an application after attending the preapplication conference, you must notify the County Planning Board that you intend to apply to the Division for a permit. Your application must include the following:

1. A completed application form (DEP Form CP-1);

2. An application fee, determined according to the 90-Day Construction Permit Regulations ($1,000 plus $10 per dwelling unit for residential facilities, $1,500 plus $10 per acre to be developed for nonresidential and mixed use facilities, maximum fee $10,000); and

3. Twenty copies of an Environmental Impact Statement (EIS), which will be discussed later.

Within 30 days of receiving your application, NJDEP will notify you in writing if the application is complete for filing. If it is incomplete, the specific deficiencies will be noted. Within 15 days following the receipt of additional information to correct deficiencies, you will be notified if the application is complete or if further information is needed. **An application will not be considered to be filed until it has been declared complete.**

After the application has been declared complete, NJDEP will prepare a staff preliminary analysis of the proposed facility. You will receive a copy of the preliminary analysis before the required public hearing.

A public hearing will be held within 60 days of declaring the application complete for filing. The purpose of the public hearing is to give the applicant and interested parties the opportunity to present orally and in writing their positions concerning the proposed facility, as well as any data developed in relation to the proposed facility. The public hearing will be held within the coastal area and, if possible, within the municipality where the facility is proposed.

At the public hearing, or within 15 days after the public hearing, the review officer may request that you submit additional information necessary for the complete review of the application.

The final decision on the application will be made within 60 days of the public hearing or, if additional information has been requested, within 90 days of receipt of the additional information. If NJDEP fails to act within this time, the 90-Day Construction Permit Law (N.J.S.A. 13:1D-1 et seq.) requires that the application will be deemed to be approved, provided that the application does not violate other statutes or regulations in effect.

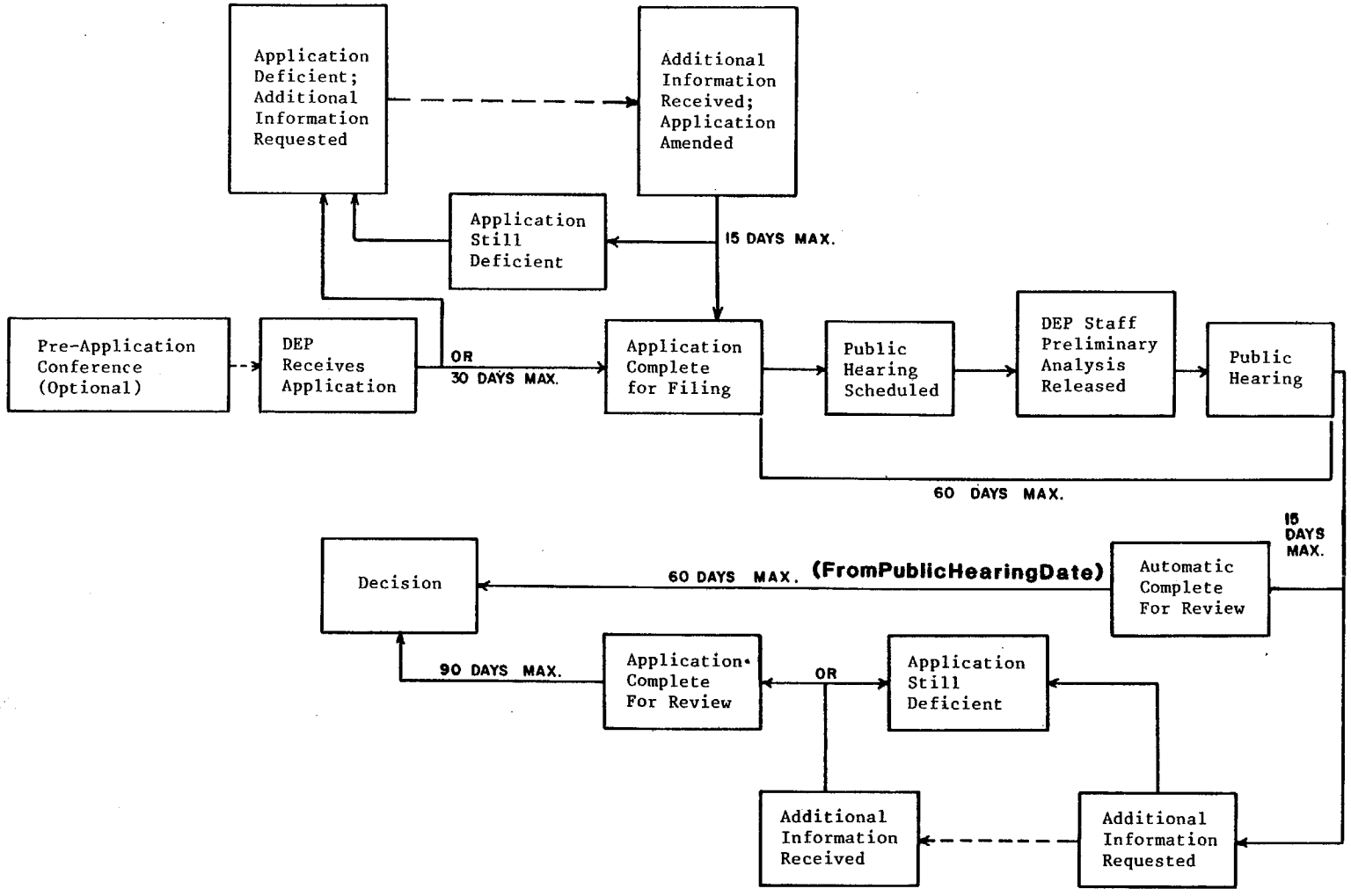
Figure B-3 is a flow chart of the CAFRA permit application process.

Tidelands Statutes

There are three kinds of tidelands instruments: grants, leases, and licenses. A grant conveys full ownership to the applicant. A lease conveys use of the property for a fixed number of years and is usually issued for projects involving solid fill (such as a bulkhead). A license also allows use of the property for a fixed number of years (usually 10 or less) and is the type of instrument most commonly used for residential docks and piers.

If you need to obtain a Tidelands grant, lease, or license, you must apply to the Tidelands Resource Council. The Tidelands Resource Council is a twelve-member citizen panel that meets twice monthly in Trenton. Its principal statutory functions are to review and approve applications for tidelands grants, leases, and commercial dredging licenses. Prior to submitting an application, you are

Figure B-3. CAFRA permit application process flow chart



encouraged to request a preapplication conference with the Division of Coastal Resources, Bureau of Tidelands, which serves as staff to the Council. The Bureau of Tidelands uses two different application forms that vary only slightly, one for licenses and one for grants and leases.

You must submit the following items with your application:

1. A current survey, prepared by a licensed surveyor, showing the applicant's upland property and the boundaries of the tidelands area applied for, the location of the mean high water line, the depth of the waterway at mean low water, the names of adjoining property owners, and a diagram of proposed or existing structures within the applied-for area; and

2. A certificate of title signed by an attorney at law or representative of a title company demonstrating evidence that you own the upland property, or have the permission of the upland owner to apply for the conveyance. (State law gives the upland owner first right to apply.)

A $25 fee is required for an application for a Tidelands grant only. There is no fee for a Tidelands lease or license application.

At the time you submit a Tidelands application, you must also submit an application for a Waterfront Development permit to the Division's Bureau of Coastal Project Review. Your Tidelands application will not be considered complete until this is done. When the application has been determined complete for review, it will be scheduled for discussion by the Tidelands Resource Council. The Council's real estate appraiser will evaluate the property, and this evaluation will be considered by the Council in making its decision. This value represents the annual rental in the case of a lease or license, or the full value of the property in the case of a grant. If your application involves legalizing an existing structure, the value may include back rental for past use. If the Council votes to approve the application, it will certify the decision at the next meeting when it approves the minutes of the previous meeting. The Commissioner of NJDEP then receives the minutes for approval or disapproval.

Multiple Permit Projects

If your project requires several coastal permits, you must submit a separate CP-1 application for each one, with the information requirements for each. If you need to apply for both a CAFRA and a Type B Wetlands Permit, you may prepare one EIS to submit with both applications. If both CAFRA and Wetlands Type A or Waterfront Development Permits are required, the second application will not be considered complete for review until the CAFRA application is complete for review. In this way, the Division will make a single decision on multiple-permit projects.

Environmental Impact Statement Requirements

When you submit your application for a CAFRA or a Type B Wetlands Permit, you must also submit an Environmental Impact Statement. An EIS is not required for applications for Type A Wetlands permits, Waterfront Development Permits, and Tidelands conveyances.

A preapplication conference is a good way to begin preparation of an EIS. Often attending a preapplication conference can reduce the amount of information you need to supply, because you receive guidance from a project review officer. The Division already has some site-specific information that you need not repeat in an EIS.

All EIS's should use the Coastal Resource and Development Policies as an outline. Within the EIS, you should locate and map the various location types as identified in the Location Policies, and describe in a detailed and factual manner how the proposal complies with the Location Policies. If you are applying for a Type B Wetlands Permit, the Location Policies with which you will be principally concerned are those dealing with Wetlands (N.J.S.A. 7:7E-3.26 and 3.27). You should compare the various uses proposed with the Use Policies, and describe in a detailed and factual manner how the use complies with these Policies. Finally, you should identify the coastal resources that will be affected by the proposed project, and describe in a detailed and factual manner the resulting effects and the means of compliance with the Resource Policies.

1. An EIS for a **CAFRA permit** must contain information needed to evaluate the effects of a proposed project on the environment of the coastal area.

The statement should include:

a. An inventory of existing environmental conditions at the project site and in the surrounding region, which shall describe air quality, water quality, water supply, hydrology, geology, soils, topography, vegetation, wildlife, aquatic organisms, ecology, demography, land use, aesthetics, history, and archeology.

b. A project description that shall specify what is to be done and how it is to be done, during construction and operation;

c. A listing of all licenses, permits, or other approvals as required by law and the status of each;

d. An assessment of the probable impacts of the project upon all topics described in (a);

e. A listing of adverse environmental impacts that cannot be avoided;

f. Steps to be taken to minimize adverse environmental impacts during construction and operation, both at the project site and in the surrounding region;

g. Alternatives to all or any part of the project, with reasons for their acceptability or unacceptability; and

h. A reference list of pertinent published information relating to the project, the project site, and surrounding region (N.J.A.C. 7:7D-2.4).

2. An EIS for a **Type B Wetlands Permit** should describe and analyze all possible direct and indirect effects of the proposed activity on the site itself as well as on adjacent and noncontiguous areas. The EIS shall refer particularly to the effect of the project on public safety, health and welfare, the protection of public and private property, the public trust in submerged lands and wildlife and marine fisheries, the protection, preservation, and enhancement of the natural environment, and the preservation of the ecological balance of the wetlands. It shall relate ecological and physical characteristics of the proposed activity site to local vegetation,

birds, mammals, tidal circulation, hydrology, meteorology, geology, soils, land use, recreation, and history and, in addition, it shall describe and analyze:

a. The reasons that structures cannot be located on lands other than wetlands;

b. Temporary and permanent physical changes that would be caused by the proposed activity and the impact of these changes on the activity area and immediate environs;

c. Alternatives to the proposed action that would reduce or avoid environmental damage;

d. All measures to be taken during and after the completion of the proposed activity to reduce detrimental on-site and off-site effects; and

e. Adverse environmental impacts that cannot be avoided.

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD APPLICATION FORM (CP # 1)

CONSTRUCTION RELATED PERMITS

READ REQUIREMENTS

PLEASE TYPE OR PRINT

1. Applicant/Owner _____ Telephone ( ) _____

   Permanent Legal Address _____

   Municipality _____ State _____ Zip Code _____

2. Location of Work: Street/Road _____

   Lot No. _____ Block No. _____

   Municipality _____ County _____

3. If applicable, Name of:

   Engineer/Surveyor/Driller (Specify) _____

   New Jersey License No. _____

   Name of Firm, if employee _____

   Address _____ County _____

   Municipality _____ State _____ Zip Code _____

   Telephone ( ) _____

4. This is an application for _____ Permit
   (Name of permit, certification, approval or exemption. See Item 9. Next Page.)

   _____

5. Fee is attached (if applicable). $_____
   (Provide explanation of how fee was calculated. Read Requirements Section of Standard Application booklet.)

6. Estimated construction cost of project:

   a. $ _____ total cost of the project.
   b. $ _____ portion for which this permit is requested.

7. I have included certifications of any public notifications. Yes_____ No _____

8. If applicable:

   a. Source of Water Supply _____
   b. For Treatment at (Water Treatment Plant) _____
   c. Stream, Waterway, Pond or Lake _____
   d. Wastewater Treatment Facility _____

FOLLOW INSTRUCTIONS CAREFULLY

READ REQUIREMENTS SECTION

6/80

9. Have any other applications for this site/project been submitted, or have any state permits been issued for this project? *(If yes, indicate status and project number below.)*

   No ..... Yes ..... Decision .....

	PERMIT TYPE	STATUS	PROJECT #
9.1.	Purchase Water		
	Diversion:		
9.2.	- Water Supply for Potable Use		
9.3.	- Surface Water for Private Use		
9.4.	- Subsurface/Percolating Water for Private Use		
9.5.	Well Drilling		
9.6.	Water Lowering (Specify: Temporary/Permanent)		
9.7.	Water Works (Construct/Modify/Operate)		
9.8.	Physical Connection Between An Approved Water Supply and a Non-Approved Supply		
9.9.	Water Quality Certification		
9.10.	Dam (Construct/Repair)		
9.11.	Stream Encroachment		
	Realty Improvements:		
9.12.	- 50 or More Realty Improvements		
9.13.	- In Critical Areas		
9.14.	- Schools, Hospitals, Nursing Homes, etc. (Specify)		
	Treatment Works Approval:		
9.15.	- Industrial Wastewater Treatment Plant		
9.16.	- Domestic Wastewater Treatment Plant		
9.17.	- Sewer Extensions		
9.18.	- Exemption from Sewer Ban		
9.19.	CAFRA		
9.20.	Waterfront Development (Riparian)		
9.21.	Wetlands		
9.22.	Air Quality Permits (Specify)		
9.23.	Solid Waste Permits (Specify)		
9.24.	Delaware and Raritan Canal Commission "Approval"		
9.25.	Other State Agencies' Permits		
9.26.	Local Permits		
9.27.	Federal Permits		

10. Brief Description of the Proposed Project and Intended Use:

    _____

    _____

    _____

    _____

    _____

    _____

11. I hereby certify that the information furnished on this application (and the attachments) is true. I am aware that false swearing is a crime in this State and subject to prosecution.

    _____ *Date*

    _____ *Signature of Applicant*

ENDORSEMENTS

SOME PERMIT APPLICATIONS REQUIRE SPECIFIC ENDORSEMENTS OF OWNERS, AGENTS, MUNICIPALITIES, ETC. ENDORSEMENTS MAY BE REQUIRED FOR YOUR PERMIT. VERIFY THE NEED FOR ENDORSEMENTS IN THE "REQUIREMENTS" SECTION OF THE STANDARD APPLICATION FORM CP # 1 BOOKLET OR WITH THE APPROPRIATE DEP AGENCY.

****

A. OWNER'S CERTIFICATIONS *

I hereby certify that _____
(PROPERTY OWNER'S NAME)

is the owner of the property upon which the proposed work is to be done. (Indicate if the work is to be done within an easement.) This endorsement is certification that the owner grants permission for the conduct of the proposed activity.

Certify whether any part of the entire project (i.e. pipeline, roadway, cable, transmission line, etc.) will be located within property belonging to the State of New Jersey (Yes _____, No_____)

_____

_____
Type: Name of Owner and Date
Address, if different from Item #1

_____
Signature of Owner

* Not required for Sewer System Application

B. APPLICANT'S AGENT

I, the applicant (name)_____
authorize to act as my agent/representative in all matters pertaining to my application the following person:

Name _____ Phone _____

Address _____ County _____

Municipality _____ State _____ Zip Code _____

Agent's Certification

_____
Signature of Applicant

Sworn before me
this _____ day of
_____ 19 ____

I agree to serve as agent for the above-named applicant

_____
Notary Public

_____
Signature of Agent

C. ENDORSEMENT BY APPLICANT AND/OR MUNICIPALITY, AUTHORITY, ETC.

1. In accordance with the applicable provisions of Title 58 of New Jersey Statutes, application is hereby made by:

   _____
   (Municipality, public agency, utility company, industry or individual who will be the eventual owner and operator of said facility when completed.)

   The applicant agrees that the works will be properly constructed and operated in accordance with the engineering plans and specifications, as approved, and the conditions under which approval is granted by the State Department of Environmental Protection.

2. Cite Authorization to sign application and date of Authorization

   _____ Signed _____

   _____
   Type: Name and Date

   Position _____

3. Endorsed by _____ Sewerage Authority
   (Not necessary if applicant is owner of the Treatment Works.)

   Signed _____

   _____
   Type: Name and Date

   Position _____

D. STATEMENT OF PREPARER OF PLANS, SPECIFICATIONS AND ENGINEER'S REPORT

I hereby certify that the engineering plans, specifications and engineer's report applicable to this project comply with the current rules and regulations of the State Department of Environmental Protection with exceptions as noted.

Professional Engineer's
Embossed Seal

_____
Signature of Engineer

_____
Type: Name and Date

_____
Position, Name of Firm

Photo credits:

Cover, p. 24, p. 56 (upper right and left): New Jersey Dept. of Environmental Protection, Division of Coastal Resources; Facing p. 1, p. 12, p. 56 (lower): Rogers, Golden & Halpern, Inc.