

Chapter 2
HISTORY OF LAND USE ON BAIR ISLAND

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Introduction

Bair Island is located on the margins of the southern part of San Francisco Bay in Redwood City, San Mateo County (see Figure 1 for location). It is approximately 2800 acres in area (Anonymous, 1982) and is bordered by San Francisco Bay to the north and Highway 101 to the south (see Figure 2). Steinberger Slough outlines the west and Redwood Creek flanks the east side.

Bair Island today is actually made up of three islands. In this report they will be referred to as the inner, middle, and outer islands (see Figure 2). The inner and middle islands are divided by Smith Slough. Corkscrew Slough separates the middle and outer islands.

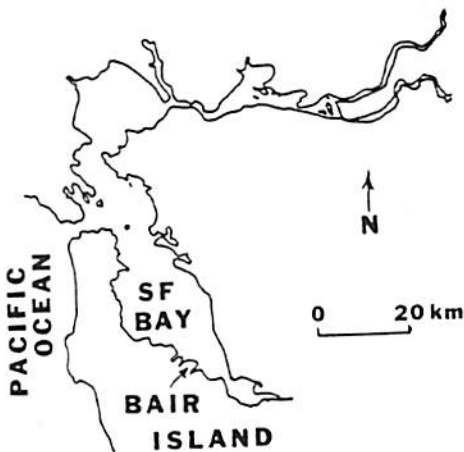


Figure 1. Location of Bair Island.
Source: Map after Nichols et al., 1986.

Historically, all of Bair Island was marshland. Major land reclamation occurred in the late 1940s to 1950s when levees were built and salt evaporation ponds established. In 1965 the salt ponds were drained and abandoned (EIPC, 1981). Much of the island is currently diked off from tidal influence, and only a small fraction of the original tidal salt marsh remains undisturbed today. Land retaining original marshland characteristics includes areas around the levee perimeters (EIPC, 1981).

Although diking has altered and somewhat diminished Bair Island's ecological value, the area provides habitat for wildlife and acts as a buffer between the Bay and urban uses (Madrone Associates et al., 1982). Because it is surrounded by water, access to the area is limited. This isolation has allowed Bair Island to remain a major feeding and nesting site for many birds. The endangered salt marsh harvest mouse also inhabits the island (Bravo et al., 1981; EIPC, 1981).

Currently there are no active plans to develop Bair Island. Several years ago a 1095-acre development was proposed by South Shores, Inc., a subsidiary of Mobil Oil Company. The proposal was for a primarily residential complex on the middle and inner islands (EIPC, 1981). Although city officials had approved the plans, the proposal was narrowly defeated by Redwood City voters in November 1982 in a

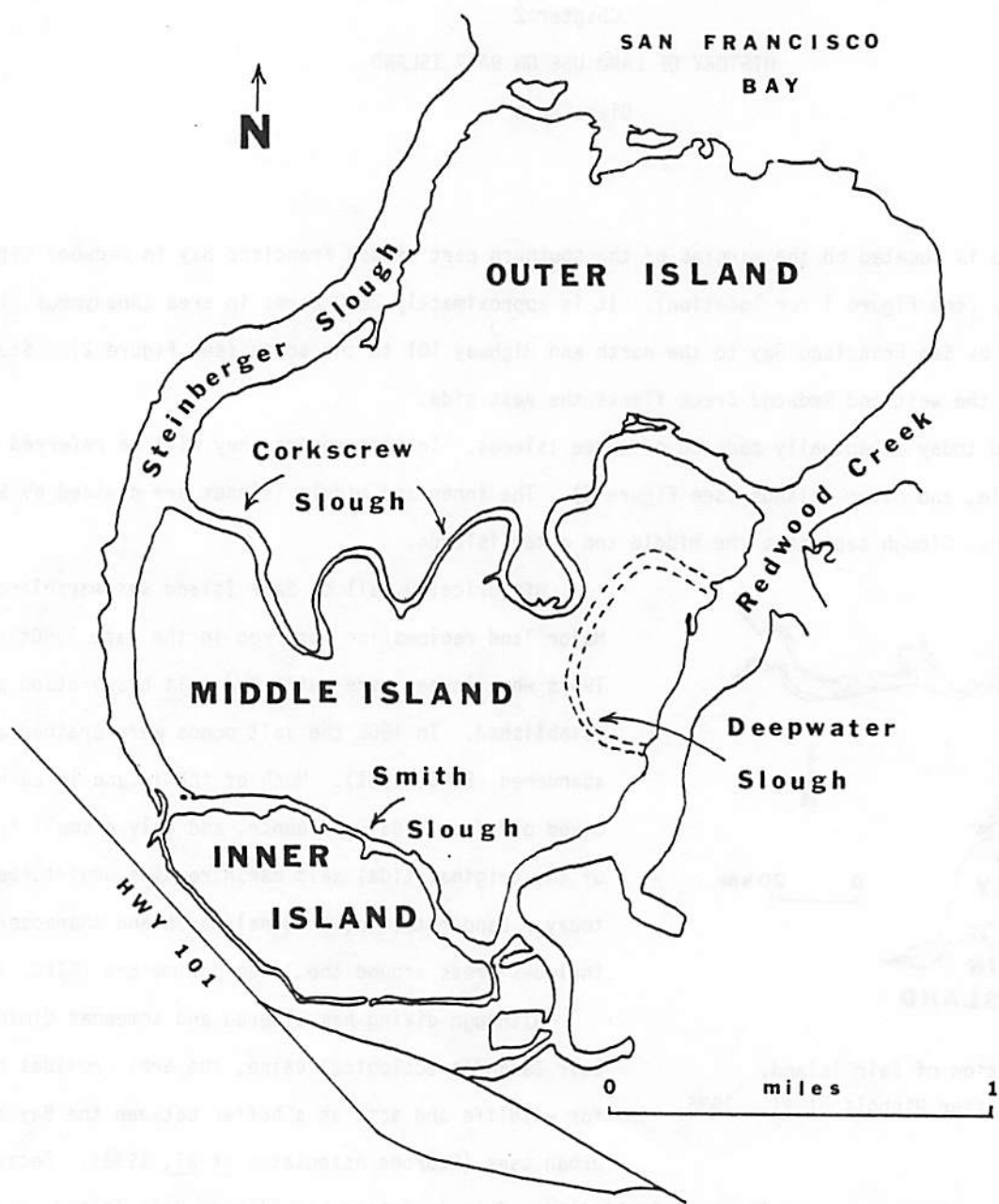


Figure 2. Bair Island Today.

Sources: USGS Map, 1980; Base Map from USCGS Chart, 1985.

referendum. It is uncertain whether or not a similar development proposal will be initiated in the future, possibly on a smaller scale (Wood, 1984).

"Bair Island is presently one of the last remaining portions of historic salt marsh in this region . . . 87.5 percent of the tidal marshes in the [South Bay] area have been altered or eliminated" (Bravo et al., 1981). In addition to its undeveloped marshlands, Bair Island has many diverse habitats including dry salt evaporation ponds, raised levees, upland grass and shrubs, tidal mudflats and open waters (EIPC, 1981).

The objective of this report is to document historical changes in land use on Bair Island. Land use patterns are illustrated by a series of maps depicting the status of the site. A knowledge of past land use is essential in understanding current conditions. Some issues concerning present conditions on Bair Island will be addressed at the end of this report.

Past Studies

Several studies have been done specifically on Bair Island, mainly in response to Mobil Oil Company's development proposal several years ago. The Environmental Impact Planning Corporation (1981) prepared a DEIR which evaluated Mobil's plan. Bravo et al. (1981) analyzes the costs, benefits and alternatives to developing Bair Island.

A general site study was carried out by the State Lands Commission (1977) which evaluates areas on Bair Island which should be set aside for environmental protection and study. Also included is a brief historical overview. Jones and Stokes Associates, Inc. (1972) describes the resources of Bair Island, including the flora and fauna.

Madrone Associates et al. (1982) assesses the ecological values of diked baylands in and around the Bay. The report includes a brief description of Bair Island. Nichols and Wright (1971) published a map which illustrates the historic margins of marshlands of San Francisco Bay.

Several publications provide useful background information on salt marshes and salt ponds. BCDC's "Bay Plan" (1969) has material outlining policies concerning salt marshes and salt ponds. The U.S. Fish and Wildlife Service put out two volumes on wildlife habitats of the Bay which include information about the wildlife and vegetation associated with marshland environments (1969).

Methods

To determine when changes in land use occurred, historical maps, nautical charts and aerial photographs were examined. A listing of the maps, charts and photographs studied is attached (see Appendix). Information derived from these sources was supplemented by relevant literature and interviews with experts familiar with the area.

Historical maps and nautical charts are available from the mid-1800s, and provide continuous coverage to the present. Nautical charts are published the most frequently; however, they may not

accurately reflect conditions of the mapped area at the publication date. Often a year or more may have passed from the time the area was surveyed until the map was actually published.

Although aerial photographs were not available for early dates, they were an important source of information for the years since 1943. The exact date that aerial photographs are taken is recorded on each photograph, making them more accurate than maps or charts in terms of dates.

Base maps for Figures 3A to 3C were made by tracing the shoreline of Bair Island from nautical charts. Figures 3A to 3C represent land use for the mid-1800s, 1955 and 1985. The 1985 map was based on a chart of the same year. A 1963 chart was used because it represented conditions as seen in aerial photographs in 1955 more closely than earlier charts. The 1934 chart was used as a base map for the mid-1800s because maps published before 1934 were of a different scale.

Information derived from the maps, charts and aerial photographs was then added to the base maps. Figures 3A to 3C reflect different major periods of land use on Bair Island insofar as they could be established from available information. Some of the land (on Figures 3B and 3C) was not categorized because of insufficient data.

Data

The greatest change which has occurred on Bair Island has been the conversion of historic marshland to a non-tidal state. Figure 3A maps an outline of Bair Island in the mid-1800s before any major land reclamation had taken place. During this period no dikes existed, and the site was in its original undisturbed condition.

Small scale land use began in the late 1800s. The study by State Lands (1977) noted that an 1898 map shows about ten acres of land as diked off at the confluence of Redwood Creek and Corkscrew Slough ". . . for use as a fishing village. The village was apparently founded about 1869 by Thomas A. McCollam" (see Figure 3A). Jones and Stokes Associates, Inc. (1972) makes reference to early land uses: "Between 1880 and 1900 the shoals immediately off Bair Island became popular smelt fishing grounds. The area was also seined for shrimp by Chinese who established a fishing camp on Bair Island."

In the early 1900s larger scale land reclamation attempts began on the island, including land use for agricultural purposes. In the State Lands study a barn and barley cultivation are mentioned; however, neither an exact location nor date is given. Also during this period (early 1900s) the area was used for ". . . raising hay crops and duckhunting" (Lopez, 1973).

In the 1920s, the outer island was owned and farmed by Fred Bair, for whom the island is named (EIPC, 1981). Eventually agricultural land uses were abandoned because "the low productivity and the handicap of limited water access did not support the financial burden of levee maintenance and within a few years the bayshore levees failed and the area returned to its original marshland state" (Lopez, 1973). The earliest aerial photographs available for the study area were taken in 1943, before the land was reclaimed for use as salt evaporation ponds. At that time some levees existed around the perimeter of



Figure 3A. Bair Island in 1800s.
Sources: USCGS chart, 1857; Nichols & Wright (1971); base map from USCGS chart, 1934.

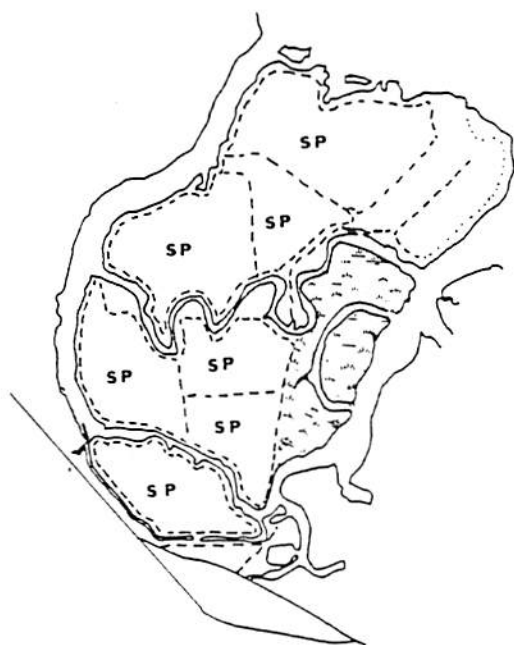
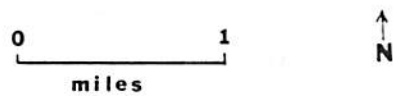
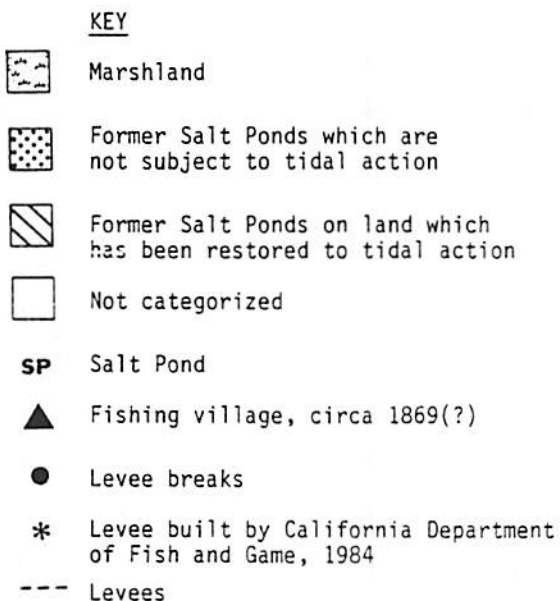


Figure 3B. Salt Evaporation Ponds on Bair Island, 1955.
Sources: Photos #4-17; base map from USCGS chart, 1963.

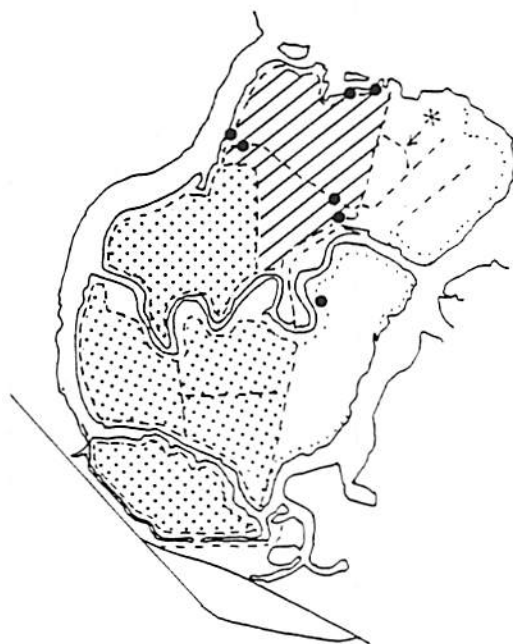


Figure 3C. Current conditions on Bair Island, 1985.
Sources: Photos #73-80; base map from USCGS chart, 1985.

the outer island, possibly remnants of the levees established to make the land suitable for agriculture.

Between 1946 and 1952, Leslie Salt Company diked off land in order to build salt evaporation ponds (Bravo et al., 1981; EIPC, 1981; State Lands, 1977). Levees built during that period are apparent in aerial photographs beginning in 1946. Figure 3B reflects conditions in 1955 when salt ponds were in production. In 1965, these ponds were drained and abandoned (EIPC, 1981).

Another major change in land use occurred in 1965 when Deepwater Slough was diked and partially filled where it converges with Redwood Creek at both the north and south junctions. The land surrounded by Deepwater Slough was purchased by the Port of Redwood City for use in depositing dredge spoils (State Lands, 1977). This change in Deepwater Slough is evident when one compares Figure 3B (1955) to Figure 3C (1985), which shows conditions at a later date.

Since 1965 a few minor changes have occurred, all involving the maintenance of levees. The levees around the inner and middle island were repaired around 1974 to 1975 (EIPC, 1981). In addition, a levee was established in the fall of 1984 by the California Department of Fish and Game (see Figure 3C) on the outer island (Kelly, 1986).

After the salt ponds were abandoned on the outer island, natural deterioration caused levee breaks to occur (Kelly, 1986). As a result of levee breaks (see Figure 3C), most of the outer island is now under tidal influence. Although levee breaks were seen in recent photographs, nautical charts and historical maps published after breaks occurred indicate that the area is still diked off from tidal action. In contrast to these tidal areas, there are inactive salt ponds (see Figure 3C) where levees prohibit the land inside from being subject to tidal action.

Discussion

As indicated on Figures 3A to 3C there have been many changes in land use on Bair Island since the mid-1800s. The original undisturbed salt marsh was altered first to farmland, then to salt ponds, and finally to abandoned salt ponds and restored tidal marsh. It is important to consider how such changes affect vegetation and wildlife.

The abandoned salt ponds on Bair Island are of several different habitat types. The inner island is pretty extensively vegetated (Kelly, 1986). On the middle and part of the outer island, land which is owned and managed by Mobil Oil Company is kept in a degraded condition. Siphons and pumps are used to keep the abandoned ponds barren during the dry season. Because the soil is highly saline from past use as salt ponds, this area does not support much vegetation. In the winter a ponded condition exists, and shorebirds and waterfowl have been observed there (Harvey, 1986).

On the outer island, former salt ponds which have been restored to tidal marsh are on land owned by the State of California. Since the late 1970s this area has been under tidal influence. Today pickleweed and cordgrass grow there, and the area on the outer island has been called "the single largest marsh restoration in San Francisco Bay" (Kelly, 1986). The striking contrast between the dry pond

habitat and the green restored marsh shows the very different conditions which can exist after abandoning salt ponds.

Bair Island provides habitat for wildlife, and is especially noted as a feeding and nesting site for birds. Many species, including the great blue and black-crowned night heron, snowy egret, black-shouldered kite (an endangered species), northern harrier, burrowing owl, and red-tailed hawk all utilize the area. Bair Island is unique in that great blue herons have been observed nesting within about five feet of ground level. Usually they prefer to nest in trees high above the ground (Roberts, 1986).

Previous studies (EIPC, 1981; State Lands, 1981) noted that Bair Island was an important nesting ground for the California least tern and the Caspian tern. However, in the last couple of years neither species has been sighted nesting there (Roberts, 1986). Attempts have been made to reestablish nesting grounds for the least tern, which is endangered. These efforts have included the construction of a levee on the outer island by the California Department of Fish and Game (see Figure 3C). The least tern prefers flat, unvegetated areas for nesting. It was hoped that by building the levee the area could be flooded to drown any pickleweed. After drainage an attractive nesting ground would be created (Harvey, 1986).

Conclusion

Concerning future land use, the fact that the South Shores proposal was rejected by voters may indicate that public opinion will prevent Bair Island from becoming developed. An alternative to developing the site would be to ensure that some areas are protected. Today only the eastern tip of the outermost island is included in the National Wildlife Refuge. The Citizens Committee to Complete the National Wildlife Refuge has expressed interest in including more of Bair Island in the refuge. As historic wetlands, the inactive ponds owned by Mobil Oil Company are considered particularly desirable areas to protect and include in the refuge (LaRiviere, 1986).

Although the barren ponds owned by Mobil are of limited value to wildlife as is, they can potentially be returned to tidal action by opening the levees (JSAI, 1972). After the levees breached on the outer island, vegetated areas became prominent within two years. One could expect vegetation to be well established within six years (Kelly, 1986). Thus, in order to restore the rest of Bair Island to tidal marsh, the owner of the land must be convinced that this is a worthwhile action to undertake.

Past studies discuss the value of Bair Island as a nesting site for birds, and most of these studies were done in the late 1970s and early 1980s. The recent absence of the California least tern and Caspian tern suggests the importance of updating the status of wildlife and vegetation on Bair Island. Additionally, the potential for restoring the rest of Bair Island should be evaluated.

A large percentage of the original historic marshlands of San Francisco Bay have been altered by levees, fill and development. Efforts should be undertaken to study and preserve these wildlife habitats for future generations.

Appendix. List of Sources.

Aerial Photographs*

No.	Agency Code	Agency	Date	Location
1	DDB-18-131	USDA	10/5/43	GD
2	DDB-18-132	"	"	"
3	DDB-18-56	"	"	"
4	GS-CF-2-191	JAPE	7/9/46	DL
5	GS-CF-2-192	"	"	"
6	GS-CP-2-166	"	"	"
7	AV-170-16-7	PAS	6/3/55	PAS
8	AV-170-16-8	"	"	"
9	AV-170-16-9	"	"	"
10	AV-170-16-10	"	"	"
11	AV-170-17-4	"	"	"
12	AV-170-17-5	"	"	"
13	AV-170-17-6	"	"	"
14	AV-170-17-7	"	"	"
15	AV-170-18-2	"	"	"
16	AV-170-18-3	"	"	"
17	AV-170-18-4	"	"	"
18	AV-933-15-3	PAS	10/28/69	PAS
19	AV-933-15-4	"	"	"
20	AV-933-15-5	"	"	"
21	AV-933-15-6	"	"	"
22	AV-933-16-3	"	"	"
23	AV-933-16-4	"	"	"
24	AV-933-16-5	"	"	"
25	AV-933-16-6	"	"	"
26	AV-933-17-1	"	"	"
27	AV-1045-15-4	PAS	5/2/72	PAS
28	AV-1045-15-5	"	"	"
29	AV-1045-15-6	"	"	"
30	AV-1045-15-7	"	"	"
31	AV-1045-16-3	"	"	"
32	AV-1045-16-4	"	"	"
33	AV-1045-17-3	"	"	"
34	AV-1188-14-4	PAS	5/21/75	PAS
35	AV-1188-14-5	"	"	"
36	AV-1188-14-6	"	"	"
37	AV-1188-14-7	"	"	"
38	AV-1188-15-1	"	"	"
39	AV-1188-15-2	"	"	"
40	AV-1188-15-3	"	"	"
41	AV-1356-14-5	PAS	6/28/77	PAS
42	AV-1356-14-6	"	"	"
43	AV-1356-14-7	"	"	"
44	AV-1356-14-8	"	"	"
45	AV-1356-15-4	"	"	"
46	AV-1356-15-5	"	"	"
47	AV-1356-15-6	"	"	"
48	AV-1356-15-7	"	"	"
49	AV-1356-16-3	"	"	"

Aerial Photographs, continued

50	AV-1705-14-4	PAS	5/30/79	PAS
51	AV-1705-14-5	"	"	"
52	AV-1705-14-6	"	"	"
53	AV-1705-14-7	"	"	"
54	AV-1705-14-8	"	"	"
55	AV-1705-15-2	"	"	"
56	AV-1705-15-3	"	"	"
57	AV-1705-15-4	"	"	"
58	AV-1705-15-5	"	"	"
59	AV-1705-16-3	"	"	"
60	AV-1705-16-4	"	"	"
61	AV-1705-16-5	"	"	"
62	AV-2020-14-5	PAS	6/19/81	PAS
63	AV-2020-14-6	"	"	"
64	AV-2020-15-2	"	"	"
65	AV-2020-15-3	"	"	"
66	AV-2020-15-4	"	"	"
67	AV-2020-16-2	"	"	"
68	AV-2020-16-3	"	"	"
69	AV-2020-16-4	"	"	"
70	AV-2265-14-3	PAS	6/16/83	PAS
71	AV-2265-14-4	"	"	"
72	AV-2265-14-5	"	"	"
73	AV-2670-14-3	PAS	10/15/85	PAS
74	AV-2670-14-4	"	"	"
75	AV-2670-14-5	"	"	"
76	AV-2670-14-6	"	"	"
77	AV-2670-15-3	"	"	"
78	AV-2670-15-4	"	"	"
79	AV-2670-15-5	"	"	"
80	AV-2670-16-2	"	"	"

*All aerial photographs listed are black & white and of normal angle.

Nautical Charts

No.	Agency Code	Agency	Date	Location
1	T-664	USCGS	1857	DL
2	18651	USCGS	1903	"
3	"	"	1906	"
4	"	"	1911	"
5	"	"	1926	"
6	"	"	1934	"
7	"	"	1938	"
8	"	"	1942	"
9	"	"	1950	"
10	"	"	1955	"
11	"	"	1957	"
12	"	"	1963	"
13	"	"	1966	"
14	"	"	1967	"
15	"	"	1968	"
16	"	"	1969	"
17	"	"	1970	"
18	"	"	1971	"
19	"	"	1972	"
20	"	"	1973	"
21	"	"	1974	"
22	"	"	1975	"
23	"	"	1977	"
24	"	"	1978	"
25	"	"	1980	"
26	"	"	1981	"
27	"	"	1982	"
28	"	"	1985	"

Abbreviations

USDA US Dept of the Interior
 JAPE Jack Ammann Photogrammetric Engineers
 PAS Pacific Aerial Surveys
 USGS US Geological Survey
 USCGS US Coast & Geodetic Survey
 GD Geography Dept, UC Berkeley
 DL 137 Doe Library, Map Room
 UC Berkeley

Historical Maps

No.	Quad	Agency	Date	Location
1	Redwood Pt, CA	USGS	1948	DL
2	"	"	1959	"
3	"	"	1968	"
4	"	"	1973	"
5	"	"	1980	"

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