Chapter 6

HISTORICAL ANALYSIS OF DUCK CLUB MANAGEMENT OF SEASONAL WETLANDS IN THE SOUTH SAN FRANCISCO BAY

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Introduction

The marshes and wetlands of San Francisco Bay have been reduced in area from 313 square miles to 59 square miles during this century. Surrounding San Francisco Bay are 80 square miles of diked lowlands that were once subject to tidal action. About 51 square miles of these diked lands are used for agriculture. Most of these areas are seasonally wet; planting and harvesting occur in the dry season. The remaining 29 square miles of diked land consist primarily of seasonal or permanent ponds, or support typical wetland vegetation. In addition, there are about 70 square miles of salt ponds and other managed wetlands around the Bay (BCDC, 1984).

The diked historic wetlands have particularly significant seasonal wildlife value for migratory birds that also use the tidal waters of the Bay. Birds take refuge in the wetlands during the high tides or during storms on the Bay. The diked lands provide fresh water and wetland conditions in close proximity to the saline Bay waters during the fall and spring; in the winter, the Bay waters are less saline because of rainfall that reaches the Bay directly or indirectly through rivers, streams and sloughs. The positioning of these habitats side by side provides food, cover and shelter that is essential to migratory waterfowl and shorebirds. If the diked wetlands are significantly altered or reduced in area, it will diminish the role of the Bay as a primary resting place for migratory waterfowl and therefore migratory bird populations will suffer (BCDC, 1982).

Wetlands of all kinds have been lost to development around the Bay. There are several types of wetlands that remain. They include ponds and fresh, brackish and salt marshes. Seasonal wetlands exist in low-lying areas that trap rainwater, creating ponds that are used by waterfowl. These areas experience periods of desiccation during the summer drought. Winter rains are trapped by dikes, allowing the fresh water to pond. Seasonal wetlands have been lost to development at a proportion that exceeds those of all other baylands. This has had a major effect on the migratory bird population.

Over half of the entire duck population that use the Pacific Flyway depend on the San Francisco Bay for their existence. About 75 species of water-associated birds are regular visitors or residents of the Bay. Ducks are present seasonally in tremendous numbers. On the average, 83 percent of the ducks found in San Francisco Bay are diving ducks; the remainder are puddle ducks. These ducks are "harvested" by

commercial industry and by recreational hunters (California Department of Fish and Game, 1973). One fourth of the total California duck harvest is captured in the Bay area. During the 12 seasons from 1948-49 to 1959-60, the harvest of ducks averaged about 750,500 annually. The total annual waterfowl-hunter use for the Bay Area was approximately 135,000 hunter-days annually, for the 12 season period. The number of seasonal wetlands owned or leased as duck clubs during this period was extremely high (California Department of Fish and Game, 1973). Since 1960, the number of migratory waterfowl that use San Francisco Bay has decreased. Many of the duck clubs have become defunct; without management, these lands often are mistaken for uplands and are subsequently developed.

The San Francisco Bay Conservation and Development Commission (BCDC) was given jurisdiction over all wetlands which were either salt ponds or managed wetlands during the three years prior to the adoption of the McAteer-Petris Act, which formally established BCDC. Duck clubs are managed wetlands that serve as a single habitat unit, with small ponds, dry areas, some areas providing food, cover and shelter. Certain management practices can increase the quality and productivity of habitat within the wetlands. Duck clubs' management practices include construction and maintenance of dikes and vegetation control. Often water is pumped onto the land to prematurely promote vegetation growth.

This study will focus on duck club management of seasonal wetlands in the South San Francisco Bay. The purpose here is to look at specific sites over time, through theuse of maps and aerial photographs, to determine if evidence of management was present. Proof of management during the period November 11, 1966 through November 11, 1969 is sufficient to establish BCDC's jurisdiction, with resulting control over development.

Past Studies

BCDC studied certain diked-off areas that were formerly part of the Bay, but not within BCDC's permit jurisdiction. The study used United States Geologic Survey (USGS) topographic maps and aerial photographs (BCDC, 1982).

A general economic study of preservation vs. development of San Francisco Bay wetlands was conducted by Luken (1976). The California Department of Fish and Game conducted a study that incorporated wetland and wildlife habitats with fish utilization (California Department of Fish and Game, 1973).

Methodology

The initial step was selecting sites which were possible formerly managed duck clubs. This was accomplished with the assistance of Paul Kelly (Kelly, 1985, pers. comm.). The sites were marked on USGS topographic maps (scale 1:24,000). Each site was located using a latitude and longitude measuring stick from Decibel Products, Inc. The longitude was averaged from two readings.

The search for aerial photographs proved to be difficult, since flights were not regularly flown during the time period from 1966 - 1969. The photographs which were available were of low resolution.

Therefore, the study was extended to include photographs of high resolution from recent flights. Photographs from 1969 and 1983 were located at the Map Room of the Main Library at the University of California, Berkeley; other photographs were located at Pacific Aerial Survey, in Oakland and Air Flight Service, in Santa Clara. Only the photographs found at U.C. Berkeley were used, due to cost and availability constraints at the other agencies.

Rainfall data for the years 1966 through 1969 was compiled (Appendix A). Recording stations were located at the Oakland Airport and in Newark. The date of the first rain heavy enough to cause ponding for each year was established.

Comparison of the sites began. Observations were made for water, the presence of vegetation control scars, dikes, and walkways or blinds. The condition of each site was established (Table 2). The results from the 1968 photographs were compared with the results of the 1983 flight, and significant changes were recorded.

Data and Discussion

The precise location of each site is listed in Table 1. Each site is listed by number. The city where the site is located follows the site number. The precise latitude and longitude of each site are given, followed by comments on the site's previous uses. A location map is provided for reference (Figure 1).

Results from the comparison of the aerial photographs are listed in Table 2. The sites are arranged numerically. The condition of the dikes around the site are listed as either good, fair, or poor. Sites where no dikes were detected are labeled as none. The presence or lack of water is listed in the fifth column. If only small patches of water existed, then 'little' was reported. Vegetation control was either present or undetected. The sites where vegetation control was detected were easily spotted. Walkways/blinds are small and can easily go undetected on photographs of low resolution. Those which were spotted were obvious, and in good condition. The final column is an interpretation of the data as to whether or not the site was managed.

Evidence of management of seasonal wetlands by duck clubs includes: (1) the presence of ponded water before the first major storm of the wet season; (2) vegetation control scars; (3) dike maintenance and/or construction; (4) walkway and/or blind construction. The ponding of water before the first storm of the year indicates that water was pumped onto the dry land to promote vegetation growth. This type of evidence was not useful for this report due to the poor photographic coverage available.

Vegetation control scars can be seen on many of the photographs (Table 2). These scars are caused by tractors that disc the land during the dry season to remove cattails and alkai bull rush. They are also caused by developers who intentionally degrade the land so that it will not appear to be a seasonal wetland. Such degradation is almost irreversible and makes proof of a wetland environment difficult.

Maintenance and/or construction of dikes was not easily recognizable on the aerial photographs. Water retention was clearly shown on certain photographs, yet on others, the dikes were evidently in poor

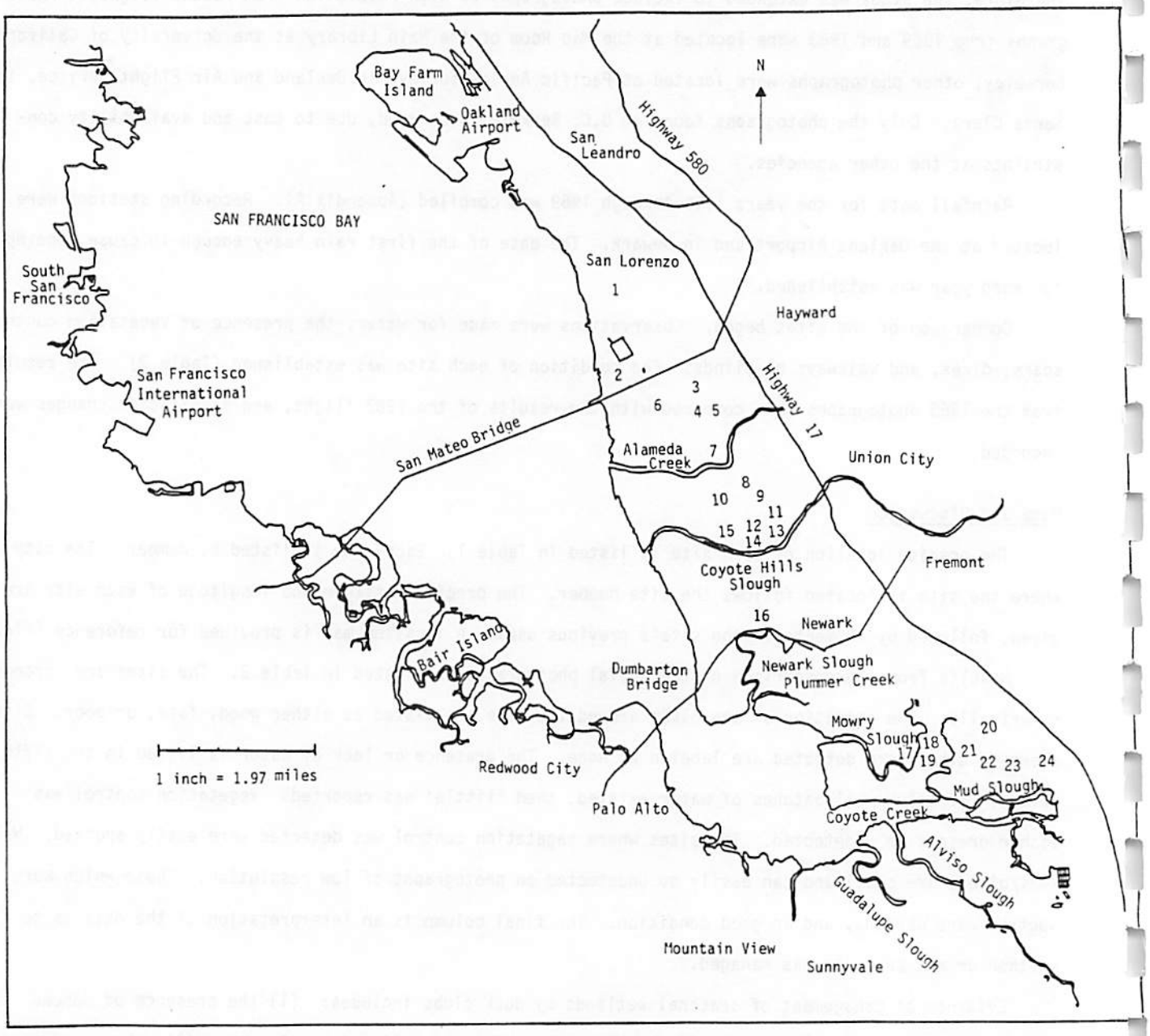

Figure 1. Study Site Locations (Based on USGS Quadrangle, Scale 1:125,000).

shape and water was not retained completely within the diked area. Dike repair is noticeable on the later photographs of some areas. Although the time of repair cannot be established, future studies could narrow the time frame considerably.

Walkways and blinds are used by duck hunters to stalk their prey. Duck clubs often construct and maintain these structures for effective use of the wetland. Walkways were observed on many photographs. Blinds were harder to detect since they are smaller in size and can be mistaken for dry patches of land.

Table I. Site Locations

Site Number [1]	City	Latitude	Longitude	Comments [2]
1	Hayward	37°39'35"	122°08'48"	Marathon Property
2	"	37°37'33"	122°08'29"	Oliver Bros. Area
3	"	37°36'50"	122°05'58"	Lattig club
4	"	37°36'37"	122°05'55"	Perry club
5	"	37°36'33"	122°05'55"	Oliver club
6	"	37°36'49"	122°06'43"	Possible club
7	"	37°35'49"	122°05'49"	Old club area
8	Union City	37°35'05"	122°05'05"	Ugly Duckling club
9	"	37°34'51"	122°05'01"	Possible old club
10	"	37°34'56"	122°05'29"	ACFCD [3] owned area
11	"	37°34'35"	122°04'55"	Definite club
12	"	37°34'20"	122°04'57"	ACFCD club
13	Fremont	37°33'57"	122°04'56"	ACFCD club
14	"	37°33'57"	122°05'27"	ACFCD club
15	Hayward	37°34'13"	122°05'11"	Possible club
16	Fremont	37°32'39"	122°05'47"	Leslie club
17	"	37°30'13"	122°01'01"	Possible club
18	"	37°30'15"	122°00'32"	Whistling Wings
19	"	37°29'51"	122°00'31"	Pintail club
20	"	37°29'53"	121°58'24"	Old duck club
21	"	37°29'44"	121°58'59"	Bamboa club
22	"	37°28'27"	121°58'33"	Possible old club
23	"	37°29'18"	121°58'19"	Caruff Property
24	"	37°28'59"	121°57'57"	Old club

Notes. 1. Refer to Figure 1.
2. Comments based on personal communication with Paul Kelly, 1986.
3. Alameda County Flood Control District

Site number 8 is a good example of a managed site. The first set of photographs showed dikes in good condition. There was a small amount of water present at the time the photographs were taken. On the dry patches of land there were very clear disc marks. The land was evenly plowed and disced in rows and circles. There were walkways that extended out into the center of the diked region. On the photographs from 1983, the dikes looked like they had deteriorated from the previous photos. Water was not present and the scars from vegetation control were very predominant. The walkways and blinds were not detected. This leads to the conclusion that the land use was changed from a managed wetland, to an unmanaged piece of land.

Analysis of the data concluded that many of the sites showed evidence of possible management by duck clubs. Table 2, column 8, lists the conclusions of management. Those sites where evidence of management was noticed were marked as 'yes'. Those sites where there was evidence of possible management were marked as 'maybe'. And the sites where there was no evidence of management were marked as 'no'. Some of the

sites showed little or no activity. Actual dates of management were not determinable.

Conclusion/Recommendations

The time period between the two sets of available photos, 1968 to 1983, is undesirably broad for an investigation of this type. The original time frame was narrower, but due to the lack of photographs, the study period was expanded. Cost considerations were a major constraint in data acquisition; future studies of the sites with less severe financial limitations could determine management more accurately. The data here can be supplemented with photographs from October 1969, which are available at Air Flight Service in Santa Clara.

Table II. Site Conditions

Site Number[1]	Photo Number	Year	Dike Condition	Water	Vegetation Control	Walkways/ Blinds	Management
1	3-87	1968	poor	little	undetected	undetected	no
2	3-87	1968	good	present	undetected	present	
	04-20	1983	poor	present	undetected	present	maybe
3	3-103	1968	good	little	undetected	present	maybe
4	3-103	1968	good	none	undetected	undetected	maybe
5	3-103	1968	good	present	present	present	yes
6	3-103	1968	fair	present	undetected	undetected	
	04-23	1983	none	present	undetected	undetected	maybe
7	3-102	1968	fair	little	undetected	undetected	
	04-26	1983	none	present	undetected	undetected	no
8	3-101	1968	good	little	present	present	
	04-27	1983	none	none	present	undetected	yes
9	3-101	1968	fair	little	undetected	present	
	04-27	1983	none	little	present	undetected	yes
10	3-101	1968	fair	little	undetected	undetected	
	04-27	1983	fair	little	undetected	undetected	maybe
11	3-101	1968	fair	present	present	present	
	04-28	1983	poor	none	undetected	undetected	yes
12	3-101	1968	fair	little	present	present	
	04-28	1983	fair	little	present	present	yes
13	3-101	1968	good	none	undetected	undetected	
	04-28	1983	good	little	present	present	yes
14	3-101	1968	fair	little	undetected	present	
	04-29	1983	good	none	present	present	yes
15	3-101	1968	none	present	undetected	undetected	
	04-29	1983	none	present	undetected	undetected	no
16	3-100	1968	fair	little	undetected	present	
	03-19	1983	fair	none	undetected	undetected	maybe
17	3-191	1968	fair	present	undetected	undetected	
	04-37	1983	none	none	undetected	undetected	no
18	3-191	1968	fair	present	undetected	undetected	
	04-38	1983	none	none	present	undetected	yes
19	3-191	1968	fair	present	present	undetected	
	04-38	1983	fair	none	present	undetected	yes
20	3-190	1968	good	present	undetected	present	
	04-39	1983	poor	none	undetected	undetected	maybe
21	3-190	1968	fair	present	undetected	undetected	
	04-39	1983	poor	none	undetected	undetected	maybe
22	3-190	1968	poor	none	undetected	undetected	
	04-39	1983	poor	none	undetected	undetected	no
23	3-190	1968	fair	present	undetected	undetected	
	04-39	1983	poor	none	undetected	undetected	no
24	3-190	1968	fair	little	undetected	undetected	
	04-39	1983	poor	none	undetected	undetected	no

Notes. 1. Refer to Figure 1.

It is important, if a future study of these sites is conducted, that the researcher be made fully aware, in advance, of the lack of available photographs. Rainfall data (Appendix A), with the addition of the October 1969 photographs and any others that may be available, may allow the future researcher to establish if ponding water that may be seen on the seasonal wetlands was pumped onto the land as an act of management.

The data presented here show some changes that have occurred to the sites in question between 1968 and 1983. Sites where management was present or possible should be studied further (Table 2). Those sites with no management devices present and without change over the period of this study should perhaps be dropped if future work is conducted.

Appendix A. Rainfall Data

	Monthly rainfall totals in inches for the wet season							Date of first rain	Amount
	Jan.	Feb.	Mar.	Apr.	Oct.	Nov.	Dec.		
1966									
Newark	1.54	1.27	.32	.36	.00	2.71	2.28	Nov. 7	.95"
Oakland WB Airport	2.15	2.12	.49	.39	T	3.86	3.51	Nov. 6	.60"
1967									
Newark	5.63	.25	2.84	3.57	.22	1.02	2.18	Nov. 30	.78"
Oakland WB Airport	8.90	.27	4.62	4.46	.53	1.32	2.70	Nov. 29	.54"
1968									
Newark	3.77	.56	2.17	.76	.27	2.48	2.26	Nov. 4	1.10"
Oakland WB Airport	5.05	1.82	3.07	.83	.29	2.44	3.21	Nov. 2	.58"
1969									
Newark	6.24	3.96	1.38	1.15	.47	.36	1.23	Oct. 15	.25"
Oakland WB Airport	6.90	8.85	.95	1.82	2.06	.71	4.33	Oct. 15	1.66"

Source: U.S. Department of Commerce
Climatological Data 1966, 1967, 1968, 1969

T = trace, too small to measure

Appendix B. Photographs

Photo Number	Agency Code	Type of Image	Color	Agency	Date	Where Located
3-87	GS VBZJ	Vertical, Stereo Overlap, Contact Print	Black & White	USGS	04/22/68	UCB Map Room
3-100	"	" "	"	"	"	"
3-101	"	" "	"	"	"	"
3-102	"	" "	"	"	"	"
3-103	"	" "	"	"	"	"
3-190	"	" "	"	"	"	"
3-191	"	" "	"	"	"	"
03-19	AV-2300	Vertical, Stereo Overlap, Contact Print	Black & White	Pacific Aerial Surveys	06/21/83	UCB Map Room
04-20	"	" "	"	"	"	"
04-23	"	" "	"	"	"	"
04-26	"	" "	"	"	"	"
04-27	"	" "	"	"	"	"
04-28	"	" "	"	"	"	"
04-29	"	" "	"	"	"	"
04-37	"	" "	"	"	"	"
04-38	"	" "	"	"	"	"
04-39	"	" "	"	"	"	"

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Map Room, 137 Main Library, University of California, Berkeley.

Pacific Aerial Surveys, 444 Pendleton Way, Oakland, California 94621, (415) 632-2020.

Air Flight Service, 2220 Calle de Luna, Santa Clara, California 95051, (408) 988-0107.