

Richardson Bay Dock and Boat Study

***The Cumulative Effects of Dock Development and Boat Traffic
on Wildlife and the Richardson Bay Wildlife Sanctuary***

Adopted by the Marin County Board of Supervisors on October 31, 2000.

**Prepared for
*The County of Marin***

**by
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October 2000

FOREWORD

This report has been prepared pursuant to a contract with the County of Marin by Greg R. Zitney of Zitney & Associates. Conclusions and recommendations presented in this report are those of the author and do not necessarily represent official County position or policy with regard to the topics addressed. Staff of the Marin County Community Development Agency contributed to this study by completing the inventory of existing and potential dock sites, preparing maps for the report, and reviewing report drafts.

The Study is intended to be used as an informational document which focuses on the potential for biological and cumulative impacts from the buildout of dock facilities in the study area. The recommendations contained in the Study are intended to be advisory in nature and do not extinguish, make non-conforming, or eliminate any property owner's legal rights to construct new boat docks, to rebuild pre-existing dock facilities, or to use and enjoy navigational easements. Recommendations contained in this report are applicable only to the extent that they are within the jurisdictional authority of the County of Marin. The recommendations contained in the Study are intended to be advisory to the towns of Tiburon and Belvedere to the extent portions of the study area are also located within their respective jurisdictions.

All photographs are by the author.

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INTRODUCTION

BACKGROUND AND NEED FOR THE STUDY

In the past several years, the Marin County Community Development Agency has processed applications for new or expanded private recreational boat docks on bayfront properties along the eastern shoreline of the Strawberry Peninsula. During the review process for these projects, issues were raised about the extent of adverse cumulative impacts on wildlife habitats in Richardson Bay resulting from the continued construction of boat docks and increase in boat traffic. Of particular concern are the cumulative effects on the Audubon Society's Richardson Bay Wildlife Sanctuary.

In 1999, the Marin County Planning Commission recommended that a study of the cumulative impacts of dock construction in the vicinity of the Sanctuary be conducted in order to allow for a more comprehensive approach to planning for waterfront recreational activity in this area. The Board of Supervisors supported this recommendation and directed staff of the Community Development Agency to initiate the study.

OBJECTIVES

The primary objective of this study is to assess the cumulative effects of boat dock development and boat traffic in a portion of Richardson Bay on wildlife resources, with particular attention to the Audubon Society's Richardson Bay Wildlife Sanctuary. With this overall objective in mind, the following more specific objectives have been identified for the study:

- Identify the number and location of potential new dock development sites.
- Conduct a literature review in regard to the effects of dock development and boat traffic on wildlife.
- Provide a general description of wildlife and habitats in the identified study area.
- Assess the past, existing, and potential future effects of docks and boat traffic on wildlife in the study area.
- Identify potential mitigation or management measures that would be effective in avoiding or minimizing identified significant impacts.
- Recommend potential policies and/or actions regarding future dock development and boat regulation in the study area, if appropriate.

PREVIOUS STUDIES AND RELEVANCE

Previous studies on the subject of dock development and boat traffic impacts in northern Richardson Bay have largely been limited to Environmental Impact Reports (EIRs) or other environmental reviews prepared for various project proposals. Some specific reports have been done on various elements of the wildlife community in the region in

connection with these reviews. The most important reports regarding this subject that are specific to the study area include the following (listed in chronological order):

- Environmental Impact Report for Harbor Point by Karl Treffinger and Associates (1973)
- Richardson Bay in Transition by Environmental Impact Planning Corporation, prepared for the U.S. Fish and Wildlife Service (no date, estimated 1978 based on content)
- Strawberry Spit Environmental Assessment by Madrone Associates (1980)
- Draft Environmental Impact Report — Strawberry Spit Residential Development (plus related addendums and responses to comments) by Madrone Associates (1981-1982)
- Richardson Bay Special Area Plan by Marin County et al. (1984)
- Initial Study for American Savings and Loan DW 89-104 by Marin County (1991)
- Harbor Seal Habitat Restoration at Strawberry Spit, San Francisco Bay by Sarah G. Allen (1991)
- San Francisco Bay Conservation and Development Commission, Dredging Permit No. 15-91 Issued to Strawberry Recreation District et al., and Related Administrative Record (1991)
- Court of Appeal Decision Regarding National Audubon Society et al. v. Marin County et al. and Linda G. Bradley et al. (1993)
- Revised Harbor Seal Study for Strawberry Spit by Earth Metrics Incorporated (1993)
- Preapplication Review 98-16 — Marin at Harbor Point Apartments and Club — Assessor Parcel No. 043-301-09 by Marin County (1997)
- Biological Study for Calender Tidelands Permit 97-52 and Minor Design Review 97-51 by Huffman & Associates, Inc. (1997, supplemented in 1998)
- Initial Study for the Calender Boat Dock by Marin County (1998)

A literature review was also conducted to determine the extent of relevant scientific research completed on the subject of the impacts of docks and/or boats on wildlife. Although limited, some relevant literature was found. Only casual references to the effects of dock development on wildlife were uncovered, but several studies addressed the effects of boat traffic, especially on waterfowl. A summary of relevant information obtained from this literature is provided in this report.

INTENDED USES OF THE STUDY

This study is intended to be used as a guide to decisionmakers when reviewing future project proposals involving dock construction and boat traffic in northern Richardson

Bay. The study also discusses general problems and potential management solutions that may be helpful in more broad-based policy decisions regarding the Sanctuary and wildlife resources in the region. Beyond these intended uses, the study may serve as a useful summary reference for an issue that has been raised several times in the past.

ENVIRONMENTAL SETTING

STUDY AREA

Figure 1 is a vicinity map showing the regional location of the study area. Figure 2 shows the study area boundary on an aerial photo base. The study area was defined using the following criteria:

- Shoreline areas containing existing or potential docks that generate the most local boat traffic in the vicinity of the Sanctuary were included. It is recognized that boats from other areas enter the study area, but local boats affect the area much more frequently by having to travel to and from their home berths.
- The open water boundary of the Audubon Society's 900-acre Richardson Bay Wildlife Sanctuary was used to define the southern open water limit of the study area for this report. This was judged to be appropriate because the Sanctuary is a primary subject of the study, and because its boundary encompasses a vast majority of northern Richardson Bay. Northern, western, and eastern study area boundaries include major shoreline habitats and developed areas that directly influence wildlife resources of Richardson Bay.

HISTORICAL DEVELOPMENT PATTERNS

In 1955, there was about 10,000 feet (about 2 miles) of shoreline in the study area developed to residential use. This increased about 150 percent to 26,000 feet (about 5 miles) in 1977. This increase included at least 85 new homes, as well as apartment complexes and condominiums. Most of the new homes included boat docks and, in many cases, included construction over the water along the shoreline. Residential developments during this period included Shelter Point, the Cove Apartments in Greenwood Cove, and single-family waterfront homes along the entire Belvedere shoreline, along Strawberry Lagoon, and in other small pockets.

The Strawberry Spit area was once tideland, but was filled around 1955-1958 to create an island by using material from Strawberry Point and dredge spoils from the adjacent tidal area. The island was later connected to the mainland to form what is now known as Strawberry Spit and Strawberry Lagoon. Figure 3 shows the progression of the creation and development of Strawberry Spit from the perspective of 1978 (i.e., the year 2000 map was projected development at that time).

The Cove apartment complex was approved in 1973 and included berths for about 40 boats. The Strawberry Spit development was approved by the County in 1983 and construction of subdivision improvements was completed in 1987. This development added 62 new homes and 9 docks to this part of the Richardson Bay shoreline. County and BCDC permits for this project prohibited construction of docks on the eastern (bay) side of Strawberry Spit. The Harbor Point apartment complex (on the southwestern shore of Strawberry Lagoon) was approved in 1972 and was completed in 1973, adding 220 housing units. At one time, Harbor Point included plans for a marina with 151 berths;

RICHARDSON BAY DOCK & BOAT STUDY

VICINITY MAP

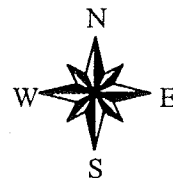
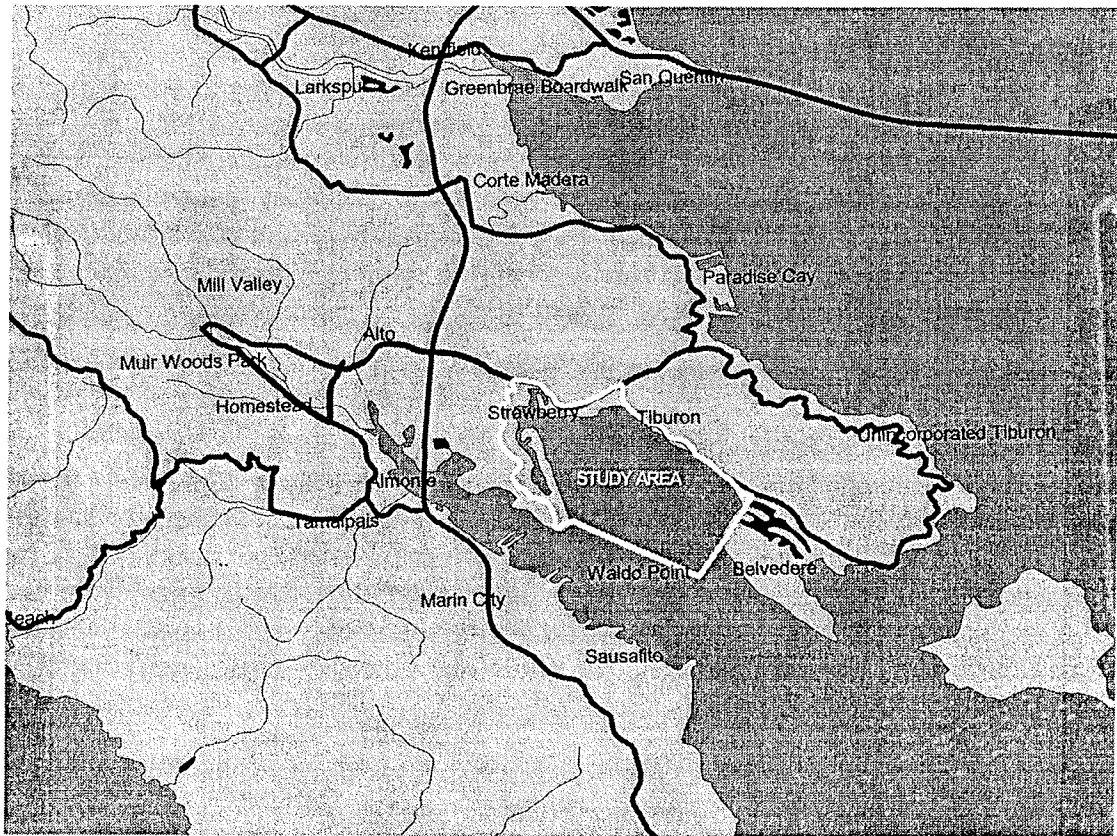


Figure 1

RICHARDSON BAY DOCK & BOAT STUDY

AERIAL PHOTOGRAPH



Figure 2

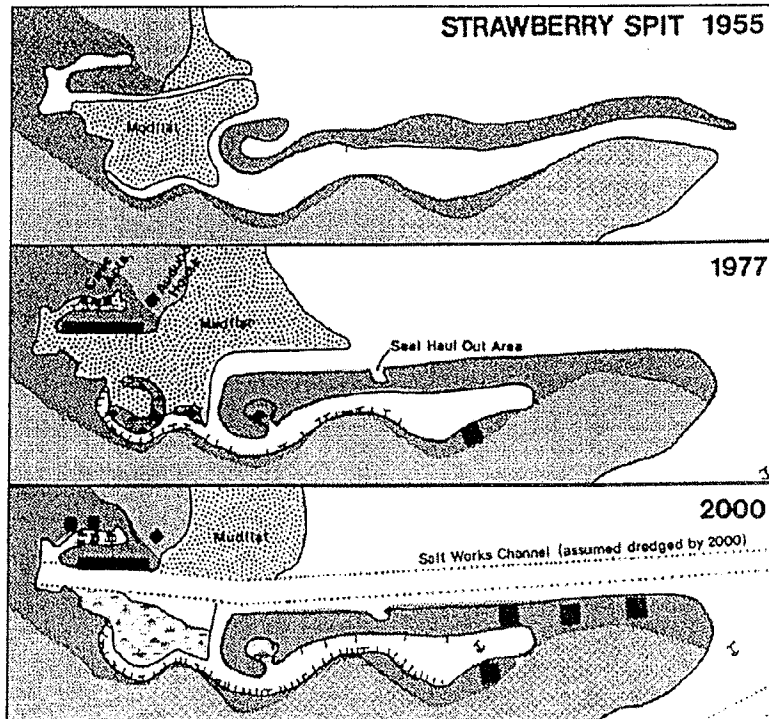


Figure 3. Progressive development of the Strawberry Spit area from the perspective of 1978. (Source: Environmental Impact Planning Corporation, estimated 1978)

however, due to various circumstances, the marina was not built and the current approved master plan does not include a marina according to the County. In 1997, owners of Harbor Point submitted a preliminary proposal for construction of a marina with a capacity of 75 berths. The County completed a pre-application review of this proposal and indicated that there were several policy inconsistencies that would make it difficult for staff to support the proposal. The County has not received a formal application for this project since that time. However, in correspondence to the County regarding this study, Mr. Raymond Kaliski (June 30, 1999) indicated a continuing interest in pursuing a marina for Harbor Point Apartments in some form.

The Strawberry Spit and Cove Apartment developments resulted in the need for maintenance dredging of Salt Works Canal and Strawberry Lagoon in order to maintain access for boats. A dredging permit was granted to the Strawberry Recreation District in 1991. In the Strawberry Point area, Salt Works Canal is dredged from the southern tip of Strawberry Point north to the navigational channel cut through the spit. Dredging continues through the cut to Strawberry Lagoon and then north up the lagoon and into Greenwood Cove. The channel cut severed the northern half of the spit to create an island that is now commonly referred to as Aramburu Island. Dredging no longer occurs in the Salt Works Canal on the east side of Aramburu Island.

Also in 1991, the County approved a master plan for construction of 9 boat docks in southern Strawberry Lagoon for Strawberry Spit homeowners.

Since completion of the described major developments, Marin County has received various individual proposals for permits to reconstruct and enlarge existing docks and construct new docks in the Strawberry area.

LAND USES AND HUMAN ACTIVITIES

Land uses in and surrounding the study area are shown on Figure 4. Figure 4 also shows existing boat traffic patterns and major geographic features referenced in this report. With respect to the objectives of this study, the most significant land uses in the study area include the Audubon Sanctuary with its wildlife preservation and management purposes; the shoreline residential developments at Strawberry Point and Strawberry Spit/Lagoon, Greenwood Cove, and the Belvedere shoreline; and the public recreation areas of Blackies Pasture and the Tiburon shoreline trail.

The Audubon Society's Richardson Bay Wildlife Sanctuary was established in 1957 on about 900 acres of mostly submerged land in the northern portion of Richardson Bay. The primary purpose of the Sanctuary is to provide protected habitat for migratory waterfowl and shorebirds during the migratory and wintering period from October through March. The Sanctuary and other areas in Richardson Bay provide critical resting and feeding habitat for migratory birds along the Pacific Flyway. The Sanctuary is part of the "San Francisco Estuary Hemispheric Reserve" which is, in turn, part of the Western Hemisphere Shorebird Reserve Network, and is one of only two sites on the North American west coast designated as a hemispheric reserve (BCDC, 1991). According to the Audubon Society, over 1 million birds may visit the Sanctuary during the migratory season (BCDC, 1991).

Human activities which are of most relevance to the study objectives are recreational in nature and include motorboating and sailing, use of personal watercraft (canoes, kayaks, rowboats¹), water skiing, windsurfing, and shoreline walking/running/bicycling.

BOAT DOCK SURVEY

Marin County Community Development Agency staff surveyed the study area to identify existing and potential dock sites. These sites are shown on Figure 5. Table 1 summarizes the type and location of existing and potential docks in the study area, and provides an estimate of the number of berths associated with them.

A few comments are in order with respect to the numbers in Table 1. The numbers of existing docks are the most accurate because they reflect the results of a field inventory or aerial photo interpretation. The numbers of potential docks are more accurate for single family residences because it is easy to identify waterfront residences that currently do not have a dock. However, when considering the potential for a marina at Harbor Point Apartments, both a 151-berth marina and a 75-berth marina have been proposed in the past. Docks for marinas are of a very different design compared to individual residence docks. This is why 5 docks are shown for 151 berths compared to about 1 berth

¹ Note that personal watercraft commonly referred to as jet skis were banned in all Marin County waters, including Richardson Bay, as of November, 1999. As used in this study, personal watercraft includes any small craft that is portable, does not require berths, and is stored out of the water. This definition is limited in its application to this study and does not replace, modify, or change the definition of personal watercraft contained in Marin County Code Section 11.36.020(2).

RICHARDSON BAY DOCK & BOAT STUDY

LAND USES & GEOGRAPHIC FEATURES

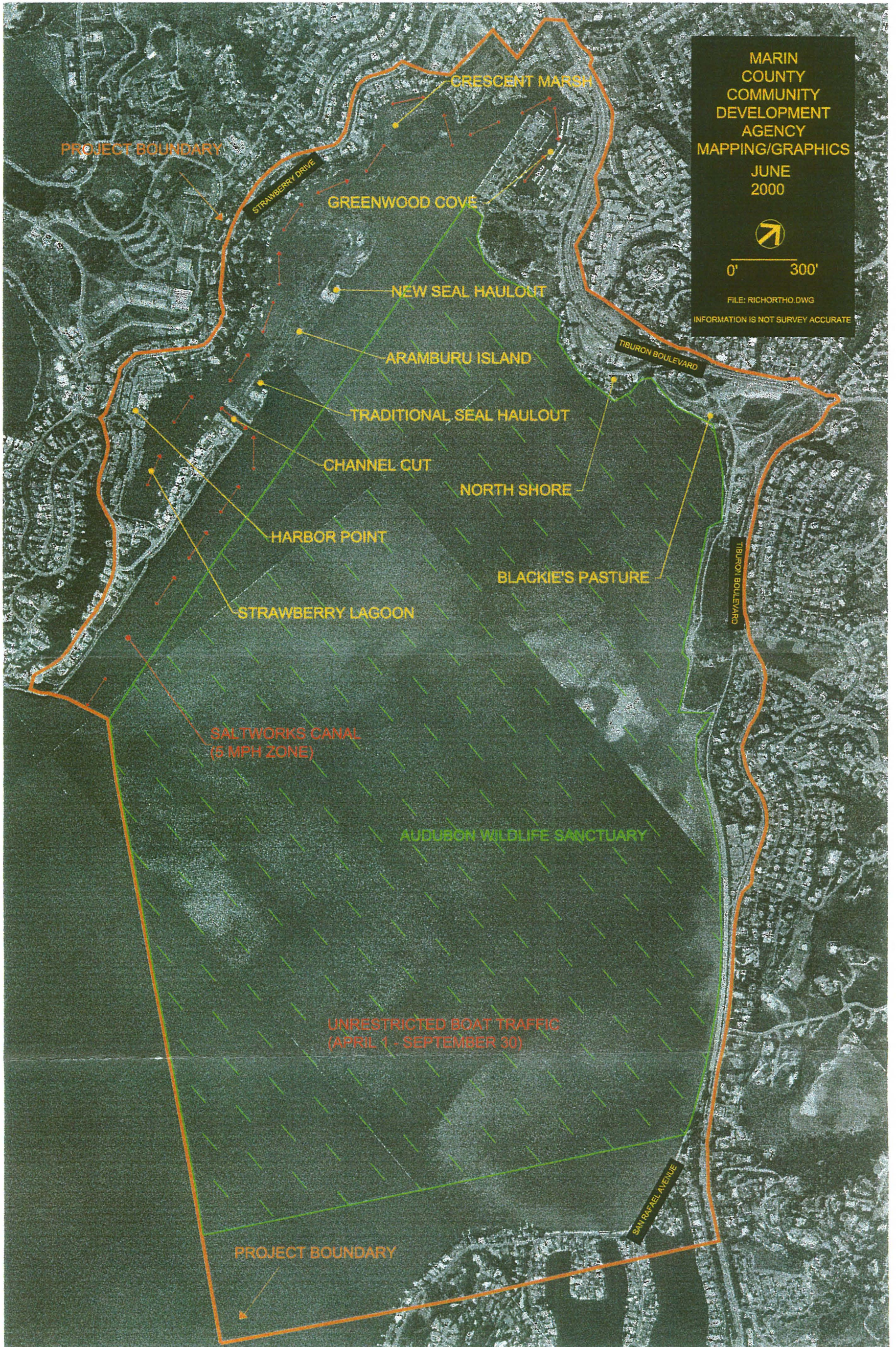


Figure 4

RICHARDSON BAY DOCK & BOAT STUDY

EXISTING AND POTENTIAL DOCK SITES

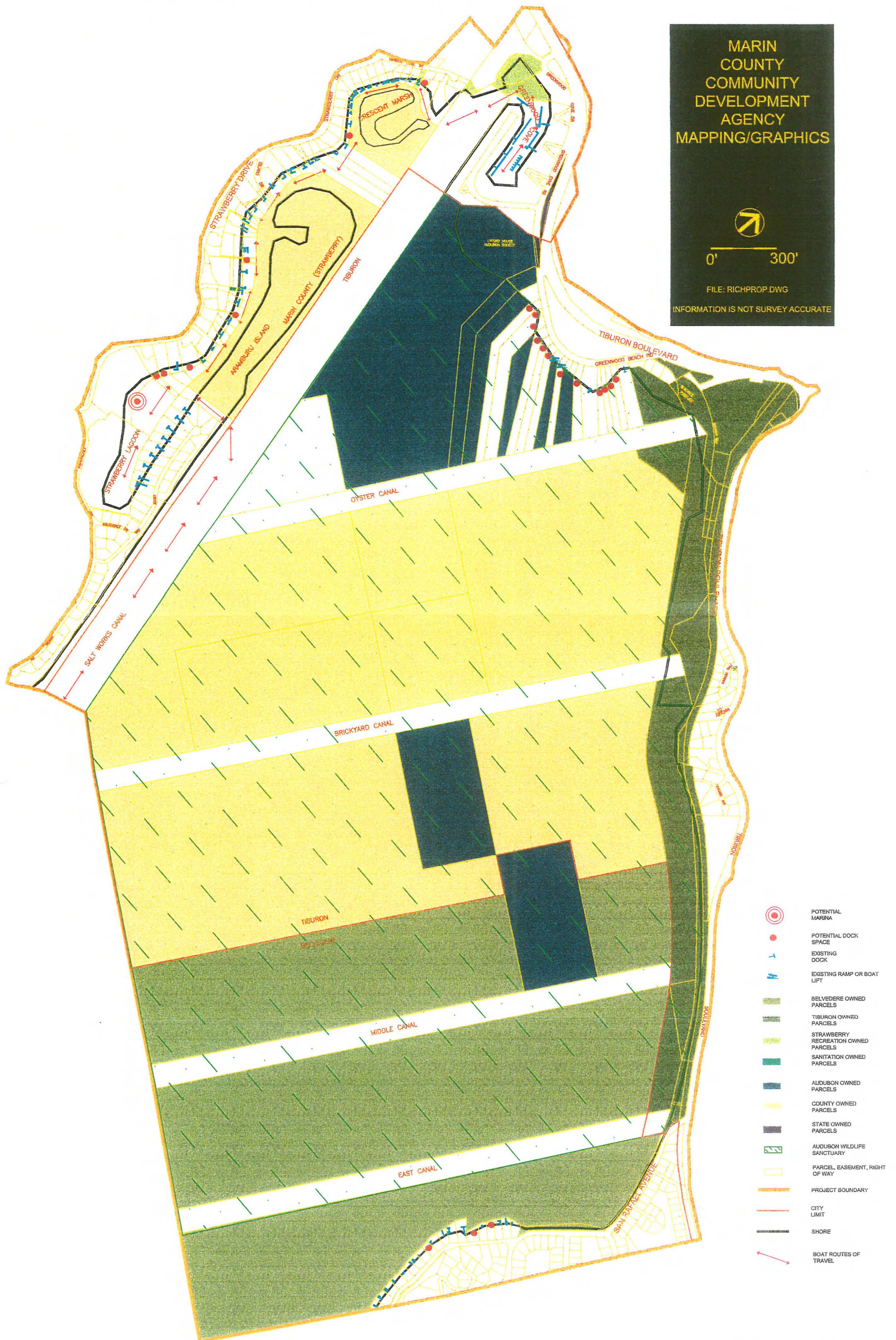


Figure 5

Table 1. Existing and Potential Docks and Berths in Study Area

<u>Location</u>	<u>Dock Type</u>	<u>No. of Docks</u>	<u>No of Berths</u>	<u>Notes</u>
Existing				
Strawberry Lagoon	Single Family Individual	48 ¹	52	Includes all shoreline residences up to Greenwood Cove. Includes one dock for Strawberry Rec. Dist. Residents.
Cove Apartments	Multi-Unit Marina	7	40	
North Shore	Single Family Individual	4	4	Includes 1 ramp, 1 hoist, and 2 docks.
Belvedere Shore	Single Family Individual	16	16	
Subtotal Existing Single Family Individual		68	72	
Subtotal Existing Multi-Unit Marina		7	40	
Total Existing		75	112	
Potential				
Strawberry Lagoon	Single Family Individual	7	10	
	Multi-Unit Marina (Harbor Pt.)	5	151 ²	
Cove Apartments	Multi-Unit Marina	0	0	Marina currently considered to be at build-out.
North Shore	Single Family Individual	12	12	Future development is considered unlikely due to extremely shallow water (requiring dredging a new channel) and location within Sanctuary boundary.
Belvedere Shore	Single Family Individual	3	3	
Subtotal Potential Single Family Individual		22	25	
Subtotal Potential Multi-Unit Marina		5	151	
Total Potential		27	176	
TOTAL EXISTING AND POTENTIAL		102	288	

¹ Includes 2 approved but not yet constructed docks.

² Reflects the number of berths approved in the original master plan. Harbor Point revised this number to 75 berths in a preliminary application to Marin County in 1997, but a formal application has not been received to date. The Strawberry Community Plan, as amended in 1982, includes a policy that establishes a preference for limiting new docks to those that serve individual property owners as opposed to multiple property owners; approval of a marina at Harbor Point, therefore, could be considered unlikely based on existing policy considerations.

per dock for single family residences. The number of berths should be regarded as approximations because this number can vary substantially depending on the size of boats. It is very difficult to estimate the number of boats (existing and potential) in the study area because numbers owned by residents change, not all available berths are occupied by boats, and local traffic also includes boats that visit the area but are berthed at other locations. In addition, personal watercraft may or may not be “berthed” since they are very portable and are usually stored out of the water. However, some assumptions have been made in previous evaluations to estimate boat traffic — these are discussed later in this report.

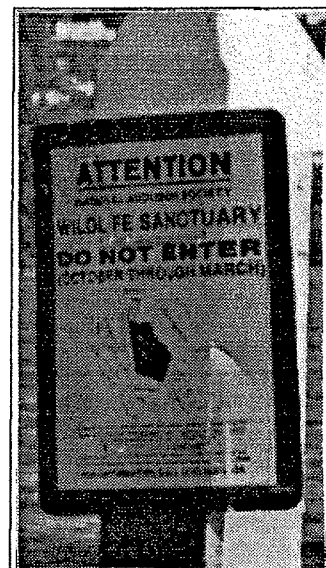
For purposes of developing an accurate database of potential dock sites, County staff considered factors such as the presence of existing zoning restrictions or conditions. Additionally, properties that share a common dock are considered not to have additional dock construction potential since it is assumed that the existing shared dock has exhausted the development potential for both properties. Additionally, the purpose of the potential dock sites map is not to recommend approval or favor development of future docks, rather it is to identify those sites that have the potential for such development to occur. Whether or not a dock could be approved for any site within the Study Area would be dependent on an analysis of site-specific factors, including those relating to proximity to accessible water, habitat characteristics, size of dock, etc. and an evaluation for project conformance with recommendations contained in the Study.

BOAT TRAFFIC PATTERNS AND REGULATIONS

Boat traffic in the study area includes motorboats, sailboats, and personal watercraft (canoes, kayaks, rowboats, sailboards). Motorboats and sailboats are typically berthed in the water at docks, while most personal watercraft are portable and do not require berths. Jet skis were banned from Marin County waters in 1999, so they are not included as a component of existing boat traffic. Recreational boating is heavier during the spring, summer, and fall when the weather is more favorable.

Because most of the study area is very shallow, boat access is limited compared to other areas of San Francisco Bay. Sailboats with a deep draft (due to the keel) are not commonly observed in the open water area. Motorboats visit the open water areas more frequently, and primarily during higher tides. Of the open water traffic that does occur, most is found at the southern half of the study area where water is deeper. Little traffic occurs in the northern half because of shallow water. Water skiing is a significant motorboat activity in the open water area. This is noteworthy because of the high speeds involved.

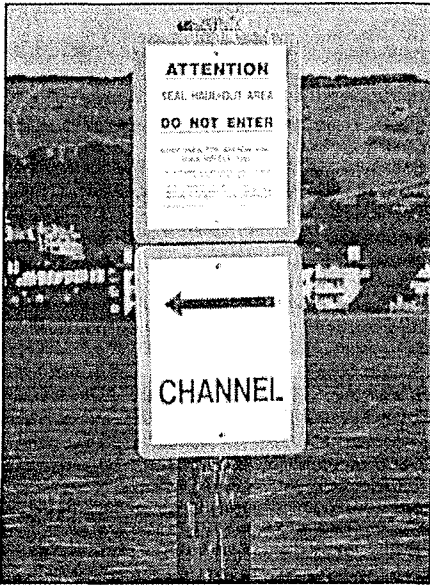
The majority of resident motorboat and sailboat traffic in the area takes place along the Salt Works Canal (to the cut in the middle of the spit) and in Strawberry Lagoon,



Open water sign denoting Sanctuary boundary and seasonal restriction.

which comprise the primary ingress and egress corridor for boats berthed in the lagoon and at Greenwood Cove. The speed limit along this corridor for its entire length is 5 miles per hour (mph). (See Figure 4)

The Sanctuary is closed to boats from October 1 through March 31 each year to prevent disturbance to wintering and migratory waterbirds. During the unrestricted months, there are no speed restrictions within the Sanctuary. The closure is “voluntary” and is dependent on compliance with posted signs.



Sign directing boats through cut in Strawberry Spit and away from seal haulout area.

Boats are discouraged (not prohibited) at all times from travelling up the east side of Aramburu Island north of the channel which was cut through the spit to connect Salt Works Canal with Strawberry Lagoon. The cut was required as part of the approval of the Strawberry Spit development in 1983 to route boats away from a seal haulout site on the east side of the spit. Boats normally enter Strawberry Lagoon at the cut through the spit, then travel either north or south through the lagoon. (See Figure 4)

Canoes, kayaks, and rowboats differ significantly from other watercraft in that they have greater access capability in shallow water. It is therefore not uncommon to see these vessels along the immediate shorelines in the study area and in the shallower portions of Richardson Bay.

According to David Gallegioni, Deputy Sheriff with the Marin County Sheriff's Marine Patrol Division (pers. comm.), the most significant enforcement issues in the study area include boats entering the Sanctuary during restricted months, and water skiing in the Salt Works Canal, which is posted for a 5-mph speed limit.

WILDLIFE RESOURCES

This section of the report describes the primary wildlife and habitats in the study area, emphasizing factors important to a consideration of dock and boat impacts.

Richardson Bay, although heavily developed along its shoreline, still provides one of the most important wildlife resource areas in San Francisco Bay. The Audubon Society's Richardson Bay Wildlife Sanctuary was established in 1957 to provide protection to hundreds of thousands of migratory waterbirds that find refuge and food within its boundary.

Historical Perspective

Richardson Bay, like other areas of the greater San Francisco Bay, was once pristine and supported a great diversity of terrestrial and aquatic wildlife. The transitional shoreline

between the land and tidal waters was undisturbed and freely accessible to wildlife. Most of the shoreline and adjacent upland areas have since been developed to residential and other uses, and habitat values and accessibility have been drastically reduced. Wildlife species which depend on these areas and/or are intolerant of human presence have disappeared from the region completely (e.g., grizzly bear, elk), while other more adaptable species (e.g., deer, raccoon) continue to maintain a presence. Very little remains of what can be considered natural shoreline habitat in the study area.

Habitat Types, Values, and Sensitivities

The Richardson Bay study area is a mix of natural and man-made habitats. The Audubon Sanctuary provides extremely valuable habitat for migratory waterbirds as a result of the shallowness of the bay and the exposed mudflats at low tide. This section provides a brief description of the major habitat types in the study area and their relevance to the assessment of potential impacts from dock development and boat traffic. See Figure 6 for a map of major habitats in the study area.

Open Water. Open water is defined as those areas of Richardson Bay that are covered by water. The areal extent of open water varies daily with the tidal cycle. Depths vary, with deeper waters located at the southern end of the study area, and progressively shallower water to the north.

Open water provides resting and feeding habitat for a wide variety of waterfowl. Some species, such as the American coot, may rest in open water and feed at nearby areas on land. Others, such as fish-eating birds (e.g., western grebe) and diving ducks (e.g., scaup, scoter, bufflehead), both feed and rest in the open water habitat. In all cases, a primary value of this habitat is that it provides space and security for both resident and migratory species.

This habitat type is highly susceptible to disturbance by boats. The movement and noise associated with boats can cause birds to take flight to other areas of Richardson Bay or, if too frequent and pervasive, to leave the area altogether. This is the primary reason why boats are not allowed in the Audubon Sanctuary during October through March, the months when the highest numbers of migratory waterbirds are present.

Mudflat. This habitat includes bay mud that is exposed at lower tides. The areal extent increases as the tide lowers, and is covered again as the tide comes in. The most significant mudflats are found at the upper (northern) end of the study area, along the Tiburon/Belvedere shoreline, and near the tidal marshes north of Aramburu Island. At the lowest tides, mudflat may occupy as much as the upper 25 to 30 percent of the Sanctuary (B. Huning, pers. comm.).

Mudflats are extremely valuable as feeding areas for shorebirds. As the tide retreats, shorebirds move into the mudflats in large numbers to forage for the abundant and varied insects, crustaceans, worms, and other invertebrates that are found in the mud. Many species of "probing shorebirds" (e.g., sandpiper, dowitcher, plover, willet) can be seen probing in the mud with their bills for these food items. One other group, wading birds

RICHARDSON BAY DOCK & BOAT STUDY

HABITAT TYPES

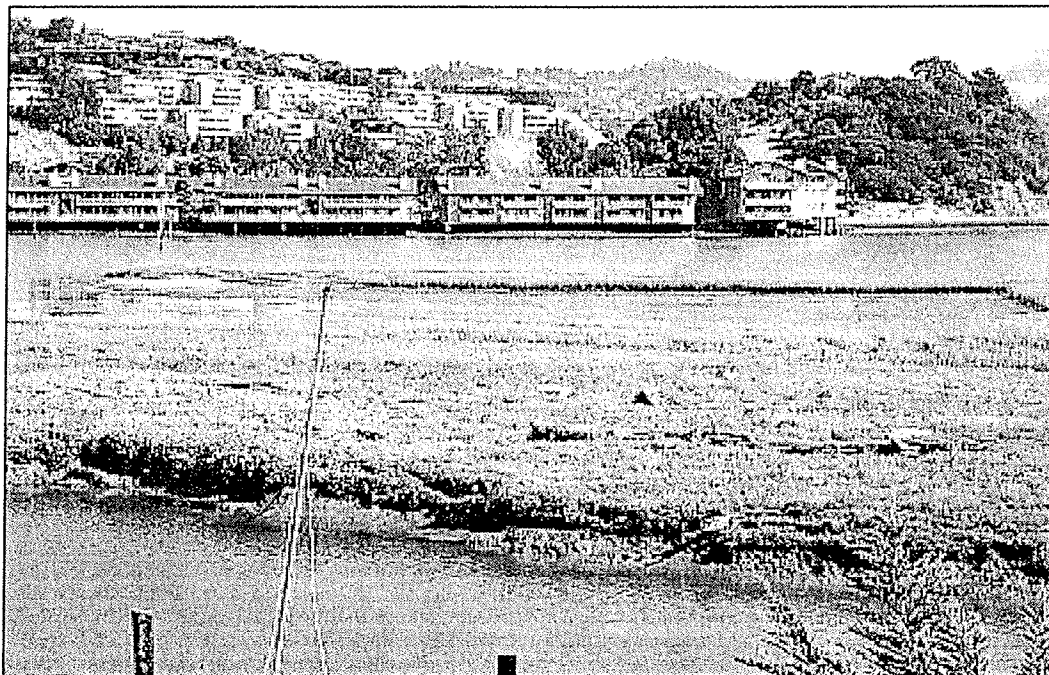


Figure 6

(e.g., herons, egrets) spend a significant amount of time in water shallow enough to "wade" in, yet deep enough to contain small fish. Wading birds, therefore, are typically found near the shoreline, in marshes, and in the shallows between mudflats and the deeper open water.

This habitat is not as susceptible to direct disturbance by boats for the obvious reason that there is no water on them when exposed. At low tide, even the adjacent water areas are usually too shallow to allow boats to come close enough to represent a significant disturbance factor. However, mudflats in the area have been impacted by dock development and channel dredging, particularly in Greenwood Cove and the area north of Strawberry Lagoon. Docks cover mudflat habitat along the shoreline, and the dredged channel reduces the amount of mudflat that would otherwise be exposed. One advantageous circumstance, however, is the fact that boats generally enter and exit the area during higher tides, so disturbance to feeding birds is minimized.

Tidal Marsh. Tidal Marsh occurs along the shoreline of Aramburu Island, on and around a crescent shaped area (referred to as the "crescent") just north of the island, and at two small and isolated coves on the northern and western shorelines of the study area. Of these areas, the tidal marsh north of Aramburu Island has the most value as salt marsh



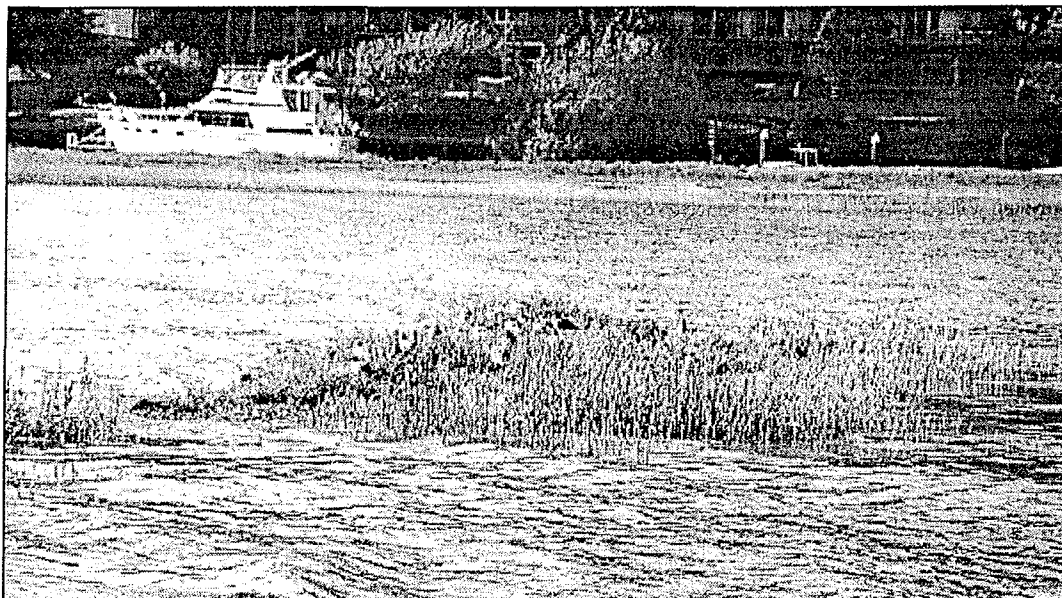
Tidal marsh and mudflat in the crescent area north of Aramburu Island.

habitat and is dominated by pickleweed. Cordgrass and salt grass are also present, but sparse. The vegetation on the crescent and the northern portion of Aramburu Island is low-growing and dense. At low tide, mudflats adjacent to the marsh become exposed. Tidal marsh provides an important source of food and cover for wildlife in the study area.

Further to the south on the island, as you approach the cut, the land becomes progressively higher in elevation. Salt marsh is limited in this area to a fairly narrow band along the shoreline.

One feature of note for this habitat type is a small island (at high tide) at the eastern tip of the crescent. This island is frequently occupied by several shorebirds.

The marshes at the northern end of Strawberry Spit and at the crescent are subjected to disturbance from boat traffic traveling up the lagoon and into Greenwood Cove. Fortunately, boats are limited to 5 mph, and many of the birds using this habitat have “habituated” to the slow-moving traffic. They also feel an added degree of security because of the vegetative cover present. While traveling past the small island at the

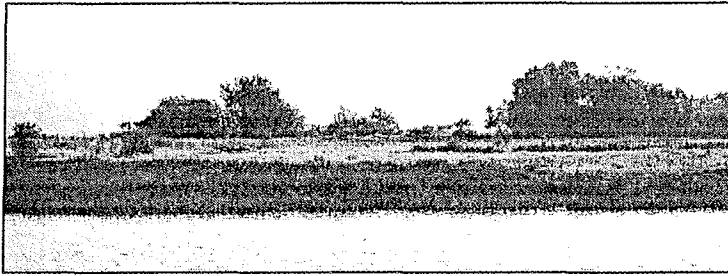


Shorebirds on a small island at the “crescent” during high tide. The birds did not flush as the boat passed within about 15 feet.

eastern tip of the crescent, the author noted that the approximately 20 birds present were wary, but did not flush as a result of the passing motorboat. The tidal marshes in the study area are, however, accessible by personal watercraft such as canoes, kayaks, and rowboats. This probably represents the most significant disturbance factor for wildlife in this habitat because there is little or no warning (noise) of their approach, so the birds may be startled by the sudden appearance of a moving vessel.

Undeveloped Upland. Much of Strawberry Spit north of the channel cut is upland habitat not subject to tidal flooding. This area contains a mix of native and non-native grasses, weeds, shrubs, and trees (e.g., coyote bush, pampas grass, anise, acacia, toyon, coast live oak, and eucalyptus). The primary value this habitat affords is cover, with the native plants providing a source of food for a variety of songbirds and other upland wildlife such as small mammals, reptiles, and amphibians. Large wading birds, such as the great blue heron, prey on these small animals as well as on fish. Because of the security of the taller cover here, birds that might otherwise flush at the sight of a passing

boat may stay in place. The author observed a great blue heron stay in cover on the spit even with a motorboat passing at slow speed approximately 10 yards away.

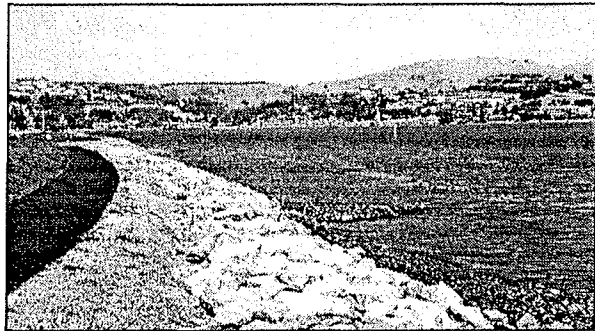


The undeveloped upland habitat of Aramburu Island Darker vegetation in the foreground is a narrow strip of tidal marsh.

Because of the relatively tall cover available in this area, boats passing at slow speed do not represent a significant disturbance factor. Non-motorized personal watercraft, however, can be disturbing to wildlife because of the "surprise" element mentioned previously. In addition, these watercraft can be easily

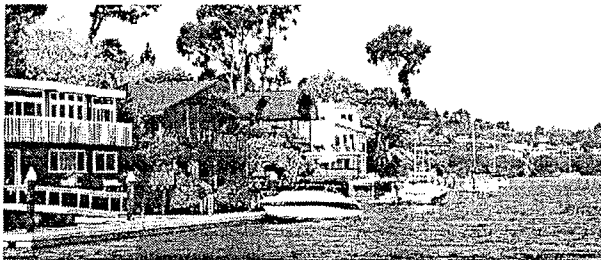
beached along the shoreline, providing their occupants with the ability to access the spit on foot.

Sandy/Rocky Shoreline. There are a couple of small areas that consist of what can be described as "sandy beach". Located adjacent to marsh or upland areas at the crescent and on Aramburu Island, these areas are characterized by a sandy substrate rather than mud. They may be partially or entirely covered by water during high tide. The most noteworthy of these areas are located on the eastern side of Aramburu Island, and are the sites of the harbor seal haulouts. (A discussion of the haulouts is provided later in this report.) These sandy flats provide resting habitat for waterbirds.



Riprap along eastern shoreline of Strawberry Spit.

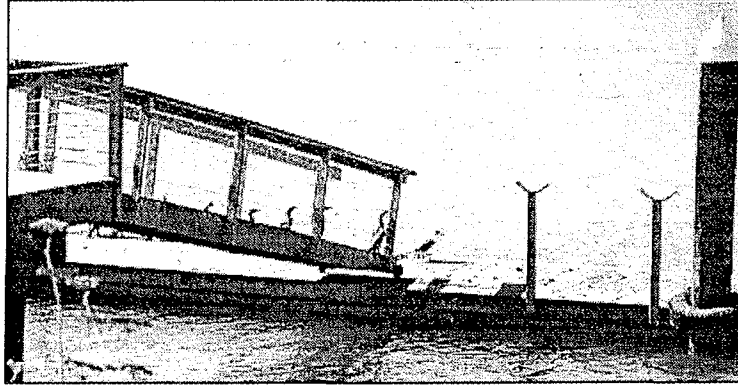
Rocky shoreline habitat is comprised of riprap and occupies the shoreline along the developed portion of Strawberry Spit, adjacent to the Salt Works Canal. It is also found along the Tiburon and Belvedere shorelines and was installed for protection against wave erosion. This habitat does provide some substrate for invertebrates and cover for crustaceans and small mammals, reptiles, and amphibians. Although birds may be observed searching for food in these areas at times, the absence of significant vegetation and associated cover makes this an unnatural and low-value habitat overall.



The developed western shore of Strawberry Lagoon.

Developed Shoreline. This includes formerly natural shorelines that have been developed to residential use, including docks. In many areas, such development has included bank protection in the form of riprap or retaining walls. Landscaping often consists of non-native plants; iceplant is

fairly common on slopes directly adjacent to the shoreline. Scattered occurrences of pickleweed and cordgrass also persist along the intertidal zone on the developed western shoreline of the lagoon. In nearly all cases, docks are of the floating type. Such development essentially removes natural habitat values for wildlife, although some waterbirds do use docks as resting sites when disturbances are not present. Although birds that frequent docks are wary and will flush when humans, dogs, or cats approach, they typically adapt to the level of disturbance in the area and do not flush with the passing of slow-moving boats.



Cormorants and a gull on one of the nine docks in southern Strawberry Lagoon.

Strawberry Lagoon. The lagoon is a combination of several of the previous types described above. It is identified separately here

because, in spite of its developed shoreline and higher disturbance by docks and boats, it still serves an important function to waterbirds as a refuge or shelter during winter storms by providing a location with calmer wind and wave action as compared to the open waters of the more exposed bay. Fortunately, such storms also discourage boat traffic and outdoor human activity when they occur, providing the birds with a low level of disturbance that would otherwise preclude significant use.

Wildlife Resources and Use

Wildlife resources in the study area are rich and diverse. For purposes of this study, it is not necessary to prepare an extensive baseline or inventory of wildlife species in Richardson Bay; however, it is important to understand the wildlife species of concern in relation to the objective of assessing impacts from docks and boat traffic. For a list of bird species known to inhabit or visit the area, see the Appendix to this report.

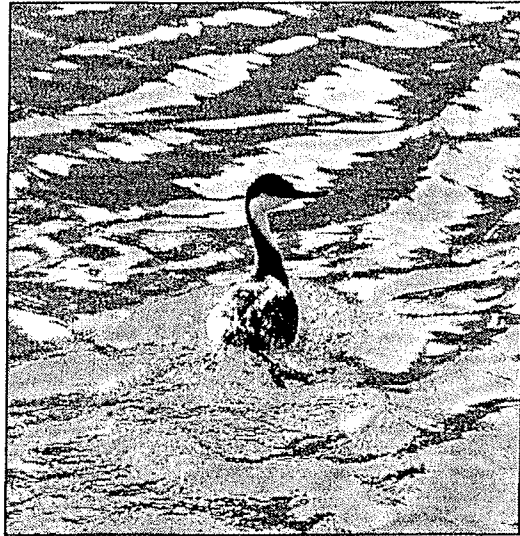
What is important to understand are the characteristics and sensitivities of the wildlife community in the study area. For this study, it is more important to gain an understanding of:

- Habitats in terms of how they are used and where they are located.
- The major groups of wildlife that depend on those habitats.
- The basic needs (habitat and others) of wildlife using the area.
- The sensitivities and behavioral characteristics of wildlife in relation to the potential impacts of docks and boats.

Waterbirds. This is a large and encompassing group, but it is the one of most concern to this study. This group includes all birds that depend on water-related habitats to meet

their basic needs for survival. It includes waterfowl and nongame species that frequent open water habitats, wading birds, and shorebirds. Following are general descriptions of these groups of waterbirds, with the primary focus on characteristics most relevant to this study.

Waterfowl and Nongame Open-Water Birds. These are the birds that you would typically see “sitting” on the surface of the water. They usually have webbed feet for swimming. Examples include ducks, geese, gulls, terns, grebes, cormorants, pelicans, and coots. (Note that many people use the term “waterfowl” to mean waterbirds that are game species.) This group is typically associated with the open water habitat of Richardson Bay, although many do use other habitats to some degree. Some primarily rest in the open water and feed elsewhere, while others both feed and rest there. They frequent large expanses of open water free from significant disturbance, but prefer nearby cover when available (such as in and around a marsh). Although considered to be open water species, they often stay close to shore to feed or take shelter. They tend to be wary and will flush to avoid disturbances that they perceive as a threat. This response would be expected in open waters where no cover is available.



A western grebe in Greenwood Cove.

Wading Birds. These are large birds that typically forage for food while wading in shallow water. They typically have long legs and do not have webbed feet. Examples include herons and egrets. They are most commonly associated with shoreline habitats with vegetation where water is shallow enough to hunt for fish. They also feed on small mammals, amphibians, and reptiles found along shoreline aquatic and terrestrial habitats. When not foraging, they usually seek shelter in upland areas near water. Depending on the amount of cover available for security, they are generally very wary and readily flush to avoid disturbance. They are usually solitary birds but are sometimes seen feeding in groups in marshes.

Shorebirds. This group encompasses the smaller birds commonly associated with shoreline habitats. They have short to medium-length legs and bills that are adapted to “probing” or “sifting” in sand and mud for small invertebrates. They are not typically swimmers, and are most commonly observed on mudflats and in very shallow water adjacent to mudflats and marshes. Many species will also feed on insects and other small animals found on marsh plants. Unlike large wading birds, they are generally gregarious and will feed and rest in large groups. Examples include sandpipers, willet, dowitchers, plovers, and turnstones. These birds are usually “quick” in their movements, and are more tolerant of nearby human presence than many other waterbirds. When disturbed, they often flush and fly to another area close by. They are very dependent on mudflats and shallow marsh habitats for food. During high tide they roost in nearby marshes and

upland areas. Shorebirds will also forage on rocky shorelines, but riprapped areas are usually too densely packed to provide much value.

Harbor Seal. The harbor seal (*Phoca vitulina richardi*) requires beaches or suitable rocky areas for hauling out to rest or sleep. There are two haulout sites on the eastern side of Aramburu Island. The southernmost site, located about 300 feet north of the channel cut, is the “traditional” site where seals were first observed to haul out in 1969-70. The second site is located about 500 feet north of the traditional site, and was constructed in 1987 as mitigation in an effort to provide the seals with greater isolation from disturbance. This was one of several mitigation measures designed to minimize disturbance. These measures are described in detail in Earth Metrics (1990), Marin County CDA (1990), and Allen (1991).

The numbers of seals hauling out at Strawberry Spit began to decline seriously in 1976. In surveys conducted during the winter months between 1984-89, only two seals were observed hauled out in 1985, and none were observed thereafter, indicating that the seals had abandoned the site. Disturbance by boats, pedestrians, and dogs is believed to have been primary contributors to the decline in seal numbers and abandonment of the site, although the coincidental collapse of the herring fishery in Richardson Bay after 1983 may also be a significant cause. (Allen 1991) However, Earth Metrics (1990) stated that because the collapse of the herring runs occurred well after the decline of seal use, it cannot be considered a major contributing factor to the decline, but does contribute to the situation overall.

The channel cut and the northernmost haulout site were constructed in 1987 after the seals had apparently abandoned the site. This significantly reduced disturbance caused by boats, pedestrians, and dogs at the haulout sites, but significant use of the haulouts by seals has not resumed to date (S. Allen, pers. comm.).

Harbor seals are sensitive to disturbance by boats, and seals will flush when boats approach. A study at Bolinas Lagoon (Allen et al. 1984) determined that the critical flushing distance for seals at a haulout site was about 100 yards. This is well within the distance that boats formerly traveled past the haulout site before the channel was cut through the spit. Although nearly all motor and sailboats now divert through the lagoon, boats are not prohibited from waters near the haulout area. Of particular importance here are the small, non-motorized boats that can easily reach the sites in spite of the shallow water. Canoes were the primary boats causing disturbance in the Bolinas Lagoon study, and Allen (1991) observed rowboats, kayaks, and/or sailboats near the Strawberry Spit haulout sites on several occasions during surveys conducted in 1985-1990.

Studies are currently in-progress of disturbances to harbor seals on haulout sites at Yerba Buena Island (near the San Francisco – Oakland Bay Bridge) and Castro Rocks (near the Richmond – San Rafael Bridge). Preliminary observations indicate that about 50 percent of human disturbance at these sites is from boat traffic. The seals appear to have adapted to automobile traffic noise from the bridges, and from boats that are passing by. Although passing boats are tolerated, boats approaching “head-on” and significant changes in

engine sounds tend to cause the seals to flush. The animals also exhibit a high sensitivity to disturbance from kayaks. (M. Galloway, pers. comm.)

For purposes of this study, it is assumed that the haulout sites at Strawberry Spit retain the potential to be used by harbor seals in the future and, therefore, will be treated as though they are being used presently.

Threatened or Endangered Species. There are two wildlife species that may reside in the study area (CNDDDB, 1997). These are the California Clapper Rail (*Rallus longirostris obsoletus*) which is listed as endangered at both the federal and state levels, and the California Black Rail (*Laterallus jamaicensis coturniculus*) which is listed as threatened by the state and as a “species of concern” at the federal level. The California Clapper Rail is most commonly associated with salt and brackish marshes traversed by tidal sloughs, and containing abundant pickleweed, in the San Francisco Bay area. The California Black Rail mainly inhabits tidal salt marshes bordering larger bays and containing heavy growths of pickleweed. Although there are no known documented occurrences of these two species in the study area, the salt marshes of Aramburu Island and the areas to the north of it are regarded as suitable habitat.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

REVIEW OF SCIENTIFIC LITERATURE

Scientific literature addressing the effects of boating disturbance is limited. Very little research has been done to address the effects of boating disturbance on wildlife in coastal, bay, and estuarine environments, and no studies on this subject could be found for Richardson Bay or San Francisco Bay in general. Much of the species-specific research that has been done is from Europe and, in particular, Great Britain. A fair amount of research on boating impacts to wildlife has been done in Great Britain, although the vast majority of this research covers inland reservoirs. In many cases, the literature consists of observations made by researchers while performing studies with other primary objectives. Also, the available literature largely addresses motorboats and sailboats, with only occasional and general references made to personal watercraft such as canoes and kayaks, and most focuses on disturbance to waterfowl. In spite of the scarcity of in-depth research, relevant inferences from available literature can be made and applied to this study for Richardson Bay.

For purposes of this study, the summary of literature is discussed by relevant topical areas:

Characteristics of Water Craft

Mathews (1982) grouped the types of water-based recreational activities that cause disturbance to waterfowl into four main categories, listed in order of decreasing disturbance. The first two categories, which cover boating, are as follows:

1. Those involving rapid movement and loud noise
 - power boating
 - water skiing
 - cruising
2. Those involving movement but little noise
 - sailing
 - wind surfing
 - rowing
 - canoeing

Mathews also indicated that the intensity and duration of the activity is important in determining how waterfowl will respond, as well as the species that are affected. Tuite, et al. (1983) found that one boat may be as disturbing to waterfowl as many.

Atkinson-Willes (1969) examined several recreation activities with respect to their effects on waterfowl on British reservoirs. Atkinson-Willes states that "Sailing poses greater problems than any other activity. The demand for facilities is enormous and continues to increase; the types of water required are those most suited to wildfowl, and the degree of disturbance is greater than most species of ducks can tolerate. Some form of segregation is therefore essential." Atkinson-Willes also notes that "Canoes, because of their shallow draught, are able to penetrate further into the shallows, and thereby add to the disturbance caused by sailing craft. The same applies to punts and rowing boats." Speight (1973) similarly noted that canoes, punts, and rowboats are particularly disturbing to nesting waterbirds because of their ability to approach closer to the water's edge.

Fraser (1987) describes the reaction of common eiders to windsurfers along the coast of South Africa. The author noted that eiders usually ignore dinghies, small sailboats, and engine-powered boats, but the rapid approach of a windsurfer caused widespread panic among the flock. Mathews (1982) observed that the frequent rise and fall of sails of capsizing beginning windsurfers are highly disturbing to birds.

Wildlife Population, Physiological, and Behavioral Responses

Mathews (1982) noted that, in general, if the disturbance duration is short, birds will tend to fly up and then return to the same area; if prolonged, they will seek other areas and not return for a long time. If a disturbing activity occurs day after day, the area may be abandoned by the birds permanently. If the activity is heavy primarily on weekends, then the area will likely be used by birds during the week if there are other waters available to the birds nearby. Mathews also notes that these behaviors only apply when the disturbance area is used for feeding and roosting and not for nesting.

Kramer (1986) studied the effects of "zoning" on an inland lake in Great Britain. Zoning in this case refers to the creation of a disturbance-free zone during the period of November through February for wintering waterfowl. Although somewhat variable depending on species affected (based on feeding behavior, food availability, etc.), Kramer found that many birds seem to exhibit a learning response in recognizing that a disturbance-free zone existed. Kramer's study focused on the disturbance created by sailing.

Bauer, et al. (1992) noted population declines in goldeneye and other wintering waterbird species on Lake Constance as the number of boats increased over a period of several years. The authors recommended the establishment of larger protected areas and stopping water sports and angling from October to March. Batten (1977) noted that waterbird populations are likely to increase when sections of a reservoir are off limits to boat traffic. Cryer, et al. (1987) observed that sailing during and outside the angling season is so disruptive at Llandegfedd Reservoir in South Wales that entire waterfowl populations desert the area.

Activity (energy) budgets, distribution, and abilities to store fat reserves by migrating and wintering waterbirds can be adversely affected by boating and other human disturbances (Belanger and Bedard, 1989)

Several studies have documented the inherent variability among waterfowl species with respect to their sensitivity and response to various types of disturbance. Cooke (1987) observed that, on a British reservoir which receives substantial fishing activity by boat and on the shoreline, numbers of most duck species increased by more than 30 percent within a week of the end of the fishing season, but numbers of coot, great crested grebe, mute swan, and waders changed little. Batten (1977) found that numbers of several waterfowl species increased significantly in a portion of a reservoir where sailing had to be suspended from August to the end of the year as a result of a pondweed infestation. Batten also noted a marked decrease in the average winter mallard count coinciding with the introduction of sailing in one portion of a reservoir, but Parr (1974) found that mallard numbers appeared to be unaffected by the introduction of sailing at Island Barn Reservoir. In a study of waterfowl use of Lake St. Clair marshes during migration periods covering a 14-year period, Dennis and North (1984) cited habitat destruction caused by marina developments on wetlands, with resulting increased boat traffic, as one of several factors accounting for observed reductions in waterfowl use in some locations.

Edington (1980) studied the effects of disturbance of overwintering wildfowl by sailing in England. Because of its warm winters, England provides refuge for a disproportionately large fraction of western Europe's waterfowl population. However, the recreational boom in the 1960's seriously threatened these British reservoirs as waterfowl refuges. Different segregation techniques based on time and space have been attempted at some reservoirs with a variety of results. Common goldeneyes were particularly sensitive to disturbance, flying up when sailing dinghies approached within 300-400 meters. Common pochards, tufted ducks, and mallards were reputedly less sensitive, tolerating the closer approach of sailing craft before flying and returning more readily when sailing stopped at the end of the day.

Tuite, et al (1984) conducted a study of wintering waterfowl distributions and response to various water-based recreational activities on inland waters in England and Wales. The study noted substantial variation among wintering waterfowl species in terms of their susceptibility to disturbance from water-based recreation activities, and also found (as one would expect) that the common and widespread species were more tolerant of human activity than the less common and "wild" species.

In a study of migratory waterfowl use of the Ontario shorelines of the southern Great Lakes, Dennis and Chandler (1974) made the following observation: "Disturbance by power boats during autumn reduces the number of Redheads and Canvasbacks using the waters of Long Point Bay during the day, but the birds have developed the pattern of feeding in the waters of the bay during early morning and late evening and spending the remainder of the day in large rafts on the open waters of Lake Erie. The pattern is similar to that at Rondeau, and has developed since the introduction of power boats with outboard motors of greater than 10 horsepower."

Research by Titus and VanDruff (1981) on the effects of recreation on Common Loon nesting in northeastern Minnesota yielded some interesting results. The authors say in their summary:

“Island and mainland nest sites were equally productive. However, a significantly greater hatch/egg laid was observed for smaller (usually remote) lakes; and loons on lakes where motors were prohibited were more successful at hatching eggs ($P < 0.05$) and producing broods ($P < 0.10$) than those on lakes where motors were allowed.

Less visible nests produced significantly more ($P < 0.05$) hatched eggs than more visible nests. Comparisons of nests near high and low human use showed that loon pairs experiencing fewer human contacts produced significantly more ($P < 0.001$) surviving young. Nevertheless, not all indicators of productivity supported the hypothesis that heavy recreational use of lakes was detrimental to the nesting and brood rearing of the loon. In fact, some analyses showed little or no effect of heavy recreational use on loon productivity. Only a slight negative effect of motorcraft on nesting and brood rearing was seen. Many birds in areas of high human use (usually lakes on which motors were allowed) refused to leave the nest when approached by humans. Loons on nests on remote lakes always flushed. The extent to which the loon may be adapting or habituating to human disturbance remains an exciting question. Although an 800-900 percent increase in recreational use of the area has occurred over the past 25 years, a 35 percent increase in adult loons has been noted; loon density is also comparable to that found in similar (remote) areas. The conclusion is that human use of this wilderness area slightly reduces the nesting and brood rearing success of individual pairs in areas of high human impact but because of undisturbed loon pairs or pairs habituating to human use, the size of the adult breeding population during the past 25 years has not declined. The findings of this study should not be applied to loon populations in more developed areas.”

Some researchers noted the ability of some waterbirds to adapt or habituate to the presence of human recreational activity. Owens (1977) conducted a study of the responses of wintering Brent Geese to human disturbance in Essex. Owens observed that “Brent Geese quickly become habituated to most sounds. Unexpected ones, such as nearby gunshots from wildfowlers, usually put the geese to flight.” Owens also noted that large boats rarely caused disturbances to the geese even when they came close. Owens also stated that “Yachts, too, rarely disturbed Brent Geese, but small boats with noisy outboard engines caused them to take flight.” Vos, et al. (1985) reported that nesting great blue herons in north-central Colorado became habituated to repeated non-threatening activities such as anglers boating past a heronry.

Some researchers made observations on the distances at which various species reacted to boat disturbance. Hume (1976) showed that goldeneye are particularly sensitive and fly up each time sailing dinghies approach to within 300 to 400 meters. Hume noted that on one occasion, goldeneye took flight at 700 meters when a powerboat approached, but on another occasion allowed a powerboat to approach to within 550 meters. Havera, et al. (1992), in a study at Keokuk Pool on the Mississippi River during spring and fall migrations, observed that boating within approximately 450 meters caused diving ducks

to take flight, and that disturbances from boating caused waterfowl to fly farther than disturbances from barges. Batten (1977) found some evidence to suggest that the number of birds in a flock affects sensitivity to approaching sailing craft, with the larger flocks being more sensitive and taking flight at greater distances from the craft.

Management Considerations

On large water bodies, several researchers have noted the importance of establishing refuge areas (known as segregation or zoning) where recreation activities, including boating, are commonplace (Cooke, 1987; Atkinson-Willes, 1969; Batten, 1977; Johnson, 1964; Mathews, 1982; Bauer, et al., 1992; Kahl, 1991)

Establishing no-wake zones or nonmotorized boating zones has also been suggested to reduce speed and the level of disturbance in areas where needed (Kahl, 1991). Mathews (1982) suggests that zoning must take into consideration the size and shape of a water body. Tuite, et al. (1983), as a result of their studies in South Wales, reached the general conclusion that where refuges are available on popular recreational lakes, the adverse effects on birds are not as serious.

POTENTIAL FUTURE DOCK DEVELOPMENT AND BOAT TRAFFIC

The survey completed by County staff concluded that there is a potential for 27 new docks in the study area (see Table 1). In terms of potential boat berths, these include the following by area:

Strawberry Lagoon Single-Family Individual	10 berths
Strawberry Lagoon Multi-Unit Marina (Harbor Pt.)	151 berths
North Shore Single-Family Individual	12 berths
Belvedere Shore Single-Family Individual	3 berths

It has been estimated by County staff that the existing 75 docks in the study area provide 112 berths. This estimate assumes one berth per individual single-family residence dock in most cases, which conforms to observations made by the author. Forty of the 112 berths are located at the Cove Apartments in Greenwood Cove, and 52 are associated with the individual docks in Strawberry Lagoon. Therefore, it is estimated that a total of 92 berths are available for boats that would utilize the Strawberry Lagoon-Greenwood Cove channel for ingress and egress. The remaining 20 berths are located along the Belvedere shoreline (16) and the north shore area (4) west of the Audubon Society's Tiburon Nature Center.

As pointed out earlier in this report, it is nearly impossible to obtain an accurate estimate of the number of boats actually berthed in the area, and is especially difficult to translate berth numbers into traffic. All berths may not be presently occupied. One dock is a public facility available for Strawberry Recreation District members and does not permanently berth a boat. Several docks also support personal craft such as canoes or kayaks that are usually kept on the dock or on other areas of private property. (Several such occurrences were observed by the author. These vessels may be in addition to larger boats berthed at

the docks.) Also, an unknown proportion of traffic is from nonresident boats visiting the area for recreation or other purposes.

Estimates of boats and daily traffic have, however, been made in a previous environmental report for Strawberry Lagoon. Earth Metrics (1990), in their harbor seal study for the 9 docks proposed in southern Strawberry Lagoon (see Marin County CDA, 1998c), estimated at that time that there were 74 existing berths in the Strawberry Lagoon area (34 on individual lots and 40 at the Cove Apartments). The additional 9 (subsequently approved) raised that number to 83 berths. Earth Metrics also estimated that there were 15 other lots in the lagoon area in 1990 that did not have docks, but had the potential for them. This resulted in a total estimated potential of 98 berths at build-out (not including the potential 151 at Harbor Point Apartments).

Earth Metrics assumed one boat per berth to estimate the number of resident boats that would generate traffic. This is probably a reasonable estimate of motorized vessels (motorboats and sailboats) based on personal observation.² Taking into account personal watercraft owned by these same residents would probably raise the total number of all boats to somewhere between 1 and 1.5 boats per berth. Even so, it would be unusual that more than one boat would be used at any one time from a single berth, so the one boat per berth estimate is the most reasonable for estimating boat traffic originating from local residents. Earth Metrics also indicated that pleasure boat traffic approaches 20 percent of occupancy in a busy marina (G.Davis, pers. comm. cited in Earth Metrics, 1990), and most of this traffic would be on weekends.

Therefore, utilizing the Earth Metrics estimates and the other assumptions and estimates in this report, existing boat traffic in the Strawberry Lagoon area can be estimated as follows (does not include the 20 north shore and Belvedere shore docks; numbers rounded to nearest half):

Existing berth estimate (from Table 1) = 92

Number of boats at 1 boat per berth = 92

Number of boats in use on a given day (primarily on weekends) = 20% of 92 = 18.4

Number of boat trips (one out, one in)³ = 2 x 18.4 = 37

If the 20 berths/boats from the north shore and Belvedere shore areas are factored in, the number of existing resident trips on a study area-wide basis would be 45.

² It is noted that BCDC (1991) stated that staff "observed that docks by the single family residences typically had two boats". Based on observations by the author, this estimate seems high. Observations indicate that one larger (approximately 20 feet or more in length) motorboat or sailboat per individual private dock was common, with some also containing canoes or other personal craft. A representative of Strawberry Recreation District (T. Graham, pers. comm.) also indicated that some residents have docks, but currently do not own boats.

³ As noted, this estimate is most accurate for busy boating days (i.e., primarily weekends and holidays). Actual numbers can vary substantially depending on day of the week, time of year, and numbers of non-resident boats visiting the area.

In looking at potential boat traffic, the analysis for the Strawberry Lagoon area would be as follows (not including the north shore, Belvedere shore docks or the marina at Harbor Point Apartments):

Potential new dock/berth estimate (from Table 1) = 10

Number of additional boats at 1 boat per berth = 10

Number of boats in use on a given day (primarily on weekends) = 20% of 10 = 2

Number of additional trips (one out, one in) = $2 \times 2 = 4$

If the potential 151 berths at Harbor Point Apartments are factored in, the same analysis would be as follows:

Potential new dock/berth estimate (from Table 1) = 161

Number of additional boats at 1 boat per berth = 161

Number of boats in use on a given day (primarily on weekends) = 20% of 161 = 32.2

Number of additional trips (one out, one in) = $2 \times 32.2 = 64.4$

In summary, each new dock/berth in the Strawberry Lagoon area of Richardson Bay would represent an increase of about 0.4 boat trips per day (1 boat x 20% x 2 trips) or 1.1 percent (0.4 trips per day divided by 37 existing trips per day) over existing traffic. If the 7 potential private residence docks were developed, boat traffic would increase by about 4 trips per day or about 10.8 percent (4 divided by 37) over existing traffic. Construction of the 7 private docks and the 151-berth Harbor Point marina in combination would result in an increase of 65 trips or 176 percent (65 divided by 37) over existing traffic. Construction of the 7 private docks and a 75-berth Harbor Point marina in combination would result in an increase of 40 trips or 108 percent (40 divided by 37) over existing traffic. Table 2 summarizes existing and potential estimated boat trips on busy days under the various scenarios.

IMPACTS OF DOCKS ON WILDLIFE AND HABITATS

Dock construction may result in the following direct and indirect impacts:

Loss of shoreline terrestrial habitat. In most locations in the study area where there is a potential for new docks, the loss of natural shoreline habitat has already occurred as a result of residential development. Waterfront residences typically are landscaped and include bank protection measures in the form of riprap or retaining walls; therefore, little remains of natural shoreline habitats in these areas.

Loss of water surface habitat. Docks replace water surface habitat, making it unavailable to waterbirds that could otherwise use it for swimming, resting, or feeding.

Shading of tidal and intertidal water and habitat. Shading can inhibit plant growth (shoreline marsh, algae, and plankton).

Table 2. Estimated Daily Boat Trips Under Various Future Scenarios in the Richardson Bay Study Area

<u>Scenario</u>	<u>Existing + Potential Trips</u>	<u>Total Trips¹</u>
Strawberry Lagoon Area: Existing	37 + 0	37
Strawberry Lagoon Area ² : Existing + new S-F ³ individual	37 + 4	41
Strawberry Lagoon Area: Existing + new S-F individual + 75-berth HP ² marina	37 + 40	77
Strawberry Lagoon Area: Existing + new S-F individual + 151-berth HP marina	37 + 65	102
North Shore & Belvedere Shore: Existing	8 + 0	8
North Shore & Belvedere Shore: Existing + Potential	8 + 6	14
Strawberry Lagoon, North Shore & Belvedere Shore: Existing	45 + 0	45
Strawberry Lagoon, North Shore & Belvedere Shore: Existing + Potential (Full Build-out with 75-berth HP marina)	45 + 46	91
Strawberry Lagoon, North Shore & Belvedere Shore: Existing + Potential (Full Build-out with 151-berth HP marina)	45 + 71	116

¹ Rounded up to nearest whole number

² Also includes 40 berths at Greenwood Cove

³ S-F = Single-Family residence, HP = Harbor Point Apartments

Increased turbidity. Placement of pilings disturbs sediments and causes temporary increases in turbidity. Required maintenance dredging also increases turbidity into the future on a periodic basis. Propeller action in shallow waters such as Strawberry Lagoon and Richardson Bay also disturbs sediments. Excessive turbidity can decrease dissolved oxygen in water to the point that it stresses aquatic organisms; however, previous analyses of this issue for the study area have not identified significant problems (Madrone Associates, 1981).

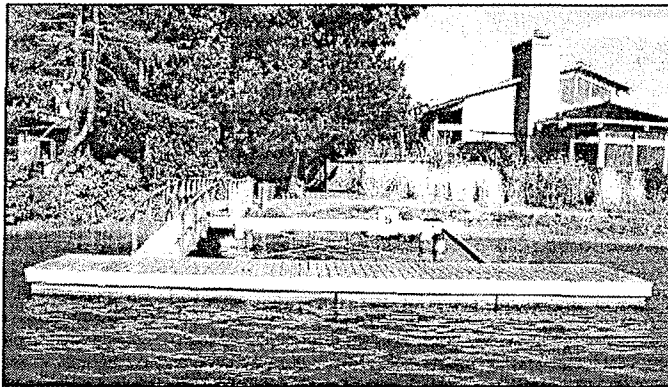
Increase in nonpoint source pollution. Boat maintenance activities (washing, sanding, painting, hull cleaning) result in increased levels of pollutants in the aquatic environment. Spillage or leakage of petroleum products from boats also contributes to pollution. Debris lost or thrown overboard, and illegal dumping of sanitary wastes may also be significant pollution sources at docks/marinas.

Docks and support pilings are typically constructed of pressure-treated wood impregnated with ammoniacal copper zinc arsenate (ACZA), which are wood preservatives known to be toxic. However, because they are sealed in the wood and do not leach rapidly or in significant quantities, they are not considered to have a significant impact to water quality in flushing systems (Marin County CDA, 1998a and b). The San Francisco Bay Conservation and Development Commission (BCDC) has indicated that it prefers the use of concrete or steel pilings, but has no prohibition on the use of ACZA or other treated wood pilings

(Nicholas Salcedo, BCDC, 1998, pers. comm. cited in Marin County CDA, 1998b).

Increase in disturbance. Noise and human activity at the shoreline and surrounding aquatic environment increases with docks and boating activity.

The potential significance of these impacts varies depending on several factors, including the resources present prior to dock construction. One factor of primary importance relative to the introduction of pollutants is how readily water is renewed in the affected area, a process commonly referred to as “flushing”. Because Richardson Bay is subject to tidal flow, flushing is generally good compared to a more closed system (such as a lake). Lagoons such as Strawberry Lagoon, however, may receive less flushing than surrounding waters because of their hydrologic characteristics. A study by Phillip Williams & Associates (1981) prepared as part of the EIR for the Strawberry Spit Residential Development (Madrone Associates, 1981) determined that water circulation effectiveness in Strawberry Lagoon would be improved significantly with implementation of the navigational channel cut through the spit (this was installed in 1987) and deepening of the channel by dredging.



Example of a floating dock in Strawberry Lagoon

The amount of surface area a dock occupies varies with its size. In an application for a private dock at 305 E. Strawberry Drive (Calender), the Marin County Initial Study (1998b) indicated that the dock would occupy about 650 square feet. The 9 docks approved west of Egret Way on Strawberry Spit are each approximately 700 square feet in area (Marin County CDA, 1991; BCDC, 1991). The originally proposed Harbor Point Marina

would have consisted of 5 floating docks with enough space for 151 berths (25 berths each with a 40-foot length and 126 berths with a 30-foot length). The entire marina facility as a whole (not dock surface) would have occupied about 2.5 acres of water surface (Karl Treffinger and Associates, 1973).

Assuming that an average private dock for a single family residence occupies about 450 square feet⁴, the area of surface coverage by the 48 existing single-family residential docks in Strawberry Lagoon is about 21,600 square feet, or about 0.50 acre. Docks

⁴ According to BCDC (1991), dock permits typically range in size from about 350 to 700 square feet of bay coverage. BCDC noted that a permitted single dock at 369 Strawberry Drive was 384 square feet; another in the vicinity was 392 square feet. The nine docks approved for the southern part of the lagoon are larger (maximum 700 square feet) because of the longer gangways required to span a shoreline band of cordgrass for mitigation. Therefore, for purposes of comparative analysis, an average size of 450 square feet was chosen.

located at Greenwood Cove (Cove Apartments) are approximately 900 feet in total length (as measured on an aerial photograph with a scale of 1 inch = 148 feet). Assuming an average width of 6 feet, this equates to about 5,400 square feet or about 0.12 acre of surface coverage. There are 16 existing docks along the Belvedere shoreline. Again, assuming each is an average of 450 square feet in area, these docks in total represent about 7,200 square feet of surface coverage, or about 0.17 acre. There are currently two docks, one hoist, and one ramp located along the north shore of the study area. For purposes of this analysis, it is assumed that in total these represent about 1,500 square feet of coverage, or about 0.03 of an acre. Therefore, the total estimated surface coverage by existing docks in the study area is 35,700 square feet, or 0.82 acre.

As identified in Table 1, there is a potential for 7 new docks at single family residences in Strawberry Lagoon, 12 at single family residences on the north shore, and 3 residences along the Belvedere shore for a total of 22 individual private docks. Assuming an average of 450 square feet each, there is a potential for 9,900 square feet (0.23 acre) of new individual residence docks in the study area. Therefore, if all of these docks were to be built at some time in the future, this would represent a cumulative increase of about 28 percent of dock surface in the study area (9,900÷35,700).

IMPACTS OF BOAT NUMBERS AND TRAFFIC ON WILDLIFE

It is well documented, and common sense would dictate, that boats and other related watercraft have the potential to significantly impact wildlife in a variety of ways depending on several factors. Table 3 provides a summary of the types of watercraft and related activities occurring in the study area, the characteristics of each in terms of the types of disturbance they cause, the habitats and wildlife most affected, and other related notes.

The extent to which boating impacts wildlife varies depending on the following:

- The type of watercraft involved and its particular characteristics such as: speed, size, noise generation, and extent to which human presence (movement, talking) is perceptible and at what distance.
- The direction of movement of watercraft in relation to wildlife (i.e., passing laterally or approaching head-on).
- The numbers of watercraft, the frequency with which the disturbing activity occurs, the location of the activity in relation to wildlife presence, and when the activity occurs in relation to the daily and seasonal needs of wildlife.
- Wildlife resources subject to disturbance and their sensitivity to the disturbance. Some species are more tolerant than others of certain types of disturbance, and some species are more tolerant of some kinds of disturbance, but less tolerant of others. The ability to “habituate” to disturbance is also highly variable among species.
- The particular habitat needs of the wildlife species in the area (e.g., resting, feeding, breeding) which may vary on a seasonal basis.
- The availability of suitable cover for protection and security of wildlife.

TABLE 3. TYPES OF WATERCRAFT IN RICHARDSON BAY (RB) AND THEIR WILDLIFE DISTURBANCE CHARACTERISTICS.

Water Craft Type/Activity	Disturbance Characteristics	Habitats/Species Most Affected	Notes
Power boats	<ul style="list-style-type: none"> • Rapid movement • Loud noise • Wave action • Water pollution 	<ul style="list-style-type: none"> • Open water areas (waterfowl: diving feeders, resting ducks) • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Common in RB • Most disturbing to waterfowl of all craft • Shoreline disturbance due to wave action and noise
Water Skiing	<ul style="list-style-type: none"> • Rapid movement • Loud noise • Wave action • Water pollution • Greater human intrusion/activity 	<ul style="list-style-type: none"> • Open water areas (waterfowl: diving feeders, resting ducks) • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Mostly non-winter activity • Highly disturbing to waterfowl • Shoreline disturbance due to wave action and noise
Sailboats	<ul style="list-style-type: none"> • Movement • Wave action 	<ul style="list-style-type: none"> • Open water areas (waterfowl: diving feeders, resting ducks) • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Less common in RB due to deep draft of keel • Shoreline disturbance due to wave action
Sailboards (Windsurfers)	<ul style="list-style-type: none"> • Rapid movement • Quick rise and fall of sail • Human intrusion/activity 	<ul style="list-style-type: none"> • Open water areas (waterfowl: diving feeders, resting ducks) • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Fairly common in RB • May disturb shoreline habitat depending on where launched
Canoes/kayaks/rowboats	<ul style="list-style-type: none"> • Movement • Shallow draft • Greater human intrusion 	<ul style="list-style-type: none"> • Shallows near mudflats • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Can access shoreline/marsh areas other boats cannot • May "surprise" wildlife due to lack of noise
Jet skis	<ul style="list-style-type: none"> • Rapid movement • Loud noise 	<ul style="list-style-type: none"> • Open water areas (waterfowl: diving feeders, resting ducks) • Shorelines with low cover (herons, shorebirds, harbor seal haulout) 	<ul style="list-style-type: none"> • Now prohibited in Marin County waters • Highly disturbing to both open water and shoreline areas

- The mobility of the affected species.
- The size and availability of suitable habitat nearby for “escape” and refuge, and the extent to which these areas are free from similar disturbance.

Descriptions of the habitat types and wildlife present in the study area, along with discussion of their sensitivities relative to docks and boating, were provided earlier in this report. The following points summarize the most critical elements of concern within the Richardson Bay study area with respect to the interactions between wildlife and boating activity. These are the most important points for the assessment of impacts and mitigation measures discussed later:

- The Audubon Society’s Richardson Bay Sanctuary is unquestionably one of the most valuable wildlife resources on the West Coast. Its highest value comes during the fall and winter months when it supports exceptionally high numbers of migratory birds. The Sanctuary is closed to boating during this period on a “voluntary” basis (i.e., observance by boaters of posted signs along the boundary).
- Although not used in several years and presently considered “abandoned”, the harbor seal haulout sites on the east side of Aramburu Island may be used again by the seals at some time in the future. The specific reasons for the abandonment are not clearly understood and may be a result of a combination of natural and unnatural causes. However, experts have concluded that human disturbances (pedestrian, dogs, boats) were likely significant contributing factors. As a result of earlier development proposals, mitigation measures have been implemented to discourage boating past the haulout sites. This is a “voluntary” restriction and is encouraged through the posting of signs and the abandonment of future maintenance dredging of the Salt Works Canal along the east side of the island. Because of these factors, the haulout sites should continue to be treated as functional into the future.
- Aramburu Island (created by the navigational channel cut through the spit in 1987) is a vital refuge area for wildlife, particularly when considering the adjacent Sanctuary and the highly developed character of the surrounding shoreline and uplands. The island provides good cover habitat even though non-native vegetation is extensive. Since becoming an island, intrusion by humans and dogs has been greatly reduced, although small boats can still achieve access. The island is now owned by Marin County and is zoned as open space, so it is not likely to be developed in the future. Some mitigation measures (specifically those tied to the approval of 9 docks in the southern part of Strawberry Lagoon) intended to improve conditions on the island for the benefit of wildlife have not yet been implemented. (Further discussion of this is included later in the report.)
- Strawberry Lagoon provides an important refuge for waterbirds during storms. Birds that otherwise would occupy the open waters of the bay will seek shelter along shorelines and more protected coves, inlets, and lagoons in order to escape high winds and waves. During such events, they will even seek shelter under docks and

piers/walkways, and in nearby landscaping along the shore. Fortunately, boating and outdoor human activity are also greatly reduced during inclement weather. This means that disturbance factors will be at a relatively low level during the time that birds may seek shelter in the lagoon.

- The speed limit along the Salt Works Canal east of Strawberry Point and Spit, and in Strawberry Lagoon and into Greenwood Cove, is 5 mph. This minimizes the “rapid movement” and noise disturbance factors in Strawberry Lagoon as boats cruise to and from their berths in the lagoon and at Greenwood Cove. With boats always travelling at a slow speed, wildlife using the upland and tidal marsh habitats nearby “learn” that these boats represent little or no threat and, therefore “adapt” or “habituate” to their presence. The boats generally pass by laterally (not head-on) at a slow speed. As stated earlier, the author passed a great blue heron within about 30 feet while on the Sheriff’s marine patrol boat. The bird was on the shoreline of Aramburu Island and did not flush. Normally, great blue herons are sensitive to approaching humans or vehicles and will flush at much greater distances. A group of shorebirds utilizing the crescent marsh north of Aramburu Island likewise did not flush even though the boat passed within about 15 feet. The speed limit is almost always complied with in the lagoon; however, it is commonly violated in Salt Works Canal along the east side of the spit from the tip of Strawberry Point to the channel cut. The author observed one motorboat traveling at a speed well in excess of 5 mph up to the channel cut, and then slow down when entering the lagoon. This is not destructive to the shoreline of the spit because the entire shoreline is protected with riprap; however, these high speeds will flush any birds in the approach route of the boats.
- The mudflats within the Sanctuary and adjacent to nearby tidal marshes are critical habitat components in the region, as described earlier. Shorebirds and wading birds that forage in mudflats utilize these habitats best when left undisturbed. Here again, the situation in the study area is relatively favorable because, when the mudflats are exposed at lower tides, waters in the lagoon and the Sanctuary are also shallower. This tends to discourage boat travel in the area, especially by deeper draft vessels. Deeper draft boats, especially sailboats and larger motorboats, tend to travel into and out of the area during higher tides (D. Gallegioni, pers. comm.). This means that boat access is limited or reduced in most mudflat areas when they are exposed at lower tides, a circumstance that is favorable to the birds utilizing them. The mudflats most susceptible to boat disturbance are those close to the tidal marshes north of Aramburu Island. These are located near the dredged navigational channel, which is more likely to receive some boat traffic even during lower tides.
- Small, non-motorized watercraft such as kayaks, canoes, and rowboats are a significant disturbance threat to wildlife in the study area. They are shallow-draft vessels and can access shallow areas of Richardson Bay that other boats cannot. Because they are quiet compared to motorboats, and are small in size and low to the water, they may not be seen or heard by wildlife until they are very close. This can cause a “panic” escape response by animals when they are suddenly confronted with their close approach. These craft are also very maneuverable and, therefore, more erratic and less “predictable” in their movement. In addition, these vessels can be

easily beached on mudflats or shallow shorelines, providing their occupants with pedestrian access to Aramburu Island and higher marshes in the area. On several occasions researchers studying the seal haulouts observed personal watercraft in very close proximity (Allen, 1991 and pers. comm.).

SUMMARY AND DISCUSSION

Evaluating the cumulative effects of docks and boat traffic in the study area is a complex and difficult task. The situation that exists in the study area today, including the creation of Strawberry Spit and the lagoon, was completed over many years and is the result of past land use and resource conservation policies. If the shoreline in the study area was undeveloped today, and “master planning” was being done for the entire area, it is likely that today’s shoreline development intensity, including docks and boating levels, would be regarded as significantly impacting to biological resources of the region. From that perspective, it could be reasonably argued that the study area is presently at or beyond “saturation” in terms of what might be considered a “compatible” level of development. However, the objective of this analysis is to determine what is appropriate for future planning considering the environmental objectives for the northern Richardson Bay area with respect to dock development and boating, and considering existing conditions.

As illustrated through research in other locations (see previous summary), as well as through circumstances that naturally occur or have been implemented in the study area over the past several years, the extent to which docks and boats impact wildlife is usually dependent on management in combination with a good understanding of wildlife resources in the affected area. In other words, the number of docks and/or boats is only one consideration, and may be far less important than other factors. To use a hypothetical example, one boat travelling from point A to point B might be far more impacting to wildlife resources than 50 boats traveling a different route, at a different time of year, at a different speed, etc. The remainder of this section attempts to put these concepts into perspective with respect to the specific conditions existing in the study area.

Natural conditions in the study area that are favorable when considering potential wildlife/boating interactions include the following:

- The highest wildlife use of the Sanctuary occurs during the winter months when recreational boating use is lower. During the remainder of the year when boat use is higher, wildlife use is lower.
- Richardson Bay is shallow. Even during higher tides, deep-draft vessels such as sailboats and large motorboats do not frequently visit the open waters of the bay, especially the northern area where the water becomes gradually shallower. Boats berthed in Strawberry Lagoon and Greenwood Cove typically use Salt Works Canal and the lagoon for ingress and egress because they are dredged to a suitable depth. This keeps most local boat traffic out of the Sanctuary.
- Mudflats, important feeding areas for shorebirds, are exposed at low tide. This further minimizes disturbance from boats because of shallow water.

Management measures currently in place which are favorable in terms of minimizing wildlife/boat interactions include the following, some of which were implemented as mitigation measures for past developments:

- Boats are not allowed within Sanctuary boundaries between October 1st and March 31st, the period of heavy use by migratory birds. This is a form of “zoning” that was discussed in the previous summary of scientific literature.
- The Salt Works Canal between the channel cut through the spit and Greenwood Cove (i.e., along the east side of Aramburu Island) has been abandoned (is no longer dredged). Boat traffic is diverted into the dredged channel in Strawberry Lagoon which “hugs” the developed shoreline north into Greenwood Cove. This has greatly reduced boat disturbance (from larger boats) on the east side of the island where the seal haulout sites are located.
- The posted speed limit for all boats in the Salt Works Canal, Strawberry Lagoon, and Greenwood Cove areas is 5 mph. This slow speed reduces disturbance impacts to wildlife. Boat traffic is therefore more “predictable” in terms of its direction and speed, thereby making it easier for many species to adapt to its presence. This traffic also generally travels parallel to Aramburu Island and the tidal marshes to the north, which has less of a disturbing effect on wildlife than a “head-on” movement.
- The navigational cut through the spit and dredging of the lagoon have improved water circulation (flushing) in the area of heaviest dock development. This helps to avoid build-up of contaminants that can occur in more closed systems.
- The channel cut through the spit, which created Aramburu Island, has greatly reduced disturbance by pedestrians and dogs. This has improved the value of the island as wildlife habitat.
- The County of Marin has acquired Aramburu Island, which was under private ownership for many years. This will, in all probability, mean that the island will become permanent open space in some form and, therefore, will not be subject to future development proposals.
- The ban on jet skis in Marin County has substantially benefited wildlife in the study area, since this type of vehicle is one of the most disturbing to wildlife.

The following existing conditions are those which represent the greatest impacts to wildlife resources in the study area:

- Personal watercraft (canoes, kayaks, rowboats) continue to be a significant disturbance factor for wildlife because of their ability to access shallow areas, their characteristics in terms of the type of disturbance they cause, and their ability to provide a means for people to access Aramburu Island on foot.

- There continues to be a problem with boaters entering Sanctuary waters between October and March when it is closed for protection of migratory birds. Factors contributing to this problem likely include inadequate signage and the inability to provide a frequent presence by law enforcement (D. Gallegioni, pers. comm.). Ski boats and fast powerboats are especially disturbing because of their rapid movement, loud noise, and unpredictability in direction of movement.

CONCLUSIONS AND RECOMMENDATIONS

There are no easy answers to the questions regarding cumulative effects of docks and boats on wildlife for the study area. As pointed out earlier, it could be effectively argued either way that there are or are not already too many docks and too much boat traffic. There are no quantitative data to definitively support either argument, and adding “one more” dock and boat to the existing condition is not something that can be measured in terms of “significance” with respect to wildlife impacts. The only sure conclusion that can be reached in this regard, and from the perspective of what exists today compared to what could exist in the future, is that “less is better and more is worse”. The fact is that past land use decisions in the Strawberry Point – Richardson Bay area involved trade-offs of resource conservation and land use development priorities. With respect to the issue of docks, boats, and wildlife in the study area, the real question is: Where do we go from here? The author believes that there are opportunities for additional “trade-offs” that, in the long term, would significantly recognize and benefit the natural resources of the region.

In this regard, it is possible to draw some reasoned conclusions as to what would be appropriate for future planning decisions considering existing conditions, the multiple interests for use of the area, and stated policy objectives of protecting and enhancing wildlife resource values. Therefore, recommendations offered are based on looking at the study area as a “system” in terms of how it functions today.

The basic conclusions drawn from the study are:

- Docks and boats do have the potential to significantly impact wildlife resources in the study area. The degree to which impacts occur is a function of numbers of docks/boats and management (siting, restrictions, travel patterns, etc.). In other words, the impact significance of any further increase in the number docks and/or boats may be able to be offset through management measures.
- The study area represents an interesting mix of extremely valuable habitats for wildlife (especially migratory waterbirds) that is surrounded by fairly intensive residential and water-oriented development.
- Through both natural and managed circumstances (described in the previous section), conflicts between boats and wildlife are and/or have been minimized or reduced substantially. This is due to the fact that the “zoning” or “segregation” between existing docks and wildlife resource values of the Sanctuary is good, and that boat

traffic patterns are such that interactions with wildlife are minimized in most circumstances.

- The importance of Aramburu Island and the tidal marshes to the north of it has increased over time as the upland areas to the west, north, and south have developed. As remnants of once larger expanses of these habitat types, they now essentially function as “oases” for local wildlife, providing cover not otherwise available in close proximity to the mudflat and open water habitats of the Sanctuary. They are important elements in the ecosystem of this part of Richardson Bay, and they warrant protection and enhancement.

Based on all considerations, the following actions are recommended:

- Aramburu Island should remain under public ownership. The County of Marin should ensure that funds are made available to complete the required mitigation measures that were originally imposed as part of the boat dock development on Strawberry Spit. (See following recommendation.)
- The mitigation measures originally proposed as part of the approval of the 9 docks in the southern area of Strawberry Lagoon should be implemented. These measures include: (1) creation of a 20,000-square foot tidal marsh at the northern end of Aramburu Island; (2) placing earthen fill on an existing earth berm as necessary to create at least a 2-foot high berm along the south and west sides of the seal haulout area to shield the site from passing boats, and planting additional native vegetation adjacent to the berm; and (3) removing non-native vegetation from the northerly portion of Aramburu Island.
- Aramburu Island should be designated as a wildlife preserve and clearly posted on all sides with “Wildlife Preserve — No Trespassing” signs. Proposed signage for this purpose should be referred to the Strawberry Design Review Board for review and recommendations.
- The prohibition of boats in the Sanctuary during the October through March closure period should be strengthened through an ordinance that makes violations punishable by fines. If at all possible, enforcement should be strengthened through increased patrols. Along with this, better signage (more and/or larger signs and/or buoys) should be posted along the open water boundary of the Sanctuary.
- Handouts in the form of pamphlets or “flyers” should be provided to all facilities in the area (including Sausalito) that rent boats, kayaks, etc. notifying renters of the closure. The handout should include a map showing the closed area, and should be provided to each renter at the time of rental (i.e., this should be done in addition to any other notices that may be posted at the rental facility). This should improve notification of the closure of the Sanctuary to non-residents who may not be familiar with the closure or Sanctuary boundaries.

- All boats, including canoes, kayaks, and rowboats, should be prohibited from traveling up the eastern side of Aramburu Island north of the channel cut through the spit. The prohibition should include the tidal marshes north of the island as well.
- New docks should not be approved for the northern shore (just to the west of Audubon's Tiburon Nature Center) where a potential for 12 additional docks has been identified. This is an extremely shallow area and dock development here would likely have to be accompanied by channel dredging through mudflats and waters of the Sanctuary. (The extensive effort and associated costs to do this are likely reasons why docks have not been built here in the past.) Prohibition here is justifiable on environmental grounds.
- No additional docks (or marinas) should be allowed in the southern portion of Strawberry Lagoon. As previously described, the lagoon provides an important refuge for waterbirds during storms. A marina at Harbor Point (as has been proposed in the past) could cover up to 2.5 acres of habitat. This part of the lagoon has a wider expanse of open water (measuring between west and east shores) than other areas of the lagoon, and therefore provides more "buffer" from nearby development for wildlife that use it. Since the western edge of the lagoon is not now impacted by the presence of docks, a marina here would likely have significant habitat impacts. It would also be contrary to established policy in the Strawberry Community Plan which recommends that no multiple-berth marinas be permitted in the Strawberry Lagoon area.
- Individual docks at the 7 potential sites along the eastern shore of Strawberry Lagoon can justifiably be approved for the following reasons:
 - This shoreline is already heavily impacted by residential development, docks, and bank protection measures. The most significant impacts, therefore, have already occurred, and the addition of this number of docks would not cumulatively impact the shoreline significantly. The 7 docks would increase habitat coverage in the Strawberry Lagoon area by about 3,150 square feet, which is about 15 percent of the existing coverage of about 21,600 square feet (based on assumptions and analyses presented earlier). Flushing in the lagoon would continue to prevent significant build-up of pollutants. Marsh habitat that may be covered by new docks can be replaced through onsite and/or offsite mitigation.
 - Assuming these docks would provide berths for 7 more boats in the area, boat traffic would increase from about 37 to 41 trips daily (primarily on weekends) based on assumptions and analyses presented earlier. As described previously, factors such as low speeds in the lagoon, predictable travel direction, travel patterns, and other management/mitigation measures already in place are greater determinants of impact significance in this environment. In other words, 3 more daily boat trips in Strawberry Lagoon are not likely to have a measurable impact in terms of wildlife response as long as the same travel patterns and traffic management measures are followed. Wildlife utilizing the lagoon and adjacent upland and marsh habitats that have habituated to existing levels of traffic will not

be significantly affected by this magnitude of increased activity. Stated another way, it would be difficult to justify denial of applications for docks at these locations on the basis of significant cumulative wildlife impacts.

Docks built at these locations should conform to the following requirements in order to gain approval:

- They should only be large enough to accommodate one boat.
- Their surface area coverage should be the smallest possible to meet the intended purpose and satisfy safety requirements.
- They should incorporate all mitigation measures required for recently approved docks in the area. Examples of such measures include minimization of fill; preservation of existing natural vegetation; replacement of non-native vegetation with native species; use of bio-engineered bank protection methods; and use of state-of-the-art construction methods and materials to minimize shoreline and aquatic impacts.
- Approved dock plans should be accompanied by reasonable and feasible mitigation measures to create, expand, and/or enhance natural shoreline intertidal habitats (marsh, mudflat) along the shoreline of the private property for which the dock is approved. Plans for habitat improvements should be developed by qualified biologists. If necessary, offsite mitigation should be required for marsh habitat lost as a result of dock construction.
- The 3 potential dock sites along the Belvedere shoreline do not represent a significant direct or cumulative impact to wildlife resources of the Sanctuary because of their location, assuming that existing restrictions and management measures are observed. Cumulative wildlife impacts would not likely justify denial of future applications at these sites, subject to different findings based on environmental review conducted at that time.

It is the author's opinion that wildlife resource values of the Sanctuary and surrounding habitats would be improved, and long-term compatibility with docks and boating activity in the region would be enhanced, with implementation of the recommendations described.

About the author:

Greg R. Zitney has over 28 years of experience as an Environmental Planner and Certified Wildlife Biologist. He received a Bachelor of Science degree in Zoology, with major emphasis in wildlife biology and management, from the University of California at Davis. He has participated in over 350 environmental resource inventories, planning studies, and impact assessments, most of which involved important wildlife and other biological resource issues. He was a founding partner of Western Ecological Services Company (WESCO), a consulting firm that specialized in natural resource and planning studies and was based in Marin County for 20 years. He has conducted wildlife studies throughout California and in several other western U.S. states. Mr. Zitney is also an instructor for courses in the California Environmental Quality Act (CEQA) and the Surface Mining and Reclamation Act (SMARA) offered through the Association of Environmental Professionals and UC Davis Extension.

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Appendix A

Bird Species Known to Occur in the Vicinity of Richardson Bay¹

<u>Species</u>	<u>Occurrence</u> ²
GAVIFORMES (LOONS)	
Common Loon	Common
Pacific Loon	Common
Red-throated Loon	Common
PODICIPEDIFORMES (GREBES)	
Red-necked Grebe	Vagrant
Homed Grebe	Common
Eared Grebe	Common
Clark's and Western Grebe	Abundant
Pied-billed Grebe	Uncommon
PELECANIFORMES (PELICANS AND ALLIES)	
American White Pelican	Rare
Brown Pelican	Uncommon
Double-crested Cormorant	Common
Brandt's Cormorant	Uncommon
Pelagic Cormorant	Rare
CICONIFORMES (HERONS and ALLIES)	
Great Blue Heron	Common
Green Heron	Rare
Black-crowned Night Heron	Uncommon
Great Egret	Common
Snowy Egret	Common
ANSERIFORMES (DUCKS, GEESE and SWANS)	
White-fronted Goose	Rare
Canada Goose	Rare
Wood Duck	Accidental/Occasional
Eurasian Wigeon	Rare
American Wigeon	Uncommon
Gadwall	Rare
Green-winged Teal	Uncommon
Cinnamon Teal	Uncommon
Mallard	Common
Northern Pintail	Uncommon
Northern Shoveler	Uncommon
Redhead	Rare
Ring-necked Duck	Rare
Tufted Duck	Rare
Canvasback	Uncommon
Greater Scaup	Abundant

Species	Occurrence²
Lesser Scaup	Abundant
Harlequin Duck	Accidental/Occasional
Oldsquaw	Rare
White-winged Scoter	Uncommon
Surf Scoter	Abundant
Black Scoter	Rare
Bufflehead	Common
Barrow's Goldeneye	Uncommon
Common Goldeneye	Common
Hooded Merganser	Accidental/Occasional
Red-breasted Merganser	Common
Common Merganser	Rare
Ruddy Duck	Abundant

GRUIFORMES (CRANES, RAILS AND COOTS)

Virginia Rail	Rare
Sora	Rare
American Coot	Abundant

CHARADRIFORMES (SHOREBIRDS, GULLS, ALCIDS)

Semipalmated Plover	Uncommon
Black-bellied Plover	Common
Killdeer	Common
Ruddy Turnstone	Rare
Black Turnstone	Common
Common Snipe	Rare
Long-billed Curlew	Uncommon
Whimbrel	Uncommon
Spotted Sandpiper	Uncommon
Least Sandpiper	Abundant
Western Sandpiper	Common
Wandering Tattler	Rare
Willet	Common
Greater Yellowlegs	Uncommon
Lesser Yellowlegs	Rare
Dunlin	Abundant
Short-billed Dowitcher	Common
Long-billed Dowitcher	Uncommon
Marbled Godwit	Uncommon
Sanderling	Common
American Avocet	Rare
Red Phalarope	Rare
Wilson's Phalarope	Rare
Red-necked Phalarope	Rare
Parasitic Jaeger	Rare
Glaucous-winged Gull	Abundant
Western Gull	Abundant
Herring Gull	Abundant
Thayer's Gull	Common
California Gull	Abundant
Ring-billed Gull	Abundant
Mew Gull	Common
Bonaparte's Gull	Uncommon
Heermann's Gull	Common
Black-legged Kittiwake	Accidental/Occasional
Forster's Tern	Common

<u>Species</u>	<u>Occurrence</u> ²
Common Tern	Rare
Least Tern	Accidental/Occasional
Elegant Tern	Abundant
Caspian Tern.	Common
Common Murre	Rare

¹ Source: Huffman & Associates, Inc. 1998. *Biological Study for Calender Tidelands Permit 97-52 and Minor Design Review 97-51* (1997). Adapted from National Audubon Society, Richardson Bay Audubon Center and Sanctuary, *Checklist of Birds of the Richardson Bay Audubon Center and Sanctuary*.

² For species whose occurrence varies seasonally, status is given for most abundant season as defined below:

Abundant -	Species present in large numbers and easily seen
Common -	Species commonly present, but not in large numbers
Uncommon -	Uncommonly seen, in small numbers
Rare -	Species recorded more than five times, yet in very small numbers
Vagrant -	Species recorded less than five times

Appendix B

Comments Received on the Draft Richardson Bay Dock and Boat Study (June 2000)

and

Responses to Comments by the Study Author and County Staff

Contents:

Letter A:	From Tirrel B. Graham
Letter B:	From Robert M. Allen
Letter C:	From Sidney & Ron Bushman, et al.
Letter D:	From Charles D. Bailey
Letter E:	From James R. Pappademas
Letter F:	From Harry Heath
Letter G:	From Patricia L. Hedge, National Audubon Society
Letter H:	From Barbara Salzman, Marin Audubon Society
Letter I:	From Scott Anderson, Town of Tiburon
	Miscellaneous Comments from the Planning Commission Workshop

Note: Responses are provided on pages immediately following each letter.

Letter A

235 East Strawberry Drive
Mill Valley, CA 94941
July 4, 2000

Marin County Planning Commission
3501 Civic Center Drive, #308
San Rafael, CA 94903-4157

RE: Richardson Bay Dock and Boat Study

Dear Commissioners:

I would like to compliment both Mr. Greg Zitney and County planners, including Tom Lai and his associates, for their thoroughness and professionalism in the preparation of the June, 2000 report. However, I have the following comments:

1. I agree with the Study's conclusion that the incremental impact of building the 4 remaining Strawberry docks is negligible. However, I wish to state for the record that the estimated boat use of 20% (pages 28 – 30) is too high. The Earth Metrics study cited in the report states 20% use for a "busy marina." Our Strawberry lagoon is not a "busy marina." If anything, it is a "sleepy marina." We bear no resemblance to a busy community like Discovery Bay.

From my house I can observe the boat traffic generated by 55 docks, 60% of the Strawberry docks mentioned in the study. We have 7 docks to our left, 7 docks to our right, plus the 40 at the Cove Apartments. As I stated several months ago, less than 1 boat per day goes by my house. This equates to 1.8% one way use or 3.6% round trip. Using this logic, the 92 existing docks plus the 4 potential docks generate less than 4 round trips per day (96 x 3.6%), not the 37 suggested in the study.

A-1

2. As many Strawberry residents have stated in prior meetings, much of our boat traffic comes from non-residents. Such use is not impacted by the number of docks. Much of our weekend boat traffic is generated by kayaks (which I personally enjoy seeing) that usually travel in groups of two or more.

A-2

3. The Study (page 39) requests additional signs for Aramburu Island. Two signs already exist. If additional signs are placed, they should be aesthetically pleasing. The signs' size, design and color should be reviewed and approved by the Strawberry Design Review Board so that they will conform to the neighborhood's standards. A-3

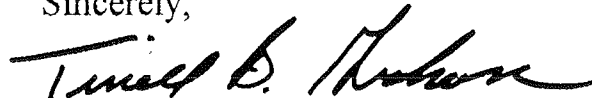
4. The Study (page 39) requests increased patrols during the moratorium. To my knowledge, Strawberry residents, who enjoy the birds and other wildlife, conscientiously observe the moratorium between October and March. Violations, if any, are committed primarily by outsiders. Handout materials indicating the sanctuary boundaries should be available for those who rent watercraft in Sausalito during the moratorium period. In addition, there should be adequate training of those enforcing sanctuary boundaries so that they monitor the appropriate area. A-4

5. The Study (page 39) states that all boats should be prohibited from traveling up the eastern side of Aramburu Island north of the channel cut. I do not think there is enough boat traffic to justify this provision. Traffic is restricted year round by shallow water and seasonally between October and March. A-5

In conclusion, I would like to reiterate that Mr. Zitney and planning staff did a fine job with an almost impossible task. I would also like to add that I have recently observed from my house several duck families and a flock of approximately 30 Canada geese (the most I've seen in years.)

Please remember that you may view much of Richardson Bay from the Strawberry Recreation District dock located on Harbor Cove Way. Also, feel free to contact me (383-4773) if you have any questions.

Sincerely,



Tirrell B. Graham

Responses to Letter A

A-1. The commenter's contention that the assumptions used in the Study to estimate boat traffic result in numbers that are too high for the Strawberry Lagoon area may very well be correct. However, the assumed activity level (20 percent of occupancy as discussed on page 28 of the Study) was the best credible estimate available without doing actual counts. Even if using a 20 percent activity level results in high estimates, this fact does not alter the findings, conclusions, and recommendations of the Study in any way. The most important point to keep in mind is that any reasonable assumption provides a foundation for conducting a comparative evaluation of existing and future conditions. Proportional increases in traffic would have been the same whether 10 or even 5 percent assumptions had been used.

Other relevant points to consider include the following:

- Although the original assumption was for a "busy marina," it seems logical that approximately the same proportion of use would apply to pleasure boats whether they were berthed at busy marinas or private docks. This does not mean that some areas, such as Strawberry, don't have unusually low usage, however.
- In the preparation of Environmental Impact Reports (EIRs) under the California Environmental Quality Act (CEQA), it is accepted practice to assume and/or estimate reasonable "worst case" impact scenarios in the absence of definitive data. Even if the estimates are high, they are still within reason as a worst case scenario.
- The 20 percent assumption is qualified in the Study (see footnote #2 on page 28) by indicating that it is primarily applicable on weekends and holidays, and is variable based on time of year, etc.
- Using 20 percent maintains a degree of consistency with earlier studies conducted by Earth Metrics.

A-2. Comment noted. Non-resident boat traffic, including kayaks, was acknowledged in the Study as a significant component of total traffic in the region.

A-3. The recommendation for posting additional signage on Aramburu Island on Page 39 has been modified to include a statement that any proposed signage to implement the recommendation should be referred to the Strawberry Design Review Board for a review and recommendation.

A-4. Comment noted. It is reasonable to conclude that residents in the Study area would be more likely to be aware of, and therefore comply with, the seasonal restriction for the Sanctuary. The suggestion regarding handout materials for those renting watercraft in the area is an excellent one and has been included in the final report as an additional recommendation. This was also suggested by Marin County Sheriff Deputy David Gallegioni in a follow-up conversation in August, 2000. Volunteers who regularly patrol the Sanctuary during the closure months do

receive training by Sanctuary personnel (David Steinhart, pers. comm., September, 2000)

- A-5. Existing boat traffic along the east shoreline of Aramburu Island may be very light. However, kayaks and other small personal craft can navigate the shallows. The primary reasons for recommending the prohibition for all boats year-round is to provide some shoreline habitat that is totally free (or nearly so) from boat disturbance, and to give harbor seals the maximum opportunity to reestablish use of the haulout area at some time in the future.

ROBERT M. ALLEN

Marin County Community Development Agency
3501 Civic Center Drive # 308
San Rafael, CA 94903-4157

June 26, 2000

SUBJECT: Richardson Bay Dock and Boat Study

Corrections/Comments

While the overall report is excellent I believe several comments/corrections are in order.

Page 7

a). Dredging was done along the western boundary of the saltworks Canal, not in the canal itself since it is in Tiburon and would have required an additional permit.

B-1

Page 8

a) According to the Audubon Society "over one million birds may visit the Sanctuary during the migratory season. (Quoted from BCDC Permit, 1991) We have lived here since 1964 and the number of birds, during the migratory season, visiting the Sanctuary, is a very small fraction of that number. That does not mean, however, the Sanctuary is unimportant.

B-2

Page 21.

a) Seal Haul Out- Per S. Allen the seals have a memory of eight years which has long ago been exceeded, so the probability of them using the haul out area again is extremely remote. Therefore using the quote, "will be treated as though are being used presently" is a real stretch of the imagination.

B-3

Page 27

a) Strawberry Recreation District Dock is a public dock, and no boat is allowed to moor there over night. It is available on a day use basis.

B-4

Page 28

a) Number of trips/day equal thirty-seven- While it is footnoted "as most accurate on busy boating days," the average is more like four or 10% of the "most busy days." Many times the number is zero and thirty-seven is more like the maximum. (Hot, summer weekend) Since this study started as a dock evaluation please keep in mind many of these boat trips are kayaks from outside the area and have nothing

B-5

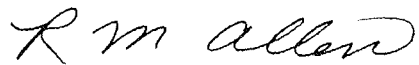
to do with docks.

Page 39

a) Recommendation #4 starting with "all boats... does this recommendation prohibition effect the Sanctuary season, or all time?

B-6

Sincerely yours,

A handwritten signature in cursive script that reads "R M Allen".

Robert M. Allen
Former Chairman, Strawberry Recreation District

cc: Terri Graham, Strawberry Recreation District

Responses to Letter B

- B-1. Comment noted. This does not affect the discussion in the Study.
- B-2. The number of birds visiting the Sanctuary will vary substantially from year to year as a result of many variables. As the commenter notes, the number, whether as large as quoted or not, does not detract from the importance of the Sanctuary.
- B-3. Harbor seal use of haulout sites is dependent on several factors that affect their suitability. Although the exact cause of the abandonment of the haulout site is unclear, as discussed on page 21 of the Study, disturbance by boats, pedestrians, and dogs is suspected to be a significant factor. Since this area was used as a haulout in the past, it is prudent to assume that it retains potential to be used again at some time in the future, particularly if many of the suspected causes of abandonment are eliminated or drastically reduced as a result of recommendations contained in this Study. Based on the comment regarding the “memory” of seals, the author contacted Sarah Allen (pers. comm., August, 2000) again to inquire about this. She did not recall making any such statement and affirmed that “memory” would have little or nothing to do with the potential for a suitable site to be utilized by seals in the future.
- B-4. Comment noted. The Study indicated that this dock does not serve as a permanent berth for a resident boat (see page 27).
- B-5. Comment noted. Please refer to the response to comment A-1 for a discussion of the use of the 20 percent figure for estimating boat trips.
- B-6. This recommendation is intended to apply year-round. It is designed to provide maximum opportunity for future use of the seal haulout, as well as provide minimum disturbance to a portion of the Aramburu Island shoreline and nearby marsh habitats for all wildlife that would utilize it.

Letter C

July 7, 2000

Marin County Planning Commission
C/o Community Development Agency – Planning Division
3501 Civic Center Drive, Room 308
San Rafael, CA., 94903-4157

RE: RICHARDSON BAY DOCK AND BOAT STUDY - WORKSHOP & PUBLIC MEETING

Dear Commissioners:

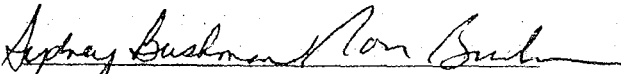
Thank you for sending one of us a copy of the Study, and notifications of the Workshop and future Public Meetings. Contrary to one of the mailers, we were unable to access the Study on the Internet, so shared the hard copy from house to house, agree with most of the recommendations therein, commend you for it's thoroughness, and felt that this one letter would fairly represent our position: our properties have been left out of the recommended sites for approval of future docks, and we hereby request that they be included.


Our four single-family properties are located just below the "C" in "CRESCENT MARSH" (fig. 4, p. 9), and are further located as the easternmost properties shown to the north of Crescent Marsh where the dredged channel begins to circle said Marsh when proceeding southwest from Greenwood Cove's dredged channel (fig. 5, p. 10). Ours are the four properties to the east of the Strawberry Public Dock, and our addresses are 40, 50, 60, and 70 Harbor Cove Way. Our homes are 12-15 years old, we have been included (substantially, due to our relatively new development and large waterfront footages) in the recent dredging assessments, and almost every other waterfront property along the dredged channel between us and the Harbor Point development has a dock, or is included in the Study as a site recommended for approval of a dock in the future (p. 40, bullet 2).

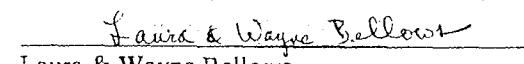
C-1

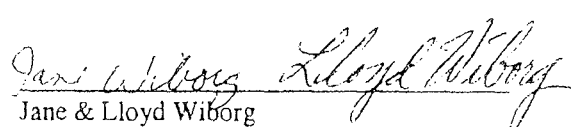
We respectfully request that our properties be included in the Study as additional "recommended approval" sites for docks. We have no intentions at present to request permits to build said docks, but must reserve the right to do so in the future, both for ourselves and future owners. **To deny our request would fly in the face of logic and fairness, and would certainly be discriminatory given the findings in the Study.**

We thank you in advance for your consideration, and shall look forward to your approval of our request.


Sidney & Ron Bushman
40 Harbor Cove Way


Drue & Art Gensler
50 Harbor Cove Way


Laura & Wayne Bellows
60 Harbor Cove Way


Jane & Lloyd Wiborg
70 Harbor Cove Way

Responses to Letter C

- C-1. The map of existing and potential dock sites is based on the results of a field inventory and interpretation of aerial photographs on file in the Community Development Agency. For purposes of developing an accurate database of potential dock sites, County staff considered factors such as the presence of existing zoning restrictions or conditions. The four lots on Harbor Cove Way were not identified as potential dock sites because a condition of the Land Division approval that created those lots in 1978 limited future dock development to one single common dock located to the south of 40 Harbor Cove Way. Additionally, the purpose of the potential dock sites map is not to recommend approval or favor development of future docks, rather it is to identify those sites that have the potential for such development to occur. Whether or not a dock could be approved for any site within the Study Area would be dependent on an analysis of site-specific factors, including those relating to proximity to accessible water, habitat characteristics, size of dock, etc. and an evaluation for project conformance with recommendations contained in the Study.

Letter D

CHARLES D. BAILEY & ASSOCIATES

Real Estate Appraisers and Consultants
Pension and Portfolio Appraisal Managers

CHARLES D. BAILEY, MAI

July 18, 2000

Alex Hinds
Thomas Lai
Marin County Community Development Agency
3501 Civic Center Drive, #308
San Rafael, California 94903-4157

Gentlemen:

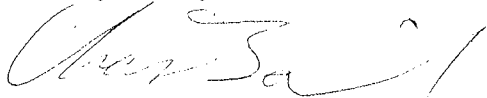
I submit the following written comments on the draft study of the Richardson Bay Dock and Boat Study.

1. They failed to list my lot as POTENTIAL DOCK SPACE.
2. I own and reside at lots APN 043-293-55 and 043-293-14 addressed at 421 East Strawberry Drive.
3. I purchased the property with the anticipation that a dock could be built.
4. The original subdivision specifically carved out and attached lot 14 as a waterfront connection to lot 55 so that it could have a dock. The lot (14) has no other use, as it is too small to build on. It is assessed at a higher value than open space, thereby considering it as a dock site. There is an 8' fee ownership strip connection lot 55 to lot 14, also establishing the direct connection and intent to provide dock opportunity to the residence on lot 55.
5. Furthermore when lot 59 (west of lot 55) was split from lot 55 several years ago, lot 55 which is directly connected to lot 14 kept lot 14 as the same ownership to keep this waterfront connection and Dock opportunity.
6. All of the other lots next to and in proximity to my lot 14 have docks. Therefore I should have the same right unless you discriminate against me.
7. I question whether not allowing me to have a dock would be inverse condemnation. At any rate it should certainly be listed as a potential dock.
8. I note you list a total of 4 potential single family docks, mine would be 5. I am home all the time 7 days a week and note very little boat traffic on Strawberry Lagoon and in fact Richardson Bay. I would say there are no more than 1 or 2 sail and/or powerboats sited per week in this area. They're a few more kayaks. Adding 5 more docks that would have very light activity also should not represent an environmental impact.
9. I enjoy the wildlife and birds on Aramburu Island as much as anyone and appreciate the preservation of that property. However, I truly believe we (5 more residential docks) can live in harmony with the birds and wildlife.

D-1

10. The addition of a 50 to 100 slip Marina may be a different story. First, the number. Second, people that keep boats in a marina tend to use them more. Third, some marinas set up races and competition that is a higher level of activity, and can be more disruptive to wildlife. Fourth, they tend to be more party oriented than residential docks.
11. In closing, I believe at the very least the study should list my lot 043-293-14 as a Potential Dock

Thank you for your consideration, Your response would be appreciated.

A handwritten signature in cursive script, appearing to read "Charles D. Bailey".

Charles D. Bailey

Responses to Letter D

- D-1. A review of the property in question indicates that it is under common ownership with a shoreline parcel (Assessor's Parcel 043-293-14) with access to Strawberry Lagoon. Since no dock exists on this property, it has been added as a site that has the potential for a future dock. Similarly, following a more detailed review of the area in question, staff identified the presence of another property, located at 381 East Strawberry Drive (Assessor's Parcel 043-282-91), which has access to Strawberry Lagoon and is not presently developed with a dock. Accordingly, Figure 5 and Table 1 have been modified to include the two additional potential single-family dock sites.

Letter E

July 20, 2000

Mr. Alex Hinds, Director
Mr. Thomas Lai, Principal Planner
Marin County Community Development Agency
3501 Civic Center Drive, #308
San Rafael, California

Re: Richardson Bay Dock and Boat Study

Gentlemen:

The purpose of this letter is to state our strong opposition to the construction of additional docks in that portion of Richardson Bay identified in your Notice. The reasons for our opposition are numerous and include the following:

Wildlife

The area for the proposed boat docks and that portion of Richardson Bay which boaters must use to access the area from the San Francisco Bay are home to harbor seals, ducks, geese, herons, egrets, cormorants, pelicans, and many others. Even with existing levels of boat traffic, it is distressing to watch these animals have their feeding patterns interrupted as boats depart from and return to their docks in the lagoon area, many of which travel at speeds far in excess of the posted speed limit in the Richardson Bay boat channel. Increased traffic undoubtedly will exacerbate this problem and eventually drive the animals away. Over the past two summers, we have watched with pleasure the restoration of our duck and geese populations; these are populations which decreased significantly during the time that construction in The Shore neighborhood of Strawberry was at its peak; now that construction along the lagoon has slowed, the birds are returning and reproducing. If they were distressed about construction on land, it is not difficult to imagine how they would react to construction in the water.

E-1

Pollution

While all parts of the Bay are tidal, the lagoon area where the proposed boat docks would be constructed does not have nearly the same water flow as more open bodies of water. Fuel, oil, waste deposits and litter from an increased number of boats in that lagoon will create an unsafe and unpleasant environment for both human and wildlife residents in the area. Examination of the water in the immediate vicinity of active harbor areas reveals the impurities released by boats and their occupants.

E-2

Congestion

The increased traffic and parking needs that obviously will result from the addition of new boat docks cannot be handled satisfactorily in this area. At present, overflow parking from the Harbor Point Apartments and the Swim and Tennis Club makes driving on the upper portion of Weatherly Drive quite hazardous. This is especially true on weekends when visitors to the apartments and Club congest the area. The cars are parked solidly along the portion of Weatherly which curves; this portion of the street is too narrow for safe on-road parking. This problem is compounded by the fact that many visitors unfamiliar with these hazards tend to drive much faster than is appropriate, especially considering the amount of pedestrian traffic on Weatherly. Traffic and parking are already a problem in this area; any new construction which increases either is foolhardy and dangerous.

E-3

Noise

This issue is multi-faceted. The noise level that would result from the required dredging and construction of the of new docks would be very unpleasant for residents of the Harbor Point apartments and The Shore at Strawberry, both because of its physical proximity to their

Mr. Alex Hinds, Director
Mr. Thomas Lai, Principal Planner
July 20, 2000
Page two

homes and its likely duration. Further, to support the increased boat traffic that would result from the new docks, necessary dredging would have to be much more significant than at present and would have to occur much more frequently. Once completed, the new docks obviously would be home to new boats, all of which would need to use their engines to depart from and return to the area at any time of day or night. And, of course, all of these boats would carry people, many of whom would give no thought to how their voices and/or music might disturb local residents. Homeowners at The Shore and Harbor Point apartment residents already have to listen to the live music coming from the Harbor Point Club when they have events; we certainly should not have to listen to the additional noise pollution of more boats and their occupants.

With very few exceptions, residents of The Shore strongly oppose the construction of any new docks in the proposed area. We will quickly withdraw support from any elected official who stands in favor of this project.

Sincerely,



Ellen B. Pappademas

James R. Pappademas
Ellen B. Pappademas
23 Egret Way
Mill Valley, California

Responses to Letter E

- E-1. Comment noted. The Study addresses all of the resource issues discussed in this comment.
- E-2. Comment noted. The issue of water-borne pollutants and tidal flushing action in Strawberry Lagoon was discussed in the Study on pages 30-31.
- E-3. The Study found that with exception to a potential commercial marina associated with the Harbor Point Apartments, the potential exists for only 3 additional infill docks in this area. The Study found that construction of the marina would likely have significant habitat impacts and could not be supported. However, the Study found that the cumulative effects of the buildout of private docks on the 3 identified lots would be insignificant due to near-build-out conditions associated with existing residential and boat dock development, the small size of individual docks, and the minimal increase in boat traffic. Additionally, recommendations to limit the size and surface area coverage of the 3 docks as well as to require feasible mitigation measures to enhance shoreline areas would avoid significant cumulative impacts.

Letter F
(Attachments not included)

July 19, 2000

Marin County Community Development
Agency
Planning Division
3501 Civic Center Drive, Rm 308
San Rafael, CA 94903-4157

Attn.: Mr. Thomas Lai

SUBJECT: RICHARDSON BAY DOCK AND BOAT STUDY

Dear Sirs/Madams:

I received a copy of subject report early this month and note that Figure 5, page 10, does not show my boat dock on the eastern most lot on the Oyster Canal (440 Greenwood Beach Road). Instead it shows a red ball indicating "potential dock space". Please correct this as the intent of the report is to eliminate "future" boat docks and for the record I want it indicated that this boat dock exists. Also Table 1., page 11, needs to be revised to show under Existing, North Shore, under Notes the following: Includes 1 ramp, 1 hoist, 1 dock and 1 floating dock. There has been a dock here for some years and I have photos to confirm this. During a storm on February 8, 1998, a 40ft. fishing boat broke anchor and crashed into my dock toppling the pilings. I received a regionwide permit from the BCDC to rebuild the dock and a building permit from the Town of Tiburon (copies of BCDC permit NOI-98-12 and Tiburon Building permit No. 2058 attached). Also attached is a photo of the dock.

F-1

Please revise the report and advise me of the progress of the corrections as this could cause problems in the future.

Thank you,

Harry Heath

Harry Heath

440 Greenwood Beach Rd.

Bel Tiburon, CA 94920

(415)383-0152

email "harry.heath@Mindspring.com"

Attach.: copy of BCDC permit No. NOI-98-12
" Tiburon Bldg. Permit No.2058
Boat Dock photo

Responses to Letter F

- F-1. Figure 5 (Existing and Potential Dock Sites) has been modified to show the existing dock improvement on this property. Table 1 has also been modified to show the increase in the number of existing docks and a decrease in the number of potential docks in the North Shore Area.



National Audubon Society
Chapters in California

July 21, 2000

- Altacal
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- Lake Almanor
- La Purisima
- Los Angeles
- Madrone
- Marble Mountain
- Marin
- Mendocino Coast
- Monterey Peninsula
- Morro Coast
- Mount Diablo
- Mount Shasta Area
- Napa-Solano
- Ohlone
- Palomar
- Palos Verdes/South Bay
- Pasadena
- Peregrine
- Plumas
- Pomona Valley
- Redbud
- Redwood Region
- Sacramento
- San Bernardino Valley
- San Diego
- San Fernando Valley
- San Joaquin
- Santa Barbara
- Santa Clara Valley
- Santa Monica Bay
- Sea and Sage
- Sequoia
- Sierra Foothills
- South Coast
- Stanislaus
- Tulare County
- Ventura
- Whittier
- Yuba
- Yosemite Area

Mr. Alex Hinds
Agency Director
Marin County Community Development Agency
3501 Civic Center Dr #308
San Rafael, CA 94903-4157

Dear Mr. Hinds,

First I want to thank Marin County for its wise decision to commission *the Richardson Bay Dock and Boat Study*. Without this document it would have been impossible for the members of the Planning Commission to make wise decisions about any single proposal for dock construction in Richardson Bay. It is only by knowing the potential cumulative impacts of every such construction that responsible choices can be made, particularly when any alteration in significant ecosystems such as those found here are being contemplated.

My specific comments regarding this extremely well done study are as follows:

1. As noted above, each and every application for any new dock construction must be analyzed in the context of the cumulative impacts of all potential dock build out. A starting point is that one would have a difficult time arguing that dock construction benefits any natural system. G-1
2. Here at Bay Audubon Center & Sanctuary (BACS), Richardson Bay is an essential tool in our success in educating families, students, and educators themselves about the Bay's natural systems. With over 17% of Marin County school children using this site for field trips, educational classes, and summer camp programs, it is clear that protecting the remaining undeveloped pieces of the bayfront is essential. G-2
3. The argument is made that boat operators coming in from docks outside of Richardson Bay are more responsible for truant behavior than from locally owned and docked boats. However decisions must be made not based upon the behavior of present dock owners in Richardson Bay, but rather on what the worst outcome of additional boats in Richardson Bay could possibly be. It is from this perspective that decisions must be made. G-3
4. BACS incurs considerable cost and volunteer time to protect the existing, leased 900 acres in the bird and wildlife Sanctuary during the months of October through November. The County should consider avenues to contribute to this important program, both in staff time, equipment and signage. Certainly significant fines are appropriate, and enforcement is essential. G-4
5. The mitigation measures called for with the approval of nine docks in Strawberry Lagoon should be implemented. G-5
6. No additional docks should be constructed within the Sanctuary, and no multiple boat use docks should be built. G-6

I look forward to working with the Planning Commission and its staff in a way that would be useful. This is a worthwhile effort and can result in the further protection of our fragile Bay. We are obligated not only to the present landowners and recreational users of Richardson Bay, but to those who will come after us in the generations to come.

Respectfully submitted,

Patricia L. Hedge
Director

Responses to Letter G

- G-1. It is the County's intent to consider the cumulative effects of dock construction and boat traffic when evaluating future proposals for dock construction in the Richardson Bay area. The Study acknowledges that dock construction does not benefit natural ecosystems by pointing out (page 38) that, in terms of cumulative impacts, "less is better and more is worse."
- G-2. Comment noted.
- G-3. Comment noted. In evaluating boat traffic, the Study did not differentiate between "resident" boats and "visiting" boats in terms of impacts to the environment. However, based on consultations conducted by the author, there seems to be a general consensus that non-residents are more likely to violate Sanctuary boundary restrictions due to ignorance or unfamiliarity with those restrictions. The Study includes recommendations to increase awareness among non-resident boaters for these reasons.
- G-4. Staff concurs with this comment. The recommendations contained in this comment would further the objectives of recommendations made by the Study.
- G-5. Comment noted. The Study recommends the same action.
- G-6. Comment noted. The Study's recommendations are in agreement with this comment.

Letter H



Marin Audubon Society Box 599 Mill Valley, California 94942-0599

July 21, 2000

Tom Lai
Marin County Community Development Agency
Civic Center
3501 Civic Center Drive
San Rafael, CA 94901

RE: RICHARDSON BAY BOAT DOCK STUDY

Dear Mr. Lai:

The Marin Audubon Society appreciates the opportunity to comment on the Boat Dock Study. We would like to express our appreciation to the County for approving and supervision of preparation of this document. It presents a well-organized, clear, and thoughtful review and analysis of the issues. We generally agree with its conclusions and recommendations. Presented below are several general areas in which we believe more information is needed in order to complete the picture of the issue, and some recommendations on the habitat and species discussion.

General Comments:

The discussion should address current compliance with restrictions in Richardson Bay. In a general way, what is the pattern and number many violations of the posted speed limit are there in the Salt Works Canal? What is the compliance with the Sanctuary boundaries during the closed season? The Richardson Bay Sanctuary should have records for Sanctuary Boundary violations and these should be summarized.

H-1

The enforcement actions currently undertaken by the Richardson Bay Sanctuary and by the County should be described. What is the responsibility of the County in providing support and assistance for management of the Sanctuary habitat waters? What measures are taken by what entity for what violations? How much is the Harbor Master or Sheriff called on to take formal enforcement action and for what type of violations?

H-2

Number of docks: We agree with the recommended measures to limit the number of new docks to four in Strawberry Lagoon and long the north shore, and to restrict the coverage of these docks as recommended on pages 40 and 41. In particular, a marina at Harbor Point would have devastating impacts and must be prohibited. At the public hearing, however, one person testified that four more docks were possible along the eastern shore of Strawberry Lagoon shoreline, and

H-3

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RECYCLED PAPER

another resident testified that docks along the northern shoreline would not be a problem because the people would not want to dredge.

The discussion should address whether these additional docks are feasible and, if so, identify the cumulative impacts of adding four additional docks as well as the docks along the northern shore.

Even if, as reflected by the testimony, docks along the north shore are not accompanied by dredging now, future residents could want to dredge and, in addition, these dock owners would likely want to travel through the sanctuary waters during the winter months. It is not clear whether there is another way to access the Bay. These circumstances and the cumulative impact of adding four or more potential new docks and boats should be considered in the additional analysis, and appropriate adjustments should be made to the recommendations.

Mitigation: As we recall, some wetland vegetation exists along the shoreline. It would be useful to know whether any wetland plants are growing along the banks of the four properties identified as being able to accommodate new docks.

H-4

We agree with recommendations that mitigation be required for each dock that is approved. This should include preservation of existing vegetation, as recommended on page 41, which can only be achieved for vegetation adjacent to a new dock because docks cover plants. The mitigation should also include requirements that the vegetative habitat, particularly the wetland vegetation, lost by the project be replaced.

H-5

Regarding the mitigation required for the nine docks on Strawberry Spit, we urge a specific recommendation that the County take action to ensure that either the dock owners implement the required mitigation, or that the County take on that responsibility themselves as the current property owner.

H-6

Enforcement Recommendations: Are there additional enforcement measures or increased enforcement that would be appropriate and useful to better assure boaters comply with speed limit and boundary restrictions? Would increased presence of enforcement personnel help?

H-7

We agree with fining, but insufficient information is provided to guide where to go with this. The Sanctuary Manager testified at the hearing that the County already has the ability to fine. How much is the fine, how frequently is a violator fined and for what violation? To be an effective deterrent, should fines be increased and/or issued more frequently?

Specific comments on the discussion of HABITAT TYPES

Page 14: The **Open Water Habitat** discussion should state that hundreds, and sometimes thousands, of diving birds raft in the waters of Richardson Bay during the winter months they spend in the Bay Area, and that quiet open water habitat is vital during winter months these migrants spend in the Bay Area getting ready for migration and breeding.

H-8

Mudflats: This discussion should note that shallow water and mudflat habitats are particularly

H-9

important during migration when waterfowl and shorebirds need to rest and refuel during low tides if they are to reach their migration destination in good enough shape to breed successfully.

Page 16 - While “boats generally enter(ing) and exit(ing) at low tide” may minimize disturbance to shorebirds because they would enter and exit during higher tides, the discussion at the top of the page 17 should recognize that impacts to diving birds would be maximized during these higher tides because this is when diving birds gather and rest in this Bay. H-10

Pages 16 and 17: Regarding “habituation” of birds to traffic, this discussion should note that while some birds may become habituated, shier species or individuals would vacate an area. In addition, newly fledged young just arriving from breeding grounds may not be comfortable using areas with regular traffic such as this. Whether habituation is beneficial to the birds must also be considered, particularly for species that are hunted. Does this make them more vulnerable to being shot in other areas where hunting is allowed? H-11

Page 17: The first paragraph discusses 20 birds that were “wary” but did not flush with a passing motorboat, giving the impression that this was not significant disturbance. While “wary” is not defined, it may mean that the birds stopped what they were doing to pay attention to the moving boat. If birds have to stop feeding or sleeping or whatever they are doing, this should be considered a disturbance and the activity that caused that reaction should be considered a disturbance factor. H-12

Page 19: Strawberry lagoon is used by large rafts of diving birds not only during storms, but during nice weather during which the birds also appear to like such protected lagoons. H-13

Page 20: It is not our experience that shorebirds are typically tolerant of nearby human presence; some individuals within species may be. We see far more shorebirds in areas less used by people. Most shorebird species flock together which enables them to better avoid avian predators. Only a few shorebirds, willets, use marshes. H-14

Page 23: Kayaks should be listed under little noise watercraft. H-15

Page 24 - Regarding Mathews observation (1982) “ if disturbance duration is short, birds will tend to fly up and then return to same area....” sounds as though this is not considered a disrupting activity. As mentioned above, actions that disrupts activity and causes birds to fly up, even if they return to the same area, is a disturbance. If the birds need to fly away to escape and feeding is disrupted, they use energy in the process, resulting in the need for more food. This is even more problematic for shorebirds for which feeding is tied to low tide and which they may miss if there are too many disruptions. The last sentence on page 24 which references activity (energy) budget but does so in a way that is not clear to average reader. H-16

Page 29: The discussion of the impacts of docks on habitats should include loss of shoreline add tidal marsh vegetation along the shoreline. We recall that some areas of the shoreline have wetland vegetation and this would be lost from coverage and shading if docks that cover this vegetation are built. It would be helpful to have information about whether any wetland H-17

vegetation exists along the sites where docks have not been built should be discussed. The loss of mudflat and invertebrates that would be covered with new docks and lost due to shading and coverage should also be considered.

Page 32: The last bullet under “The extent to which boating impacts wildlife varies....” The availability of suitable cover for protection and security of wildlife” must be considered together with the fact that many water dependent species, including most shorebirds and

H-18

waterfowl, do not depend on cover for protection but depend on distance and open areas and numbers to avoid threats.

It should also be recognized that the time of year may make a difference in species sensitivity to disturbance. Young birds that have just arrived from breeding grounds may be particularly sensitive and vulnerable.

H-19

Page 34, second bullet: The presence of “escape” habitat, while important, is only part of the picture. As mentioned above, if wildlife have to stop what they are doing or move to another location, that is an adverse impact.

H-20

Page 35: Bullet one: this discussion assume that the boats always travel at the posted 5 mph speed limit. This, however, has not been established. Last bullet: “Marshes” should be added to the list of habitats on which vessels can be breached.

H-21

Thank you for considering our comments.

Sincerely,


Barbara Salzman, Chair
Conservation Committee

Responses to Letter H

- H-1. There are no known records or surveys of the number of times that the speed limit in Salt Works Canal is violated. However, as noted in the Study on page 35, it is likely that the speed limit is exceeded frequently in the southern portion of the Canal along Strawberry Spit and up to the channel cut leading into the lagoon. The author observed one boat significantly exceeding the 5-mph limit in this area while conducting field surveys. With regard to violations of the Sanctuary boundary restriction during the closed season, David Steinhart (pers. comm., September, 2000) indicated that Audubon's voluntary patrols encounter about one trespass per weekend day on average. The Audubon Society usually patrols on weekends when recreational boating traffic is heaviest. Audubon patrols are not normally conducted on weekdays.
- H-2. Enforcement by the Richardson Bay Sanctuary is primarily through weekend patrols staffed by volunteers. Patrol staff will approach trespassing boaters and notify them of the restriction. In nearly all cases, the trespassing boats will immediately leave the Sanctuary and no further action is taken. Patrol staff are usually equipped with a cellular phone and, in circumstances where they may encounter an uncooperative boater or repeat violators, a telephone call may be made to the County Sheriff for further enforcement. In such cases, however, the County's one marine patrol boat may be a great distance away and not able to respond quickly. According to Deputy David Gallegioni, the Sheriff's boat primarily responds to complaints in the Sanctuary area. Otherwise, the area is occasionally patrolled on an irregular basis.
- H-3. As a result of comments received and additional follow-up investigation, County staff determined that there was one additional existing dock/berth in the North Shore area (and, therefore, one less potential dock/berth in this area), and two additional potential docks/berths in the Strawberry Lagoon area. The net change from what was originally evaluated is, therefore, one additional existing dock/berth and one additional potential dock/berth. Figure 5, Table 1, and the analysis in the report have been revised to reflect these changes. The Study's recommendation to prohibit future docks along the North Shore area because of potential impacts to the Sanctuary and biological resources remains unchanged.
- H-4. A specific inventory of biological resources at the identified potential dock sites was not part of the scope of this Study. Such an inventory would be conducted as part of environmental review for new dock applications.
- H-5. Replacing any wetland vegetation lost as a result of dock construction would normally be required as a part of standard environmental review for such proposals. The intent of the recommendation on page 41 with respect to "reasonable and feasible mitigation measures to create, expand, and/or enhance natural shoreline intertidal habitats" is to go above and beyond the simple "replacement" approach. In other words, if it is reasonable and feasible to do so, the County should, by policy, seek to maximize creation of natural shoreline

habitat on parcels seeking to construct new docks. The concept of “reasonable and feasible” would have to consider a range of factors.

- H-6. Due to the large number of ownership interests, a mitigation fee was collected by the County from each of the 9 lots on Strawberry Spit that were approved for construction of a dock with the intent of utilizing the fees to implement the required mitigation measures. However, due to complications that hindered the County’s ability to obtain access to the island to undertake the mitigation measures, the County subsequently utilized the mitigation fees to acquire the island from the private property owner. Since the mitigation measures have not been implemented, the Study recommends that the original mitigation measures be implemented. In order to ensure the continued recognition of the importance of Aramburu Island to the ecosystem in the area, the Study has been modified to incorporate the following additional recommendation:

Aramburu Island should remain under public ownership. The County of Marin should ensure that funds are made available to complete the required mitigation measures that were originally imposed as part of the boat dock development on Strawberry Spit.

- H-7. The Study identified increased enforcement of existing speed limits and Sanctuary closure as one area where improvements would be beneficial. The County has at various times considered adding an additional patrol boat and increasing its marine patrol staff, but budget limitations have prevented this to date. Citations for violating the closure usually include about a \$100 fine (D. Gallegioni, Deputy Sheriff, pers. comm., September, 2000). Establishing and/or increasing fines is one option the County should consider, but this should be accompanied by better signage and noticing as previously recommended.
- H-8. The points raised in this comment are valid with respect to diving birds and the importance of Richardson Bay to them. These are specific points that are covered more generically by the discussion under “Open Water” on page 14 of the Study.
- H-9. The points raised in this comment with respect to the importance of mudflats to migratory birds are valid. The discussion on page 14 does emphasize the importance of mudflats to shorebirds in a more generic way. The intent of the discussion in the Study is to emphasize that the mudflats provide vital habitat to both migratory and resident birds.
- H-10. This comment refers to times (high tide) that much of the mudflat habitat becomes shallow “open water”. The characteristics and sensitivities of open water habitats and diving birds are discussed on pages 14 and 20 of the Study.
- H-11. The Study has been revised to include a statement regarding the variability among species in terms of their ability to habituate or adapt to disturbance (see discussion on page 35) Whether habituation is beneficial to wildlife is beyond the scope of this Study.
- H-12. According to the dictionary, “wary” means “on one’s guard; watchful.” In this case, the birds were paying enough attention to the passing boat to determine if it represented a “threat” which would have likely triggered a flushing (taking flight)

response. Due to a number of factors (slow speed and direction of the boat, habituation, etc.), the birds did not regard the passing boat as enough of a threat to require an escape response. As the comment notes, this is a disturbance; however, it is a very minor disturbance compared to one that would have caused them to take flight.

H-13. Comment noted.

H-14. Shorebirds would typically be expected in greater numbers where there is relatively low human disturbance. Tolerance by wildlife is relative, and the statement in the Study is that they are more tolerant of disturbance than many other water birds. This is largely due to the fact that they can quickly take flight to a nearby area.

H-15. The discussion on page 23 is a summary of existing scientific literature. The author of the summarized study did not list kayaks; however, characteristics of kayaks are listed in Table 3 of the Study.

H-16. Mathews' observations illustrate that there are several degrees of disturbance and the responses that wildlife have to them. There was no implication that the short duration disturbance did not constitute a disrupting activity. Comments regarding disturbance causing greater expenditure of energy are correct. This can have more significant implications if food supplies are short or access to them is restricted. This was basically the point of the reference to Belanger and Bedard (1998) at the bottom of page 24.

H-17. The discussion on page 29 does identify loss of shoreline and water habitats (which include marsh vegetation) as an impact of dock construction. It is beyond the scope of this Study to inventory and quantify habitats at all potential dock sites. This would be done as applications for new docks are reviewed.

H-18. The points raised by this comment are covered in the previous bulleted item and the following two bulleted items in the referenced section of the Study.

H-19. The time of year with respect to sensitivity to disturbance is identified in the fifth bullet on page 32.

H-20. Comment noted.

H-21. See response to Comment H-1 regarding compliance with speed limits. The second part of this comment references vessels that can be beached (not "breached"). The discussion also references marshes as one of the habitats that can be accessed as a result.



Letter I

RECEIVED BY
AUG 15 P 2:35 August 14, 2000

Planning & Building Department

Tom Lai, Principal Planner
Marin County Community Development Agency
3501 Civic Center Drive, Room 308
San Rafael, CA 94903

PLANNING & BUILDING DEPARTMENT

RE: TOWN OF TIBURON COMMENTS ON RICHARDSON BAY DOCK AND BOAT STUDY

Dear Mr. Lai:

The Town of Tiburon is in receipt of the courtesy copy of the above-referenced document as forwarded by your department. Thank you for providing the Town with an opportunity to comment. Due to the Town of Tiburon's limited jurisdiction over the study area, these comments will focus on the "north shore" area as identified in the study.

The study indicates that there is potential for 13 additional docks to be developed in the "north shore" area, all of which would be associated with existing single family homes along Greenwood Beach Road. Three existing boating facilities (1 ramp, 1 hoist, and 1 dock) already exist in the "north shore" area, according to the study. The Town believes these existing facilities to be many decades old, and largely relics of an earlier time that preceded filling and siltation of Richardson Bay in that vicinity.

I-1

The Town agrees with the author of the study that it is unlikely that additional boat facilities would be proposed in the "north shore" area due to extremely shallow water and the high cost of dredging necessary to achieve functional boating facilities. However, in these robust economic times, one cannot assume that monetary obstacles would prevail.

Therefore, the Town of Tiburon will utilize the Richardson Bay Dock and Boat Study, when finalized, as an environmental resource document for any future boat facilities proposed in the "north shore" area. A note to this effect will be placed in all Planning & Building Department address files for Greenwood Beach Road. Thank you once again for the opportunity to comment.

Very truly yours,
Scott Anderson
Scott Anderson
Planning Director

Cc: Town Council
Planning Commission
Town Manager

dock study. letter.doc

Responses to Letter I

I-1. Comment noted.

Miscellaneous Comments from the Planning Commission Workshop

A question was raised at the workshop as to whether there is a correlation between boating and impacts on food supply for aquatic life (i.e., does increased boating activity reduce the food supply?). This, as with many issues involving biological resources, is a complex topic. This subject was not extensively researched as part of this study; however, there are some general principles that can be briefly discussed.

Boating activity has the potential to reduce food supplies by:

- Disturbing sediment on the bottom of water bodies which, in turn, disrupts invertebrates that inhabit those sediments.
- Tearing or cutting vegetation which may be a source of food itself, or provide habitat for organisms that are fed upon by others.
- Eroding banks and shoreline vegetation as a result of waves from the wake of boat traffic.
- Contaminating habitats with pollutants that impact food sources.

Such impacts are usually more severe in aquatic systems where the natural conditions include relatively quiet, low-flowing or still, and shallow waters. The shallows of a mountain lake would be a good example. In these environments, the constant churning of propellers can severely disrupt substrates and shorelines.

In the case of the Richardson Bay study area, the waters of the bay are highly “turbid” as a result of tidal action and the large influx of sediments from the Delta. Shoreline habitats have already been greatly disturbed as a result of shoreline development or riprap. Therefore, boating does potentially impact food sources in the region; however, it does not likely represent a significant impact in this case because of the existing conditions.

Appendix C

RESOLUTION NO. 2000-136

RESOLUTION OF THE MARIN COUNTY BOARD OF SUPERVISORS APPROVING THE RICHARDSON BAY DOCK AND BOAT STUDY

SECTION I: FINDINGS

- I. **WHEREAS** the Community Development Agency prepared the Richardson Bay Dock and Boat Study (“Study”) to study the cumulative impacts of dock construction in the vicinity of the Audubon Society Richardson Bay Wildlife Sanctuary. Based on County-generated surveys of the number and location of existing and potential dock sites and a literature review of dock development and boat traffic effects on wildlife, the Study provides an assessment of the cumulative effects of boat dock development and boat traffic with an emphasis on the wildlife resources within the Sanctuary. Based on this assessment, the Study recommends a number of mitigation or management measures that would avoid or minimize identified significant impacts and that could be used as the basis for the development of future guidelines regarding dock development and boat regulations in and outside the study area.
- II. **WHEREAS** on June 21, 2000, the Study was completed and distributed to agencies and interested parties for review and comment.
- III. **WHEREAS** the Marin County Planning Commission held a duly-noticed public workshop on July 10, 2000 to consider and take public testimony on the proposed Study.
- IV. **WHEREAS**, after the close of the public commenting period on July 21, 2000, the Marin County Planning Commission conducted a duly-noticed public hearing on October 16, 2000 to consider the proposed Study and the responses to public comments, and recommended that the study be approved by the Marin County Board of Supervisors at a future public hearing.
- V. **WHEREAS** the Marin County Board of Supervisors held a duly-noticed public hearing on October 31, 2000, to consider the recommendation of the Planning Commission to adopt the proposed Study.
- VI. **WHEREAS** the Marin County Board of Supervisors finds that the proposed Study is not subject to the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15262 of the CEQA Guidelines because the project consists of a planning study that considers environmental factors.
- VII. **WHEREAS** the Marin County Board of Supervisors has reviewed and considered the information contained in the Study and comments and responses thereto.

SECTION II: ACTION

NOW, THEREFORE, BE IT RESOLVED that the Marin County Board of Supervisors hereby adopts the Richardson Bay Dock and Boat Study.

SECTION III: ADOPTION

PASSED AND ADOPTED at a regular meeting of the Board of Supervisors of the County of Marin held on this 31st day of October, 2000, by the following vote:

AYES: SUPERVISORS Cynthia L. Murray, Harold C. Brown, Jr., John B. Kress, Annette Rose


NOES: NONE

ABSENT: SUPERVISOR Steve Kinsey



PRESIDENT PRO TEM
BOARD OF SUPERVISORS

ATTEST:



CLERK