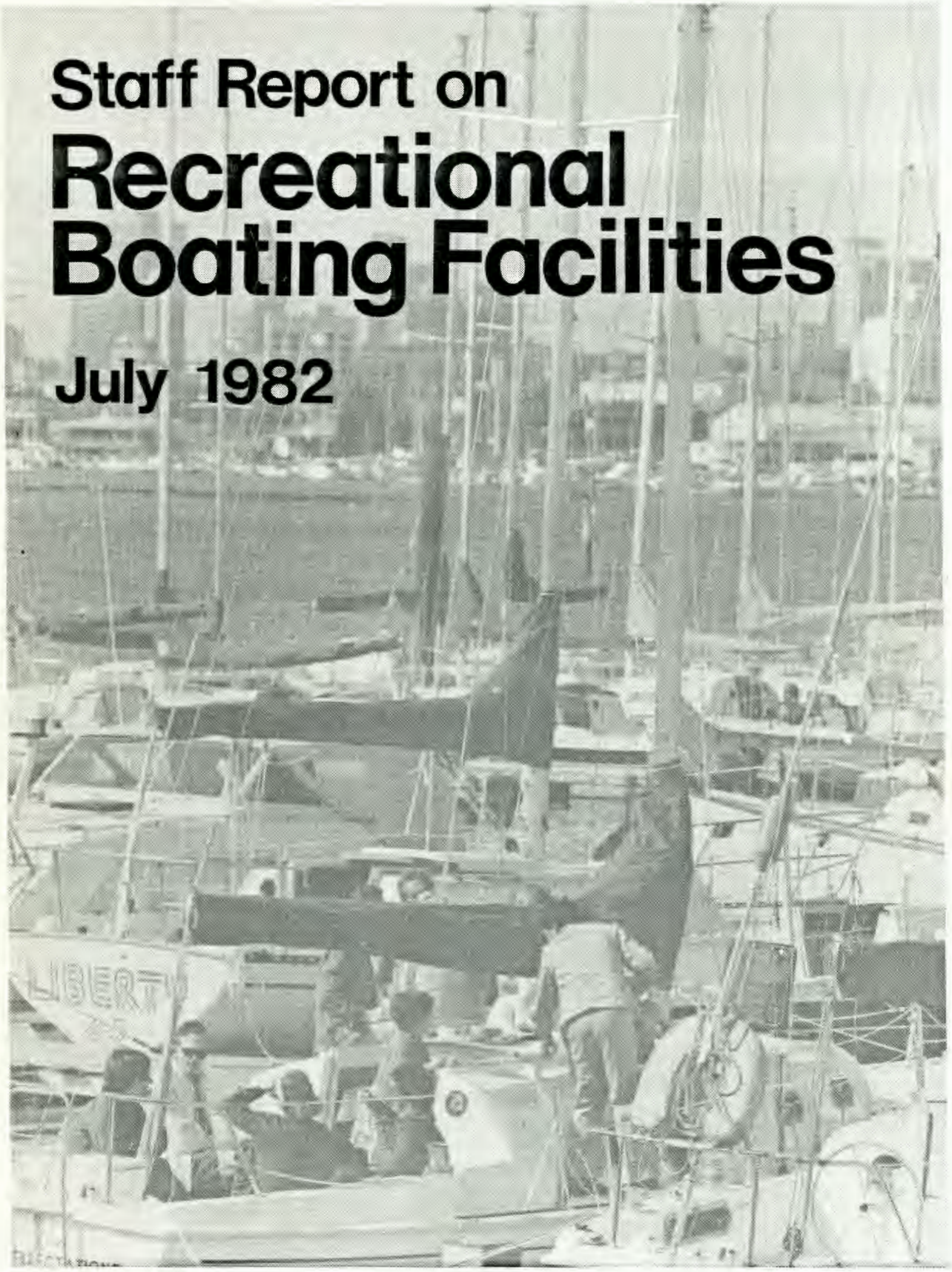
Staff Report on
Recreational Boating Facilities

July 1982



San Francisco Bay Conservation & Development Commission

Staff Report

on

Recreational Boating Facilities

San Francisco Bay Conservation
and Development Commission

July 1982

This document was prepared with financial assistance from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, under the provisions of the Federal Coastal Zone Management Act of 1972, as amended.

FOREWORD

The McAteer-Petris Act provides for the continuing review of all matters concerning San Francisco Bay. Beginning in 1977, the Commission raised several questions about the current Bay Plan findings and policies on recreational marinas, launching ramps and small boat docks. In April, 1979 the Commission adopted a work program for a boating study that directed the staff to investigate marinas and other boating facilities. In addition the staff was directed to recommend findings and policies for reducing fill and other impacts associated with marinas. The program also envisioned the development of siting and design guidelines for marinas.

This report, prepared by the BCDC staff, results from that study. It focuses on the types of facilities associated with boating, especially marinas. Proposed changes to the findings and policies of the Bay Plan concerned with boating facilities are included in the report. Final recommendations will be prepared after public hearings on the report.

C O N T E N T S

CHAPTER I: INTRODUCTION AND SUMMARY

I'D RATHER BE SAILING

San Francisco Bay is one of the most exhilarating places in the world for a boater. Its vast size and enormous diversity challenge a wide variety of sailors -- deadly serious World Cup racers, youngsters managing tiny El Toros, agile windsurfers, hardy rowers, wily fishermen and more. They all enjoy a unique relationship to the Bay, a perspective and knowledge that only closeness to the water and everchanging winds and currents can bring.

Sailboat racing, for example, is exciting, challenging and demanding. Organized racing goes back to 1869 when the San Francisco Yacht Club held its first regatta. Today, up to 1,000 boats participate in the weekend Yacht Racing Association sponsored races on the Bay, from eight-foot-long El Toros to fifty-foot yachts. The Bay is also the starting point for two ocean races to Hawaii. Sailors from around the world also congregate in the Bay Area to participate in international races and Olympic trials that regularly occur.

Power boating is also very popular. Regattas and cruises sponsored by yacht clubs for large power boats frequently occur. The Bay's sloughs and the Delta provide hundreds of miles of byways for exploration, resting, skiing or fishing.

The newest small boating sport, windsurfing, brings a very direct and close connection to the Bay. Each summer windsurfers challenge one another at the Golden Gate. Canoeing, kayaking and rowing also occur in the calm, sheltered waters of the sloughs and tributaries of the Bay.

Boating on the Bay is educational as well as recreational. The sea demands respect, and the sailor must bring to it well-honed navigational and sailing skills. Many local jurisdictions and private parties offer sailing instruction. The U. S. Power Squadron offers courses in boating safety and boat handling. For the uninformed, the inexperienced, or, perhaps, merely the unlucky, the Bay can be dangerous.

Bay Area boats vary as much as boaters' interests and incomes. Most boats in the Bay Area are small, stored at home, and put into the Bay at launching ramps on weekends. But there are also many sailboats, yachts and large power boats moored in marinas that dot the edge of the Bay. Marinas also provide services: dry storage for boats, food, repairs, sales and chandlery supplies. Because of the variety of activities, and the interest in boats, marinas are lively places where many are drawn to enjoy, live, work and dine. Marinas often become the focal point for condominium, office and commercial projects.

Boating on San Francisco Bay has been and is likely to continue to be a major Bay Area recreational activity. The number of boats on the Bay can be expected to increase steadily. Most boats owned by Bay Area residents can be stored on dry land; some need a marina berth.

SUMMARY OF THE REPORT

This report first discusses marinas, the boating facility that makes the greatest demand on the Bay. Marinas are defined, and the Bay Plan's designation of marina sites is analyzed. The report points out that (1) demand projections are not reliable; and (2) site designations in the Bay Plan do not correlate with the sites where marinas have actually been built. The report suggests abandoning the demand forecasts and site designations. Instead, a new finding recognizing that additional berths will be needed in the future would be substituted.

The report discusses the large amount of fill that could be allowed for marinas under the existing Bay Plan policies, points out how fill can be reduced without unduly interfering with marina development, and proposes to eliminate fill for parking and roads associated with marinas. These would have to be built on existing land. Sites without sufficient existing land would not be suitable for marinas.

Other impacts on the Bay, especially due to dredging and water pollution, are discussed. The report suggests adding findings and policies to address these matters. The report also discusses the number of Bay marinas -- whether there are now, or will soon be, too many marinas -- and concludes that this is not a serious problem.

The report then points out that after an acceptable site is identified, the marina must be carefully designed. The best marina design will protect the boats but not interfere with flushing, will be convenient but not deny visual access to the boating activity and the water, and will include amenities for the entire public including public access, viewing areas, landscaping and, at the right places, launching facilities. No standards can achieve these objectives because sites and projects vary too much. Each marina project must be analyzed individually and the Commission should continue to rely on the advice of the Design Review Board, the Engineering Criteria Review Board and the staff on design issues. Financial aspects of marinas are then discussed.

The report then turns to non-marina boating facilities, especially individual boat docks and launching facilities. Minor policy revisions are suggested, mainly to avoid unsuitable sites. Lastly boating safety is briefly discussed.

CHAPTER II: MARINAS

INTRODUCTION

Most of this report concerns marinas because, of all recreational boating facilities, they require the most shoreline area for support facilities, the most water area for mooring boats, and potentially the most fill for parking and associated features. They also have the greatest impact on water quality and cause the greatest concern about conflicts with other uses for the Bay and shoreline. Public marinas also involve substantial costs to build, operate and maintain.

DEFINITION

Marinas, in the simplest sense, are basins for storing boats, usually keeled or larger boats that cannot be conveniently stored on dry land. Marinas ordinarily consist of breakwaters -- wooden piles, steel sheets or solid earth -- to protect boats from wave action and surge, floating docks and ramps to provide an orderly location for tying up boats, and water channels sufficiently deep and wide to allow safe and convenient navigation.

But most marinas also include a number of associated facilities, including boat hoists or ramps to put boats in and out of the water, harbormaster and maintenance buildings, lockers for storing gear, restrooms, pump-out stations to remove waste from holding tanks, pumps for gasoline, clubhouses for boaters, and parking lots. On the whole older marinas tend to have facilities more narrowly related to the sailor's needs. Newer marinas, with some exceptions, combine boating facilities with other uses such as restaurants, townhouses and condominiums, shops and occasionally, port and industrial works. Complete marinas may also include bait shops and charter fishing offices, docking and receiving facilities for commercial fishermen, yacht sales offices, boat repair yards and chandleries.

Marinas are both publicly and privately owned. Those publicly funded and operated by local governments are usually funded by a loan from the Department of Boating and Waterways.

EXISTING POLICIES ON MEETING BERTH DEMAND

In the Bay Plan, marinas are classified as water-related recreation, a priority use, and the findings and policies on marinas are found in the Recreation section of the Bay Plan (pages 21 and 22). Finding "h" indicates that demand for recreational facilities will increase more rapidly than the population as the work week is shortened and spending power per capita increases. Finding "c" states that planning for recreational uses should be carried out for a 50-year period, or to the year 2020.

Recreation Policies 1 and 2 assume that demand for marina berths should be satisfied by the Commission. Policy 1 estimates that 70,000 berths will be needed* in 2020 and that 1,250 acres of shoreline will be required for the berths. Policy 2 states that marina sites are designated on the Bay Plan maps, that these sites should be reserved for marina purposes, and that other sites will also be needed to meet the demand.

The "need" for boating facilities was based on population projections, boat ownership trends and the ratio of boatowners to the population. In 1969, when the Plan was adopted, the 2020 Bay Area population was projected at 10.8 million; 1 person out of every 25 was expected to purchase a boat[1/]; and 17 boats out of 100 were expected to be berthed in a Bay Area marina[2/]. These assumptions resulted in the Bay Plan's 70,000 berth prediction for 2020, about 50,000 more than now exist.

In general, these assumptions have not proved valid. In 1968 when the present Bay Plan policies were first established, there were about 12,700 berths in the Bay. In the last thirteen years, the Commission has authorized approximately 6,500 new berths to bring the total number to 19,200. However, the Bay Plan projected a demand by 1975 at 24,800 berths; and by 1980, a demand of 40,000. In fact there were only 14,200 berths by 1975 and 19,200 berths by 1980.

It is clear now that the 1969 Bay Area population estimates were too high, and since 1969, population projections for the year 2020 have been revised downward from 10.8 million to 7.2 million[3/]. If the demand projections were revised to reflect the lower population now expected, 47,000 berths would be estimated to be needed by 2020. Since 1969 the number of boaters per capita has also not increased as much as then expected. In 1969 there was one boater for every 350 Bay Area residents; in 1980, one boater for every 250 residents. However, the Bay Plan assumed there would be one boater for every 155 Bay Area residents by 2020. If the ratio of boaters per capita were revised on the basis of actual experience, there would be an estimated demand for only 30,300 berths in 2020.

Other ways of predicting demand lead to similarly divergent results. For example future demand can be estimated by projecting present trends as established by Commission-approved projects. An average of 228 berths per year was approved by the Commission between 1970 and 1975. Between 1975 and 1980, the average increased to 1,066 per year. Estimates of demand based on the low average yields 9,120 new berths needed by 2020. Estimates based on the high average would result in 42,640 new berths needed by 2020.

---

* "Need" is a term of art; there is, of course, no need for marina facilities in the sense that there is a need food, shelter and clothing.

It thus appears that neither projections based on population estimates and assumptions about boaters per capita, nor extrapolation of actual trends can be relied on to establish the likely number of berths to be needed in 2020. Population projections are accurate for the first 4 to 5 years, but become increasingly unreliable over time. Assumptions about the number of boat owners per capita and the number of boats needing berths also change over time. Trends based on actual experience more closely reflect market conditions but do not recognize rapid changes in recreational preferences.

And recreational preferences are very susceptible to change due to changes in disposable income, amount of leisure time, recreational alternatives, cost of a particular activity and accessibility. The recreation study prepared in 1968, which became the basis of the recreational policies in the Bay Plan, assumed that Bay Area residents would have more money for recreation and more time[4/]. Since 1980, however, disposable income has declined, not increased. The cost of boats has increased by approximately 20%. The cost of mooring a boat has increased by up to 50%. And between 1970 and 1980 there has been little change in the amount of leisure time enjoyed by Bay Area residents.

It is thus apparent that while demand for marina berths has remained strong, the existing estimates in the Bay Plan are both unreliable and out-of-date. Moreover, there does not now appear to be any other way of estimating demand that will be reliable over a fifty-year period. Since marinas will continue to be built so long as there is a market for them and suitable sites are available, there would appear to be no need to retain the demand estimates in the Bay Plan.

SITE DESIGNATION IN THE BAY PLAN AND ACTUAL LOCATION OF MARINAS

Policy 2 on page 21 of the Bay Plan states that "sites should be reserved for all marina and fishing pier installations indicated on the maps." Policy 4(a) states that marinas should be well distributed around the shores of the Bay, but it is modified by Policy 4(b) which excludes sites that rapidly silt up or are unusually foggy.

Pursuant to these policies, the Bay Plan designated seventy-seven existing and proposed marinas on the Bay Plan maps where, it was assumed, many of the 50,000 additional berths needed through 2020 could be built. The proposed marina sites were fairly widely distributed around the Bay with 8 sites in the South Bay, 9 sites in the Central Bay and 9 sites in the North Bay. An additional three sites are shown easterly of the Carquinez Bridge. The Plan also allowed other suitable sites to be used.

The designated sites were based on suggestions by local governments and developers who were then planning new or expanded marinas. The sites were not evaluated for environmental, financial or engineering feasibility, and development of some would destroy marshes and mudflats. Development of others would involve extensive initial and maintenance dredging. Other sites would need considerable fill for parking and other marina facilities.

Moreover, for the most part during the last 12 years, the designated sites have not been selected for actual marina developments. Only two of the thirty-four marina projects built between 1970 and 1982 were actually located at sites designated on the Bay Plan maps. These were the Emeryville and Embarcadero Cove Marinas. The remaining marina developments occurred at existing marinas or at sites not specifically designated for marinas. This would indicate that the site designations have been of questionable value.

A more compelling influence on marina distribution in the Bay has been boater preference. Given similar recreational conditions, a boater prefers to have a marina near his or her home. For this reason marinas have usually been located near population centers (see Figure 1). This was the case in 1970, and it has not varied since then. San Francisco, the East Bay shoreline from Alameda to Richmond and Marin Counties have two-thirds of the available berths (three miles of the Sausalito waterfront and three miles along each side of the Oakland Estuary are largely occupied by marinas, and the remaining third are scattered around the Bay. Sailboat marinas tend to be located in the Central Bay in Marin, San Francisco and Alameda Counties. These locations are nearer to deep water, strong winds and popular race courses. Powerboat marinas are usually located in the South Bay and easterly of Carquinez Bridge, near areas offering good cruising, smoother waters for waterskiing and good fishing.

ISSUES RELATING TO MARINA DEVELOPMENT

Marinas can have major adverse impacts on the Bay: fill, water pollution, loss of valuable habitat, and conflicts with other uses needing the same space.

A. Fill

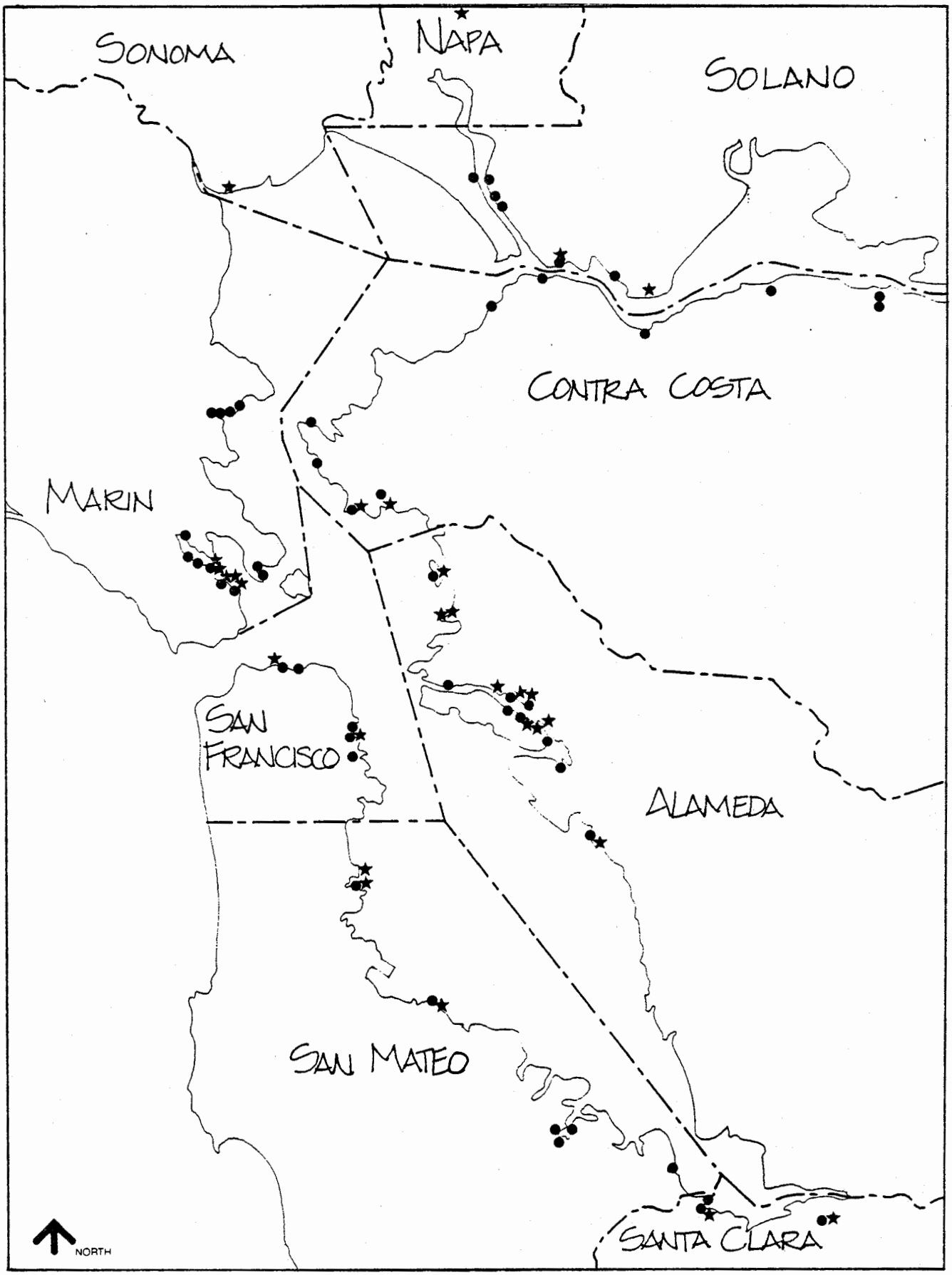
Of major concern to the Commission is the amount of fill, especially solid fill which is usually permanent, needed for a marina. Existing policy allows considerable fill for a wide variety of marina facilities, including roads and parking. Yet the Commission's experience from the last eleven years indicates that marinas can be built with much less fill than the Bay Plan now allows.

1. Existing Policies

Marinas are a form of water-related recreation for which fill may be approved under the McAteer-Petris Act and the Bay Plan. Specifically Recreation Policy 4(b) (page 21) states:

> "Fill permitted for marina development should be the minimum necessary to provide support facilities (parking, service buildings, launching lanes, etc.). At a density of 44 berths per acre of water surface, about 3/4 acre of land is generally sufficient for each

Figure 1



● Location of Berthing in January, 1968
★ Location of Major Permit Activity; 1970-1981

San Francisco Bay Conservation and Development Commission

acre of water surface (750 sq. ft. per berth). Marinas having fewer than 44 boats per acre require less land per berth. No fill for marinas should be permitted to exceed 3/4:1 land/water ratio."

If applied literally, Policy 4(b) would allow marinas to be built at sites that have little or no existing land. Moreover, assuming the worst case, approximately 900 acres of solid fill for parking and other marina support facilities could be placed by 2020 if 50,000 more berths are provided. This solid fill would be in addition to the pile-supported and floating fill for berths and ramps. While 50,000 berths may not be needed or built, the land to water ratio allows substantial fill to be placed for whatever new berths are built.

2. Impacts of Fill

Fill, especially earth fill or fill of any kind in mudflats and marshes has serious adverse impacts on the Bay. The Bay, including water, mudflats, and marsh, is a complex biological system, in which micro-organisms, plants, fish, waterfowl, and shorebirds live in a delicate balance. Filling destroys the habitat of fish and wildlife and can disrupt the ecological balance of the Bay which has already been damaged by past fills. Even seemingly minor changes, such as that caused by new fill or dredging, may have far-reaching and sometimes highly destructive effects5/.

Filling almost always increases the danger of water pollution by reducing the capacity of the Bay to assimilate the increasing quantities of liquid wastes being poured into it. Filling reduces both the surface area of the Bay and the volume of the water in the Bay; this reduces the ability of the Bay to maintain adequate levels of oxygen in its waters and also reduces the strength of the tides necessary to flush wastes from the Bay6/.

Filling reduces the air conditioning effects of the Bay and increases the danger of air pollution in the Bay Area. Reducing the open water surface over which cool air can move in from the ocean will reduce the amount of this air reaching the Santa Clara Valley and the Carquinez Strait in the summer--and will increase the frequency and intensity of temperature-inversions, which trap air pollutants and thus cause an increase in smog in the Bay Area7/.

Floating and pile-supported fill have lesser adverse impacts on the Bay. However, the shading caused by this fill can disrupt the bottom environment and can result in temperature changes that adversely effect the Bay environment8/.

FIGURE 2
SELECTED BCDC MARINA PERMITS

Project Name	Permit Number	County	Number of Berths Authorized	Waiting List	Fill for Berths (Acres)	Fill for Support Facilities (Acres)	Maximum fill (acres) that could have been approved for support facilities (44 berths per acre of water)	Comments
Emeryville	1-70	Alameda	374	Yes, 1/3 years	2.0 acres	9.0 acres	6.3 acres	5 acres of excess fill placed without authorization.
Portobello	32-71	Alameda	100	No	.8	.3	1.7	Part of apartment development.
Berkeley Marina Expansion	37-71	Alameda	580	Yes, 3-5 years	2.3 acres	400 ft^2 .009 acres	9.8	
Alameda Yacht Harbor Expansion	4-72	Alameda	170	No	.55	---	2.9	
Gas House Cove Expansion	10-74	San Francisco	13	Yes, 10 years	495 ft^2 .01	---	.22	
Shellmaker Port Sonoma Marina	16-74	Sonoma	40	No	.14	---	.68	Basin dredged from dry land; 31.7 acres of new surface area.
Pelican Harbor Expansion	1-75	Marin	90	Yes, up to 2-1/2 years	.55	.02	1.5	
Alviso Marina Expansion	13-75	Santa Clara	49	Unknown	.22	640 ft^2 .015	.83	
Embarcadero (Port of Oakland)	1-76	Alameda	213	Yes, 2 years	.63	.04	3.6	
Coyote Point Marina Expansion	9-76	San Mateo	476	Yes, 5 years	1.5	70 ft^2	8.1	Fill for support facilities placed before 1969.
Pier 39	22-76	San Francisco	335	No	1.62	1.6	5.7	7.5 acres of new surface area; Marina part of commerical retail project.

FIGURE 2 (continued)
SELECTED BCDC MARINA PERMITS

Glen Cove Marina Expansion	24-76	Solano	194	Yes	2.5	---	3.3	
Sausalito Yacht Harbor Expansion	26-76	Marin	200	No	.1	.01	3.4	
Oyster Point Marina Expansion Replacement	7-77	San Mateo	600	Yes	3.0	.03	10.2	Under construction.
Benicia Marina	5-77	Solano	309	N.A.	2.0	---	5.26	Under construction. Dredged from dry land.
Port of Oakland Renovation	8-77	Alameda	44	Yes	.26	---	.75	
Port Sonoma Shellmaker	7-78	Sonoma	347	No	.9	.04	6	
Richmond Marina	11-78	Contra Costa	500	Yes 15-40 years	1.8	.2	8.5	
Brisbane	14-78	San Mateo	600	N.A.	2.8	.02	10.2	
Napa valley Marina Expansion	20-78	Napa	48	No	.6	---	.8	Certain waterway jurisdiction only.
Deak Office Park	32-78	Marin	100	N.A.	.55	---	1.7	Under construction. Replacement of old marina as part of office park project.
Alameda Marina Village	39-79	Alameda	609	N.A.	3.2	1.7	10.3	Under construction. Part of residential/ office project.
Emerybay Cove	12-80	Alameda	456	N.A.	2.4	---	7.8	Under construction.

NOTE: Only permits with berthing are included here; fill fogures will not correspond to those in the text.

3. Commission's Experience with Fill for Marinas

In the last 11 years, the Commission has approved 36 major permits for construction of new marinas, renovation of existing marinas or expansion of existing marinas, at 20 locations to provide 6,500 berths. A total of 63.3 acres of fill was authorized for marina uses (see Figure 2).

Of this amount, the Commission authorized 32.9 acres of floating fill for berths, 0.7 acres for pump-out and fuel docks, launching ramps and similar facilities, and 2.6 acres for breakwaters. There is little that can be done to reduce fill for these marina purposes. Fortunately most of this fill is pile-supported or floating.

The Commission also authorized 9.4 acres of this fill for portions of restaurants, dry boat storage areas, chandleries, small shops, yacht brokers offices and public access and recreation. About 4.4 acres of this fill was for small restaurants, yacht clubhouses, restrooms, bait shops, boat sales offices, dry boat storage areas, and harbormaster's offices. One project, Pier 39 (Permit 22-76) accounted for 1.62 acres of this fill. But that project also involved the removal of over 9 acres of pile-supported fill that had been placed for old Piers 37 and 39.

Except for marinas, the Bay Plan generally does not allow fill for parking and service roads. In the case of marinas, substantial fill for parking and traffic circulation can be placed. Of the total marina fill, 4.1 acres were for parking and roads. This is considerably less than 32.5 acres of fill that could have been allowed for parking consistent with Policy 4(b).

Two projects accounted for more than 90% of the authorized fill for parking and roads. They also involved unique circumstances. The Emeryville Marina (Permit 1-70) accounts for 3.9 acres of fill used for parking and roadways. But the fill also created a solid breakwater for the marina basin. And, except for fill placed prior to the Commission's jurisdiction, the City only had water-covered property for the marina. This project also involved an over-fill of 5 acres which the Commission later authorized for park and public access uses only. The Alameda Marina Village project (Permit 39-79) involved 0.19 acres of fill for parking and roadways. But the project was located at an old shipyard where former shipways and other structures made the shoreline extremely difficult to develop without placing fill. Precluding fill for parking would eliminate marina projects at sites with no or little existing land, like the Emeryville marina and would cause parking to be further away from berths in projects like Alameda Marina Village.

On the other hand, 5,300 berths were provided during the last 11 years without any fill for parking. This brings into serious question the need to allow fill for parking for marinas.

Between 1970-1981, 2.6 acres of fill were allowed for breakwaters, usually after the original permit was issued. The need for and type of breakwater were often inadequately evaluated by the applicant at the

time the Commission considered the application. In 8 of 12 marina applications involving breakwaters (66%), the applicant returned to request a breakwater after the marina had been constructed. This pattern points out the need for a thorough evaluation by a qualified hydrologist of marina proposals when they are first planned to assure that the total fill and impacts of the fill are fully understood when the project is first considered.

4. Minor Fill Provisions

Fill can be authorized for any use, including marinas under the Bay Plan policies that allow minor fill to improve shoreline appearance or to provide new public access. To some extent these provisions have been used by the Commission when site conditions required fill and substantial public benefits were provided. Commission Regulations 10443 and 10444 set out the restrictions under which fill for access or shoreline improvement can be placed9/. Once the fill meets the requirements, any use may occur.

During the 1970-1981 period the Commission authorized .32 acres of fill for shoreline appearance purposes and 11.6 acres for new public access. A large percentage (75%) of the fill for public access was placed at three sites. About 3 acres were authorized at the Emeryville Marina (Permit 1-70), 3 acres were authorized at the Richmond Marina (Permit 11-78), and 3 acres at the Alameda Marina Village (Permit 39-79). In both the Richmond and Alameda projects extensive shoreline modifications were needed due to the condition of the shoreline. As pointed out above, Emeryville involved a site that was almost entirely water-covered. About 1 acre of fill was also approved for public access at Pier 39 (Permit 22-76) but this project involved substantial commercial uses on a replacement pier in addition to a 335-berth marina. At four other marinas, the Commission authorized fill for access for fishing piers or for boardwalks over the Bay that provided the pedestrian with a close view of the water rather than of a gently sloping shoreline.

The Bay Plan10/ also allows the Commission to authorize small amounts of cantilevered or pile-supported fill for any use when the structure improves the appearance of the shoreline and uses the Bay as a design asset. This provision provides design flexibility to avoid long sections of straight shoreline, provide windbreaks where needed and add visual interest to the Bay and shoreline. Commission Regulation 1013411/ establishes the rules under which this type of fill may be approved. The regulation allows fill for small restaurants, yacht clubs, decks and similar structures at marinas if they are justified for design reasons. Nevertheless between 1970 and 1981 no fill was authorized at a marina under these circumstances.

5. Fill Conclusions

The current Bay Plan policies allow fill for "marina support facilities," except for dry boat storage. Therefore, parking and roads can now be built on fill. Substantial amounts of fill may result. Experience from the last eleven years indicates that such fill is usually not necessary

to build marinas. Some fill for unloading areas should be allowed if shoreline conditions warrant.

Some marina uses, berths, ramps, walkways, guest and short term berths, pump out stations, fuel docks, unloading areas, boat launching facilities and breakwaters must be on fill, usually pile-supported or floating.

Of these, breakwaters involve the greatest potential amount of fill and present the most difficult design problems. Sheet pile and timber breakwaters involve much less fill than earth breakwaters but may not always be feasible economically nor provide the best design for a particular site. Fairly detailed information about surge, fetch, currents, prevailing winds at the site and marine engineer's and hydrologist's evaluation of proposed breakwaters should be provided when the marina application is first submitted. Some earth breakwaters may be needed at certain sites but, in most cases, surge and fetch can be sufficiently moderated with sheet-pile, timber-pile or floating breakwaters. Breakwaters requiring the least fill should be preferred and no parking should be allowed on breakwaters.

Other marina uses, restaurants, yacht clubs, chandleries, snack bars, bait shops, harbormaster offices and yacht broker offices can now be built on either earth or pile-supported fill. Some shoreline areas benefit from small structures that extend over the Bay, however, because these facilities are generally small and can be located substantially on existing land, no earth fill should be allowed for these uses.

No changes should be made to the special rules for minor fills for shoreline improvement, new public access or using the Bay as a design asset. Some fill for these uses should be allowable at any marina pursuant to these rules.

Revised Policy 4(b), Recreation, in Appendix A would implement these suggestions.

B. Water Circulation and Water Quality at Marinas

While water quality in San Francisco Bay has generally improved during the last decade, some areas of the Bay with large concentrations of marinas, such as Richardson Bay suffer from poor water quality. Moreover, current studies12/ show that marinas have lower water quality than open Bay. Poor water circulation and inadequate flushing are chronic problems within many enclosed basins.

1. Water Pollution Associated with Marinas

The Regional Water Quality Control Board reports a problem with fecal contamination due to untreated sewage discharges from recreational boats and unsewered houseboats. In a recent sampling of marina basins, the Board found that 22 of the 23 marinas sampled failed to achieve shellfish harvesting standards.

Several other pollutants, including petroleum products and heavy metals, originate from boats. In addition runoff, containing oily wastes, may flow into marina basins from adjacent parking lots or boat repair yards. Outflow pipes near or at marina basins may also discharge wastes that cannot dissipate readily due to inadequate circulation in confined marina basins.

Copper contamination is common in marina basins due to the use of copper-based "anti-fouling" paints that is leached from boats, piles and other treated surfaces. In poorly flushed basins, copper can reach toxic levels on the floor of marina basins. During dredging copper can be disturbed and re-released into the Bay waters. Alternative anti-fouling preparations are now being manufactured, mostly substituting longer-lived metal compounds such as tributyl tins and zinc oxides for the copper based paints. The newer materials are more costly but are alleged to give a better seal and last longer. The impact on the Bay of the newer preparations is not yet known. More research will be needed before any recommendation can be made regarding anti-fouling paints.

While current Regional Board regulations and federal laws prohibit the release of contaminated surface run-off into the Bay, some nevertheless occurs. Surface runoff from boat repair yards at marinas can contain paint particles, oils, greases, copper and other heavy metals. Surface runoff from parking lots at marinas often contains grease, fuels and oily wastes. Traps, drains and other new devices can prevent some of these pollutants from entering the Bay.

If pollutants flow into an enclosed marina basin that is not adequately flushed, the pollutants will not readily disperse. Improperly designed or placed drainage systems can exacerbate the water quality impacts. This is a particular difficulty at older marinas. In the newer marinas, the Commission has conditioned permits to require attention to runoff. While studies show that grease traps may not be very effective, new techniques including fiber filters in the drainage system and porous surfaces in parking areas may better eliminate oil and grease from surface runoff 14/.

2. Pollution Removal

Natural forces disperse pollutants so that contamination levels are kept well below toxic levels. Flushing, the main force responsible for dispersion, is the free movement of water through an area by tidal forces. Sediments are spread so that they do not accumulate to high levels. However, maximum flushing may not coincide with the protection of boats from surge and fetch. Care must be exercised to reduce surge and fetch without significantly lowering flushing.

The shape and location of the marina basin affects pollution levels of the water and bottom sediments. Basins with square shapes or long, dead-end channels do not flush well. Channels that are open ended and allow for water flow may be flushed adequately. Often flushing action in older marinas can be improved by opening dead-end channels to tidal forces.

Channels can also be designed to simulate natural drainage, for example a branching pattern with decreasing channel widths and depths. Basins can also be designed to maximize water velocity and circulation. Sometimes mechanical devices, such as pumps or aeration devices, may be necessary to ensure adequate water movement through marina basins.

3. Pollution Prevention

Preventing runoff containing contaminants from entering the Bay untreated and assuring that untreated sewage is not discharged from boats are two ways to reduce the adverse impacts of boating and marinas on water quality.

The U.S. Coast Guard estimates that roughly 85% of recreational boats have not complied with the marine sanitation device regulations15/. For San Francisco Bay, the regulations provide that recreational vessels under sixty-five feet in length with a head (toilet) must have one of three types of sanitation devices. Class I and II devices treat the sewage on board. After treatment the effluent can be released into Bay waters. Class III devices are holding tanks. All boats longer than sixty-five feet must have a Class II or III device. Because holding tanks are costly, add to the weight of a boat and may change sailing characteristics, many owners prefer Class I or II devices.

While the regulations indicate what devices should be available, no regular inspection assures that they are. Vessels that are boarded by the Coast Guard for other reasons are inspected for compliance with all regulations, including sanitation devices. Cases of non-compliance are reviewed by a Coast Guard hearing officer who may drop the case, levy a fine of up to $5,000, or issue a warning. During the first year after the regulations became effective in 1980, the Coast Guard only issued warnings. After 1981 the Coast Guard levied small fines in some cases. Practically, the public will have to rely on the good will of boaters and their understanding of water pollution impacts.

Assuming that boats will contain wastes until they return to a marina, it is necessary to provide convenient pump-out and dumping facilities for wastes. Otherwise untreated sewage and galley wastes will likely be dumped into the Bay.

For the last 11 years the Commission has required pump-out facilities at new or expanded marinas. The Regional Board reports16/, however, that some pump-out facilities are difficult to use or are poorly located so that boaters do not often use them. In some cases marina operators charge high fees for the use of the pumps which also may discourage use by boaters.

4. Water Quality Conclusions

When new marina applications are approved, provisions should be made for (1) efficient flushing of the basin, (2) appropriate devices to remove oils from surface drainage, (3) diversion of surface runoff, preferably for treatment but at the least into areas with good levels of mixing and flushing, (4) readily accessible and low cost pump-out facilities, (5) prevention of spills and leaks, whenever possible, and (6) the use of new, less contaiminating "anti-fouling" paints, if and when they are found safer than existing copper based paints. To assure that these matters are addressed, a new finding and policy concerning water quality aspects of marinas should be added to the Bay Plan. Revised Policy 4(b), Recreation, in Appendix A would implement these suggestions.

C. Dredging

Most of the Bay is shallow and many shoreline areas silt up rapidly. This is particularly true of areas south of the San Mateo Bridge and certain locations easterly of the Carquinez Bridge. Unless a particular site is scoured naturally, dredging will be required to establish sufficient depths for boats to float at all stages of the tide. Substantial maintenance dredging may also be required thereafter for the life of the project.

Dredging destroys bottom dwelling marine life, is costly and disposal near the dredging may destroy wetlands or increase sedimentation at other locations.

1. Dredging Methods

There is no "best" dredging technique. The least damaging and most cost effective technique depends on the location and physical characteristics of the site. Often the dredging technique and the time of dredging is selected by the marina operator based on availability of equipment, amount of bid and proximity to an acceptable disposal site, rather than on the impacts on the Bay.

The three most commonly employed methods of dredging -- hopper, hydraulic, and clamshell -- have different impacts on the Bay. Hopper dredging and hydraulic dredging involve sucking sediment. But hopper dredges require a larger vessel that needs deeper water, returns the water to the Bay at the time of dredging and stores the sediment for disposal elsewhere. Hopper dredges causes the least turbidity. The quality of the water returned at the site can present problems because of pollutants in the dredged sediments. Small hydraulic dredges usually pump material into a holding pond. In a holding pond, the sediment sinks to the bottom and the clearer water is pumped back into the Bay. Again, the quality of the water returned to the Bay can be of concern. The major drawback is that a large ponding area may be needed to allow the sediments to settle out of the dredged material. The clamshell technique involves a crane, often on a barge, with a large "bucket" that scoops mud and places it on adjacent land or in a barge for

hauling to a disposal site. Water and silt drains immediately back into the Bay. This method causes the most water turbidity but is the most commonly used for marina dredging in the Bay.

2. Impacts

The impacts of dredging include the release of pollutants, creation of localized turbidity, and the removal of habitat. Substances found in dredged sediments include heavy metals, toxic chemical compounds, oil and grease. As discussed in the water quality section, within marina basins, such substances pollute bottom muds. Significant localized turbidity can block the gills and feeding parts of marine organisms and can smother bottom dwellers17/. Once the bottom community is removed it can take up to 18 months for communities to reestablish themselves. Sites that silt up rapidly require frequent dredging which prevents bottom organisms from becoming reestablished.

3. Existing Dredging Policy

Dredging can be approved pursuant to the Bay Plan Dredging Policies.18/. Initial dredging of less that 100,000 cubic yards and any amount of maintenance dredging can be administratively approved by the Executive Director pursuant to Commission Regulations 10122(a)(1) and 10122(a)(2). The Executive Director may also approve the disposal of spoils at Army Corps' designated dumping ground pursuant to Commission Regulation 10122(a)(3). The Bay Plan19/ establishes the following preferences for spoil disposal: (1) on dry land; (2) as fill in an approved fill project; (3) in ocean disposal sites; or (4) if no other alternative is feasible; at a designated Bay disposal site where the maximum possible amount will be carried out the Golden Gate on the ebb tides.

4. Dredging Policy Conclusions

Dredging should be avoided, if possible. Sites requiring substantial initial or long-term maintenance dredging should be avoided. Some dredging will likely be needed even at suitable sites. Breakwaters and basin designs should avoid localized impacts on sedimentation that increase the amount or frequency of dredging. Disposal sites should be identified for the long term so that all impacts of the marina development are known when the project is first considered. Dredging should be done as infrequently as possible and at the times and by the method that has the least impact on bottom organisms

Revised Policy 4(b), Recreation, in Appendix A would implement these suggestions.

D. Conflicts with Other Uses

Prior to 1976, the Commission considered applications for approximately 200 new berths per year. Within the next three years the

requests increased dramatically to approximately 1,000 berths per year. The Commission then expressed concern that the greatly increased number of berths, if continued into the future, would consume too much of the Bay's limited shoreline.

However, since 1979 the number of berths requested has decreased almost 50 percent. The earlier, high rate has not continued. Also, marinas only occupy at the most 55 miles, or less than 5.5% of the 1,000 mile Bay shoreline. Furthermore, marinas have not conflicted with other high priority uses -- ports and water-related industry. For the most part marinas have been sited at undesignated areas or at park priority use areas where they add recreational variety.

The only three cases where marina basins arguably could be said to have conflicted with another priority use were at the mouth of the Petaluma River in Sonoma County, in Richmond, and in Benicia. At Port Sonoma the Commission authorized a small portion of one new marina within a water-related industrial area. But most of the site was required to be left for future industrial use. In the case of Richmond, the Inner Harbor shoreline was designated for port and water-related industrial use until 1977 when the designation was removed so that the City could develop a marina, commercial recreational and residential uses on the shoreline. In the case of Benicia the shoreline was designated for both water-related industry and port uses. In both cases local government and the Commission through special area planning, determined that less land area was needed for the port or water-related industrial use. Both sites were also shallow so that considerable fill or dredging would have been required if port or water-related facilities were to be built.

Marinas also, by their nature, do not interfere with park uses. During 1970 through 1981 the Commission authorized 6 marinas adjacent to park priority use areas. No conflicts with other park uses have been reported. In many cases the marina development led to significantly improved public access and fishing facilities that otherwise would probably not have been built at the parks.

With regard to non-priority uses of the shoreline, marinas should take precedence because marinas are a priority water-related recreation use.

Since marinas have not conflicted with other priority uses, are compatible with park priority uses and do not take up large amounts of shoreline space, there is no need to pre-select marina sites or limit the number of marina berths that may be built in the future.

MARINA LAYOUT AND DESIGN

A. Introduction

Once an appropriate marina site has been selected, the layout and design present complex issues. Most marina developers are familiar with marina design and will present a well-designed, functional marina project. But the policies of the Bay Plan are necessarily general in nature, and the

discussion in this section indicates how these policies should be interpreted. As with all design matters, however, design professionals are needed to provide information, analyses and alternatives.

B. Basic Facilities

Basin design, channels and breakwaters are of particular interest to the developer; they must be efficient and economically feasible. But flushing action must also be satisfactory and the breakwater design should require the least fill. Berth layout and channel widths also affect visual access to the Bay.

The basic facilities in a marina are the waterways and berths, the breakwaters and shoreside support facilities. Their layout, design, construction and maintenance ensure the safety and ease of use of the facility. High quality construction and maintenance ensure that a facility will have a long life. For each project the site characteristics, including wind velocity, currents, wave surge, water depth and dry land available, determine whether a marina can be constructed economically and with acceptable impacts on the Bay.

1. Channels and Water Depths

The Department of Boating and Waterways guidelines for the width and depth of various channels (see Figure 3) within a marina basin, include:

a. Entrance Channel (outside the marina):

Minimum Width: 75'
Minimum depth: 3' below deepest draft or 5', whichever is greater.

b. Interior channel (Channel within a marina linking entrance channel and fairways):

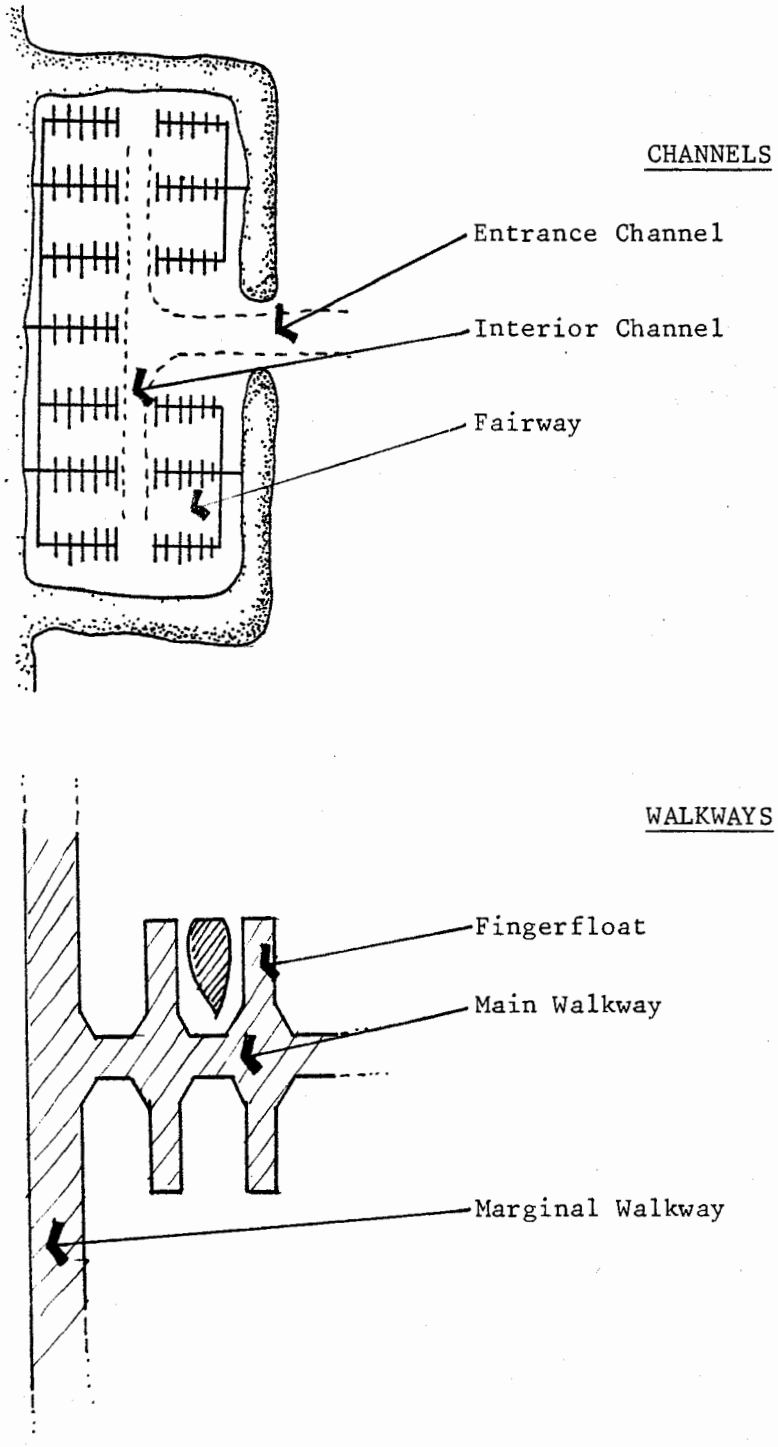
Minimum width" 75'
Minimum depth: 2' below deepest draft or 4', whichever is greater.

c. Fairway (channel within a marina linking interior channel and berths):

Minimum width: 1.75 times the length of longest berth where berths are perpendicular, or 1.5 times the length of the longest berth where berths are parallel.

Figure 3

DEFINITIONS OF MARINA FACILITIES



Source: Department of Boating and Waterways, Layout and Design Guidelines for Small Craft Berthing Facilities, 1980.

For various boats the minimum depths are as follows:

Boat Length	Minimum Depth	
	Power	Sail
up to 25'	4'	4'
26 - 35'	6'	6'
36 - 45'	6'	6'
46 - 55'	8'	8'
56 - 65'	8'	10'

These standards should generally be adhered to to help ensure boating safety.

2. Basin Protection

Ideally, marinas would be located only in areas that are naturally protected from waves. Since this is not always possible, breakwaters may have to be constructed to deflect surge and fetch. The type, direction and height of expected waves and prevailing wind directions and strengths are the primary factors governing breakwater design.

There are two breakwater types used in the Bay: floating and fixed. Fixed breakwaters are commonly of one or two forms: a narrow "wall," made of sheet piles or timber piles, or a solid mound, formed of dirt or a dirt core with exterior riprap. Fixed breakwaters cause unavoidable adverse impacts on the environment by altering natural water flow patterns and littoral drift of sediments. They can also result in "piling-up," the momentary entrapment of water behind the structure, that causes accelerated water outflows. Water outflow scours bottom sediment and can lead to turbidity and structural damage. Earth and rock breakwaters cover larger areas of Bay floor habitat and the bottom-dwelling organisms found there.

Floating breakwaters have been used at several Bay marina sites. Floating breakwaters dampen the amplitude of incoming waves while allowing unimpeded water circulation, thus promoting water quality within the marina basin. Floating breakwaters are more vulnerable to extensive wave action and often require more frequent maintenance than fixed structures. They have been constructed of materials such as timber piles, tires, and concrete. The tires are injected with a foam substance which after time decreases in buoyancy. Tire breakwaters also become weighted down by sessile organisms. Over time, the tires can sink. Some consider tires ugly and, if tidal forces are sufficiently strong, tires may become detached and float out in the Bay, creating a navigation hazard and, perhaps, eventually coming to rest in a marsh or mudflat. Breakwaters made of solidly anchored concrete slabs have demonstrated no flotation problems and require considerably less maintenance but must be securely anchored to rigid piles. An engineered

floating breakwater that has demonstrated it can remain floating over many years and that is solidly anchored eliminates the major impacts of fixed breakwaters. Experience in the Bay has shown however, that only the best engineered floating breakwaters work well over time.

One other major disadvantage of floating breakwaters is that they cannot be used for public access. Large mound breakwaters and some pile breakwaters, on the other hand, are wide enough to serve as public access areas. Some projects have even proposed solid breakwaters to serve as parking lots. This requires between 36 and 42 feet of flat surfaced area, as opposed to only between 8 to 12 feet or less for the breakwater function alone. Fill for breakwaters should be the minimum necessary to protect the marina facility and should not be increased simply to provide parking.

3. Floating Fill for Ramps and Berths

A variety of materials can be used to build docks and ramps, including wood, plastic and fiberglass. The most suitable material depends on the design and style of the marina, and the construction and maintenance budget. No standards exist establishing the "best" material. For pilings, wood or concrete are the usual choices. Either material is appropriate. However, if wood is used, it should be treated to protect against marine organisms such as Teredo and Limnoria tripunctata, wood borers which can otherwise cause rapid deterioration of wood.

The Department of Boating and Waterways has guidelines for the sizes of walkways and finger floats (see Figure 3). The suggested dimensions are:

Marginal Walkway (main walkway parallel to the shoreline):

without individual gangways; minimum width: 8'
with individual gangways; minimum width: 6'

Main walkways (walkways connecting to marginal walkways):

minimum width: 6'
maximum length: 750'

Fingerfloats:

up to 20'; minimum width: 2.5'
21 - 35' 3'
36 - 60' 4'
>69' 5'

While different sizes should be considered, these guidelines provide a good rule-of-thumb to help determine whether minimum fill for the berths would result. Less fill is required for double berths where two boats share one finger float. Double berths can be used in protected basins.

4. Opportunities to Increase Surface Area

Excavating dry or diked sites for marinas provides an opportunity to increase the surface area of the Bay. Two such marinas have been built in recent years. Port Sonoma Marina was built in diked lands, formerly used for agriculture. The Benicia Marina was excavated from dry land. There are trade-offs involved in this type of construction, so for each project proposed, the value of the existing land use and habitat values must be carefully evaluated. In Benicia, the site was ruderal and had little value for wildlife. The Port Sonoma site, however, was used for agricultural purposes and by wildlife. On the positive side, these sites, once part of the Bay, were restored to the Bay.

C. Support Facilities

Marina support facilities, including repair facilities, small restaurants and sales facilities are common in most marinas; parking and restrooms are required in all facilities. The design and location of these support facilities can enhance or impede public access and views within the overall site design of a marina. These elements should be carefully reviewed in the project development phase.

1. Parking and Drop-Off Facilities

If fill for parking is not allowed, the concern about parking is limited to its relationship to public access. The Public Access Design Guidelines[22/] recommend that parking lots be kept back from the edge of the Bay. Boaters, however, would like to be able to bring their vehicles close to the shoreline to drop off sailing equipment. While parking generally should be located away from the edge of the Bay, drop-off areas should be allowed for convenient access to boat slips.

If the Bay Plan policies are revised to preclude fill for parking, the number of spaces should be left to local governments and the Department of Boating and Waterways. The current recommendation of the Department is .6 parking spaces per berth, plus additional parking for commercial facilities, launch ramps, etc.

2. Restrooms

Restrooms are necessary facilities at marinas both for boaters and the visiting public. All BCDC permits have required that marinas include restrooms. Provision of permanent, attractive restrooms close to the berths discourages the use of marine heads. Public restrooms should be required in all new or expanded marina facilities.

The Department of Boating and Waterways has guidelines for the number and location of restrooms at marinas. These guidelines include: (1) restrooms should be 600', and no more than 1,000 feet from any berth; (2) restrooms should be designed to fit into the overall project; (3) restrooms should meet local public health requirements; (4) there should be generally

one toilet per sex per 35 berths and one lavatory per sex per 50 berths; (5) toilets should be the low flush type; and (6) restrooms should be accessible to paraplegics.

3. Other Facilities

Several other facilities, such as small restaurants, boat repair facilities and boat sales facilities, are commonly found at marinas. These are necessary support facilities for boats and boating. While these facilities are located throughout the Bay area, they should not be required at any particular facility. Their location is determined by the market for the services they provide. The basic concern if they are proposed at a marina is that they not interfere unduly with public access to and along the shoreline.

D. Public Access

Public access has been provided at marina projects in all parts of the Bay, resulting in at least 30 acres of new public access along 8.3 miles of shoreline. Improvements commonly include pathways, landscaping, seating areas, lighting, trash containers, fishing areas, and view areas. Marinas are appropriate and popular areas for public access. The linear edge of the marina basin makes a good place for strolling, the activity in the basin and surrounding areas provide an interesting focus and the boats themselves provide visual relief and interest.

Unfortunately public access at Bay marinas often lacks variety and is often difficult to find when approached from roadways or parking areas. Most public access at marinas is also well above the water surface, diminishing the primary value of access, proximity to the water. Seating is often sparse and not oriented toward Bay-related activities.

The Public Access Design Guidelines apply to every type of public access, including marinas. These guidelines recommend that the access should feel public, be usable, provide, maintain and enhance visual access, enhance and maintain the visual quality of the shoreline, connect to other public access areas, take advantage of the Bay setting, and be compatible with the natural features of the shoreline, the project, and adjacent development.

The following additional guidelines would improve public access at marinas:

- Provide a variety of access areas, such as perimeter walkways, open landscaped areas, and plaza-like seating and view areas;

- Provide clearly marked public access parking, preferably within sight of the public access areas or with clear signing to the public access area;

- Provide improvements such as outdoor eating and seating areas, lighting, trash containers, fishing piers, restrooms, and launching ramps that can be used by non-berth holders.

- Provide trash containers, lockers, boat storage, public utility structures, and parking in areas that will not interfere with views or intrude unnecessarily on public access areas;

- Site pathways, seating areas, and plazas to provide a variety of views, including both the marina basin itself and through the basin to the open waters; and

- Provide access down to the water where feasible.

Public access on docks can be provided if the marina is specifically designed with that use and with safety in mind. Elements to be included in such a design are railings and/or wire fencing on the sides of the docks to prevent people from falling into the water. Additionally, docks should be wide enough so the public access uses do not unduly conflict with the activities of the boaters, e.g, transportation of equipment from the land to the slip, etc.

Bay views are another aspect of public access. The Design Review Board has raised concerns that marinas interfere with views to the Bay. In general, this is true, but marinas also provide an interesting and active focus for views. They also frame views through marina basins to the open waters of the Bay. Design and layout of berths should be reviewed by developers, staff and Commission to ensure that a variety of views are provided of boating activity, berthing and open water.

Views can also be varied by the elevation of the viewing area, the relationship of the viewing area to the water, and landscaping at the marina. By varying the elevation of access paths, different views of the boat activities and the Bay can be achieved. Areas where viewing is from the land can be supplemented by areas where viewing is over the water. Landscaping can be used to shelter access areas, as well as screen service areas and to enhance and frame more distant views of the marina and the Bay.

View corridors to the open Bay waters should be provided, in areas with large numbers of marinas along the shoreline. In marinas with solid breakwaters, views should be provided between the property line and the alignment of the breakwater. Breakwaters should be set back some distance from the property line. Whenever possible, public access should be available on top of solid breakwaters. Fishing may also be provided if conflicts with boating can be avoided. Marinas with no breakwater should orient docks perpendicular to the shoreline so there are views from the shoreline to the open Bay waters.

Covered berthing does impact views and covers additional water surface. The "cover" is essentially a shed built over the water and docks to protect boats from rain and sun. While covered berthing is considered necessary in areas of severe weather conditions, such as snow and hail, they are generally not considered necessary in the Bay Area.

E. Marinas as Parts of Larger Projects

Most of the marinas considered by the Commission in the last several years have been part of a larger development complex, including residential, office, and commercial/retail uses.

In residential developments, it is important to have sufficient land area and landscaping to make the public access inviting to the public while retaining reasonable privacy for the residents. The public and private areas also need to be clearly defined through signing and appropriate landscaping. In commercial and retail projects greater numbers of the public come to the shoreline. Many stores and restaurants are open in the evening and on weekends, inviting the public to the shoreline. Usually the design encourages public use. The major concern is to assure that commercial facilities take full advantage of the Bay as a focal point. Office/marina projects may require fewer parking spaces than most other combinations of uses because the peak use of offices is during weekdays and peak use of the marina is weekend days. But offices do not attract the large numbers of the public than a commerical development does.

Parks are very compatible with marinas. Joint development of these facilities provide a variety of shoreline uses for the public. Public access should be continued along the shoreline and through the marina.

Thorough understanding of the proposed uses and users of the overall project will aid in evaluation of the appropriateness of the design of a project and the proposed public access. The public access should serve both users of the adjacent project and members of the general public.

FINANCING MARINAS

The Department of Boating and Waterways (DBW) funds public marinas and launching facilities, mostly by lending money to local governments who wish to build or expand marinas. Some grants are also given for public launching ramps and similar facilities. Boaters requested the program because of the perceived lack of sufficient berthing. In the twenty-one years from 1957 to 1978, the DBW has loaned $72,000,000 for marina development statewide. Most of the public marinas in the Bay Area have been built with DBW loans. Of the eight new marinas BCDC approved in the last 11 years, half have been public, funded by DBW loans, and half have been privately funded.

Originally the money for this program came from the California Water Fund and from bonds. Currently about $7,000,000 a year, raised from taxes on gasoline for boats, is deposited in the Small Craft Harbors Revolving Fund. The loans made from this fund are repaid with interest (currently at 7.9%) and reinvested into the program. Monies from berth rentals and leases for commercial establishments at marinas are used to repay the State loans and to pay for maintenance of the public marinas.

Some private marina operators feel the State loan program results in unfair competition with private marinas because non-profit enterprises can charge lower berth rentals. DBW is aware of the disparity in berth rental

fees and has been attempting to bring the berth fees of public marinas closer to the fees charged by private marinas in the vicinity. While marina fees are set by the operators, usually a local government or public agency, DBW can require that fees be raised to market value before an additional loan or grant will be given. Increased fees are resisted by renters who wish to keep fees low.

Because berth rentals alone may not generate enough funds to repay loans, DBW also usually requires commercial facilities at public marinas, such as restaurants, shops and boat services. Leases for these uses are desirable and often generate considerable income. But there is a limit to the number of commercial and boat-related facilities that any one area can support. Some private developers believe that the requirement for commercial facilities at public marinas diverts such facilities away from private marinas.

It is not entirely clear whether these arguments have merit. In any case, it would also be difficult for the Commission to address financing. Present state policy is to fund public marinas by loans. DBW's policy is to assure that the marina will generate sufficient funds to repay the loan with interest. In most cases this will mean commercial facilities associated with the marina development. No Commission policy should address this matter.

CHAPTER III: DRY BOAT STORAGE AND BOAT LAUNCHING FACILITIES

INTRODUCTION

Storage of boats on dry land reduces fill in the Bay for marinas. Less shoreline is needed for facilities associated with dry storage. No fill is allowed for dry storage areas, but launching lanes and hoists, which require some fill, are needed for boaters who store their boats on dry land.

Most of the boats in the Bay Area can be stored on dry land. The Department of Boating and Waterways assumes that all boats 18 feet long and one-half of the boats between 18 and 21 feet in length are stored on land. For the Bay Area, approximately 100,000 boats fall into this category. But not all of these boats are stored on land. Some boaters prefer to keep smaller boats in a marina berth rather than spend time trailering, hauling and launching their boats. Also some shorter boats have deep keels and cannot be conveniently trailered or launched at ramps. On the other hand some longer boats are not kept in a marina berth, usually because they are raced and the hulls are easier to maintain if the boat is not berthed in the water. For these owners the time and trouble associated with launching and hauling a keeled boat is offset by the reduced hull maintenance.

LAUNCHING FACILITIES

A. Demand

For boats that are stored on dry land, launching and dry storage facilities are needed. There are two ways to put a boat into the water: hoists and launching ramps. Launching ramps are mainly used by flat hulled boats, including outboards, inboards, rowboats, and some sailboats with removable keels. Approximately 90 percent of all boats less than 16' long are flat hulled boats. Boat hoists are mainly used by fixed, deep keel boats, especially sailboats, or for hauling out large boats for repairs. In 1982 there were approximately 10,000 boats in the Bay Area in this category.

To meet expected demand for boat launching facilities, Policy 1 of the Bay Plan recommends that 2,230 acres of shoreline be set aside for launching ramps. This estimate was based on the same population and boat ownership assumptions that were used to establish marina needs. The land requirement is based on large launching facilites with six 12-foot wide lanes at each launch ramp and associated parking and incidental facilities. As pointed out previously, the population and ownership projections require revision.

Boat launching facilities have not increased as much as the demand indicated by the Bay Plan's projections. In 1965 there were 270 boat launching facilities: 193 launching lanes and 77 boat hoists. These included Bay Area facilities located both within and without the Commission's jurisdiction. By 1977 there were 292 launching lanes and 99 hoists for a

total of 391 facilities. Of these only 119 lanes and 60 hoists are within the Commission's jurisdiction (see Figure 4). The others are located on Bay tributaries, in the lower Delta, or on the Pacific coastline. Launching facilities will accomodate between 25 and 40 boats per lane per day.

While the number of facilities has increased in the last ten years, the number of lanes has fallen far short of the Bay Plan estimate of 1,200 lanes. Discussions with consultants and the Department of Boating and Waterways (DBW) indicate that the Plan's estimates are far larger than expected demand.

There are several reasons why the demand for boat launch facilities has not met the predictions made in the Bay Plan. First, while the number of boats in the Bay Area has increased, the number has not increased at the rate predicted in the late 1960's. There has also been a slight shift away from the very small boats, under 16', to the medium range boats, between 16' and 26' feet long. Many of these boats are kept in berths, rather than on dry land. Changes in State policies and laws have reduced the areas of the shoreline which are appropriate for the construction of boat launch facilities, especially large facilities. For example, several of the proposed boat launch facilities on the Bay Plan maps are shown in areas of tidal marsh. Under current State policy, fill would not be allowed in those areas. Since the passage of Proposition 13, local governments have had difficulty maintaining state-funded launching facilities because no state funding is given to local government for maintenance.

Most launching facilities that are available to the general public are publicly financed. DBW grants provide funding for launch ramps, restrooms, lighting, shore protection, utilities, car-trailer parking, landscaping, irrigation and boarding floats. Since 1963 DBW has awarded grants for launching facilities in Alameda, Oakland, San Leandro, Richmond, Cuttings Wharf, Alviso, Benicia, Emeryville, Redwood City and Suisun City. To help fishermen and hunters reach popular wildlife areas, the Wildlife Conservation Board has also funded boat launching lanes at Black Point in Marin County and on Grizzly Island in Solano County.

Five proposed and 18 existing launch facility sites are designated on the Bay Plan maps. Of the launching facilities the Commission has authorized since 1969, none has actually been located at a designated site. Thus, like marinas, the designations have not proved particularly helpful. Again, like marinas, launching facilities can be located at any suitable site whether designated or not.

Because the designation and demand approach has not been a useful indicator of actual trends, the staff suggests deleting both designations for proposed boat launch ramps and the demand forecasts. Because the demand for small boat launching facilities will continue to grow the Commission should adopt a revised finding and policy strongly supporting launching facilities at any suitable location.

Figure 4

LAUNCHING FACILITIES IN BCDC'S JURISDICTION

	BOAT LAUNCH RAMPS		HOISTS	
	Public	Private	Public	Private
ALAMEDA	25	8	3	17
CONTRA COSTA	6	13	0	9
MARIN	9	8	0	11
NAPA	1	4	0	0
SAN FRANCISCO	4	6	2	7
SAN MATEO	7	0	1	2
SANTA CLARA	4	1	1	0
SOLANO	16	2	2	3
SONOMA	3	2	0	2
	75	44	9	51
TOTAL				179

Source: Department of Boating and Waterways, Inventory of Boating Facilities, 1977.

B. Siting

Fisherman and hunters want launching ramps near good fishing and hunting areas. Waterskiiers, for the most part, want them located near calmer waters. Sailors prefer areas with good wind and current conditions. Racers want to be near the Central Bay where most of the races are held.

The Bay Plan encourages launching lanes near prime fishing areas favorable for smaller boats and near calm, clear water suitable for waterskiing. Boat hoists are common at marinas, yacht clubs and boat repair yards. Recreation Policy 4 (b) discourages both at sites that tend to fill up unusually rapidly with silt or mud or that are subject to unusual amounts of dense fog. Launching lanes are frequently built at public marinas or by municipalities at separate sites.

While a launching ramp does not require much space along the shoreline, associated parking is extensive. DBW guidelines recommend 25 to 30 car/trailer spaces per launching lane for urban projects and 30 to 40 car/trailer spaces for rural projects. Because cars with trailers must be accomodated, parking spaces must be oversized. Due to the difficulty of manuevering cars with trailers, oversized circulation aisles must also be provided. Typical dimensions for car/trailer parking space is 10-feet by 40 feet. Six launching lanes would therefore need 150-240 parking spaces, occupying approximately 2 acres. Parking requirements are similar for hoists. If there are picnic or other day use facilities built with the launching ramp, additional parking will be needed.

C. Fill

Recreation Policy 1[23]/ allows the Commission to approve fill for both the launching facility and associated parking. Some fill is, of course, necessary to build the ramp, loading floats and other associated facilities. But the policy also allows substantial amounts of fill for parking and traffic circulation. A launching facility of six ramps, using DBW's estimate for the amount of space allocated to car/trailer parking, could require as much as 2 acres of fill. In addition, another 1.5 to 2.5 acres of fill would be needed to provide for traffic circulation. In fact, the Commission has approved less than 1 acre of fill for launching facilities in the last 13 years. Of this only a small fraction was for parking and traffic circulation.

There seems no reason to treat launching facilities differently than marinas in terms of fill policy. The Commission's experience to date would also indicate that fill for parking at launch ramps is not needed. Fill should continue to be allowed for ramps, boarding docks, and minor shoreline adjustments needed to create an accessible and usable launching facility. But parking should be located on existing land, not on fill. No changes to the launching facility siting policies seem to be needed.

DRY BOAT STORAGE

In addition to launching facilities, some commercial storage for boats should be provided. While many boats can be stored at home, commercial facilities can offer greater convenience and security to the boater. In 1965

there were approximately 2,100 commercial dry boat storage spaces in the Bay Area. In 1977 the number of dry storage spaces had increased to 3,100. Of these, approximately 2,000 are along the shoreline within the Commission's jurisdiction. The remaining spaces are inland.

Based on boat demand, Policy 1 estimated a 2020 demand for 78,600 dry storage spaces to be accommodated on 540 acres of shoreline. Moreover, a sampling of the newer dry boat storage facilities, indicates that 145 boats can be stored per acre if the boats are 22 feet long or less and can be stacked 3 to 5 boats high on racks. Interpolated 1980 demand would be 34,000 spaces. In fact, however, only about 3,100 spaces were actually provided.

The discrepancy between the number of commercial spaces actually available and those estimated to be needed can partly be explained by the convenience and low cost of home storage.

Most boat dry storage that has been provided within the Commission's jurisdiction is located at marinas. Examples include Shellmaker Marina, Oyster Point Marina, Deak Office Park Marina, Clipper Yacht Company, Mariner Square, The Ramp, Richmond Marina, Coyote Point Marina, and Glen Cove Marina.

The Bay Plan does not allow fill for dry storage facilities nor are sites reserved for that use. The staff suggests retaining these policies.

CHAPTER IV: OTHER BOAT FACILITIES

In addition to marinas and dry storage, boats can be moored at individual boat docks, usually adjacent to residences, at buoys or by anchoring out. Small boat docks consist of piles and decking or a floating platform extending out to water deep enough for the boat to float. Boats can also tie up to mooring buoys, small floating devices fixed to the Bay's bottom, or anchor out by simply dropping an anchor. To reach boats anchored out or attached to buoys, dinghies may be needed. This inconvenience and the lack of protection during stormy conditions make these methods unpopular in the Bay.

NON-MARINA DOCKS

Although small boat docks individually have little impact on the Bay, they can have cumulative impacts. Each individual boat dock has required twice as much fill as each marina berth. Since considerably fewer individual docks have been built, the total fill is much less for individual docks. Pump-out stations or similar facilities for handling waste are not available. Some shoreline locations may not be suitable for docks because they block pedestrian access along the shore. Boating, made more likely if docks are nearby, can also interfere with wildlife in certain locations.

A. Number and Location

Small boat docks are considered consistent with Policy 2 of "Other Uses of the Bay and Shoreline" in the Bay Plan if they meet the requirements of Commission Regulation 10122(a)(4). The Regulation allows the Executive Director to approve "construction of new single boat docks no larger than 1,000 square feet and multiple boat docks no larger than 2,500 square feet." In the last fifteen years (January, 1966 through June, 1981) the Executive Director has authorized the construction of approximately 150 new boat docks at non-marina locations. These resulted a total of 1.4 acres of pile-supported and floating fill. In addition he authorized reconstruction of 15 docks that existed when the Commission came into existence. The average size of each authorized dock is 417 square feet, about half of the maximum allowable size.

Most individual boat docks are built in the four North Bay counties, particularly Marin County, where a large amount of shoreline is used for residences. Much of the County also has suitable shoreline topography and good access to open Bay waters. About 58 docks have been approved in Richardson Bay and 71 in the Larkspur-Corte Madera area. In the northern portions of Marin County only 5 docks have been authorized. Other areas where individual docks have been approved include the Cities of Benicia and Alameda, and Napa County.

B. Impacts

1. Fill

In general, an individual boat dock involves more fill than creating a boat mooring space at a marina. For example, Emerybay Cove Marina in Emeryville, approved in 1980, required 2.3 acres of fill to berth 456 boats, about 190 square feet of fill per boat. That is about half of the 417 square feet for the average non-marina boat dock.

Fill per dock can be reduced if small multiple docks are built or if docks are built along a property line for joint use of a single dock. But only six such docks have been authorized in the last 12 years. These have been built as part of new apartment or condominium projects where a developer controlled the shoreline before individuals purchased the units. During the last eleven years owners of adjacent parcels have not built shared docks. Factors that make this option less desirable to owners include allocating costs fairly to each user; establishing the level, necessity and frequency of maintenance; and determining when the dock will be built.

2. Other Impacts

The primary impact of a small boat dock on the Bay is usually negligible, but secondary impacts, such as increased boat traffic, may harm sensitive wildlife, such as harbor seals. Public access along the adjacent shoreline and appearance may be harmed if several small docks of varying height, width, length and materials extend out from the shore.

A review of 550 technical articles on small coastal structures indicates that they have a "low impact" potential. The impacts that do occur are usually short term due to disruptions caused by construction. Minor increased turbidity and sedimentation can result if dredging is involved or a water-borne pile driver is used. But most of the small docks authorized by BCDC did not involve dredging and construction occurred from the shoreline.

Ongoing impacts are both negative and positive. On the positive side, the piles supporting the docks provide substrate for algae growth and places for invertebrates to attach themselves, provide cover and feeding sites for fish, and offer resting and feeding observation posts for birds. Negative impacts include minor changes in water temperature due to shading and interference with the behavior of marine organisms. Shading can eliminate marsh plants if most of the light is cut out.

The most controversial and perhaps most significant secondary impact of docks identified to date is the impact of boat traffic on seals. As development has occurred along the shoreline, seals have retreated to a few "haul outs" where they can rest peacefully. The Department of Fish and Game reports that the known haul outs remaining along the Bay are at Castro Rocks (Contra Costa County), Mowry Slough (Santa Clara County), Angel Island (Marin County), Redwood Creek (San Mateo County) and Strawberry Spit (Marin County).

A serious conflict with seals occurs in the Strawberry Spit area of Marin County. Seals use the Spit when they haul out for resting. Seals cannot move easily on land and are more susceptible to predators. They are also shy. For these reasons human activity, including boating, can be disruptive to seals. The channel between the Spit and the mainland is narrow. On the inland side several docks exist and several more have been proposed.

Risebrough, an expert on harbor seals, believes that Strawberry Spit is a critical, major haul out. In his studies of the harbor seals at Strawberry Spit, he found that the passage of recreational boats along the Salt Works Canal, which runs adjacent to the haul out area, usually caused all or a majority of the seals to return to the water. Boats further away, for example at the outer channel marker, would not drive the seals off the Spit. On the landward side of haul outs, Risebrough found that pedestrians and dogs could travel fairly closely to a haul out area if they are hidden from the view of the seals by thick landscaping or fences. Risebrough also observed that the presence of sport fishing boats and private sailboats disturbed the seals on rocks in the East Bay. On occasion in the South Bay, Department of Fish and Game staff found that seals had been deliberately harassed. Evidence included seals that had been wounded by boat propellers and gunshot. Due to these identified impacts on seals, the Commission has refused to grant permits for boat docks that would result in increased boating near Strawberry Spit.

Small boat docks can have three other possible secondary effects on the Bay, boat congestion in narrow channels, interference with shoreline access and may block views of the water.

Congestion may result from docks that extend too far into a narrow water channel. Constriction of water areas can be minimized by restricting the length of approved boat docks. If new docks do not extend beyond existing docks, the width of water available to boaters would likely be sufficient.

Boat docks can interfere with public access along the shoreline. Boat docks are constructed in two basic forms: either as a solid deck supported permanently above the water by piles or as a solid deck which floats on the water and is connected to the shore by a hinged ramp. In both cases the dock crosses the intertidal area and forces the pedestrian to climb over the dock or a ramp leading to the dock. A number of such docks in close proximity may discourage the pedestrian and impede efforts to provide shoreline access.

Docks, especially fixed docks, also can impact on the visual quality of the Bay and shoreline. Fixed elevation boat docks are more noticeable at lower tidal stages than floating docks. Design control can mitigate this impact. Local governmental planners have attempted to control the visual impact by assuring that the color and construction materials of fixed docks are compatible with existing adjacent structures and not jarring in comparison to the natural shoreline features of the area.

The Commission has also been concerned about the physical and visual impacts of individual docks primarily from a public access standpoint. The Public Access Design Guidelines and the Design Review Board address questions of appearance and design raised by boat docks.

C. Policy Conclusions

Individually, most small boat docks have few adverse impacts on the Bay but impacts, usually cumulative ones, at some sites are serious. The Commission currently allows individual and small multiple boat docks at any location. This policy should be revised to assure that docks that conflict with wildlife use or unduly interfere with shoreline access are not permitted. Revised Policy 2, "Other Uses of the Bay and Shoreline," in Appendix A address these concerns.

MOORING BUOYS

Buoys represent a low cost, low fill method to serve boaters. They consist of spherical floats, usually made of steel, that are anchored to a sinker on the bottom of the Bay, usually by a chain or cable. Buoys are usually painted white and are not lighted. When used for mooring boats, buoys are usually permanent, when used for mooring boats but they can be easily removed or relocated.

A. Number and Location

According to statistics maintained by the State Department of Boating and Waterways, and a review of BCDC permits, there are approximately 460 mooring buoys in the Bay (see Figure 5). Many of these were placed before the Commission came into existence. The vast majority are at marinas and yacht clubs with many fewer at public waterfront parks and commercial establishments.

In contrast to the distribution of small, individual docks, buoys are fairly widely dispersed throughout the Bay. The largest numbers are found in Alameda, Solano and Contra Costa Counties. Marin and San Francisco Counties each have between 50 and 60 and a very small number are located in Santa Clara County.

Buoys are not likely to become very popular. They provide limited protection for boats in rough water or in stormy weather. For this reason they are almost always located in sheltered areas. Boaters must either row or swim to a boat located at a buoy, which is considerably more inconvenient than reaching a boat from land directly. Boats secured to a single buoy may circle around that buoy, possibly creating a navigation hazard for other boats. This problem can be solved by using two buoys or a buoy with an anchor or shoreline connection. In addition to mooring buoys, there are also marking buoys placed by the Coast Guard or others to mark channels, set race courses or warn of hazards.

Figure 5

NUMBER, TYPE AND LOCATION OF MOORING BUOYS

MARINAS	317
Barnhill Marina, Alameda	90
Dowrelio Boat Works, Contra Costa	90
Montezume Harbor, Solano County	60
Mission Rock Resort, San Francisco	36
Little Honker Bay Resort	20
Collinsville Resort, Solano	10
Alviso Marina, Santa Clara	10
Treasure Island Marina, San Francisco	1
YACHT CLUBS	78
Solano Yacht Clubs, Solano	30
Oakland Yacht Club, Alameda	20
Corinthian Yacht Club, Marin	15
Mariposa Hunters Point, San Francisco	10
Vallejo Yacht Club, Solano	3
PARKS	34
Angel Island State Park, Marin	30
McNear's Beach, Marin	7
OTHER COMMERCIAL	18
Stone Boatyard, Alameda	6
Anderson and Cristofani/Marine Ways San Francisco	6
Pacific Boat Works, San Francisco	4
PRIVATE (all located in Tiburon, Marin County)	6
TOTAL	456

Source: BCDC permit files and Department of Boating and Waterways, Inventory of Boating Facilities, 1977.

B. Impacts

There are no significant impacts on the environment associated with the installation or use of buoys. Buoys can be easily removed or relocated if they create a navigational hazard or increase boating at an unsuitable location. There are few in the Bay and no reports of congestion or interference with other boating activities associated with buoys have been reported to the Commission.

C. Policy Conclusions

The Commission Regulations 10122(e)(a)(4) allow the Executive Director to issue permits for buoys. Buoys should meet the siting requirements of proposed Policy 2, "Other Uses of the Bay and Shoreline," in Appendix A.

ANCHORING OUT

When a boat temporarily anchors, no BCDC permit is required. The U. S. Coast Guard delineates and enforces anchorages through the Bay. Most of these are for commercial vessels. Designated anchorages are for the temporary mooring of different types of vessels within the Bay which are waiting for shoreside facilties. In the Bay the Coast Guard has set aside several types of anchorages, including general, temporary, special, naval and explosive anchorages.

For smaller boats, anchoring out is also only temporary. As with buoys it is necessary to swim from boat to shore or use a small dinghy. Except in a few well sheltered coves, the boat is not well protected. So most anchoring occurs for a few hours at a pleasant location in the Bay, often near yacht harbors or at parks. Anchoring out houseboats has presented some difficulties in Richardson Bay. There will be addressed in the upcoming special area plan for that area.

Because the Commission has no authority over temporary anchoring out, there is no need for policy.

CHAPTER V: BOATING SAFETY

No agency controls the number of boats on the Bay. Even if the number of marina berths were limited, that would only restrict a certain size and type of boat, and would not necessarily reduce the number of boats on the Bay. Conflicts between recreational boats and commercial shipping can occur, especially during heavy fog. A combination of federal and State rules regulates Bay boat traffic.

The U. S. Coast Guard regulates navigation in the Bay[24/]. Navigational rules give priority to the larger boat. Commercial ships and tankers have the right of way at all times. The smaller, more maneuverable boats are responsible to change course to avoid accidents.

The Coast Guard also provides assistance in emergencies, by responding to distress signals, towing boats that are not maneuverable and rescuing injured or ill boaters. Federal law also requires the State to report vessel casualties. The Department of Boating and Waterways (DBW) maintains accident statistics. The DBW Biennial Report for 1978-1980 shows the following statistics for reported accidents for the entire state:

	1976	1977	1978
Accidents	910	939	960
Fatalities	96	115	104
Injuries	251	330	324
Property Damage	$3.1 million	$2.3 million	$2.9 million

DBW is also charged with providing for the safety of the boater. Basically, this is carried out through a variety of training programs from teaching high schoolers basic boating safety to safety awards and public service announcements on the radio. Accidents will likely increase as the number of boats on the Bay increase.

While no agency has the authority to control the number of boats on the Bay, the Commission, when reviewing proposals for new marinas which would increase boating traffic in a specific area of the Bay, should obtain the advice of the U. S. Coast Guard and DBW to help ensure that the new marina would not contribute significantly to unsafe boating conditions. Constricted water areas and heavily used channels are areas that need close scrutiny. The Commission should also support measures to assure training for recreational boaters. Increased knowledge of boating rules and experience with Bay sailing are the factors most likely to reduce boating accidents.

APPENDIX A

PROPOSED BAY PLAN CHANGES

I. PROPOSED CHANGES TO THE BAY PLAN TEXT

The following changes to the Bay Plan policies are recommended, current policy language is given, language to be deleted is lined out, and new language is underlined.

A. RECREATION

Findings

a. ~~Seven years ago~~ In 1963, only about four miles of the ~~276-mile~~ approximately 1,000-mile Bay shoreline were being used for waterfront parks. Since then, increased interest in the Bay has resulted in development of additional parks, marinas, and other forms of water-oriented recreation. But the full recreational potential of the Bay has by no means yet been reached.

b. The demand for recreational facilities, including parks, marinas, launching ramps, fishing piers and beaches, in the Bay Area will increase even more rapidly than the population increases, and will be accelerated ~~as~~ if the work week ~~is~~ shorten~~ed~~ s and ~~as~~ spending power per capita increases. Many more recreational facilities will be needed.

c. Planning for ~~recreational~~ park uses ~~of~~ along the Bay and shoreline should anticipate needs as far into the future as possible. For parks, there is no practical estimate of the acreage that should be provided on the shoreline of the Bay, but it is assumed the largest possible portion of the total regional requirement should be provided adjacent to the Bay. All sites near the Bay that may be needed for ~~recreation~~ parks in the future should be reserved now; otherwise, most of this land will have been taken for other uses by the time it is needed. At the present time, 50 years appears to be the farthest into the future that any park needs can be projected reasonably, so ~~recreational~~ park needs to the year 2020 should be considered.

d. Boating allows residents to take advantage of the unique opportunities provided by the Bay. As of July, 1981, the Commission had authorized approximately 6,500 new berths, bringing the regional total to approximately 19,200 berths. Additional berths and launching ramps will be needed in the future. Some locations are unsuitable for marinas or launching facilities because of high rates of sedimentation, valuable habitat, and insufficient upland for support facilities.

~~d.~~ e. A major supplement to parks, marinas, and other forms of water-oriented recreation are the several areas of water-oriented commercial recreation and public assembly that have been developed around the Bay, such

as the Ghirardelli Square-Fisherman's Wharf-Northern Waterfront area in San Francisco, Jack London Square in Oakland, and the downtown waterfronts of Sausalito and Tiburon.

~~e.~~ f. Additional commercial recreation and public assembly are desirable uses of the shoreline if they permit large numbers of persons to have direct and enjoyable access to the Bay. These uses can often be provided by private development at little or no direct cost to the public.

Policies

~~1. Based on an estimated future population of 10.8 million, the Plan maps should include the following facilities:~~

~~Marinas2/ 1,290 acres1/~~
~~Launching ramp facilities3/ 2,230 acres1/~~
~~Swimming beaches 230 acres1/~~

~~Total shoreline acreage 3,750 acres~~
~~Fishing piers (lineal feet of gross length) 40,000 lineal feet~~

~~1/ Dry land only, including parking and ancillary requirements. Some fill may be needed.~~
~~2/ Based on estimated requirement of 70,000 boat slips by 2020, including about 750 square feet of dry land per berth for support facilities (would necessitate around 200 marinas at an average density of 44 boats per acre). Excludes dry storage acreage estimated at 540 acres on basis this need not be provided directly on the waterfront.~~
~~3/ Based on estimated requirement for 210 launching ramp facilities with an average of six 12-foot wide launching lanes each (rough guide; actual sizes will vary).~~

1. As the population of the Bay Region increases, an increasing number of people will use their leisure time in water-oriented recreational activities. Water-oriented recreation facilities such as marinas, launch ramps, beaches, and fishing piers should be provided to meet those needs. For parks, there is no practical estimate of the acreage that should be provided on the shoreline of the Bay, but it is assumed the largest possible portion of the total regional requirement should be provided adjacent to the Bay.

REASON FOR CHANGE: Although there is still an increasing demand for recreational facilities in the Bay Area, the figures shown in Policy 1 are no longer accurate. The population projection for 2020 is higher than current predictions. The dry land requirement for

support facilities for marinas and launching ramps, such as parking, have decreased. The prediction for needed number of boat slips in 2020 is higher than current Deparment of Boating and Waterways figures. No new estimate of needed acreages are available for recreational facilities such as beaches or fishing piers.

2. ~~The Bay Plan maps indicate 77 marinas and 39 fishing pier sites. If present trends continue, these will be adequate for the immediate future but not for the next 50 years. Therefore, sites should be reserved for all marina and fishing pier installations indicated on the maps.~~ The Commission should ~~also~~ allow additional marinas, boat-launching lanes, and fishing piers ~~elsewhere~~ on the Bay, provided they would not preempt land or water areas needed for other priority uses and provided they would be feasible from an engineering viewpoint, and would not have significant adverse effects on water quality, circulation, or inadequate flushing; would not destroy valuable marshes or mudflats; and would not harm identified fish and wildlife resources.

REASON FOR CHANGE: This policy was intended to set the number of marinas and boat launching facilities. However, the Commission has not established priority use areas for marinas or fishing piers. The mapped sites do not indicate sites which could ultimately be approved for marinas, but show the general sites of marinas which existed in 1968 or were proposed by private or public entities.

3. The Bay Plan maps include about 5,000 acres of existing shoreline parks and 5,800 acres of new parks on the waterfront. In addition, 4,400 acres of military establishments (especially around the Golden Gate) are proposed as parks if and when military use is terminated.

4. The following general standards have been used in determining locations for each type of recreational facility (and should be used as a guide in allowing additional ones):

a. General. Each type of facility should be well distributed around the shores of the Bay to the extent consistent with more specific criteria below. Any concentrations of facilities should generally be as close to major population centers as is feasible. Recreational facilities should not preempt sites needed for ports, waterfront industry, or airports, but efforts should be made to integrate recreation into such facilities to the extent they might be compatible. Different types of compatible public and commercial recreational facilities should be clustered to the extent feasible to permit joint use of ancillary facilities and provide greater range of choice for users.

~~b. Marinas and launching lanes. (1) Sites that tend to fill up unusually rapidly with silt or mud, or that are subject to unusual amounts of dense fog, should be avoided, (2) launching lanes should be placed where wind and water conditions would be most favorable for smaller boats, (3) some launching lanes should be located near prime fishing areas and others near calm, clear water suitable for waterskiing. Fill permitted for marina development should be the minimum necessary to provide support facilities (parking, service buildings, launching lanes, etc.). At a density of 44 berths per acre of water surface, about 3/4 acre of land is generally sufficient for each acre of water surface (750 sq. ft. per berth). Marinas having fewer than 44 boats per acre require less land per berth. No fill for marinas should be permitted to exceed 3/4:1 land/water ratio.~~

b. Marinas. Marinas should be allowed at any suitable site on the Bay. Unsuitable sites are those that tend to fill up rapidly with sediment, have insufficient upland, contain valuable marsh or mudflat, or are subject to unusual amounts of fog. Fill should be permitted for marina facilities that must be on fill, such as breakwaters, berths, ramps, and pump-out docks. Fill should also be permitted at sites previously used where deteriorated pilings or shipways and similar conditions make shoreline use difficult. Fill should not be permitted for roads or parking, except for short term unloading areas. Fill for incidental marina structures, such as harbormaster and yacht brokerage offices, clubhouses, restaurants, chandleries and other small shops should be permitted but only if they are consistent with the policies on minor fills for shoreline improvement or new public access. No new marina or an expansion of an existing marina should be approved unless water quality and circulation will be adequately protected and, if possible, improved. Public amenities such as viewing areas, restrooms and public parking should be included; substantial physical and visual access should be provided; frequent dredging should be avoided; and maintenance of all facilities should be assured. Whenever solid fill for a marina is authorized the applicant should also be required to provide substantial off-setting environmental benefits, such as restoring a diked-off area to wetland condition or enhancing an environmentally degraded area.

c. Launching Lanes. (1) Launching lanes should be placed where wind and water conditions would be most favorable for smaller boats, (2) some launching lanes should be located near prime fishing areas and others near calm, clear water suitable for waterskiing, and (3) additional launching facilities should be located around the shoreline of the Bay, especially where there are few existing facilities. Launching facilities for public use should be included within marina projects wherever possible and should be free or provided at low cost to the boating public. Where space is limited, boat hoists may be installed instead of launching ramps. Launching facilities should include adequate car parking, trailer parking, restrooms and public access. Fill for ramps into the water, docks and similar facilities should be permitted. Other fill should not be permitted.

REASON FOR CHANGE: The new policies for marinas and launching facilities reflect the Commission's experience over the last 11 years. Marinas and launching facilities are

recognized as desirable if located at suitable sites and properly designed. Fill for parking and roads would not be allowed. Minimum fill for other marina and launching facilities would continue to be allowed.

~~c.~~ d. Fishing piers should not block navigation channels, nor interfere with normal tidal flow.

~~d.~~ e. Beach sites. (1) Beaches for swimming and sun—bathing should generally be in warm areas protected from the wind. (2) Some new beaches could be planned adjacent to power plants or other industrial plants that warm the nearby waters as they discharge heated water that has been used to cool industrial machinery.

~~e.~~ f. Water—oriented commercial—recreational establishments, such as restaurants, specialty shops, theaters, and amusements, should be encouraged in urban areas adjacent to the Bay. Some suggested locations for this type of activity are indicated on the Plan maps. Effort should be made to link commercial recreation centers (and major shoreline parks) by a fleet of small, inexpensive ferries similar to those operating on some European lakes and rivers.

5. Features to be included. To assure optimum use of the Bay for recreation, the following facilities should be encouraged in shoreside parks and in or near yacht harbors or commercial ferryboat facilities.

a. In shoreside parks. ~~(1)Where possible, parks should provide some camping facilities accessible only by boat, Up to 2,200 such campsites will be needed by year 2020. In addition, docking and picnic facilities should be provided for boaters.~~ (1) Where possible, parks should provide some camping facilities accessible by boat, and docking and picnic facilities for boaters. (2) To capitalize on the attractiveness of their Bayfront location, parks should emphasize hiking, bicycling, riding trails, picnic facilities, viewpoints, beaches, and fishing facilities. Recreational facilities that do not need a waterfront location, e.g., golf courses and playing fields, should generally be placed inland, but may be permitted in shoreline areas if they are part of a park complex that is primarily devoted to water—oriented uses. (3) Where shoreline open space Includes areas used for hunting waterbirds, public areas for launching rowboats should be provided so long as they do not result in overuse of the hunting area. (4) Public launching facilities for a variety of boats should be provided in shoreside parks wherever possible. ~~(4)~~ (5) Where open areas include ecological reserves, access via catwalk or other means should be provided for nature study to the extent that such access does not excessively disturb the natural habitat. ~~(5)~~(6) Limited commercial recreation facilities, such as small restaurants, should be permitted within waterfront parks provided they are clearly incidental to the park use, are in keeping with the basic character of the park, and do not obstruct public access to and enjoyment of the Bay. Limited commercial development may be appropriate (at the option of the park agency responsible) in all parks shown on the Plan maps except where there is a specific note to the contrary.

REASON FOR CHANGE: The figures for needed campsites accessible by boat are out of date and there are no new figures available. The proposed language is more general, yet supports a variety of park facilities for recreational boaters. The proposed language adds general language supporting boat launch facilities in parks.

b. In or near yacht harbors or commercial ferryboat facilities. Private boatels and restaurants should be encouraged where adequate shoreline land is available.

REASON FOR CHANGE: The added language will ensure that proposed projects have adequate shoreline for parking, storage, and other support facilities. The overall purpose is to lessen the amount of fill required for these facilities.

6. All the waterfront land needed for recreation by the year 2020 should be reserved now, because delay may mean that needed shoreline will otherwise be preempted for other uses. However, recreational facilities need not be built all at once; their development can proceed in accordance with recreational demand over the years.

7. In addition to the major recreational facilities indicated on the Plan maps, public access should be included wherever feasible in any shoreline development, as described in the policies for Public Access to the Bay. That policy is intended to result in much more access to the Bay than can be provided by public parks alone, especially in urban areas, and to encourage private development of the shoreline.

8. Further study should be given to the feasibility of dredging a network of channels paralleling the shoreline in shallow areas, for use by small boats and recreational ferries. Channels could open up large areas, particularly in the South Bay and San Pablo Bay, for recreational boating, could make possible the development of marinas and launching lanes at more frequent intervals, and could add visual interest to shoreline areas. In addition, the channels could separate marshes and mudflats from dry land, thus enhancing the wildlife value of these areas.

9. To enhance the appearance of shoreline areas, and to permit maximum public use of the shores and waters of the Bay, flood control projects should be carefully designed and landscaped and, whenever possible, should provide for recreational uses of channels and banks.

10. Because of the need to increase the recreational opportunities available to Bay Area residents, small amounts of Bay filling may be allowed for shoreline parks and recreational areas that provide substantial public benefits and that cannot be developed without some filling.

B. OTHER USES OF THE BAY AND SHORELINE, POLICY 2:

2. Accessory structures such as boat docks and portions of a principal structure may extend on piles over the water when such extension is necessary to enable actual use of the water, e.g. for mooring boats, or to use the Bay as an asset in the design of the structure, only if such structure would not adversely impact sensitive wildlife habitats or public access.

REASON FOR CHANGE: The added language will ensure that small boats, individually or cumulatively will not adversely affect marshes and mudflats or fish and wildlife habitat, including the harbor seal haul-outs, and will not block navigational channels or shoreline access.

C. The following changes to the Bay Plan Maps are recommended:

1. Delete the proposed marina symbols on Bay Plan map Nos. 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18.

2. Delete the proposed boat launch symbols on Bay Plan Map Nos. 8, 9, 11, and 15.

NOTES

1/ California Department of Navigation and Ocean Development, Boating Resources Developmnt Planning Study, 1973, page 33.

2/ San Francisco Bay Conservation and Development Commission, Recreation on and Around San Francisco Bay, 1968, page 18.

3/ League of Women Voters, San Francisco Bay Srea Decision Makers, 1981.

4/ San Francisco Bay Conservation and Development Commission, San Francisco Bay Plan, Recreation Finding 6, page 21, 1979.

5/ Ibid, page 1.

6/ Ibid, page 1.

7/ Ibid, page 2.

8/ Shanks, L. R., Small Coastal Structures--A Review, U. S. Fish and Wildlife Service, 1978.

9/ California Administrative Code, Title 14, Division 5

Section 10443. Special Rules -- Small Fills for Improving Shoreline Appearance

(a) Small amounts of fill for improving shoreline appearance (pursuant to the last clause of subdivision (a) of Government Code Section 66605) shall be approved only if (in addition to findings on other relevant policies) the Commission finds and declares that:

(1) Fill is necessary because:

(A) The present appearance of the Bay and shoreline in the area adversely affects enjoyment of the Bay and its shoreline within the site area itself or within adjacent areas of the Bay or shoreline; and

(B) It is either physically impossible or economically infeasible to improve the appearance without filling;

(2) The amount of filling approved is the minimum necessary to improve shoreline appearance;

(3) The proposed project would improve the shoreline appearance.

(b) The Commission may permit any small amount of fill pursuant to paragraph (a), in any area not designated for a priority water-related use, to be used for any purpose, whether or not water-related, that does not adversely affect enjoyment of the Bay and its shoreline within the fill area itself or within adjacent areas of the Bay or shoreline. The Commission may permit any small amount of fill pursuant to paragraph (a) in any area designated for a priority water-related use to be used for any purpose that does not adversely affect enjoyment of the Bay and its shoreline within the fill area itself or within adjacent areas of the Bay or shoreline, and that would have no adverse effect upon present or possible future use of the area for the designated priority water-related use.

(c) The Commission may permit a small amount of fill created by the mooring of an historic ship, as defined in Regulation Section 10136, for the purpose of improving shoreline appearance (pursuant to the last clause of subdivision (a) of Government Code Section 66605) if (in addition to findings on other relevant policies) the Commission finds and declares that:

(1) All the requirements of Section 10136(a) or (b) have been met; and

(2) The proposed fill will improve the appearance of the shoreline.

(d) The Commission, in approving any fill pursuant to paragraphs (a) and (c) of this Section and in excerising its continuing jurisdiction pursuant to Regulation Section 10130(b), shall impose reasonable terms and conditions as provided in subdivision (f) of Government Code Section 66632, to assure that the approve project will comply with the San Francisco Bay Plan.

(e) The requirements of paragraphs (a), (b), and (d) of this Section shall not apply to Commission actions with respect to proposals that meet the requirements of Regulation Section 10124 and 10134.

Section 10444. Special Rules -- Small Fills for Improved Public Access.

(a) Small amounts of fill for improving public access to the Bay (pursuant to the last clause of subdivision (a) of Government Code Section 66605) shall be approved only if (in addition to findings on other relevant policies) the Commission finds and declares that:

(1) Fill is necessary because:

(A) There is at present inadequate public access to the Bay shoreline in the area; and

(B) It is either physically impossible or economically infeasible to improve the public access without filling.

(2) The amount of filling approved is the minimum necesary to provide improved public access to the Bay.

(b) The Commission shall, in approving any fill pursuant to paragraph (a) of this section, impose reasonable terms and conditions as provided in subdivision (f) of Government Code Section 66632, to assure that the approved project will comply with the San Francisco Bay Plan.

(c) The Commission may permit a small amount of fill created by the mooring of an historic ship, as defined in Regulation Section 10136, for the purpose of improving public access (pursuant to the last clause of subdivision (a) of Government Code Section 66605) if (in addition to findings on other relevant policies) the Commission finds and declares that:

(1) All the requirements of Regulation Section 10136 (a) or (b) have been met; and

(2) The proposed fill will improve public access.

10/ San Francisco Bay Plan, Other Uses of the Bay and Shoreline, Policy 2, page 31.

11/ California Administrative Code, Title 14, Division 5

Section 10134. Bay as Design Asset. "Use of the Bay as an asset in the design of the structure," as used in the San Francisco Bay Plan policies on Other Uses of the Bay and Shoreline concerning extension of portions of structures over water on piles means.

(a) Designed (by such means as location, and window placement and size) to afford to occupants of the strucure a feeling of closeness to the surface of the Bay waters that cannot be achieved except by such extension on piles, and

(b) Designed so as not to adversely affect enjoyment of the Bay and its shoreline by residents, employees and visitors of the structure and of adjacent areas of the Bay or shoreline, and

(c) Designed so as to improve the shoreline appearance.

12/ Regional Water Quality Control Board, Preliminary Information for Current Study of Bay Water Quality, 1982.

13/ Ibid, 1982.

14/ Stenstrom, Michael, Gary Silverman and Teras Brezinski, Oil and Grease in Stormwater Runoff, 1982.

15/ Current Study of Bay Water Quality, 1982.

16/ Ibid.

17/ Shanks, L. P., Small Coastal Structures--A Review, 1978.

18/ San Francisco Bay Plan, Dredging Policies 1-6, pp 15-16.

19/ Ibid, pp 15-16.

20/ Ibid, Port Policy 6, page 18.

21/ Ibid, Water-Related Industry, Policy 3, page 16.

22/ San Francisco Bay Conservation and Development Commission, Public Access Design Guidelines, p. 56. Unpublished report.

23/ San Francisco Bay Plan, Recreation Policy 1, page 21.

24/ 14 United States Code, 89; 18 United States Code 111.

BIBLIOGRAPHY

Association of Bay Area Governments
Water Quality Management Plans: Vessel Wastes--The Problem and Possible Solutions. Environmental Management Program Technical Memo. No. 6. 1977

Department of Boating and Waterways
Layout and Design Guidelines for Small Craft Boat Berthing Facilities, January, 1980

Department of Boating and Waterways
Layout and Design Guidelines for Samll Craft Boat Launching Facilities, January, 1980

Department of Navigation and Ocean Development
Inventory of California Boating Facilities, November, 1977
Management Consulting Corporation

Department of Navigation and Ocean Development
Boating Resources Development Planning Study, October, 1973
Arthur Young and Company

Department of Navigation and Ocean Development
Eleventh Biennial Report
July 1, 1976 - June 30, 1978

Huller, D. L.
Dredging Management in Today's Environment
Dredge Material Research, Vol D-81-1
June, 1981
U. S. Army Corps of Engineers

Lawrence, Hugh G., Attorney at Law
Personal Correspondence, July 20, 1978

Livingston, Kimball
Sailing the Bay, 1981
Chronicle Books

Marine Mammal Commission
Population Biology of Harbor Seals in San Francisco Bay
Bodega Bay Institute of Pollution and Ecology, March 15, 1978

Schroeder, W. L., Oregon State University
Dredging in Estuaries
National Science Foundation/Research Applied to National Needs
Division of Advanced Environmental Research Technology
1977

Regional Water Quality Control Board
San Francisco Bay Shellfish Program: Quality of Shellfish Beds
1981

Rice, S. J., Smith, T. C. and Strand, R. G.
Geology for Planning: Central and Southeastern Marin County
1976
California Division of Mines and Geology

Seattle University
The Oxygen Uptake Demand of Resuspended Bottom Sediments
Environmental Protection Agency Water Quality Office
Program No. 16070
1970

Shanks, L. R.
Small Coastal Structures: A Review
U. S. Fish and Wildlife Service
National Space Technology Laboratories Station

Stenstrom, Michael, Gary Silverman and Teras Brezinski
Oil and Grease in Stormwater Runoff, February, 1982
Association of Bay Area Governments

Office of Coastal Zone Management
Coastal Facility Guidelines (working paper)
1976
U. S. Department of Commerce, National Oceanic
and Atmospheric Adminstration

U. S. Army Corps of Engineers, San Francisco District
Small Craft Harbor Improvement, City of San Leandro Marina
1975

U. S. Army Engineer District, San Francisco
Detailed Project Report: City of San Leandro Marina Small Craft Harbor
Improvement (draft)

U. S. Fish and Wildlife Service and California Department of Fish and Game
Protection and Restoration of San Francisco Bay Fish and Wildlife Habitat
1979

U. S. Fish and Wildlife Service
Richardson Bay Study 1955-1977-2000
1977