CLASS I ARCHEOLOGICAL SURVEY, NORTH DELTA PROGRAM, SACRAMENTO AND SAN JOAQUIN COUNTIES, CALIFORNIA (PRELIMINARY DRAFT)

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Resource Management Division
California Department of Parks and Recreation
Sacramento

Prepared for
Division of Planning
California Department of Water Resources,
Sacramento

May 31, 1994

C-074057

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ABSTRACT

In 1993 the California Department of Water Resources contracted with the Department of Parks and Recreation to carry out a Class I Archeological Survey in order to assess cultural resources information needs for the North Delta Program. The study area for this project extends along the Sacramento River from Freeport Bend to Brannan Island State Recreation Area, and eastward to the 100-year flood line. The Sacramento River, the Mokelumne River, the Cosumnes River, Dry Creek, Morrison Creek and Deer Creek converge in this area.

In order to identify known and potential resources in the study area a variety of published and unpublished reports, records and manuscripts were examined. Archeological site location data was obtained from the North Central and Central California Information Centers, as well as from files at the Office of Historic Preservation and the Archaeological Research Facility, University of California, Berkeley. An assessment of potential historic site locations was obtained through a review of historic maps and other records.

A total of 138 recorded archeological sites are located within the study area, while the historic map survey provided data on 889 historic site locations. Most of the identified sites were connected with agricultural activities or early settlement. The study area contains nine properties listed on the National Register of Historic Places, and four additional properties have been determined eligible for inclusion. Also present are four California Historical Landmarks and Points of Historical Interest.

Of the islands and tracts in the study area, only the Beach Lake District has been extensively surveyed. The majority of the districts have had little systematic archeological survey, and no survey at all has been carried out on some tracts. Except in the towns of Isleton, Walnut Grove and Locke, no architectural survey or identification work has been carried out.

This report provides recommendations for specific Class II survey work within the study area in connection with the Section 106 review process.

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INTRODUCTION

The California Department of Water Resources (DWR) is conducting an environmental review of the North Delta in connection with a proposed program of flood control measures on the lower Mokelumne River and adjacent distributaries. The North Delta Program (NDP) includes evaluation of eleven alternatives. These include various proposals for channel dredging, levee setbacks and creation of flood by-passes, as well as expansion and gate modification on the Delta Cross Channel (DWR 1990). In July, 1993, the California Department of Parks and Recreation (DPR) entered into an agreement with DWR to provide a Class I Archeological Survey as part of this review.

State development of water programs in the Delta involves compliance with both state and federal laws which mandate the inclusion of cultural resources in the planning process. Specifically, this includes the National Historic Preservation Act of 1966 (NHPA) and the California Environmental Quality Act of 1970 (CEQA).

Study Area and Project Alternatives

The NDP Study Area (Fig. 1) follows the east bank of the Sacramento River from about Freeport to Brannan Island, extending eastward as far as the 100-year flood line. The area contains about 170,000 acres of which about 150,000 are used for irrigated agriculture. The remaining area consists of waterways, natural areas, levees, and lands devoted to residential, industrial and municipal uses.

The Sacramento River, the Mokelumne River, the Cosumnes River, Dry Creek, Morrison Creek and Deer Creek converge in the North Delta to form a network of meandering channels and sloughs. With only one exception, no designated flood bypass channels or storage facilities have been constructed for floodwaters. As a result, leveed islands and tracts in the North Delta Study Area are repeatedly and extensively flooded. Since 1980, there have been 14 such occurrences in the North Delta Study Area (DWR 1990).

The purpose of the North Delta Program (NDP) is to address a broad range of water management issues. These are as follows:

1. Alleviate flooding in the north Delta;
2. Reduce reverse flow in the lower San Joaquin River;
3. Improve water quality;
4. Reduce fishery impacts; and
5. Improve State Water Project flexibility and water supply reliability.

In addition to these objectives, the program is designed to improve navigation, some types of recreational opportunities, and wildlife habitat.

The NDP includes evaluation of 11 different alternatives, including a no-action plan.

The NDP includes evaluation of 11 different alternatives, including a no-action plan. Each alternative is a combination of various project components. The components include enlarging the Delta Cross Channel gate structure, dredging river channels, constructing levee setbacks, and developing island floodways.

The Preferred Alternative (Alternative 5B - Fig. 2) includes the following components:

1. Dredging the main stem and South Fork of the Mokelumne River.
2. Enlarging the main stem and North Fork of the Mokelumne River with levee setbacks (Figure 3) and channel dredging.
3. Enlarging the Delta Cross Channel gate structure.

In addition to the Preferred Alternative, the NDP includes evaluation of the following project alternatives (Fig. 3):

1. No Action
2A. Dredge the South Fork Mokelumne River
2B. Dredge the South Fork Mokelumne River and enlarge the Delta Cross Channel gates
3A. Dredge the South Fork and North Fork Mokelumne River
3B. Dredge the South Fork and North Folk Mokelumne River and enlarge the Delta Cross Channel gates
4A. Enlarge the South Fork Mokelumne River and dredge the North Fork Mokelumne River
4B. Enlarge the South Fork Mokelumne River and dredge the North Fork Mokelumne River and enlarge the Delta Cross Channel gates
5A. Enlarge the North Fork and main stem Mokelumne River and dredge the South Fork Mokelumne River
6A. Create an island floodway
6B. Create an island floodway and enlarge the Delta Cross Channel gates

Regulatory Context

The most important Federal laws applicable to archeological and historic resources are the National Historic Preservation Act of 1966 (as amended; P.L. 89-665, 95-515) and the National Environmental Policy Act of 1989 (P.L. 91-190), and regulations associated with them, particularly 36 CFR 800. These statutes and regulations, as well as others that also apply to cultural resources (e.g., P.L. 93-291), cover all projects that include Federal land, are supported in whole or part by Federal funds, or require a Federal permit (e.g., 404 Permit), include a consultation process with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) to ensure that potentially significant historic resources have been adequately considered in the planning for an undertaking.

The National Register of Historic Places (NRHP) has been established by statute to list sites deemed to have historical significance (365 CFR 60). Any Federal action that could

affect a cultural resource listed on or eligible for listing on the NRHP is subject to review and comment under Section 106 of the National Historic Preservation Act. Affects to these historic properties must be considered in accordance with the regulations of the Advisory Council on Historic Preservation (36 CFR 800). Insignificant cultural remains usually do not require management consideration unless they possess the qualities specified by the California Environmental Quality Act (CEQA) or other laws.

Significance of cultural resources - which generally must be at least 50 years old to be considered - is measured by NRHP criteria for evaluation:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and,
> (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) That are associated with the lives of persons significant in our past; or
> (c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) That have yielded, or may be likely to yield, information important in prehistory of history (36 CRF 60.4)

The most important state regulations providing for the protection of historic properties, including prehistoric and historic archeological resources, are contained within CEQA Appendix K (14 California Administrative Code, Section 15000 et seq.), which outlines procedures appropriate for the protection and preservation of such resources. The Health and Safety Code (Section 7052) prohibits the disturbance of human remains except under certain conditions and also specifies procedures (Ch 1492), including consultation with the California Native American Heritage Commission, to be followed in the event that Native American graves are found. Other sections of the Public Resources Code (Sec. 5025, 5024.5, 5097.5, 6313), prohibit unauthorized disturbance or removal of archeological or historical resources on public lands and specific procedures to be followed in the event such resources are to be altered. The State Penal Code (Section 622.5) applies to objects of historical or archeological interest located on public or private land and, specifically exempting the land owner, provides penalties for damaging such objects.

CEQA Statutes and Guidelines define an "important archeological resource" as one which:

A. Is associated with an event or person of
   1. Recognized significance in California or American history, or
   2. Recognized scientific importance in prehistory.
B. Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archeological

research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archeological methods (California Office of Planning and Research 1986: 295-296).

If, after identification and evaluation, an archeological site is determined to be legally important under Federal statute, then a mitigation plan must be prepared in consultation with the State Office of Historic Preservation and the Advisory Council on Historic Preservation. If an archeological site is deemed not to be legally important, both the resource and the effect on it should be noted but need not be considered further in the process. In the NDP, where both CEQA and NRHP evaluation criteria apply, Federal standards prevail. Historic properties assessed as NRHP-eligible are also considered significant and procedures for managing these properties under 36 CFR 800 satisfy the CEQA Statues and EIR Guidelines as well.

Scope of Work

In compliance with the Section 106 review process, DWR contracted with DPR to provide a Class I Archeological Survey of the Study Area. Such a survey is defined as follows:

> A Class I survey is primarily a literature/archival search. It consists of consulting the National Register of Historic Places and supplemental National Register listings to determine whether or not any National Register eligible/listed properties exist in the area of a Reclamation action or on lands under Reclamation's administration. It also includes contacting the SHPO, State Archeologist, State Historian, State Historical Society, and/or other appropriate individuals, agencies, or institutions to determine what cultural resources may be present in an area and what kind of additional information may be needed for an adequate inventory of cultural resources. Regional records shall also be examined for potentially eligible properties for listing on the National Register of Historic Places on lands under Reclamation's administration. It may be necessary to visit potentially significant areas or sites identified by the literature/archival research. If a Class I survey indicates that the area has not been adequately inventoried, then a field examination is necessary (U.S.Bureau of Reclamation 1989).

In addition, a field (Class II) survey of areas of immediate affect along the Lower Mokelumne under the Preferred Alternative was undertaken in 1991 (West 1991).

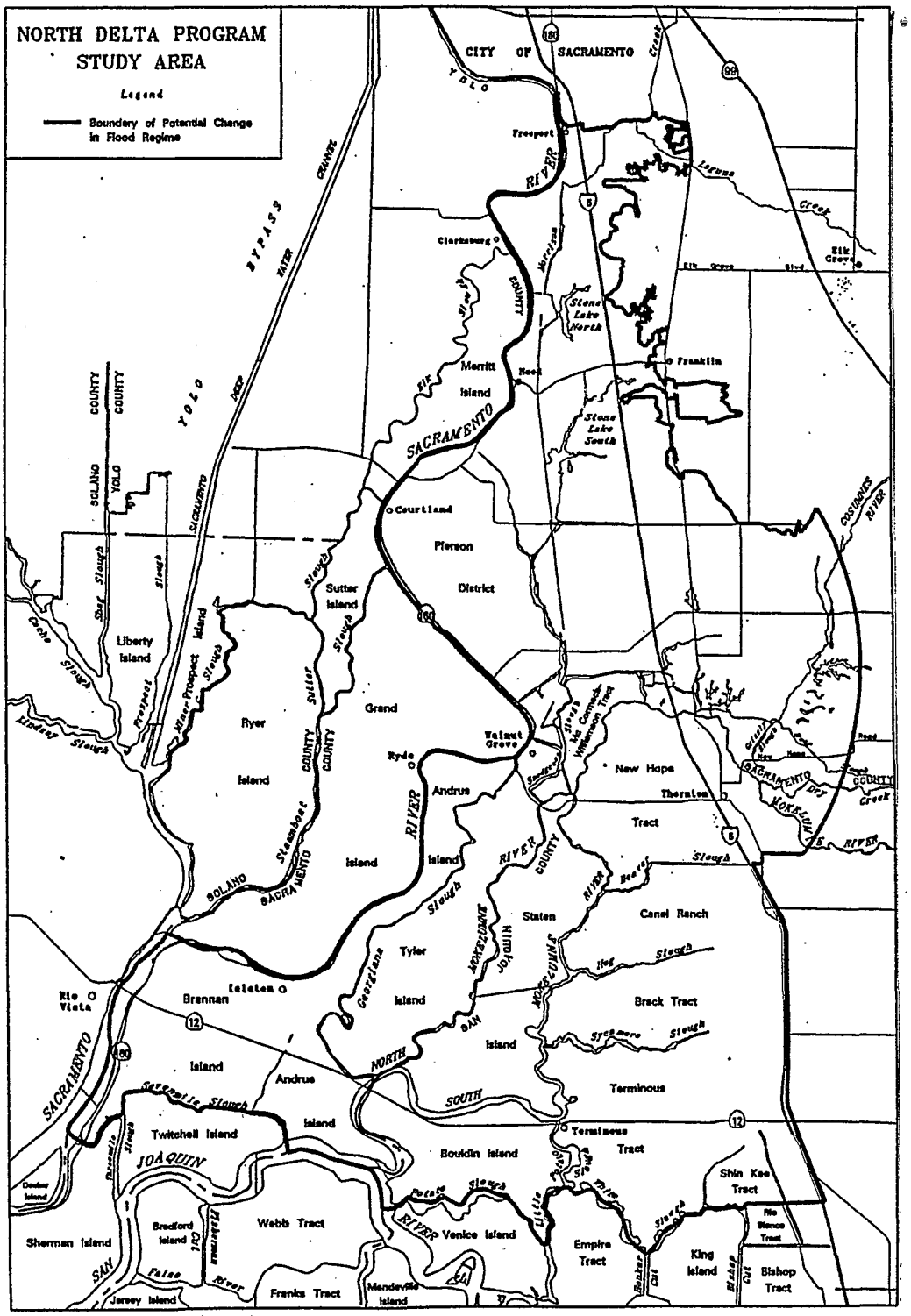


Figure 1. North Delta Program (NDP) Study Area

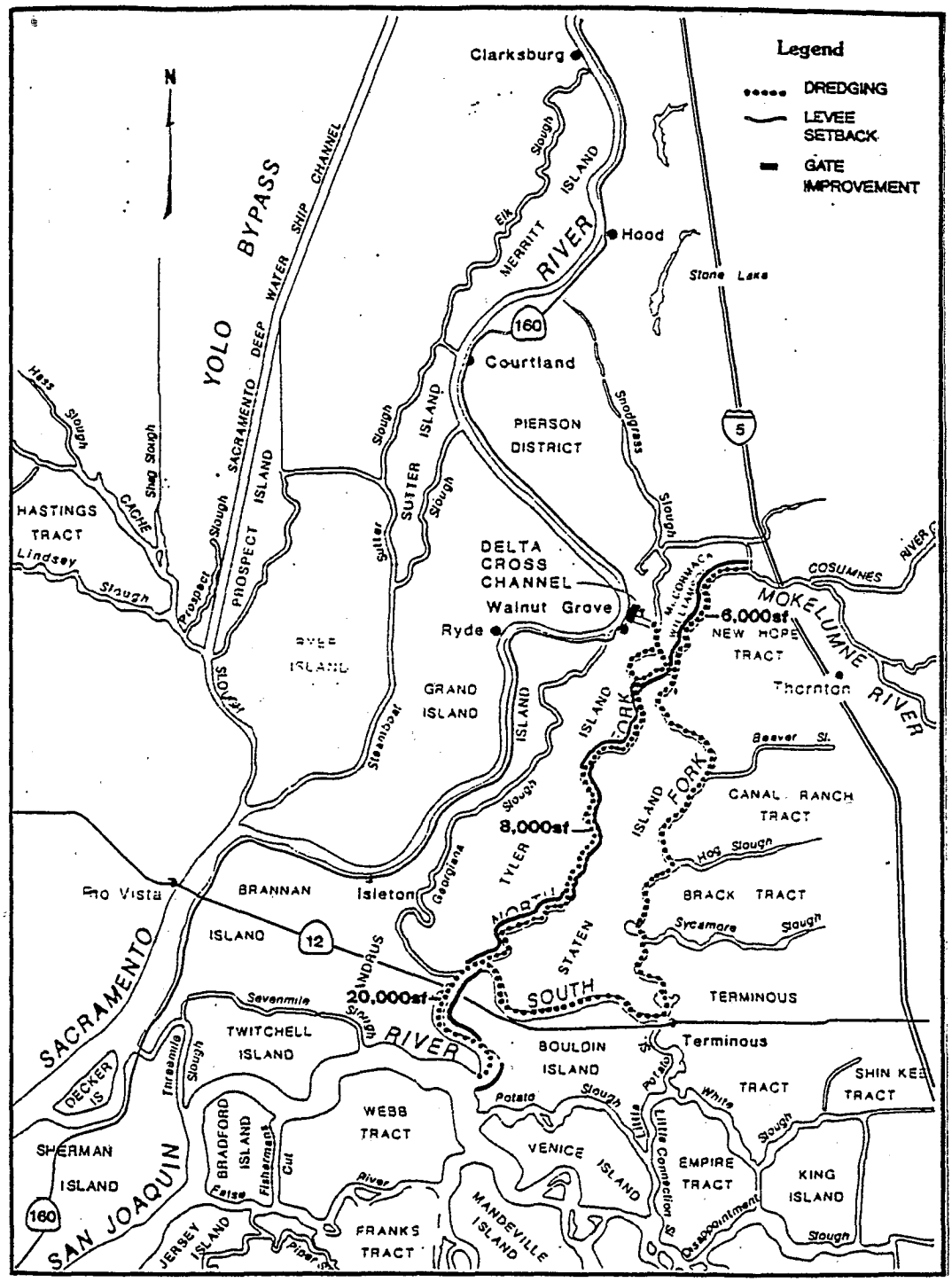
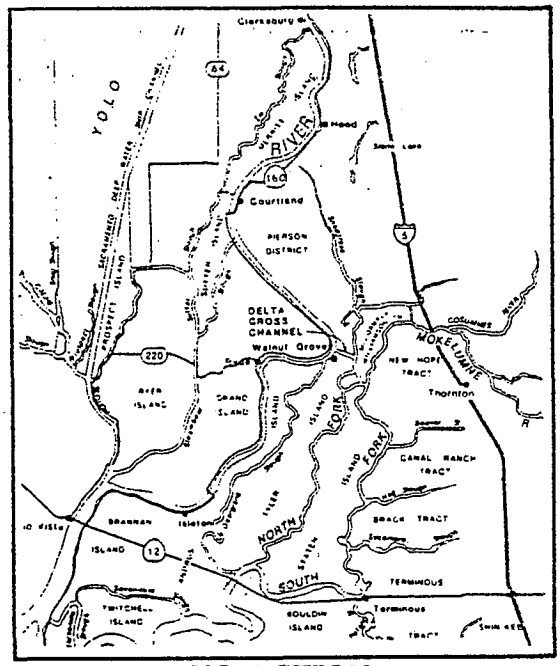


Figure 2. North Delta Program Preferred Alternative (5B)



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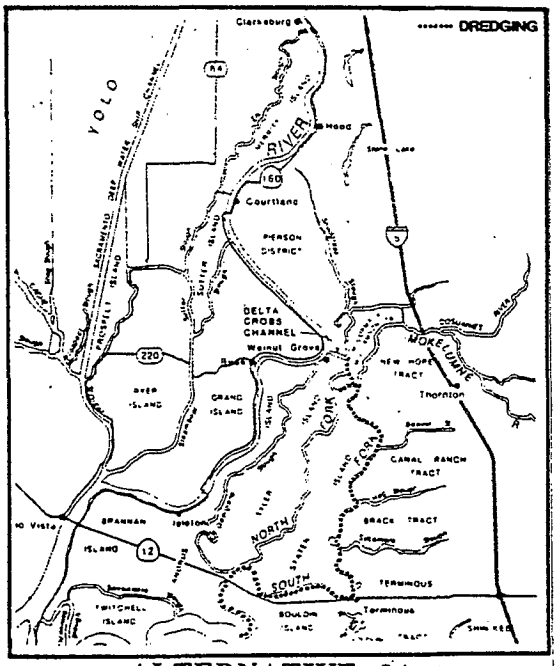
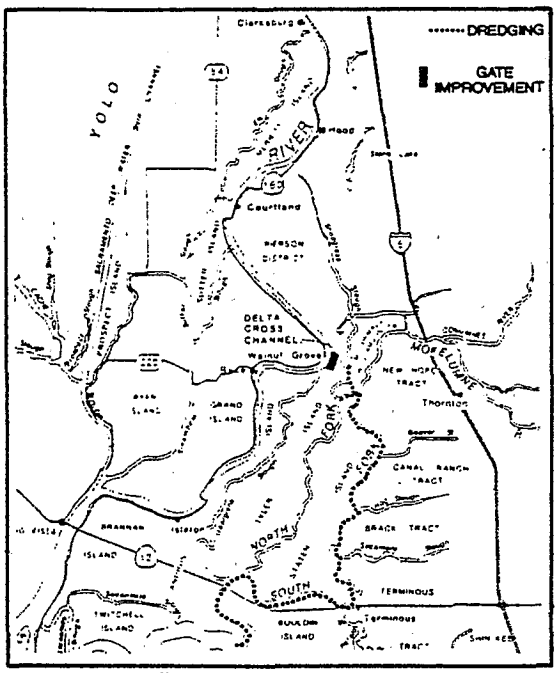
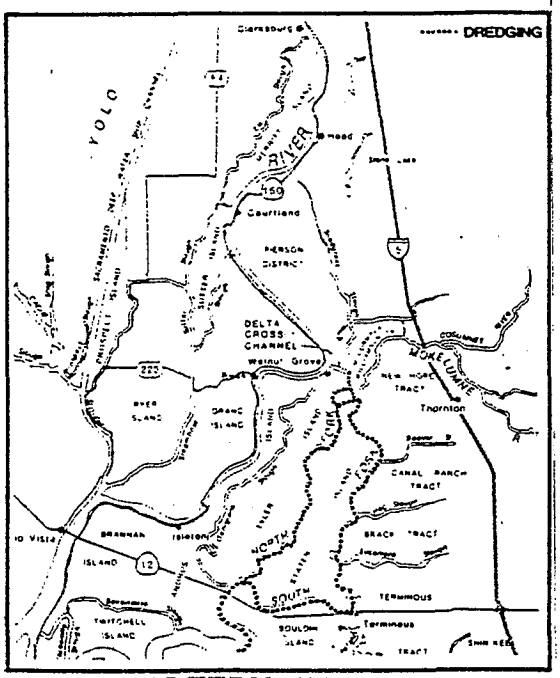


ALTERNATIVE 2A

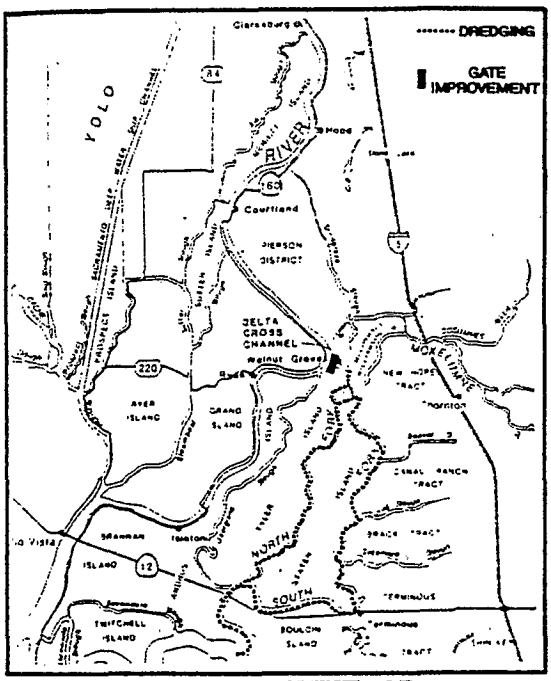


ALTERNATIVE 2B



ALTERNATIVE 3A

Figure 3. Other North Delta Program Alternatives



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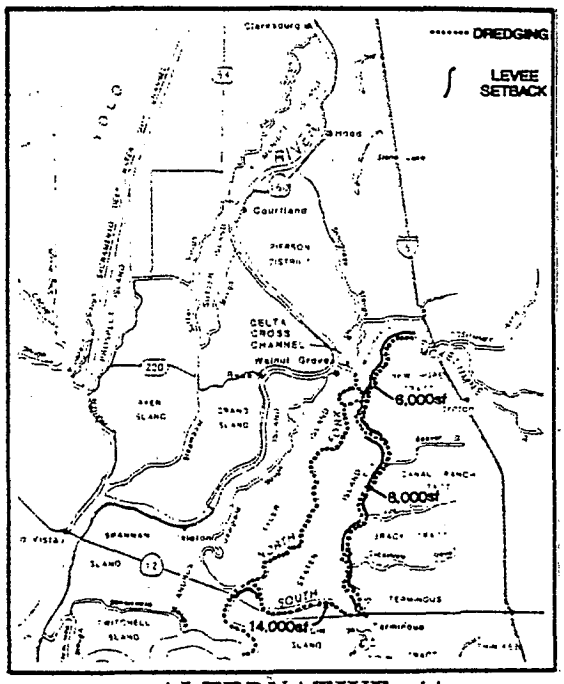

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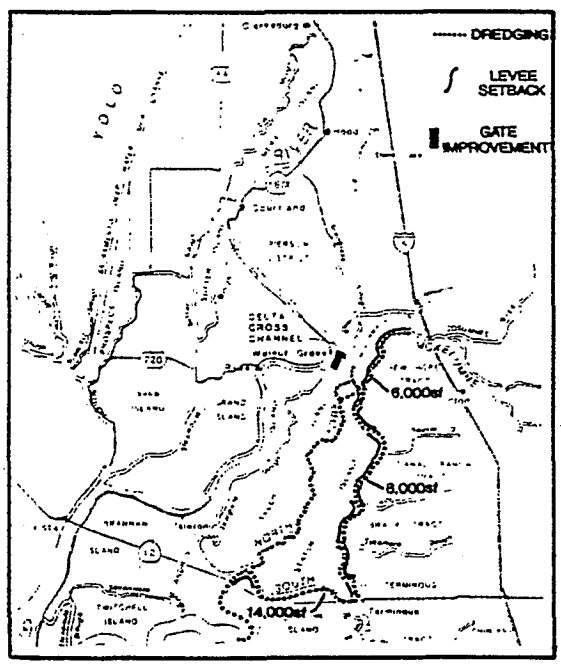

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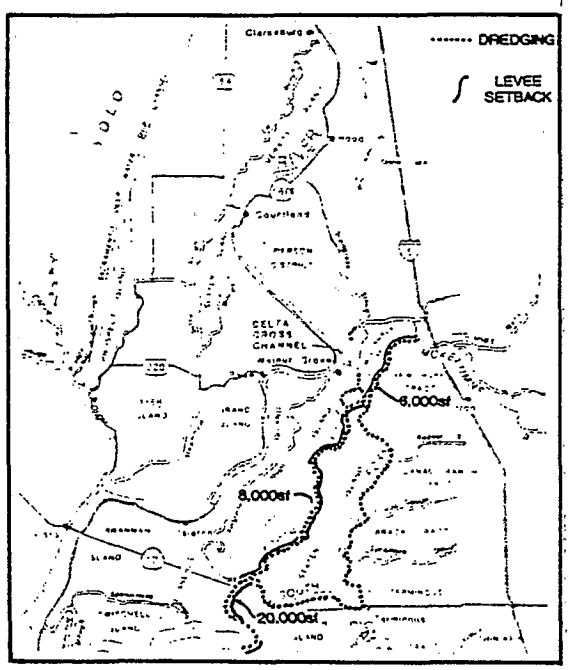
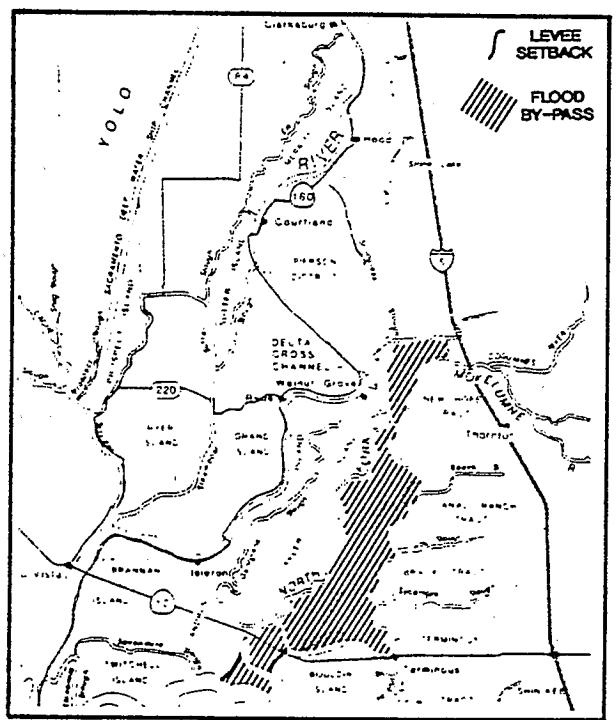
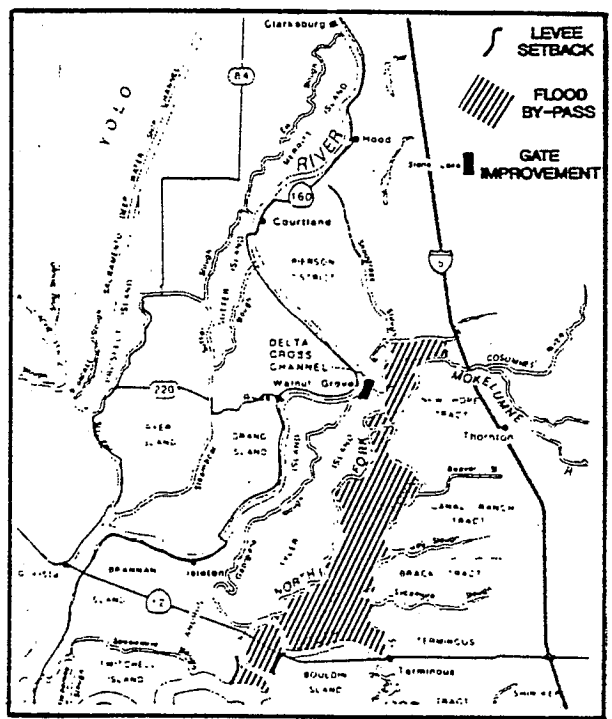


ALTERNATIVE 5A

Figure 3 (Con't). Other North Delta Program Alternatives



ALTERNATIVE 6A



ALTERNATIVE 6B

Figure 3 (con't). Other North Delta Program Alternatives

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RESEARCH METHODS

Preparation of this report involved review of archeological, ethnographic and historical literature, as well as examination of early records and documents, systematic examination of historic maps and archeological site records, consultation with historians and archeologists familiar with the study area, and contacting Native American groups and local historical societies.

As part of this study information was obtained from the following repositories, usually through repeated visits by the authors:

California Department of Parks and Recreation (Resources Management Division, Central Records), Sacramento;
California Resources Agency Library, Sacramento;
California State Archives, Roseville;
California State Library (California Section; General Collections; Government Documents Section), Sacramento;
California State Railroad Museum, Sacramento;
California State University, Stanislaus (Archaeological Information Center);
Haggin Museum, Stockton;
PAR Environmental Services, Sacramento;
Sacramento History Center, Sacramento;
Sacramento State University (Library; Archaeological Information Center);
State Office of Historic Preservation, Sacramento;
U.S. Bureau of Land Management, Sacramento;
University of California, Berkeley (Bancroft Library; Map Library; General Library; Archaeological Research Facility);
University of California, Davis (Shields Library).

Due to time constraints, some information repositories - notably the San Joaquin County Historical Society and the University of the Pacific - could not be visited.

In addition, the following individuals were contacted by the authors for information and guidance regarding the project:

Dr. Paul Bouey, Far Western Anthropological Research Group, Davis;
Dr. Catherine A. Callaghan, Ohio State University, Columbia, OH;
Dwight Dutschke, Office of Historic Preservation, Sacramento;
Gene Itogawa, Office of Historic Preservation, Sacramento;
Dr. Jerald J. Johnson, Department of Anthropology, Sacramento State University, Sacramento;
Patti Johnson, U.S. Army Corp or Engineers, Sacramento;
Dr. Peter Leung, Asian-American Studies Department, University of California, Davis;
Mary Maniery, PAR Environmental Services, Sacramento;
Dr. Randall Milliken, Oakland;
Sylvia Sun Minnick, California Department of Parks and Recreation, Sacramento;

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Tod Ruhstahler, Haggin Museum, Stockton;
Kim Tremaine, BioSystems Analysis, Inc., Sacramento.
Dr. James West, Office of Environmental Quality, U.S. Bureau of Reclamation, Sacramento;
Cynthia Woodward, Office of Historic Preservation, Sacramento;

On the recommendation of NAHC and OHP, the following historical societies and Native American organizations were contacted by letter:

Amador Tribal Council, Alvin Walloupe, Chairperson, Ione;
Consumnes River Miwoks, Gary Blue Yonemura, Sacramento;
Elk Grove Historical Society, Elk Grove;
Galt Historical Society, Galt;
Ione Band of Indians, Harold Burris, Chairperson, Ione;
Ione Band of Miwok Indians, Nicolas Villa Jr., Chairperson, Ione;
Isleton Brannan Island Historical Society, Isleton;
Sacramento River Delta Historical Society, Walnut Grove;
San Joaquin County Historical Museum, Debbie Hastel, Lodi.

Replies were received from the Sacramento River Delta Historical Society and the Galt Historical Society (Appendix 1).

Archeological Surveys

A wide variety of archival sources were searched in this Class 1 survey. The two archaeological Information Centers that hold the site records and copies of survey reports for Sacramento (Sacramento State University) and San Joaquin (California State University, Stanislaus) counties were queried about sites in the project area. Original site records from the University of California Archaeological Research Facility (Berkeley) were examined. Other information repositories checked were the files of the California Department of Parks and Recreation (Sacramento) and the holdings of the State Office of Historic Preservation (Sacramento). Another source of information on prehistoric sites was the library of PAR Environmental Services (Sacramento).

Reports of archeological surveys conducted in the project area were consulted to attempt to confirm the placement and the status of prehistoric sites. In particular, those reported only by Schenck and Dawson (1929), but not otherwise confirmed, are of some concern. Site placement on these records was very approximate (generally to within 40 acres) and many of the sites were already said to have been levelled. In 1962 U.C. Berkeley graduate student Zenon Pohorecky identified several sites (SJO-114, -115 and -116) solely on the basis of soil testing for calcium deposits. These locations have not been independently confirmed as being due to human habitation by finds of artifacts or burials.

Cartographic Review

While a formal record system for archeological (originally, specifically Native American) sites has been in existence in this part of California for over 60 years, the same is not true for strictly historic sites and structures. Thus in terms of identifying potentially NRHP-eligible properties, a difficult problem exists in that only the most recent cultural resource surveys have included attention to historic resources, and these surveys include only a small percentage of the study area. Consequently it was necessary to provide an initial estimate of the number and distribution of potentially significant properties.

Owens (1990), in a study for the Corps of Engineers, prepared an overview of cartographic evidence of historic property locations in the Delta as a whole, based on General Land Office, Geological Survey and similar early maps. The present study used this as a model, employing additional maps and providing UTM coordinates and an initial estimate of the integrity of the potential properties.

The procedure involved transfer of historic site locations to recent topographic quadrangles, and systematic recordation of the information provided by each map source. Potential survival of historic structures was estimated based on presence or absence of plotted structures at each site on the most recent USGS 7.5' quadrangles, exclusive of photorevisions. Survival of archeological resources at a site was assumed to be possible except when it had been impacted by channel dredging or freeway construction or had been previously tested with negative results.

This method provides a quantifiable overview of historic sites and structures which may survive within the project area. Except in unusual cases, it does not provide the detailed information necessary to access the significance of such properties, nor can a direct assessment of integrity be provided except where field study has been carried out.

Given the reliance on early maps, a brief discussion of methods is necessary. In the present study, greatest reliance was placed on those maps resulting directly from instrument surveys or - beginning in 1931 - on aerial photo compilations. Included in this series, however, were railroad surveys, which raised considerable problems. While based on initial instrument surveys, these maps tended to be reproduced for decades, with only the features within the right-of-way being updated. Maps of the proposed Sacramento Southern line through Walnut Grove, for example, were initially prepared in 1907 (SSRR 1909); at least as late as 1950, however, Southern Pacific was still using the same base map, updating only the features on its own property (SPCo c.1950).

A similar difficulty was experienced with county maps and charts of Delta landings. These maps provided useful information on land holdings and names of landings, but sites were often casually located, and details that no longer applied were sometimes recopied from earlier maps. Behrens (c. 1930), for example is a well-delineated chart of Delta landings, but it draws on a much earlier map of the region's channels. In areas where these channels had

since been realigned, such as the southern edge of Bouldin Island, its locations of camps and landings are worthless.

These difficulties were taken into account in the present review. Camps and landings which could not be precisely located were excluded, or assigned only tentatively to otherwise definite site locations. Locations found only on secondary sources were generally excluded unless the cumulative evidence suggested they were reliable.

Geographical Organization

For convenience in handling the data, and to provide clearer focus in planning, the NDP study area is here classified into 19 districts. For the most part these are natural island or well-recognized tracts. In some cases, however, the districts are arbitrarily defined or historically-recognized tracts are expanded to include adjacent areas. These districts are shown in Figure 4, and the historical backgrounds and known resources of each will be discussed in subsequent sections.

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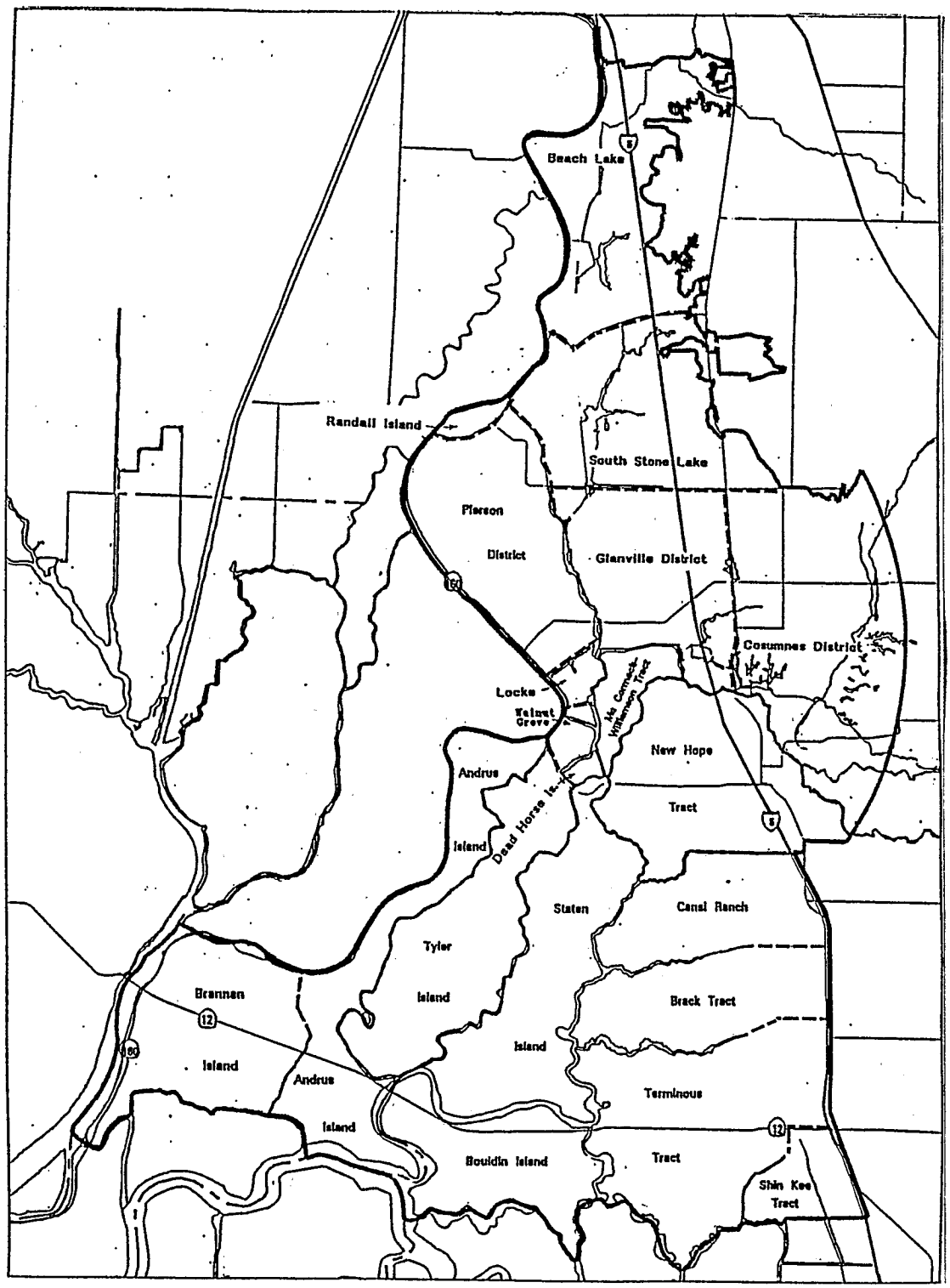

Figure 4. Location of individual districts within the North Delta Program Study Area.

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HISTORICAL OVERVIEW

Prehistoric Occupation of the Delta

In the late 19th century a number of individuals began digging in the mounds of the Delta area to seek artifacts. One of the earliest was James Barr of Stockton who was active doing field surveys and site excavations from 1880-1906. Other excavators around the turn of the century included H.C. Meredith, P.M. Jones and W.H. Holmes. Elmer Dawson of Thornton was active in site survey and archeological testing from 1912 to 1929 (Derr 1990:5-6). W. Egbert Schenck subsequently collaborated with Dawson to publish his findings (Schenck and Dawson 1929). Although these workers noted differences in cultural practices and artifact types among the excavated sites, their work did not result in any classification or analysis of the patterns they encountered.

In the 1930s, Sacramento Junior College under the direction of Dr. Jeremiah Lillard began excavation of a number of the mound sites in the Delta. To account for the patterns they observed, Lillard and his students developed a classic tri-partite historic division with the titles Early, Middle and Late Horizons (Lillard, Heizer and Fenenga 1939; Heizer and Fenenga 1939). This classification was subsequently elaborated by Beardsley (1954).

This classification was later modified into a system in which Early Horizon became the Windmiller Pattern (ca. 2500 B.C. to 500 B.C.), the Middle Horizon (in the lower Central Valley) became the Berkeley Pattern (ca. 1000 B.C. to A.D. 1000), and the Late Horizon became known as the Augustine Pattern (ca. A.D. 500 to A.D. 1800). These Patterns were broken down into Phases and Facies to allow for more selective definition of relatively minor adaptations and shifts within a more dominant pattern. The most frequently used are Phase 1 and 2 of the Augustine Pattern, the transition between the two occurring about 1500 A.D. (Fredrickson 1973; Moratto 1984:201-214; Bennyhoff and Hughes 1987:149). In addition, an additional pattern - the Meganos Complex has been identified at various sites contemporary with the Berkeley and Augustine Patterns (Bennyhoff 1968).

In the last two or three decades archeological investigation has shifted away from a focus on cultural classification to the investigation of other aspects of prehistoric culture and adaptation. Of particular interest have been studies of subsistence adaptation, paleodemography, paleopathology, settlement patterns and exchange networks (e.g. Doran 1980; Schulz 1981; Dickel, Schulz and McHenry 1984; Jackson 1986; Tremaine 1994). All such studies, however, have been based on the culture sequence previously established for the region.

Environmental Background

Human occupation of California extends back at least 11,000 years, but no evidence has been found of settlement in the Delta prior to 4500 years ago. To understand the reason for this, and to understand the adaptations of the regions cultures, it is necessary to understand the formation of the present Delta.

The Delta is a large tidal wetland located in the center of the Sacramento-San Joaquin Valley where the Sacramento, San Joaquin and Mokelumne River Systems converge at the head of the San Francisco Bay estuary. Drainage from one-third of the State's land areas passes through this area. Historically this region was a low-lying zone in which the meandering distributares of the three river systems formed innumerable islands covered by marsh vegetation and bordered - where natural levees were present - by riparian forests. In geological terms, however, this was a fairly recent development.

At the height of the last glaciation, sea levels were about 300 ft lower than at present, and the Sacramento River entered the ocean several miles west of the Golden Gate. At the end of the Pleistocene, sea levels began to rise. In the period from 10,000 to 8,000 years ago this rise was quite rapid, amounting to 6.5 ft per century; thereafter the rate began to decline. Although sea level rise has continued to the present, over the last 6,000 years it has averaged 4-8 inches per century. As a result, the rising sea entered the Golden Gate between 10,000 and 11,000 years ago and by 6,000 years ago had begun to approximate the present San Francisco Bay (Atwater, Heidel and Helley 1977).

The formation and expansion of San Francisco Bay meant that water discharge from the Central Valley was increasingly impeded. This converted the Delta from an erosional to a depositional zone. A marsh community began to expand across the increasingly inundated flood plain, and as sea levels continued to rise peat deposits were formed from the decaying roots of these plants. Peat soil formation in the western Delta was underway by 6000 years ago. Over the ensuing millenia peat deposits have accumulated and expanded eastward in correlation with rising sea level (Fig. 5; cf. Schlemon and Begg 1975; West 1977; Atwater and Belknap 1980).

East and north of the peat zone, sedimentation gradually raised the level of the flood plain. Numerous large lakes formed along meandering creek and slough systems in the lowlands back of the main river channels, fed not only by local runoff but by periodic overflow from the rivers (Schlemon 1971; Atwater 1980). The age of these lakes is presently unknown, but archeological site distributions indicate that they were a focus of human exploitation by 2000 years ago.

Given abundant evidence for human occupation in other areas of California during the first half of the Holocene, it is virtually certain that contemporaneous settlements existed in the Delta. In the absence of any local evidence of human activity prior to 2500 B.C., then, it must be assumed that alluviation on the Valley floor has buried any surviving sites from earlier eras (Bickel 1978:7; cf. Curtice 1961:20-25).

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Recent archeological studies have shown particular interest in the effect of climatic change - particularly changes in rainfall - on local human adaptation. Unfortunately, little direct evidence of such change is available from the Delta itself. As a consequence, considerable reliance has been placed on the long tree ring sequence of bristlecone pines in the White Mountains. This sequence has been especially attractive because variation in ring widths at lower elevations reflect changes in rainfall, and because the reflected long term wet and dry cycles correlate closely with the prehistoric culture sequence in Central California. Thus Windmiller and Augustine Phase 1 occupation occur during periods of long term drought in the White Mountains, while interior Berkeley and Augustine Phase 2 occupations correlate with much wetter periods (Moratto, King, and Woolfenden 1978; Schulz 1981). It should be noted, however, that very little independent evidence to support extrapolation of the White Mountain sequence into the Central Valley has yet been produced.

Windmiller Pattern

This archeological complex (formerly known as the Early Horizon) dates from about 2500-500 B.C. Windmiller sites have been recorded from the North Delta south to Stockton and east to the Camanche Reservoir. The complex may be represented by as many as 10 sites in the present study area, most of them in the New Hope Tract. The Windmiller Pattern is the only culture known from the Delta during this period; contemporaneous sites in the Bay Area have been associated with the Berkeley Pattern (see below). In at least two Delta sites Windmiller components are found stratigraphically below later Berkeley or Augustine components.

The Windmiller Pattern is perhaps the most distinctive prehistoric complex in Central California. Windmiller sites yield a variety of artifacts diagnostic of the time period. Among these are large projectile points of chert and obsidian, pecan-shaped grooved objects of baked clay, quartz crystals, steatite tobacco pipes, steatite beads, finely ground alabaster and schist charmstones, abalone and olivella shell ornaments, and ground slate pins.

What truly distinguished the Windmiller Pattern, however, was the mortuary complex. The great majority of the recovered artifacts are grave goods, associated with burials interred in a ventrally extended position, oriented to the west and southwest. Such an insistance on extended and closely oriented burials is otherwise unknown from prehistoric Central California (although there are some indications of more ancient parallels in Southern California). Furthermore, recent studies conclude that Windmiller sites were not villages but specialized cemeteries (Schulz 1981; Meighan 1987).

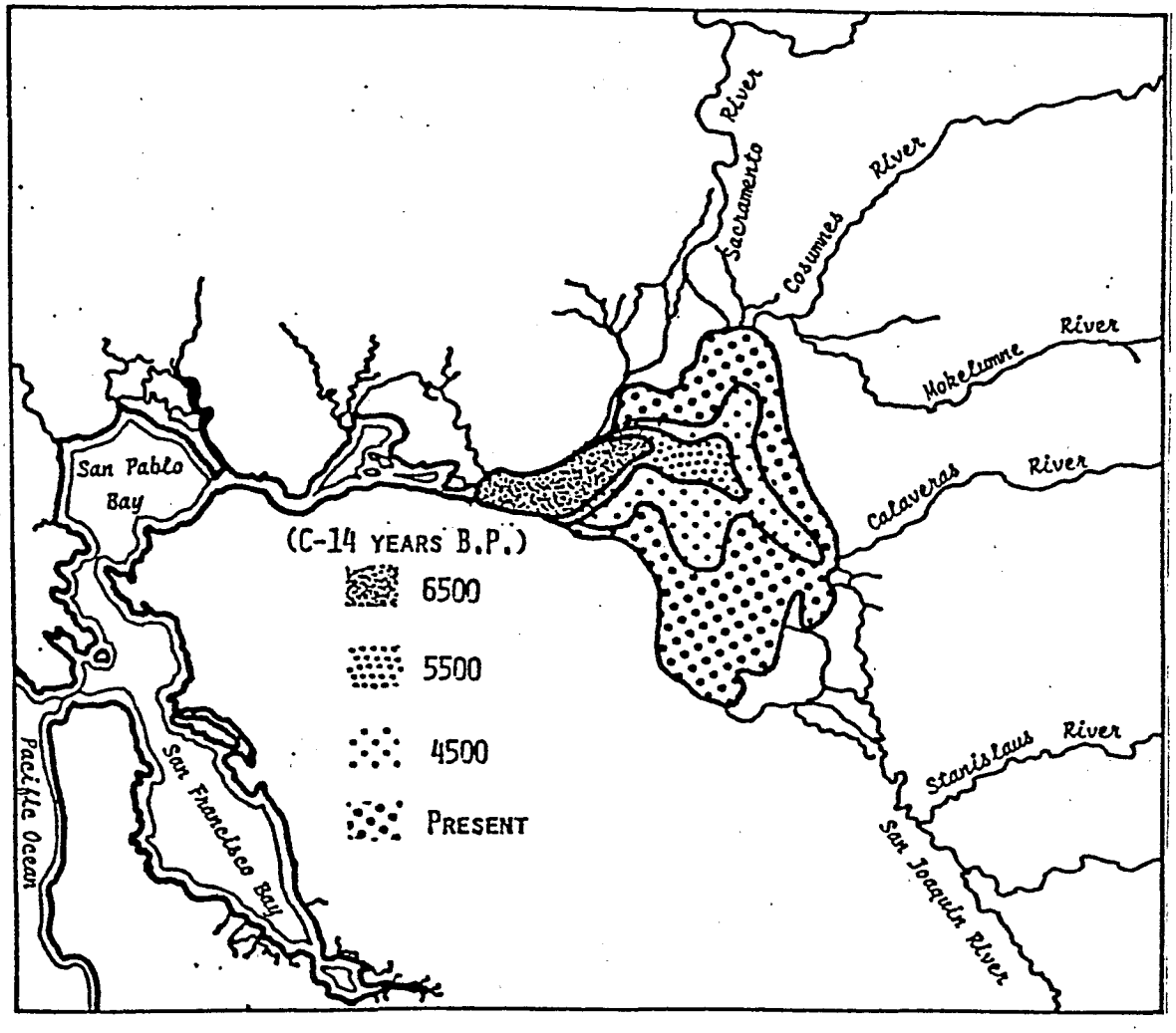

Figure 5. Holocene expansion of peat deposits in the Delta (West 1977).

Analysis of Windmiller burial orientation has shown a statistically significant association with the range of the setting sun along the western horizon. Furthemore, the great majority (80%) of burials are oriented to the winter half of that range (Schulz 1970).

The burial orientation data have been related to a long-standing debate concerning the antiquity of the acorn complex - that is, of the historic pattern in which acorns constituted the dietary staple (equivalent in importance and productivity to agriculture elsewhere in native North America) and were associated with a particular set of processing tools and procedures - and specifically of its relevance to the Windmiller economy. As early as 1949, Heizer noted the abundance of Windmiller projectile points and the paucity of grinding tools, and hypothesized that the subsistence economy depended primarily on hunting (Heizer 1949). Subsequently, McHenry (1968) provided paleopathological evidence that Windmiller children suffered greater metabolic stress than was common in later periods, and argued that the subsistence base was less reliable. Ragir (1968; 1972), however, argued that Windmiller sites contained more milling tools than Heizer (1949) had realized, and that the artifactual evidence was thus compatible with an acorn-based economy.

With this background, two distinct interpretations were made of the burial orientation data. Schulz (1970) hypothesized that the dominance of winter orientations indicated a concentration of mortality in that season. Along with paleopathological evidence, this was taken to indicate at least occasional unreliability of winter food stores, and that the Windmiller economy - unlike later economies in the region - did not rely on acorns as a major food source (cf. Dickel, Schulz and McHenry 1984).

Moratto (1984:204-206), on the other hand, saw burial seasonality merely as indicating the time of year when particular cemeteries were most in use. He viewed Delta plant food resources as so abundant "that it is difficult to imagine recurrent episodes of starvation unless the effective environment had been modified greatly by climatic changes." Furthermore, the number of mortar fragments in Windmiller sites was sufficient to "suggest that pulverizing of acorns or other seeds was an important activity." The paucity of summer orientations was attributed to a pattern of transhumance in which Delta Windmiller people moved into the foothills during the summer. With such populations he associated the Sierra mortuary caves that were in use during this period.

Neither of these interpretations is entirely convincing. The significance of heavy winter mortality, if the known Windmiller cemeteries are representative, is difficult to assess, since no corresponding evidence is available from later populations known to have had acorn-based economies. On the other hand, while records of historic transhumance in the San Joaquin Valley can be offered as parallels for the Windmiller settlement system, association with the Sierra mortuary caves implies use of completely different funerary practices in different seasons. Futhermore, the one Windmiller component known from the Sierra foothills exhibits the same pattern of winter mortality found in the Delta (Schulz 1970).

Several authors have followed Ragir (1968; 1972) in pointing out that milling tools are more common in Windmiller sites than originally supposed. The only detailed study of these tools, however, indicates that they are markedly less common than in later sites, and many were clearly used for purposes other than food processing (Schulz 1981). Again, neither of these arguments is compelling. Given the nature of the Windmiller sites as specialized cemeteries, it is clear that the artifact assemblages do not reflect subsistence activities as directly as do those from later midden sites. In this situation, the only directly comparable data in regard to subsistence patterns comes from paleopathological study of the burials themselves. Studies undertaken to date suggest that the Windmiller subsistence base was less reliable than was that of the succeeding Berkeley Pattern (Dickel, Schulz and McHenry 1984).

An innovative critique of this debate has been provided by Basgall (1987). He notes that virtually all analyses have assumed that the acorn was a resource of such high caliber that its use would be expected in any California subsistence economy within range of suitable natural crops. While the acorn constituted a highly productive crop amenable to long-term storage, Basgall argues that "it is handling costs that ultimately condition subsistence choices, and if too great, such costs will cause a resource to go under- or unexploited until such time as increased production at the expense of productivity becomes necessary" (Basgall 1987:41).

Effective acorn exploitation required an appropriate settlement system with a decrease in mobility and hence impaired access to other resources. It may have placed more onerous labor requirements on those most responsible for harvest and processing (i.e., women). It also implied increased territorial consolidation and more formalized political organization. And although the acorn provided a more reliable dietary capable of supporting a denser population, decreased mobility meant increased susceptibility to disease, and paleodemographic evidence in fact suggests declining longevity in later acorn-reliant cultures (Doran 1980). Given these factors, the transition to acorn dependence can be expected among populations dense enough to repay the committment, and the transition, once made, could provide selective advantages in conflicts with non-adapted groups. But for mobile groups capable of supporting themselves on a diffuse resource base, acorn reliance entailed unreasonable costs (Basgall 1987:41-45). Prehistoric acorn reliance thus cannot be presumed a priori, but must be demonstrated from archeological evidence. The evidence presently available suggests that the Windmiller (and perhaps the Meganos) economy had not made that transition, but that the Berkeley economy had.

Between 1000 and 500 B.C. the Windmiller Pattern was superceded by the Meganos Complex and the Berkeley Pattern. Its relationship with these subsequent cultures is not yet clear.

Berkeley Pattern

In the Delta the Berkeley Pattern (here formerly known as the Transitional Period or the Middle Horizon) extends from about 500 B.C. to between 500 and 1000 A.D. In the Bay

Area, however, what has been argued to be the same complex appears as early as 2500 B.C. This proposition, however, is not universally accepted, suffers from lack of clarity as to the defining traits of the complex (Gerow 1974).

A wide variety of artifacts characterize assemblages of this pattern as it appears in the Delta (Bennyhoff, in Elsasser 1978:40-41). A general list is given in Moratto (1984:180): "large foliate and concave-base projectile points; imperforate charmstones; bone awls, statulae, bipoints, and fish spear tips; varied baked-clay objects; millingstones, cobble mortars and pestles; and an array of shell beads and ornaments." The funerary complex is characterized by flexed burials lacking any predominant orientation and usually interred within the village. Judging by the number of mortars and pestles found, the dietary appears to have focused on acorns.

The Cosumnes District forms an important center for this pattern, and a variety of local variations or phases ("facies") of the complex have been defined. Five of these facies are based on sites within or immediatley adjacent to the study area: Lobensels (SAC-73), Morse (SAC-66), Hicks (SAC-60), Brazil (SAC-43) and Need (SAC-151).

Acceptance of an association between the Delta complex and the much earlier representation in the Bay Area suggests that the Berkeley Pattern originated there, later expanding into the Delta, and displacing the Windmiller population from the Mokelumne northward by 500 B.C. Given the very tentative evidence for an increase in rainfall at about this time, it is possible that the lower Sacramento Valley witnessed an expansion of oak woodlands, and that more populous Berkeley groups already adapted to systematic exploitation of this resource, were able to displace or incorporate smaller Windmiller populations less effectively adapted to the new environment.

What this change might mean in terms of later ethnic or linguistic groups is not clear. It is tempting to see the entrance of the Berkeley Pattern as the arrival of ancestral Miwok-speaking peoples, but the Bay Area historically was the home of people speaking Costanoan, Wappo and Wintun languages as well. Furthermore, since little is known of the occupation of the area north of the Delta prior to 500 B.C., it is not even certain from which direction the Berkeley population (or cultural influence) entered the Delta.

Equally unclear is the relationship between the Berkeley Pattern and the contemporaneous Meganos Complex or the succeeding Augustine Pattern.

Meganos Culture

A peculiar mortuary trait of ventrally (later dorsally) extended burials, lacking any particular orientation, usually interred in special cemeteries and usually accompanied by few grave goods, appears in the Delta following the Windmiller occupation. These burials are often placed in sand hills (meganos, in Spanish). The study area includes at least two sites (SAC-66 and SAC-104) having components associated with the Meganos Culture (Bennyhoff

1968).

Bennyhoff (1968) recognized 17 Meganos sites, of which eight were specialized cemeteries. Not only do the cemeteries contain few grave offerings, but midden deposits at the occupation sites are shallow and include few artifacts. This suggests a semi-sedentary occupational pattern "with greater emphasis on seasonal movement and much more frequent shifts in village locations than is typical of Berkeley or Augustine" populations (Bennyhoff 1968:5).

While the Meganos complex has been seen as "a fusion of the Windmiller and Berkeley Patterns" (Bennyhoff 1968:1), it seems as likely that it represents simply a continuation of the Windmiller Culture following a religious change which devalued grave goods and solar burial orientation. Whatever the origin of the complex, it expanded westward into the Bay Area for several hundred years before retreating to the Delta. The last evidence from the Delta is about 1000 A.D.

Augustine Pattern

This cultural complex is generally dated from ca. 500 A.D.to historic times. It has been divided into two widely accepted temporal phases: Phase I (A.D. 500 - 1500), Phase II (after A.D. 1500). Renamed by Bennyhoff (1968) as the Augustine Pattern for a site by that name (Sac-127), and by Ragir (1972) as Hotchkiss Culture based on finds at site CCo-138. In the North Delta, the Augustine population is ancestral to the Plains Miwok (Bennyhoff 1977). The material attributes of this complex are: "flexed or (occasional) extended burials as well as cremations; preinterment burning of artifacts; serrated points and curves of obsidian; incised bird bone tubes; elaborate *Haliotis* shell ornaments; clamshell and magnesite disk beads as well as *Olivella* beads; and shaped, flat bottomed mortars" (Moratto 1984:180, 212-213).

In addition to major villages - usually located along the rivers - smaller camp sites were located around the lakes and sloughs of the interior. Initial occupation of these sites was sometimes initiated by Berkeley Pattern people, but occupation clearly increased as Augustine exploitation of palustrine resources intensified. The Augustine Pattern grades into the period of historic contact with first Spanish and then other intruders. Although a host of new artifacts are added during this period (glass trade beads, iron items, etc.), they are simply added to an ongoing artifact assemblage that had been in use for at least the past three or four hundred years (Phase II of the Augustine Pattern).

Plains Miwok

The great majority of the North Delta Program study area lies mainly within lands formerly occupied by the Plains Miwok (Bennyhoff 1977:165). The villages speaking these

languages were vastly diminished by the proselytizing efforts of Missions San José, Santa Clara and Dolores (San Francisco) in the early 19th century, followed by the devastating malaria epidemic of 1833, and finally by the hordes of Argonauts involved in the Gold Rush of 1848-50 (Cook 1955; Phillips 1993).

The first linguistic study done among the Plains Miwok was the collection of a vocabulary from the village of Talatui by Horatio Hale of the Wilkes Expedition of 1841 (Hale 1846). A late 19th century linguistic word-list, purported to be derived from a Plains Miwok-speaking woman, was published by Alphonse Pinart (1894). In recent years, linguist Catherine Callaghan (1984) interviewed several descendants of the Plains Miwok. From the fragments remembered by these individuals (none spoke the language on any regular basis), she prepared a Plains Miwok dictionary. She also studied Northern Sierra Miwok (Callaghan 1987) and Bay Miwok (Callaghan 1982) and concluded that all three languages were closely related.

One of the earliest ethnogeographic studies of the area was published by Alfred Kroeber (1908). Later came an important work in ethnohistory by Egbert Schenck (1926) titled, "Historic Aboriginal Groups of the Delta Region." The most detailed study of the ethnogeography of the area was accomplished by James Bennyhoff (1977). More recently, Randy Milliken has continued Bennyhoff's work through an intensive study of the San José Mission records (Milliken, personal communication 1993).

Bennyhoff (1977:59-81) identified 28 independent Plains Miwok villages, of which eight were correlated with archaeological sites in the North Delta Program study area. In addition, a ninth village, Musupumne, is believed to have been on Staten Island, but no archaeological site has been recorded to pinpoint this location. The North Delta villages are as follows:

> Hulpumne = Sac-85 and Sac-86, south of Freeport. Possibly both of these sites were associated with Hulpumne. Of the two, Sac-85 is much the larger; Sac-86 may have been a subsidiary hamlet.
>
> Gualacomne (Walak) = Sac-56 (?), opposite Clarksburg. On the Vioget Map of 1843 the village of Walagomnes is shown on the west side of the Sacramento River, in the vicinity of Clarksburg, although other evidence placing it on the left bank of the Sacramento seems compelling.

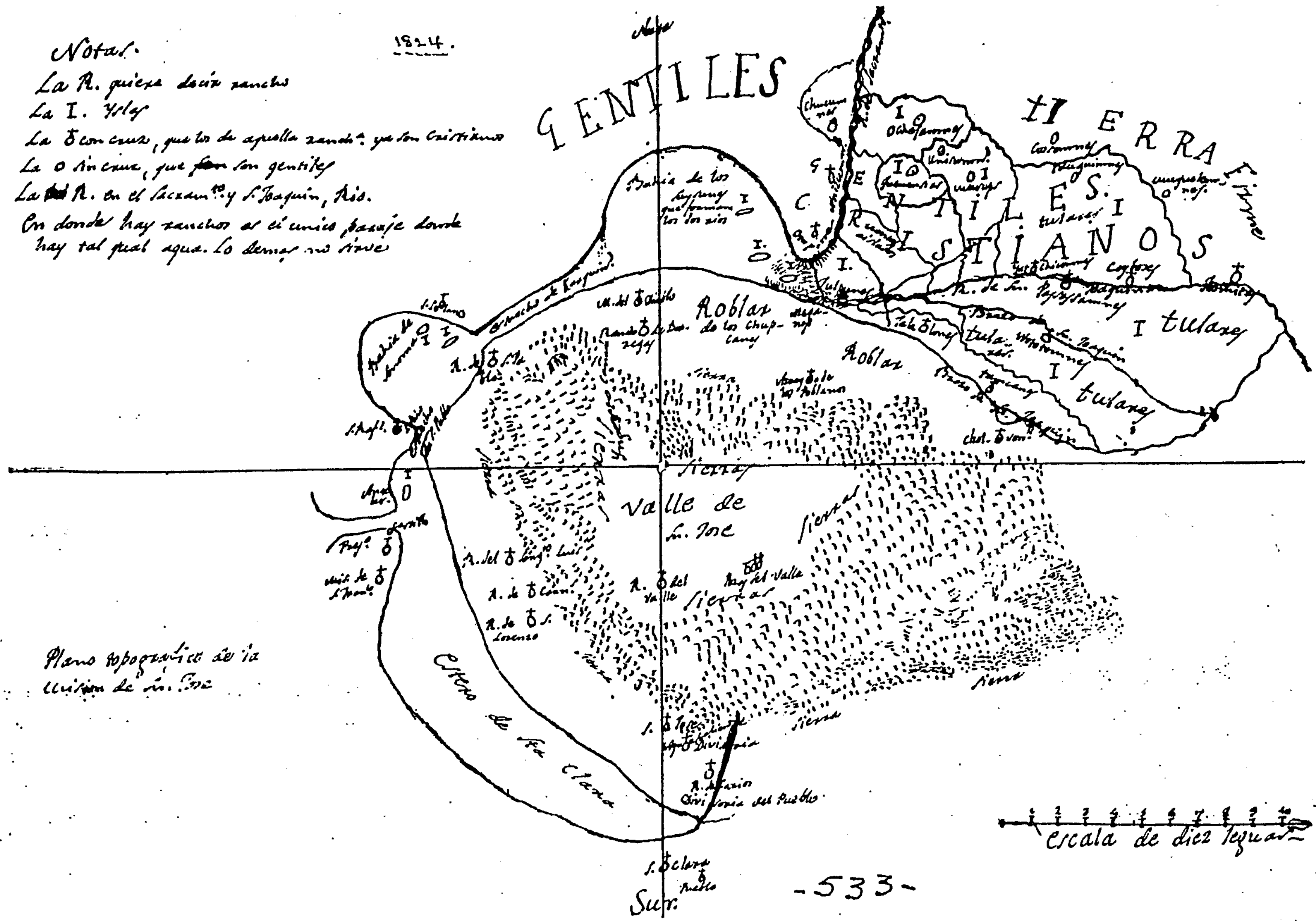

Figure 6. Plano topografico de la Mission de San Jose (c. 1824). This early map of San Francisco Bay and the Delta provides approximate locations for many of the Plains Miwok villages (Bancroft Library).

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Chupumne = Sac-62 (?), near Hood. An alternate association with Sac-64 has also been suggested (Johnson 1974b:4).

Ochejamne = Sac-70, in the Pierson District. The village mentioned in letter of Sutter to Reading (May 11, 1845) as having a chief called Clement. The historic settlement of Onisbo, located near the site, was presumably named after the last chief of the village.

Junizumne (Unisumnes). Bennyhoff (1977:73) suggested Walnut Grove as being the location, but allowed that it was perhaps Sac-75, near Locke, since no likely site was known in Walnut Grove. However, he was unaware of an unrecorded site found in Walnut Grove during the construction of the Southern Pacific Railway line in 1929 (Delta News 1929a).

Guaypemne = Sac-25 (?), on Tyler Island. The last known individual from this village was interviewed by C. Hart Merriam in 1905 (Merriam 1966-67, 3:367-369. The site was said to be near the mouth of the Mokelumne River, Guaypéms appeared to be the equivalent of a group known to Merriam as the Wipa (Schenck 1926:136).

Musupumne -- On the west bank, of the South fork of the Mokelumne River, on Staten Island.

Tihuechemne = Sac-144. On the east side of the Cosumnes, 2 miles north of Thornton.

Sotolumne = Sac 168 (?), also on the Consumnes, 7 miles south of Elk Grove.

Organized into political alliances, these groups for several decades provided an effective resistence to Spanish and Mexican incursions into the Delta. (Information on the individual villages is provided under the appropriate districts, below.)

In a detailed environmental and demographic study, Baumhoff (1963: Table 12) estimated that the Plains Miwok population, prior to contact was about 14,350 people, an average of 512 residents per independent village or tribelet. Given this estimation, the North Delta population can be suggested as 4,600.

Limited historical and ethnographic information suggests that the southern margin of the study area lay within the territories of other populations.

The Bay Miwok group that lived at the southern end of the study area was called the Julpun (Bennyhoff 1977:144-145, 164; Callaghan 1982). Although most members of this group were taken to Mission San José, following secularization a number of them moved back to the vicinity of their native areas. It has been suggested that some may have moved

up to the area of Sutter's Fort and that this may be the basis for the village named Hulpumne (Schenck 1926:137). On the other hand, Julpun appears to have been linked with the area of lower Marsh Creek in Contra Costa County based on the name Rancho de los Julpunes (or Pulpunes) owned by John Marsh. This group has been suggested as the claimants of Bouldin Island, the southern portion of Brannan and Andrus Islands and perhaps the southwestern portion of Terminous Tract.

Shin Kee Tract and southeastern Terminous Tract have been included in the territory of the Tauquimne Yokuts (Bennyhoff 1977: Map 3).

European Intrusion

Beginning with the Spanish explorations to the area of San Francisco Bay and up the Sacramento River, there was sporadic contact with the peoples of the North Delta. In the early 1800s, expeditions were periodically sent out from the missions of Santa Clara, Dolores (San Francisco) and San José (Cook 1960). These expeditions were focussed on exploration, attempts to bring in new recruits to the missions, and later for punitive reasons as the Indians of the Central Valley became active in harboring fugitives from the missions and in raiding the coastal mission settlements.

In the late 1820s other foreigners made their way into the land of the Plains Miwok. These included American (Ewing Young, John Walker, Jedediah Smith) and Hudson's Bay fur trappers (Peter Skene Ogden, John McLeod, Michel Laframboise) and even Russian explorers from the settlement at Fort Ross (Ilya Voznesenski [Alekseev 1987:21]). The most persistent and, ultimately, devastating of these groups was the Hudson's Bay Company which made forays into the Delta, with a base at French Camp below Stockton, for nearly a decade from 1827 until the late 1830s. The Company employed steel traps in an attempt to wipe out the beaver in California. This was intended to make the area south of the Columbia River less appealing to other trappers and shore up the southern border region of the Hudson's Bay Company (Lester Ross, personal communication, 1991). In addition, the expedition of 1832-33, led by John Work, seems to have brought with it the seeds of a terrible malaria epidemic which killed off much of the Central Valley population in 1833 (Cook 1955; Maloney 1944). This group set up camp in the vicinity of Stockton, at French Camp in the summer of 1833.

In this same year, interest in settling parts of the Central Valley and foothills increased among the coastal inhabitants. A map was prepared by John B. R. Cooper in 1833 to lay out potential land grants. However, no one really exploited the opportunities in the area until the arrival of John Sutter in 1839. Sutter established his New Helvetia settlement near the confluence of the Sacramento and the American rivers and began to attract a large and disparate group of inhabitants. A land grant in 1844 to Anastasio Chabolla called the Sanjon de los Muquelemes extends into the eastern edge of the project area (Land Case, 93 N.D.). Chabolla did not occupy the ranch himself, assigning a majordomo named José Salinas to occupy the land (George F. Wyman, testimony in Land Case 406 N.D.:44-45). The ranchers

of the valley were frequently at odds with the Indians living in the area, many of whom had developed a taste for horseflesh (Levy 1978:400).

American migration in the mid-1840s coming overland from Missouri and directed toward the ranch of John Marsh (near Brentwood) and Sutter's Fort further swelled the numbers of non-native and non-hispanic peoples. Finally, the Gold Rush, beginning in 1848, brought hordes of foreigners who overwhelmed the remaining indigenous people. A few small villages continued into the 1850s, but as they came into conflict with the white settlers, they were either exterminated or forced into hiding. Perhaps the last such group was resident on lower Dry Creek. The conflict between this group and the in-coming Americans is described elsewhere (see Cosumnes District, Historic Native American Settlement, below).

Reclamation

With the exception of the higher natural levees (particularly those along the Sacramento River) the lands of the Delta were subject to periodic flooding. Much of the area supported a community of emergent vegetation (the tulares) specifically adapted to annual if not permanent inundation. These conditions combined with native resistence to preclude Euroamerican settlement until the 1840s. Even after the discovery of gold the tule lands were initially thought of as waste lands:

> Now for a description of the valley of the Sacramento... [T]here is but very little good land at most along cloast to the river and on some of the sloughs... and in all cases it is the highest next the river and desends back... On an average it is about 1/2 mile in width [sic:usually 1/5 mile or less] then comes the Tola or Bull Rush all it differs from the Bush in the States it grows abought 10 ft in hight and is about 1 inch thick or more at the but and grows even all over the ground and not in bunches or on tusics as it does in the States and grows as thick as it can stand... [T]his runs of[f] gradually until it gets to[o] deep for Tola and then comes the Lake or Pond. When the River raises in the spring it Raises the Tola as we call it till it comes to the high ground and Last Spring the River flowed its Banks and then it was one purfect Lake from one Mountain to the other... The Land is as a general thing next to the River covered with very heavy timber about half way back to the Tola and this is grass of the best kind... The contry from the River to Cash Creek... is one wilderness of Warter & Tola with some exceptions next the Lakes they have high Banks. The tola in dry Seasons abounds with Elk and in wet they flee to the bench land of the Mountains where I have seen thousands in one gang. We have some grizoly Bear bucks gees swan sandhill Cranes and in fact all kind of Sea fowl abounds hear (Browning 1851:2).

Agricultural settlement was restricted to the natural levees (the "front lands"), the lower lands behind them (the "back lands") being used, if at all, only for grazing cattle in the dry season or for small plots of annual crops on the less saturated terrain. These early small crops, however, were often amazingly productive. The value of the lowland soils was thus

soon recognized, and attention turned to permanently reclaiming them for agriculture.

The Legal Environment of Reclamation

Land title in California in the third quarter of the last century was a quagmire of conflicting interests in which small settlers who squatted on land in hopes of preemption were in conflict with those claiming large tracts on the basis of Mexican titles. In the Delta, swamp land titles came into play as well, with the added problem of differences between the state and federal governments in exactly which lands were overflowed. The laws established to deal with this problem faced internal conflicts as well. On the one hand, the state--which acquired the authority to dispose of swamp land--wished to sell these lands as cheaply as possible and in moderately sized plots, to assure that they were widely available; on the other, as became gradually apparant, reclamation was a capital-intensive prospect of considerable risk. The series of laws which came into play, and the political and economic forces which effected them, have been discussed by Adams (1909), Thompson (1957), Peterson (1974) and Kelley (1989).

The situation began in 1850 when Congress passed the Arkansas Act, giving to public land states all the unsold swamp and overflow land within their boundaries, state title being contingent upon reclamation of the land, making it available for agriculture. For California, newly admitted to the Union, this act made available for state disposal vast expanses of marshy or regularly flooded terrain, including about 500,000 acres in the Delta alone.

For 18 years, however, California's attempts to take advantage of this opportunity were fitful, contradictory and largely unsuccessful. The initial effort was an 1851 act that disposed of the swamp land on Merritt Island, just west of the project area, to two developers under stipulation that they reclaim and cultivate it. This act set a precedent for placing reclamation in private hands, but its physical accomplishments seem to have been temporary.

More far reaching was the act of 1855 which authorized the sale of swamp lands at $1.00 per acre. Purchasers were allowed five years to pay and were limited to a maximum of 320 acres. Acreage bought on time had to be reclaimed within five years or title reverted to the state. This act failed to create the hoped-for demand, or to achieve any important reclamation, and the delayed payment option invited abuse. Three years later it was replaced with a new system. The 1858 act created a General Swamp Land Fund, into which all the purchase money--still at $1.00 per acre--was deposited. The fund was theoretically available for use in reclamation, but no system for this was created.

With swamp land still a "drug on the market", the legislature returned to the issue the following year. Maximum acquisition was increased to 640 acres, and the five-year credit scheme was revived, purchase requiring only 20% down. The Swamp Land Fund was retained, still with no provisions for its use. This law, like its predecessors, was singularly unsuccessful in disposing of the available land, much less reclaiming it. By the end of 1860

less than 10% of the state's swamp land had been purchased.

In 1861 the legislature departed diametrically from its previous approaches, creating a Board of Reclamation Commissioners. The Board was empowered to authorize the formation of a reclamation district whenever petitioned by the owners of at least one-third of the land in an area "susceptible to one mode or system of reclamation." The salaries of the commissioners were paid from the Swamp Land Fund, and provision was made for survey and other reclamation expenses from the same source, once a district was recognized, up to a total of $1.00 per acre. When it became evident that this limitation was impractical, additional legislation was passed authorizing county boards of supervisors to levy reclamation taxes if so petitioned by one-third of a district's landowners. Although a system was at last in place to further reclamation, the concentration on vast projects and the Board's location in Sacramento made it impractical. In 1866 the Board's powers were transferred to the county supervisors along with the Swamp Land Funds, which the latter were charged with expending under the earlier limitations.

Finally, two years later, the legislature entirely revised the swampland system. The new legislation--popularly known as the Green Act, after the Colusa County legislator who drafted it--remade the system by radically localizing it:

> The statute of March 28, 1868, prescribed methods by which landed proprietors, owning more than half the area included in any particular "body of swamp and overflowed, saltmarsh, or tide lands, susceptible of one mode of reclamation," might incorporate themselves into an association for reclamation purposes. Having determined upon such an organization, the parties... present to the board of supervisors of the county within which the lands are located, a petition praying for their incorporation into a reclamation-district, and setting forth an accurate description of the lands... After the performance of specified requirements as to publication, &c., necesary to give due notice to all parties in interest, the board of supervisors, if they find the facts correctly represented, and that no lands have been improperly included..., note their approval, and the papers are spread upon the county records, giving a corporate character to the proposed organization. The corporaters then elect a board of three trustees to superintend the execution of the works. They are authorized "to employ engineers and others to survey, plan, locate, and estimate the cost of the work necessary for reclamation, the land needed for right of way," &c. This cost is then assessed upon all the lands included in the reclamation-district by a board of commissioners appointed by the county board of supervisors. These assessments are reported to the county treasurer, who collects them, with other taxes, and pays out the proceeds upon the order of the board of trustees of the district. To encourage the reclamation of lands under this law, by the spontaneous action of the proprietors, it was further provided that the... swamp and overflowed lands should be sold at $1 per acre, in gold, which sum was to be refunded to the purchaser upon the completion of a system of reclamation-works... (U.S. Commissioner of Agriculture 1874:188).

Under the Green Act there were no limits on the amount of swampland available to individual purchasers. This opportunity to own large agricultural estates--and to compel the participation of smaller owners--at last made the tule lands attractive to wealthy capitalists. Between 1868 and 1871 virtually all of the state's millions of acres of swampland passed into private ownership, and the 1870s witnessed the first extensive effort of reclamation in the Delta. By the early 20th century, virtually the entire Delta had been reclaimed under this system (Kelley 1989:62; Thompson 1965).

Reclamation Methods

Initially, settlers along the higher natural levees saw little need for flood protection. William Johnston, who settled along the east side of the Sacramento north of Hood, later testified that prior to 1862 farmers in his vicinity made little use of levees (Sacramento Union 1881). The focus of levee construction in the early years was on tule lands, and these efforts involved small hand-built structures, intended primarily to exclude tidal water.

The simple nature of these works is illustrated in the account of an early tule farmer. After a detailed description of the hand tools employed (a tule cutter and a special hook), the report proceeds to the method used in levee construction:

> In commencing the ditch and levee, it is well to look as to whether the river bank is washing away or making. If making, go as near to the water as you please, so that high spring tides in boisterous weather, breaking against the banks, spend their force before striking the levee; then lay off your ditch, say five feet in width, with a line, say six rods in length; take the cutter and sink the blade to the handle every time, until you have traced the whole length of the line; then turn the line on the other side and do the same thing; when done, wrap up the line and commence ditching...
>
> One foot from the edge of the ditch, set the first sods for the levee... then, seven feet from these, place the outside sods--this will make the levee seven feet from out to out. The sods, in good tules, are cut about three feet in length; these, in a seven foot levee, will leave a vacancy of about one foot in the center. When the sod is all out, and piled on both sides one foot higher on the outside than inside, jump down into the ditch and throw out with a long handled round bladed shovel, two shovelings of soft mud into the space between the sods, which makes it water tight and completes the levee. The sods, which are about ten inches square and three feet in length, are taken out of the ditch and put upon the levee with nothing but the hook.
>
> The sluice boxes can be put in before or after the sod is taken out; they should be put in at the lowest tides in order to secure the most effectual drainage... The ditch and levee together measure across, thirteen feet, the levee on the outside being about three and a half feet in height, and on the inside about two and a half feet.
>
> ... Such a ditch costs about two dollars per rod, and from three to four dollars if it passes through timbered land (Cubbins 1860:364-365).

The inefficacy of such rudimentary structures was amply demonstrated in the winter of

1861-62. The floods of that season were so severe that some observers were led to doubt the possibility of constructing any levees capable of withstanding them, and to suggest that flooding was not only inevitable but beneficial (Agricola 1862).

Such arguments raised four different issues: 1) that the delta lowlands provided natural flood water reservoirs whose elimination could only lead to destructive effects on higher settled lands; 2) that peat soils needed annual augmentation of alluvial deposits to grow productive crops; 3) that levees capable of withstanding winter floods were impractical with available technology; and 4) that summer levees could be constructed that would be overflowed but not destroyed in winter.

The warning that flood waters could not be excluded from the tule lands without creating more widespread devastation elsewhere found few listeners at the time. The hydrology of the Central Valley was poorly understood, and the issue raised "the question of the commons" in a situation in which developers of necessity undertook reclamation projects only with the effects on their own lands in mind. The warning was amazingly prescient, but the problem was not effectively dealt with until the creation of the bypass system in this century (Kelley 1989).

The argument that peat soils required annual inundation to be productive was incorrect in essence, and in ensuing decades it was to fall afoul of the problem of hydraulic mining debris which choked the rivers with unproductive sediment.

Arguments involving levees dealt simply with practicalities. As would be demonstrated, peat levees were inherently unstable no matter how constructed, and winter floods were capable of destroying low broad-based levees of this material. In any case, annual redraining of "seasonally reclaimed" lands was an expense that few farmers must have relished, and the restriction to summer crops on rich delta lands surely met with little enthusiasm.

Landowners thus opted for reclamation systems which they hoped would exclude all floodwaters. Their efforts in the latter 1860s and early 1870s, however, were not dramatically more impressive than those prior to 1862. Although levees continued to be built by hand, their construction soon fell to Chinese labor:

> Chinese labor is used almost entirely in making the levees. An engineer having planned the work, estimates are made, and thereupon Chinese foremen take contracts for pieces at stipulated rates, and themselves hire their countrymen for the actual labor. This subdivision, to which the perfect organization of Chinese labor readily lends itself, is very convenient. The engineer or master in charge of the work deals only with the Chinese foremen, pays them for the work done, and exacts of them the due performance of the contract (Nordhoff 1874:130).

Levee construction during this period has been reviewed by Thompson (1982), who reports that between 1870 and 1875 most of the levees constructed were 4-6 ft high, 8-20 ft

through the toes and 3-6 ft across the crowns. Peat levees--built of blocks of sod--tended to be given steeper slopes than those constructed of sediment.

Details are available on several levee systems within the project area, and these illustrate not only the relatively modest construction of the early 1870s, but also the greatly increased scale of such works by the end of the decade. On upper Tyler Island, for example, reclamation was initiated in 1870, the first levee having a 5-6 ft base, a height of 3 ft and a 2-ft-wide crown. By 1877 this had been enlarged to a system 20 ft across the toes, 5 ft high and with a 3 ft crown. Two years later it had been expanded to 30-40 ft by 7 ft by 15-18 ft (Thompson 1982:14).

Similar details from lower Andrus Island illustrate not only the increasing scale of construction, but the counteracting effects of subsidence, shrinking and erosion. There, a levee constructed in 1872-73 had a 15-ft base, a 4-ft height and an 8-ft crown. Work continued with annual additions thereafter (Fig. 7c):

> All in all, the maintenance crews at lower Andrus Island emplaced about six cubic yards of spoil per linear foot of levee for over seven miles. Had the levee neither lost volume nor subsided, it would have been 11 feet high and 24 feet across the toes. However, it is doubtful that the laborers were able to keep the levee much above an elevation of three or four feet. In June of 1878 it was three feet high, and a landowner noted in 1879, "our levees are only about one or two feet above ordinary high tide, they have kept settling ever since they were first built" (Thompson 1982:15).

On southern Brannan Island, likewise, an initial 1871-72 levee had a 15-ft base, a 4-ft height and an 8-ft crown. By the end of 1874, levee crews had added an additional 6 ft of height and 5.5 ft of base (Fig. 7d), but by 1878 this structure was only 3 ft high. Here, as elsewhere, repeated effort was incapable of maintaining peat levees on peat foundations at heights greater than 3 or 4 ft. (Thompson 1982).

Although peat levees continued to be built through the 1870s, the deficiencies of this material were soon notorious. Peat was found to be porous, this failing being sometimes serious enough to flood a tract through seepage alone. In regard to compaction and subsidence, experiments showed that while sediment contracted less than 10% on drying, peat--from loss of water and compaction--might lose two-thirds of its bulk in three months (Lawton 1879). The resulting shrinkage in the levee was the cause of the mysterious cracking which affected such structures, forming fissures that might extend to a depth of 40 ft, or run for a quarter of a mile or cut across the levee to let in flood waters (Browne 1873:397; Thompson 1982:23-25; Thompson and Dutra 1983:24-26).

It was widely recognized that mineral soils were much superior to peat for levee construction. In the Delta, however, surface deposits of such soils were generally restricted to the natural levees along the river bank. There they were used as a base upon which to construct the artificial works, but--so long as hand construction was employed, which could

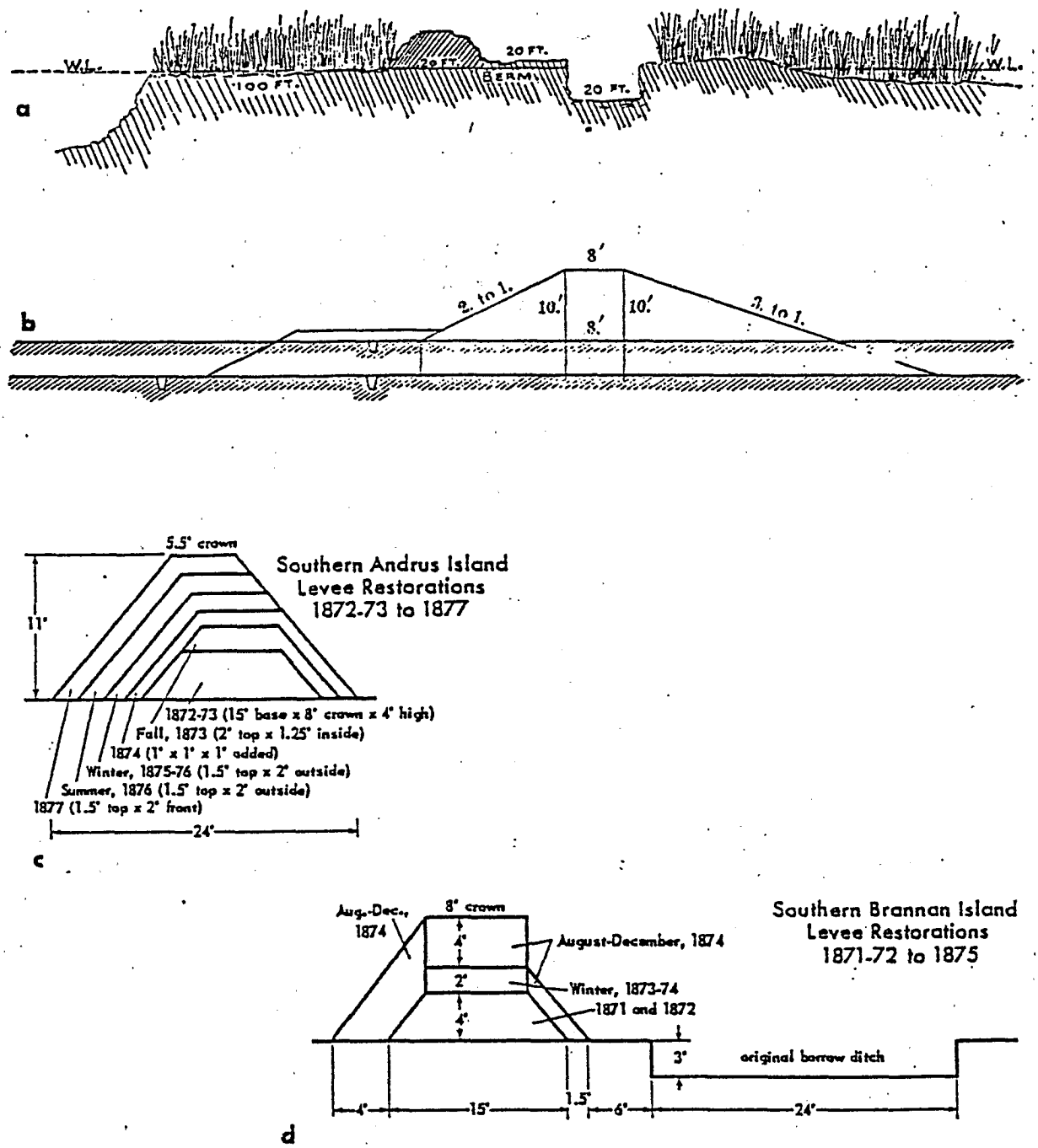

Figure 7. Cross-sections of Delta levees: a) An early hand-built levee (Peatfield 1894); b) "The best system" of levee (LeConte 1898); c-d) Reconstructed sequences of levee work, Andrus and Brannan Islands (Thompson 1982).

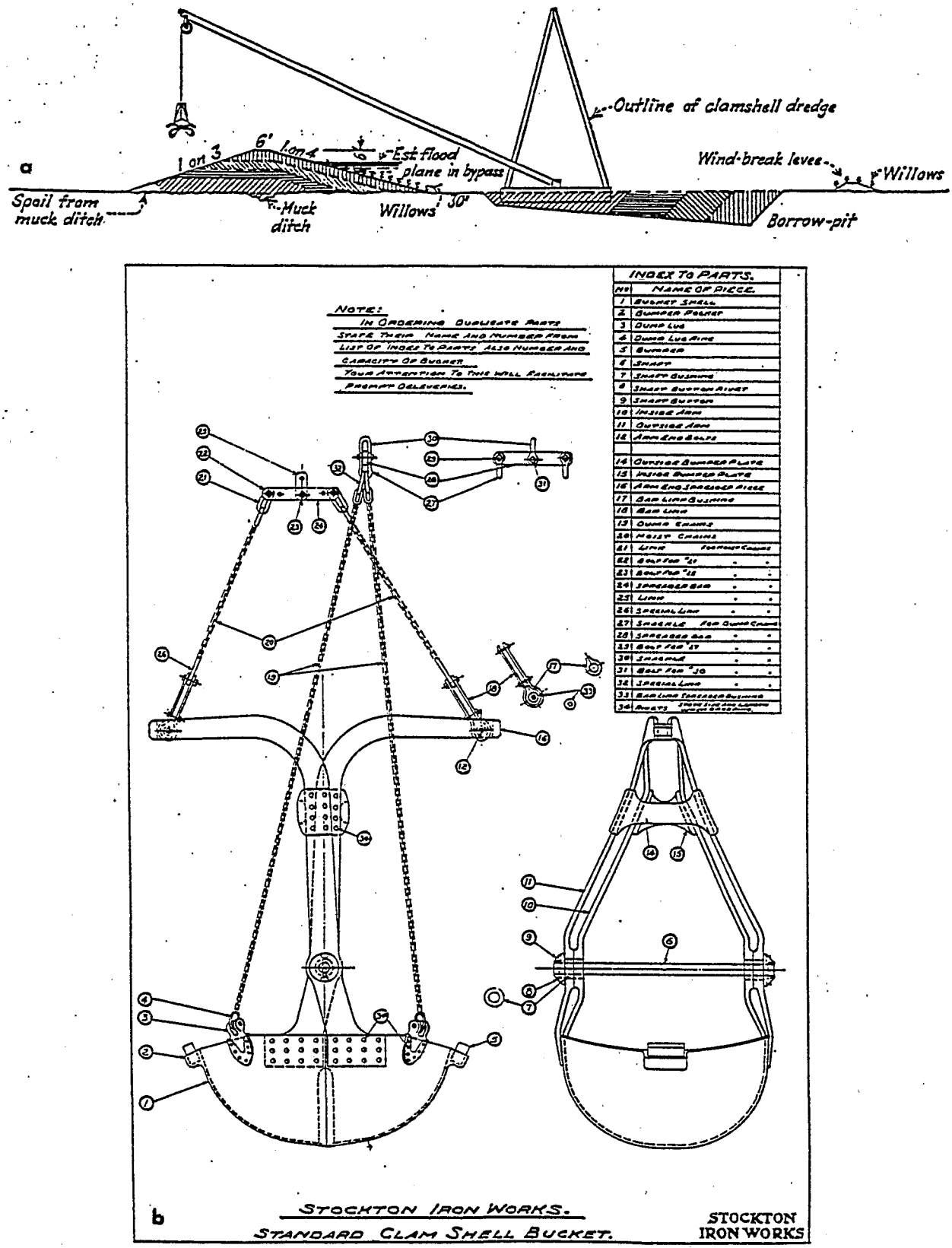

Figure 8. The clamshell dredge: a) Schematic view of clamshell working (Tibbetts 1931); b) Detail of bucket (Stockton Iron Works 1913).

obtain material only from the land being worked--such sediment was often too restricted to provide the spoil as well.

The solution to this difficulty came with the introduction of the steam dredge. Dredges of various kinds were in use in Central California by the late 1850s, primarily on San Francisco Bay, and were tried experimentally in the Delta over the next two decades, often in connection with hand labor. Most types of dredges were of limited use, either because of limited reach or restriction to certain soil types (Thompson and Dutra 1983).

The machine that ultimately proved most useful was the clamshell dredge (Fig. 8). This machine has been described in detail by Thompson and Dutra (1969):

> [T]he California clamshell dredge... consist[s] of a rectangular hull with flush deck, above which the legs of an A-frame converge forward of the gallows frame and working spuds to support a long boom that extends well beyond the bow with a large clamshell bucket. The boxlike housing includes a pilothouse that is straddled by the A-frame and gallows frame. At the stern rises a stack, an after-spud frame, and a spud. This... dredge was made with wood and iron. It [had a] stoutly built, flat-bottomed, and shallow hull...
>
> The hinged pair of heavy metal scoops that comprise the bucket is designed to grab, lift, and transport material up to 150 to 300 feet, sometimes more, with a swing of the boom... In all operations, the boom's inclination is held constant by iron guys or steel cables strung to the top of the A-frame. The boom is trussed to transmit the load of the bucket to the base of the A-frame. The A-frame is steadied by back-legs and by either iron or cable back guys... The pivoting heel of the boom, too, is integrated strongly into reinforced segments of the hull. These legs and guys must accomodate many tons of compression and tension alternately as each working cycle of bucket and boom is completed... The machinery that operates the bucket and lifts the spuds is housed on the main deck or within the hull; the boiler is aft, where its weight helps to counterbalance the bucket and boom. As on all of the dredges used in reclamation in California, the main enginese operate the tools of dredging. None of the dredges have been self propelled (Thompson and Dutra 1983:88)

This machine was introduced to the Delta in the late 1870s, and during the 1880s it gradually supplanted most hand work in Delta levee construction:

> The long-boom clamshell machine... had a number of virtues. It could dig to considerable depth and in all kinds of material... The bucket could be used to clear brush and trees from sites to be excavated or raised, and it could be used to roughen surfaces so that fresh overburden would bond more securely with the underlying material. The same grappling capability was used to pull snags and piling. Most of the material excavated by a bucket remained relatively cohesive and relatively free of water, and it could be placed with precision at some distance from and above the borrow area. The buckets could be discharged atop and in-board of levee crowns without requiring baffles or containment structures. The long boom and single bucket were well suited to spot maintenance. Also, in times of levee outage, the bucket could

be used to lay cribs, fascines, or spoil along the rows of pilings that were driven across crevasses to begin the farmland restoration process... This same attribute of the derrick could be applied to lift heavy machinery or to remove the specially designed rail and road bridges with which borrow cuts and canals outside of many reclamation districts were spanned. In sum, the long-boom clamshell dredge was the most versatile of dredges, and it cost less to buy, operate, and maintain than did the more specialized large-volume movers of spoil, the ladder and hydraulic dredges. It outperformed the dipper dredge in all respects, except in dredging hard clay (Thompson and Dutra 1983:129).

In the Delta, the clamsell dredge made possible the construction of larger levees, using mineral soils from the channel rather than the unreliable peat soils from the island itself. It also permitted the ready excavation of channels on the margins of reclamation districts and the creation of levees with the spoil from the same process. With the use of such machines, by 1920 most of the Delta--including the entire North Delta study area--had been reclaimed.

Reclamation Sequence

Reclamation in the Delta began with small scale efforts in the 1850s and 1860s, usually on lands adjacent to natural levees. After passage of the Arkansas Act, land consolidation by large owners allowed reclamation of larger tracts in the North and South Delta during the 1870s and 1880s. The Central Delta, the Yolo Basin and most of the smaller tracts were not reclaimed until after the turn of the century.

The sequence of reclamation has been graphically summarized by Thompson (1965) and the sequence in the North Delta is depicted in Figure 9. The history of reclamation is discussed below in more detail in the sections on the individual tracts.

Preparation of Reclaimed Land

Since levee construction often trapped saturated or flooded lands, it was necesary in the early years to include sluiceways and gates into the levee during construction. These features were meant to remove excess water during low tides. To this end they provide adequate service during normal flows, but they were difficult to keep in repair and frequently proved damaging during high water, when seepage onto the reclaimed land was accelerated. Pumps were introduced to solve this problem in the late 1870s, but Delta land owners were slow to adopt them. Pumps did not become commonplace until about 1890, and they did not become universal until the introduction of electricity in the early 20th century (Thompson 1957:274-275, 278-282).

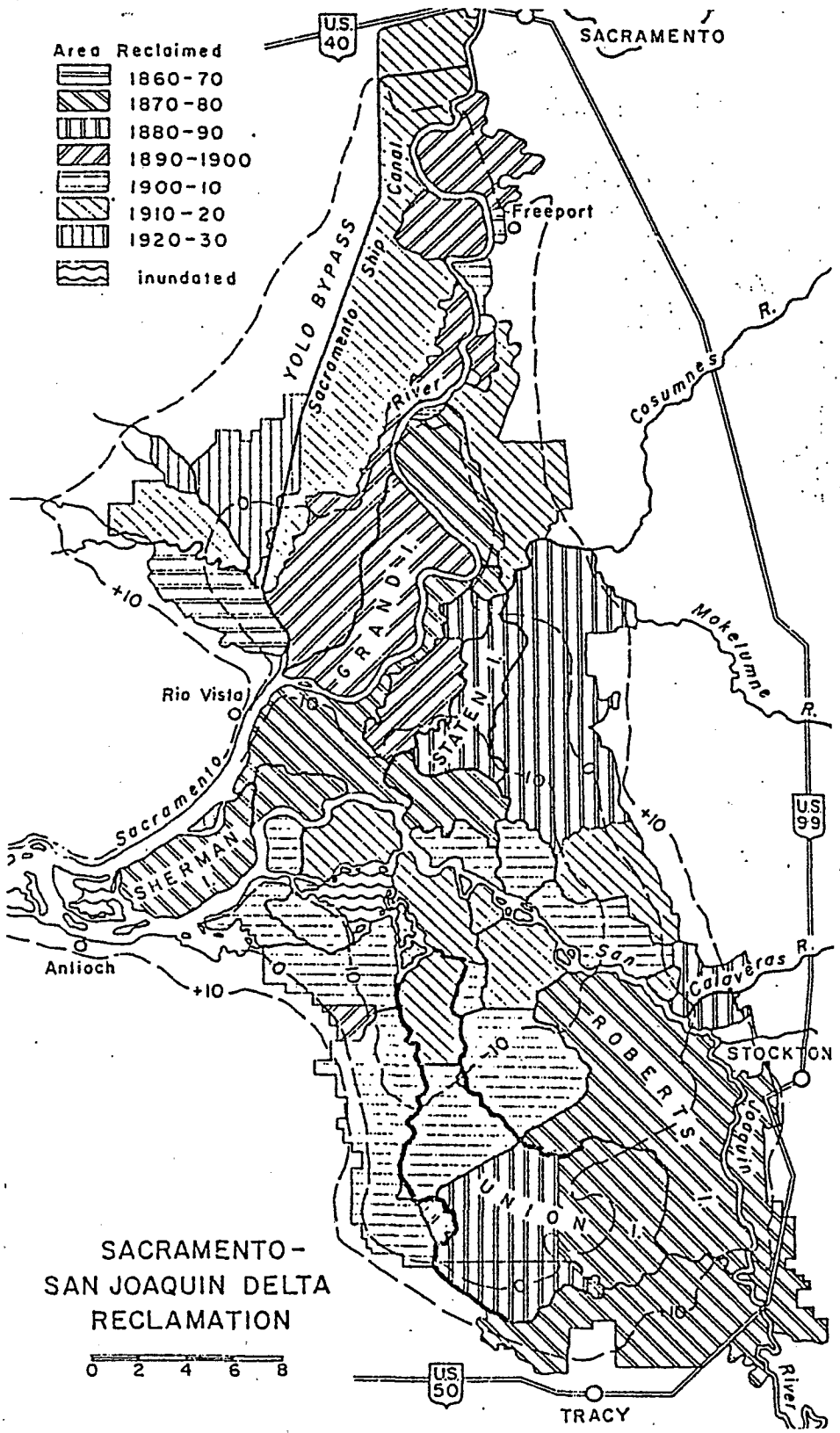

Figure 9. Sequence of land reclamation in the Delta (from Thompson 1965).

The experiences of pioneer reclamationists involved not only levee construction but another aspect of reclamation: how to prepare tule lands for cultivation. Fire was quickly found to be an important tool:

> About the first of May I shall be ready to burn off my land; this is done by simply setting fire to the sod in several places... On the burnt ground, the tides--all fresh water--are permitted to come in and flow the land for two or three tides, which leaches the ashes; when this is done the land is ready for planting or sowing. Some are opposed to burning; they say the ground is too low already; that to burn the sod, which varies in depth from six to fifteen inches, is to ultimately ruin the land, or at least, injure it seriously; but this is the statement of those only who have not tried the experiment.
>
> The land that has been drained on Sherman Island, broken up and put under cultivation without the process of burning, has taken three years for the sod to rot; and when ditches get foul so as to impair the drainage, the sod would suck up the water to that degree as to drown or destroy the crop, and in a very dry time, when the river is low, vegetation grown upon the sod would suffer for want of sufficient solid soil. I find that the sod land of the tules invites vermin of all kinds that are small enough to shelter in it. The last crop of potatoes of the season upon such land is inferior, and badly eaten by field rats (Cubbins 1860:365).

Burning was soon standard practice in swampland reclamation. It was the cheapest, fastest and most effective method to prepare the land for the initial crops:

> The tule, deprived of water, dies, and one man with a box of matches clears twenty acres per day, not only burning off the tule but the tussocks or roots, the ground being allowed to dry to that condition that permits from six to twelve inches of the uppper surface of soft, dead tule roots to burn off, when the absorbed moisture from below prevents further consumption (Whitney 1873:17).

The popularity of the practice was noted by a Brannan Island settler, who reflected that after Brannan and Andrus were fully enclosed by levees in 1873, "everybody was crazy on the subject of burning, and they all commenced burning in order to get a crop in the first year" (Hart F. Smith, in Tucker 1879f:13).

On lands already reclaimed, burning became an easy way to remove stubble and weeds. It also released potash to fertilize the next crop, and it was believed to be an effective prophylactic against same pests and plant diseases. The disadvantage was that burning peat soils contributed to land subsidence, and incautious burning could endanger peat levees (Weir 1949; 1950b; Newmarch 1980; Thompson 1982:27).

Once the tracts were leveed and drained and cleared, ditches had to be excavated for drainage and irrigation. Initially hand dug by the same Chinese crews that had constructed the levees, by 1918 effective mechanical ditch diggers had been introduced to fill this task. By this time the usual ditch system consisted of a permanent ditch (usually called a "4-foot ditch") surrounding each 20-40-acre field, with smaller impermanent "spud" ditches used to feed water into the field. Irrigation water was not generally applied to the field surface;

rather the spud ditches were held full until the water had seeped laterally to raise the water table throughout the field (Thompson 1957:273; Weir 1950b:41).

Agriculture

General Overview

Agriculture in the Delta has necessarily adapted to local soils and topography. The native economics of the region, although they had access to no domestic plants other than tobacco, managed the local environment through controlled burning and selective culling and harvest of wild plant crops (Blackburn and Anderson 1993). By the 1830s they had adopted melons, cucurbits and possibly other introduced crops, and were acquiring horses through raids on settlements nearer the coast.

During the gold rush, Euroamerican immigrants settled along the natural levees of the Sacramento, planting many of the same garden crops pioneered locally by the Miwok, adding others, clearing forested areas and sowing grain while using the backland for grazing. Orchards soon occupied much of the natural levee land, and the river lands, especially from the Pierson District northward, became an important fruit growing area (Thompson 1957:318-320).

Reclamation of the Delta islands greatly expanded the territory available for agriculture. It also allowed the development of a variety of crops, their distribution over larger tracts, while accelerating the trend toward tenant farming.

The association of various crops with specific ethnic groups has been repeatedly noted by historians. This can be illustrated with the example of asparagus, which from the 1890s to the 1930s was a particularly important cultigen in the North Delta.

Asparagus Industry

The rise of asparagus as a specialty crop was a particularly important development for the Delta, which for many decades provided the bulk of the nation's production. The soils and climate of the region were ideally suited for this crop, and its early expansion required the development of a local canning industry. The creation of this industry was facilitated by ready access to water transportation, but once initiated it fostered the development of rail and road transportation systems. Furthermore, both the asparagus harvest and the canning operations helped perpetuate earlier patterns of employment of immigrant labor in field and factory. Indeeed, one historian has attributed to this one crop the prolongation of Chinese involvement in California agriculture "by about fifty years" (Chu 1970:22).

Commercial asparagus production requires deep, loose and light soils, well watered but with a water table that remains at least 2 ft below the surface during the growing season. The reclaimed organic and alluvial deposits of the Delta met these requirements perfectly.

Asparagus is a perennial, usually transplanted as one-year-old crowns from a nursery field. Commercial harvest does not occur until at least a year after transplantation, and full productivity is not achieved until a year to two thereafter. In Delta fields, rows were traditionally 8-10 ft apart. This allowed planting of annual crops between the rows during the first year or two, and left room for the horse-drawn sleds used during the harvest. In the spring, the fields were plowed into ridges that covered the plants to a depth of 12-20 inches, allowing the shoots to grow straight without exposure to sunlight. The fields were productive for 10 or 12 years and then had to be cleared and planted to other crops (Smith 1905; Bailey 1916; Jones and Robbins 1928).

The fields were generally leased in tracts to tenant farmers - usually immigrants - who tended the plants and arranged labor for the harvest:

> Each 200 acre tract has a camp consisting of bunk houses, bath house, kitchen and dining-room to accommodate a crew of about sixty men. In addition to the necessary barns and outhouses, each tract has two washing sheds conveniently located in the fields to which the freshly gathered "grass" is brought for trimming, washing and boxing (Cruess and Christie 1923:12).

Initially most of the tenants, and most of the field crews, were Chinese. By 1916, half the tenants were Japanese, 30% were Chinese and 20% Portuguese, while the field labor force consisted of 50% Japanese, 30% Chinese and 10% Sikhs, with most of the remaining 10% being Filipinos, Hawaiians, Mexicans and Portuguese. During the mid-1920s Filipinos gradually replaced Japanese in the fields. By the 1950s, asparagus cutting was almost entirely performed by Filipino labor, but by then the focus of the industry had shifted to the south Delta (Smith 1905; Bailey 1916; Rio Vista Banner 1919a; Cruess and Cristie 1923; Cruess 1924; Banner of the Delta 1927; Stewart 1929; Tideways 1954).

During the harvest (March through June) the shoots were cut by hand, collected, washed and sent to the packing shed or cannery. For the first month, all harvested asparagus was directed to the fresh market, most of it being shipped by rail to the East Coast. Thereafter, the bulk of the harvest was directed to the canneries. Since asparagus deteriorates rapidly after cutting, an important development in establishing the quality of the California product among Eastern consumers was the practice of canning within 24 hours of cutting. This meant building canneries as near to the fields as possible.

The pattern for this was established in 1892, when Robert Hickmott built the first California cannery intended primarily for asparagus. This plant was on Bouldin Island, immediately adjacent to Hickmott's asparagus fields. Within two years Hickmott had positioned his product in Eastern markets, and by 1900 he had replaced his initial small cannery with two larger operations on the same island. Hickmott's success inspired asparagus canneries at Sacramento, Milpitas, Antioch, Vorden and Andrus Island. California production, which had been only 5,000 cases in 1887, reached 143,861 cases in 1900 and 227,126 cases in 1902. The Bouldin plantations were destroyed by flood in 1904, but the industry continued to expand. Ever more acreage was devoted to asparagus, and canneries

were built near Isleton and Locke and at other locations in the west and south Delta (Tobin 1890:91; Smith 1905; Western Canner 1936).

By 1923, two canneries had been established at Isleton and two additional plants were situated at nearby locations on Brannan and Andrus Islands. Over 26,000 acres were by then devoted to the crop in California, the vast majority in the Delta; the annual pack was 1,519,756 cases, again overwhelmingly of Delta origin.

In 1926 a third cannery was built at Isleton, and in the same year a national advertising campaign was launched for California canned asparagus. Farmland devoted to asparagus had risen to more than 56,000 acres and the pack exceeded 2,236,000 cases. This inspired the extension of the Southern Pacific line from Walnut Grove to Isleton, completed in 1929, so that the product could be hauled out directly by rail (Western Canner 1926c; 1936; Delta News 1929a).

The industry continued to grow for the next few years, but the boom was ending. Cannery production reached a high of more than 2,672,000 cases in 1929, while land committment peaked at 76,550 acres in 1936. By 1931 farmers and canners began to worry that overproduction was driving down prices, while a large portion of the 1930 pack remained unsold. As a result, a curtailment arrangement was reached between canners and growers, and the 1931 pack was reduced substantially. This set a precedent for industry support of limitations, which continued in the ensuing years (Delta News 1931a; Western Canner 1931c).

By the mid-1930s, improved roads and the development of refrigerated trucks meant that canning operations could be concentrated in larger plants in centers such as Sacramento, where access to a greater variety of crops permitted a longer packing season and a labor pool for the canneries was more readily available. Meanwhile, as the heavy plantings in the North Delta were retired and the land diverted to other crops, the focus of the industry shifted to the South Delta. By 1940 most of the North Delta canneries had ceased operation.

Minority Labor in Delta Agriculture

The importance of immigrant labor in the development of California agriculture has been extensively studied (e.g., Fuller 1939; Chin 1967; McWilliams 1971; Saloutos 1975; Daniel 1981; Bonacich 1984) and need not be reiterated here. Agriculture in the Delta began as a family farming enterprise by settlers who claimed - and themselves worked - relatively small tracts of land. These farmers initially found little common cause with the bonanza wheat kings, the owners of vast grain fields who initiated the extensive use of immigrant labor. Indeed, after passage of the Green Act they sometimes (as in the Pierson District) found themselves in direct conflict with large holders of swampland in their own reclamation districts. Many were thus attracted to the agrarian ideals of the Grange Movement, and in the early 1870s Grange chapters were established at Walnut Grove and Courtland, as well as at such nearby towns as Franklin, Galt and Rio Vista (Carr 1875:249,255,266).

In fact, however, two trends affecting Delta agriculture made extensive dependence on imported labor inevitable. The first was the concentration of reclaimed swamp land in large tracts; the second was the phenomenal success of the Delta as a center of specialty fruit and vegetable crops. The effect of the latter trend, on a statewide basis, has been summarized by C. E. Daniel:

> In point of fact, a transformation of considerable magnitude was discernible in the major farming districts of the state during the 1880s. Wheat and other cereal farming...declined in importance as the cultivation of fruits...and vegetables was greatly expanded. In 1879 the combined value of cereal crops in the state was nearly $70 million, a figure that represented just over 96 percent of the total value of all agricultural production in California for that year. The value of all the fruits, nuts, and vegetables produced was less than $3 million, or only 3.9 percent of the total value of all agricultural products. The statistics for 1888, less than a decade later, revealed dramatic changes... The aggregate value of cereal crops had fallen to $49 million, while the value of crops produced just in the orchards and vineyards of the state had jumped to $25 million, or slightly more than 50 percent of the value of the entire crop of cereals for that year. Moreover, the latter crops were grown in an area equal to only about 9 percent of that devoted to cereals...
>
> That fruit and vegetable farming in California were pursued on the same highly commercialized and specialized basis that wheat farming had been was a function both of changing economic and technological circumstances directly affecting the state's agricultural status... In large measure, the industrialization of California's fruit and vegetable farms resulted from a very rapid market expansion brought about by new and improved methods of transportation. The first transcontinental railroad linking California to the population centers of the Midwest and East was completed in 1869, but it produced no dramatic changes in the state's agriculture largely because its principal product, wheat, was still more cheaply transported by water than by rail. In the 1880s, however,...the development of refrigerated boxcars made possible the shipment of perishable products to distant eastern markets. With these developments fruit and vegetable farming on a commercial scale experienced a boom of such dimensions as to dwarf even that sparked by the discovery of gold. With new markets creating a seemingly insatiable demand for the fruits and vegetables of the state's irrigated fields, orchards, and vineyards, the profitability of such farming appeared to be guaranteed. The nearly simultaneous development of new and improved canning and drying techniques permitted California farmers not only to sell all of the fresh produce they could grow, but to profit as well from an equally strong and enduring demand for processed fruits and vegetables (Daniel 1981:33-35).

The Delta was as strongly affected by agricultural intensification as any area of the state. Delta farmers, who had employed Chinese labor in the construction of their levees turned readily to the same labor source to tend their fields and orchards. They soon found it profitable to lease their land in tracts to Chinese tenant farmers:

> The Chinese developed a symbiotic relationship with the landowners. Those

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Chinese who planted orchards for their landlords were employed not as farm laborers but as tenant farmers. Landowners leased several hundred acres at a time to Chinese tenants who were then required to prepare the ground for planting, and sometimes even to supply the saplings needed. These tenants, in turn, had responsibility for recruiting the requisite labor supply during the planting, thinning, weeding, and harvesting seasons. While the orchards were growing, the Chinese de facto were renting the land between the growing saplings for their own use. They grew berries and vegetables between the rows of trees. In some instances, a graduated rental payment calibrated to the life cycle of the fruit trees was set up. When the trees were young, and their roots had not yet spread, the tenants paid a relatively high rent for use of the land between the trees. Then by the third and fourth years, when the trees' roots had spread out far enough to be injured if the land in between were plowed for other crops, the rent would be decreased because the land could no longer be used for other crops. At the same time the trees had not yet begun to bear fruit so no income could be obtained from the land. By the fifth and sixth years, when the trees began to bear and the Chinese tenants could sell the fruit, their rent increased again. In this manner, the Chinese acted simultaneously as tenants who leased land to grow crops of their own and as caretakers for the growing orchards...

Chinese involvement in...the Sacramento-San Joaquin Delta...was also important in the 1880s because the nature of Chinese tenancy helped to determine the pattern of Chinese interaction with the larger society. Chinese large-scale tenants always needed seasonal help, which they recruited from the rural Chinatowns. The white landowners usually had no direct dealing with these seasonal laborers. The tenants made the decision on how many workers to hire, how much to pay them, and how long to keep them. In other words, the tenants assumed all the managerial responsibility for cultivating the land. In some instances, landlords continued to live on their farms, while in other cases, they were absentee. The tenant farmers acted as middlemen who funneled jobs to their compatriots, on the one hand, and labor and managerial expertise to white landowners, on the other hand. County archival records indicate that many of these Chinese tenants operated hundreds and sometimes even thousands of acres - a scale of agriculture undreamed of in the Pearl River Delta of Kwangtung Province from which most of them had emigrated. Agriculture was one of the most important channels for upward social mobility among rural Chinese immigrants in nineteenth-century California (Chan 1984:294-296).

The role of Chinese tenants and Chinese labor in Delta agriculture has been discussed by several authors (Arreola 1975a; 1975b; Chan 1984; 1986; Leung 1984; Leung and Armentrout Ma 1988; Chu 1970; Minnick 1988; Walker 1992). By 1882 Chinese laborers were performing an estimated two-thirds to nine-tenths of the state's agricultural work, but the Chinese Exclusion Act, passed in that year, led to a rapid numerical reduction. By 1890 perhaps only 20% of the state's agricultural labor force was Chinese. Their numerical importance declined more slowly in the Delta than elsewhere, and revived briefly during the Great Depression, when the area attracted about 2,000 year-round and 1,000 seasonal Chinese residents (Leung and Armentrout Ma 1988:2-3).

Various other ethnic groups have provided substantial numbers of tenant farmers and farm laborers. Portuguese farmers had arrived in the Delta during the 1850s, settling especially on the Yolo side of the river. Many of these early settlers and their descendants became landowners, but as late as 1916 20% of the tenants on Delta asparagus lands were Portuguese, as were a much smaller percentage of field laborers (Thompson 1980b; Walters 1988; Bailey 1916).

Italian and Japanese tenant farmers entered the Delta in the 1890s, occupying tracts formerly worked by Chinese. Sikhs arrived in the San Joaquin Delta in 1907 and for two decades were an important element in the asparagus and celery fields. Filipino and Mexican labor became important beginning in the 1920s (Walker 1992).

The situation in regard to tenant farmers early in the century can be judged by a Japanese-language review published in 1909:

> About ten miles from Freeport to Courtland is occupied by Japanese tenant farmers except for three Chinese and Italian farmers. If we go down the Sacramento River during the shipping season of vegetables and fruits, we will be surprised to see Japanese names written in English on boxes piled on landings... Within four miles from Courtland to Vorden there are no Portuguese farmers, and Japanese occupy 80% and Italians 20%. Within 3 miles from Vorden to Walnut Grove Japanese maintain 90% and Italians 10%... On Tyler Island, Andrus Island and along the San Joaquin River, Japanese tenant farmers are increasing the area of cultivation year after year (Ofu Nipposha 1909:12).

A more accurate picture of the importance of different ethnic groups among tenant farmers in the study area is provided by a survey conducted by the Immigration Commission the following year. Japanese immigrants were indeed the most important group of tenant farmers, but they comprised only 31% of tenants and controlled only about 26% of leased acreage. By the latter measure, Chinese and Italian farms were almost as important as Japanese holdings. The survey is also useful in demonstrating the geographical variation in ethnic concentration. Italian tenants, in particular, were absent from most tracts in the study area, but controlled virtually all of Staten Island (Tables 1,2).

Living conditions on the tenant farms was assessed in the same survey:

> On the more recently reclaimed tule lands the same general conditions prevail. The houses on the "camps" are generally built two stories in height in order that the men may have a place of temporary safety in time of flood. They are the roughly boarded and frequently unbattened structures, now occupied by Italians, then by Japanese, and then by some other race as the tenants change. The chief differences between the lives of the Italian farmers here and elsewhere are found in the facts that there are fewer families, the housekeeping is usually done by the men, larger numbers of hands live with the tenant farmers, and because of the water near the surface, a detached building ordinarily takes the place of the unwalled cellar dug under the house in other localities to serve as wine cellar and living room.

The Portuguese tenants of "camps" in the more recently reclaimed lands and those most subject to inundation, live under conditions neither better nor worse than those just described... Little attention is "given to beautifying them or the premises." Hard work, "close living," and much saving are characteristic of the Portuguese of these localities.

On the tracts of recently reclaimed lands, which have been held in large tracts, the Japanese live in the same type of temporary structures as are occupied by tenants of other races. The only difference of importance between the Japanese and the Italian and Portuguese groups is a difference in the number of tenants and employees living together. Because of the large number of their countrymen employed as temporary laborers the Japanese houses are very much crowded during certain seasons of the year. In one group, for example, there were 33 men living in a structure with two large rooms and a smaller one. In another instance 36 were occupying an 8-room structure. In a third instance 61 men-tenants and employees-were occupying an 11-room structure. These are typical of the tracts devoted to the growing of vegetables on a large scale. It is a "camp life," furnishings and the work of housekeeping being reduced to the minimum... When a white family resides on the farm leased in part or as a whole to Japanese tenants (or to Chinese, as well), these tenants occupy the usual Chinese bunk house. In nine cases in ten this an old structure in bad repair. When the white farmer has moved away-as is not infrequently the case-the tenants (Japanese or other) may occupy the house vacated. Almost invariably the houses so occupied are old and in a badly "run-down condition." Whatever the character of the structure occupied, the furnishings are almost invariably of the simplest and the housekeeping reduced to the indispensable...(Millis 1911:351-352).

TABLE 1

Tenant Farm Ethnicity in the Delta, 1910 (Farmed Acreage by Ethnicity of Tenant)

	JAPANESE		CHINESE		PORTUGUESE		ITALIAN		OTHER		TENANT TOTAL	OWNER-FARMED
TRACT	Area	%	Area	%	Area	%	Area	%	Area	%	Area	Area
Pierson District	2278	33.3%	1852	27.1%	950	13.9%	1390	20.3%	370	5.4%	6840	1681
Upper Andrus	686	42.5%	200	12.4%	530	32.8%	0	0.0%	200	12.4%	1616	442
Middle Andrus	277	23.3%	140	11.8%	200	16.8%	0	0.0%	572	48.1%	1189	368
Lower Andrus	432	28.5%	535	35.2%	241	15.9%	0	0.0%	310	20.4%	1518	1626
Brannan Island	1040	17.9%	551	9.5%	632	10.9%	0	0.0%	3597	61.8%	5820	533
Tyler Island	4518	37.8%	5741	48.1%	218	1.8%	0	0.0%	1460	12.2%	11937	251
Staten Island	567	6.1%	0	0.0%	0	0.0%	8084	87.6%	579	6.3%	9230	0
NDP Study Area	9798	25.7%	9019	23.6%	2771	7.3%	9474	24.8%	7088	18.6%	38150	4901
All Sacramento	17597	30.4%	11516	19.9%	4545	7.8%	12985	22.4%	11301	19.5%	57944	6112
All San Joaquin	8692	20.4%	9762	22.9%	1281	3.0%	2410	5.6%	20537	48.1%	42682	0
Total Delta	26289	26.1%	21278	21.1%	5826	5.8%	15395	15.3%	31838	31.6%	100626	6112

(From Millis 1911:Tables 8 and 9)

TABLE 2

North Delta Tenant Farmers, 1910

TRACT	Japanese Tenants	Chinese Tenants	Portuguese Tenants	Italian Tenants	Other Tenants	Total Tenants	Owner-Farmers
Pierson District	22	14	5	10	2	53	7
Upper Andrus	7	2	6	0	2	17	7
Middle Andrus	4	1	3	0	4	12	2
Lower Andrus	4	4	2	0	2	12	2
Brannan Island	6	4	3	0	4	17	3
Tyler Island	5	4	2	0	4	15	3
Staten Island	2	0	0	32	2	36	0
NDP Study Area	50	29	21	42	20	162	24
Percent	30.9%	17.9%	13.0%	25.9%	12.3%	100%	

(From Millis 1911:Table 8. Partnerships counted as a single tenant.)

Although agriculture has formed the basis of the study area's economy since the 1850s, various industries were undertaken in the ensuing century, including sugar refining, canning and brick making.

Sugar Refining

The only sugar refinery in the study area was built at Isleton in 1876. An account of this plant is given under Andrus Island, below.

Canning

The first cannery in the North Delta was established at Courtland in 1880 to pack salmon. Few details are available on this plant, and what little is presently known is provided in the account of Courtland, below.

With the foregoing brief exception, it was the asparagus boom that was responsible for the initiation - and chiefly responsible for the expansion - of the canning industry in the North Delta. A small asparagus cannery was established on Bouldin Island by Robert Hickmott in 1892, and by 1900 this had been replaced by two much larger plants. Hickmott's operations were destroyed by flood in 1904 (see Bouldin Island, below), but their success had already bred imitation. An asparagus cannery by built at Vorden by the California Fruit Canners' Association at the turn of the century and another by the Golden State Asparagus Co. on Andrus Island in 1902. Libby, McNeil & Libby followed with a plant west of Isleton in 1907 and another north of Locke in 1917. Three canneries were subsequently opened at Isleton: in 1920 by Bayside Canning Co., in 1922 by the J. F. Butts Co. and in 1926 by California Cooperative Canneries. The only North Delta cannery not established primarily for asparagus was the plant of the Thornton Canning Co., built in 1928.

Operations in the asparagus canneries have been described by a number of observers, the following indicating the state of the industry in 1916:

> Upon arrival at the cannery the "grass" is immediately put in the way of canning, it being the practice of the best canneries to put it up the same day as received. For this reason the cannery day usually commences about 1 p.m. with the morning receipts and continues until the last of the day's deliveries have been handled, usually about midnight, though not infrequently the day continues until 3 or 4 o'clock in the morning. A fair day's supply for a large cannery is from 1,000 to 1,200 boxes, though 1,500 is not abnormal.
>
> After passing on the scales to determine their gross weight, the boxes of asparagus are emptied on the sorting tables, where the stalks are divided into the seven grades recognized by the trade... The sorting is done in "cutting boxes," wooden

receptacles holding about 5 pounds each. The stalks are smoothly laid in the cutting box with the heads in one direction and their butt ends are trimmed evenly so as to give a uniform length. They are then placed in "china baskets" holding about a bushel and a half and dipped into a vat of boiling water (called a "blanching vat") for about 5 minutes. This thoroughly cleanses them and also softens the stalks so they can be handled without danger of being bruised or broken.

After leaving the blanching vat the asparagus is dumped on the canning tables. These are about 20 feet long and 2-1/2 feet wide. Each worker, and there are seven at a table, has a 20-inch porcelain-lined sink set into the table in front of him. A constant supply of clean cold water fills these sinks and the asparagus is again washed and picked over, all broken, bruised or discolored stalks being removed. Over the canning tables are two shelves. On the top one is kept a supply of empty cans and on the lower are placed the filled cans. An alleyway between the tables provides for the passage of attendants who keep the packers supplied with asparagus and empty cans, removing the filled ones. A wooden tray holding a dozen cans is used in handling both filled and empty cans. The packer inserts the stalks, butts down, in the empty can, using care to see that they lie straight and that the can is filled according to established rules-so many stalks according to the grade...

The work of sorting and packing in cans is largely done by Chinese and Japanese-not because of their doing it any cheaper or better but simply for the reason that white labor will not work the irregular hours, hands in water all of the time, and with the discomforts that seem inseparable from the short season and crowded accommodations available.

The work is all done as "piece work." Usually it is "farmed out" to a "boss" Chinese or Japanese, who receives an average of 20 cents a dozen cans for handling the asparagus from the time it is unloaded on the receiving platform of the cannery in lug boxes, through the process of sorting, blanching, packing, etc., until the cans are piled on the cooling platform ready for labeling and boxing. The supervising, inspecting and mechanical work is done by white men, as is also the labeling and boxing.

Until recently, what in trade parlance is known as "hole and cap" cans were used. They have a hole 2-1/16 inches in diameter in the top of the can and are sealed by a tin cap being soldered over the hole. It required considerable skill and time to pack a can through this small opening. More modern methods have brought about the use of the "sanitary" can, which comes to the cannery without any top, making it much easier to clean and pack. It is closed, as explained later, by having a top crimped on its end. As each can is filled, it is placed on a wooden tray holding a dozen. These trays pass under the eyes of an inspector who sees that they are properly packed. The trays then go to the "brining table," where an ingenious arrangement of twelve pipes automatically fills each can full of a weak brine, a mixture of pure water and the best salt. The cans then go to a series of three machines through which they are passed automatically; the top is clinched on by the clincher, the temperature raised by a steam bath so as to drive all air from the can by the exhaust box, and the edges of the can and of the top are doubled together into a

hermetical seam by the seamer. The cans are then placed in a retort, where they are cooked for twenty-five minutes in a steam bath of 230 degrees Fahrenheit, under a pressure of 7 pounds. They are then ready for the cooling platforms and, after inspection, are labeled, boxed and warehoused for shipment (Bailey 1916:13-14; cf. Millis 1911:361; Cruess and Christie 1923; Barnhill 1930).

The Chinese labor force at one of the North Delta canneries in 1910 has been described by Chan (1986:336-337).

Mechanization improved various aspects of the process in the ensuing years. Mechanical washing and sorting was soon introduced. Improvements were made in the cooking process and larger and more permanent brick and concrete structures were built to house the operations. Mechanical handling of the pack was also introduced, as was motorized transportation, which gradually replaced river transport in shipping the product to market (Bitting 1924; Brookes 1929; Western Canner 1929b; 1929d).

The 1920s witnessed a revival of anti-Asian agitation. The Pratt-Low Cannery in Ryde initiated a policy of "only white help" in 1920 and three years later "an understanding" was reported "among packers and shippers along the river that as little Oriental help as possible was to be used in canning and packing." The extent to which such prejudices affected the North Delta canneries is unclear (Rio Vista Banner 1920; 1923; Western Canner 1936:19-20).

As previously noted, by the mid-1930s, improved roads and the development of refrigerated trucks meant that canning operations could be concentrated in larger plants near urban centers where access to a greater variety of crops permitted a longer packing season and a labor pool for the canneries was more readily available. Meanwhile, heavy asparagus plantings in the North Delta gave way to other crops, and the focus of the industry shifted to the South Delta. By 1940 most of the North Delta canneries had ceased operation.

Brick Making

The beginnings of brick manufacture in the study area are unclear. This is hardly surprising: brick manufacture in the mid-19th century was often little more than a cottage industry. Temporary kilns could be, and often were, set up only long enough to fire sufficient brick for one or two buildings. Such transient operations, perhaps, were the sources for reports of brick construction at Mokelumne City in the 1850s and of a brickyard at Walnut Grove before 1870 (Hillman and Covello 1985:219; Maniery and Cunningham 1990b).

More permanent and more productive, however, were the brick factories that operated near Freeport and Thornton in the 1880s. Available information on these yards has been reported elsewhere.

Transportation

The network of navigable rivers which interconnect in the Delta made water carriers the most important means of transporting goods and passengers until well into the 20th century. Boats have plied the region's waterways for thousands of years, but it was the initiation of regular steam navigation in 1849 that inaugurated rapid transport in volume. Passage between Sacramento and San Francisco - by sail, a matter of days - was reduced to a period of hours (Harney 1908).

Expansion of steamer traffic on the rivers provided farmers with a ready means of shipping their crops either to Sacramento or - more often - San Francisco. As a result, most Delta farms constructed landings where the boats could stop. Many such landings were merely cleared areas along the bank or rude piles of brush and wood across which produce and passengers could be precariously loaded or off-loaded. More successful farming operations built wharves and even warehouses along the banks.

Public roads were slowly extended into the Delta. By 1851, a road extended along the east bank of the Sacramento as far as the Runyon farm (opposite the head of Steamboat Slough) and another skirted the tulares, crossed the Mokelumne at Benson's Ferry and extended south toward Stockton (Thompson 1851).

The expansion of road networks in the Delta, the proliferation of ferries and their gradual replacement with bridges have been described by Thompson (1980a; 1981). The Delta's surviving historic bridges have been described by Mikesell (1990).

Railroad lines entered the Delta in 1863 with the establishment of the Freeport Railroad. In 1882, a narrow gauge line was built to Brack's Landing by the San Joaquin & Sierra Nevada Railroad. Each of these lines lasted only a few years, but later lines were more successful. Between 1909 and 1912 the Sacramento Southern Railroad extended a line south from Sacramento to Freeport, and along Snodgrass Slough to Walnut Grove and Locke. Southern Pacific extended this track to Isleton in 1929, and to southern Andrus Island in 1931. Meanwhile, Western Pacific built a line through Franklin, New Hope and points south about 1910 and extended a branch line to Terminous in 1927.

The purpose of all these lines was to capture farm produce shipments previously sent to the Bay Area by boat. They were inspired by the growth of specialty crops such as asparagus and celery and boosted the growth of such packing and shipping centers as Isleton, Walnut Grove, Locke, Thornton and Terminous. The railroads, however, were frequently in competition with each other and in conflict with growers and packers over freight rates. With the improvement of highway networks and the development of refrigerated trucks, they declined in importance.

BEACH LAKE AREA

This "tract" is arbitrarily defined as extending along the east bank of the Sacramento River from Freeport Bend to Hood-Franklin Road and inland to the eastern margin of the study area. It includes Reclamation Districts 744 and 745 and the Edinger-Johnson District as well as a much larger extent of unorganized land in the Freeport vicinity and east of the reclamation districts. The tract is now transected by Interstate 5. Total area is about 9700 acres.

Surface elevation is about 10 ft above mean sea level along the Sacramento River, falling to sea level or below in some of the backland area immediately to the east, and rising gradually to about 15 ft above sea level at the eastern margin of the area. Surface soils are primarily alluvial sediments (Weir 1950a). Prior to Euroamerican settlement riparian forest dominated the natural levees along the Sacramento, with extensive stands of marsh vegetation on the lower areas and with grasslands to the east. Two large lakes occupied the lowest areas: Beach Lake (now reclaimed) immediately south of Freeport, and North Stone Lake (formerly Whitcomb's Lake) further south (Fig. 10).

Only a few early settlements occur in this area. Freeport is located near the northern boundary. Immediately upriver, either on the northern margin of the study area or immediately outside was the site of Webster, which was evidently also the Russian embarcadero for Sutter's Fort. Hood (formerly Richland) is located at the southwestern corner of the area, extending into the South Stone Lake area.

The Beach Lake area is not directly impacted by any of the project alternatives.

Prehistoric Occupation

Of the 25 prehistoric sites in the area, eight lay along the Sacramento River, 16 were situated around the shores of Beach Lake and North Stone Lake, while one lay on the plain east of Beach Lake. These sites document an occupation beginning about 500 B.C. The lake shore settlement pattern has been discussed by Tremaine (1994).

Historic Native American Occupation

Three Plains Miwok villages were located in the Beach Lake area: Hulpumne, situated near Freeport, and Gualacomne (sometimes rendered as Walak), opposite Clarksburg, and Chupumne, near Hood. Early references to the former group are confusing, but Gualacomne appears to have been one of the larger Miwok villages on the Sacramento. The village was visited by the Duran expedition in 1817. Acceptance of baptism began in 1821, and this group seems to have avoided conflicts with the Spanish. After the 1833 malaria epidemic survivors from the smaller village of Hulpumne evidently amalgamated with Gualacomne, and the following year marks the high point of Gualacomne/Hulpumne

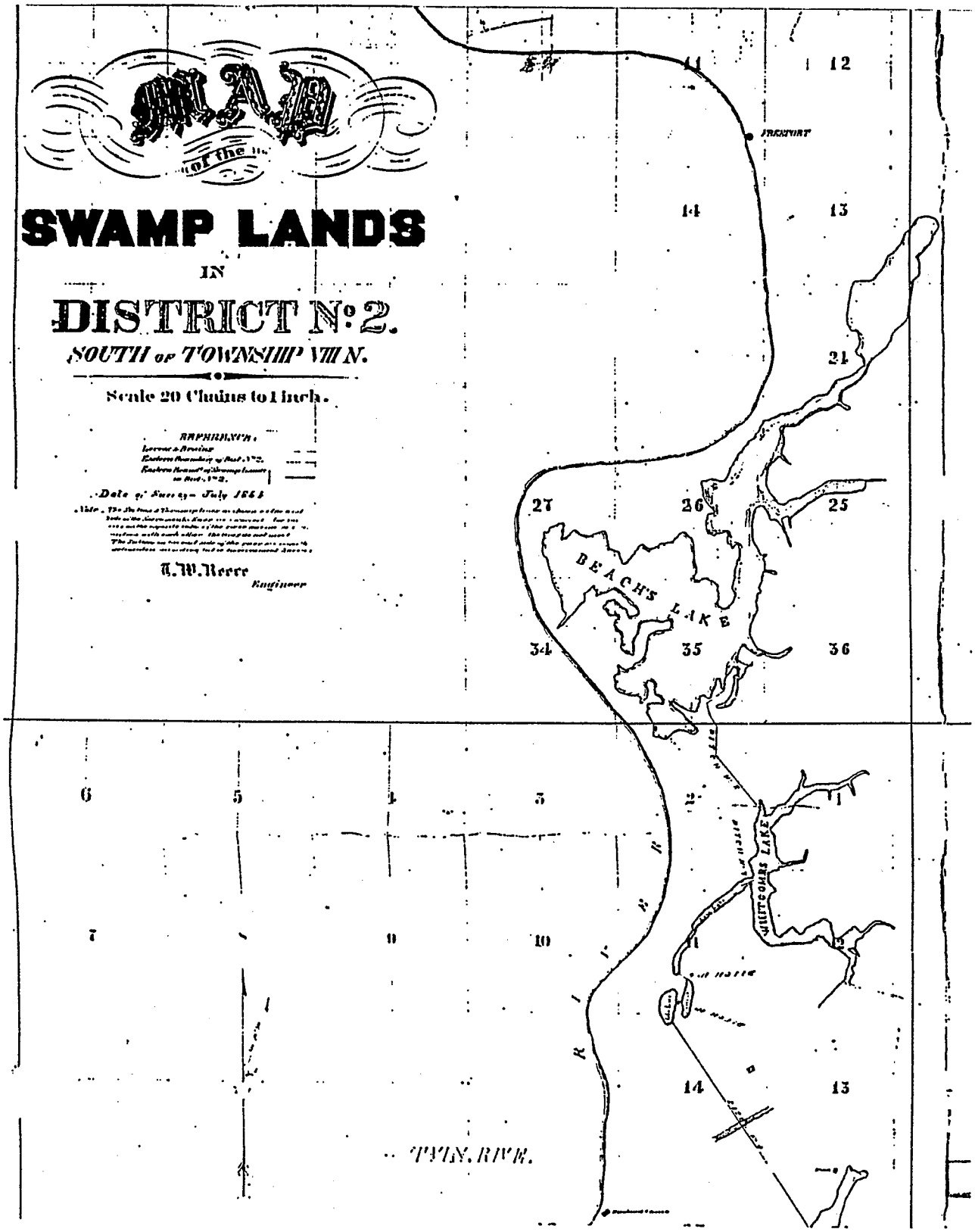

Figure 10. Portion of a map of Swamp Land District 2 (Reece 1864) showing Beach Lake and Whitcomb's (North Stone) Lake (California State Lands Commission).

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conversions to Christianity (Bennyhoff 1977:59-66).

The Gualacomne were the first Miwok with whom Sutter made contact, visiting the village and picking up guides on his first trip up the river in 1839. Thereafter the group was closely attached to New Helvetia (Bennyhoff 1977:65-66). The site continued to be occupied for at least a few years, Sutter obtaining from Gualacomne fishermen the salmon which he used to initiate a salt fish industry. The village was visited and described in 1841:

> Arrived at 11 PM at a Rancheria where we found about 30 Indians belonging to a tribe under the jurisdiction of Capt. Sutter. They are stationed here to catch & cure fish for the establishment. Their huts were formed of willows planted in the ground, bent over and tied together at the top, and covered with thatch... The men & boys [were] employed in drying fish, the females were preparing (by washing, drying and pounding) a seed resembling Timothy seed, of which they make a thick gruel, which as the wheat crop has failed, is now their substitute for bread. This place is about 20 miles below Capt S's by water, but only 10 by land (Phelps 1983:194).

In 1843 the Gualacomne salmon fishery was shifted several miles upriver to the abandoned Nisenan village of Sama (north of the present study area), the Miwok village name being transferred to the new site (Bennyhoff 1977:66).

The village of Chupumne was located in the southwestern corner of the district in the vicinity of Hood (archeological site Sac-62). Marriage ties linked the people of this village with Gualacomne (near Freeport) and Ylamne (on Elkhorn Slough, west of the Sacramento). Chupumne was evidently allied with the largest settlement in the area, Ochejamne (in the Pierson District), in resisting Spanish and Mexican incursions. No baptisms occurred among Chupumne people until 1828, and in the ensuing six years only eight individuals received baptism. The village was presumably devastated by the 1833 malaria epidemic. Chupumne is mentioned by Phelps (1983) in 1841, but the group was probably politically extinct shortly thereafter since the name does not occur in any later documents of the Sutter era (Bennyhoff 1977:67-68).

Euroamerican Settlement and Reclamation

Euroamerican settlement in the Beach Lake area began in 1848, when Tobias Kadell established a farm at Freeport Bend. The front land along the Sacramento was quickly taken up over the next few years. No homesteads along this stretch of the Sacramento are mapped by Ringgold (1850), although the omission is clearly an oversight since by this time there were "many settlers squatting down by the side of the river doing more or less at farming" (Kerr 1929:21). The first plat maps of the area (GLO 1859b; 1859c) show the front land entirely taken up.

From Freeport south as far as Walnut Grove the river frontage was soon "an unbroken line of orchards", while the back lands were used for hay, grain and vegetables (Sacramento Union 1888).

Prior to the 1862 flood, local landowners felt little need for artificial levees, but the raising of the river bed by hydraulic mining debris thereafter, left the area increasingly prone to floods. Levee work began in earnest by 1868, and between 1874 and 1876 three reclamation districts (Districts 203, 254 and 287) were formed in the area. In 1881, a local landowner, State Senator William Johnston, reported that like many of his neighbors he had raised his house on a mound. His levee was 6 ft high and had a base of 24 ft. Even so, it had been overtopped by floods the previous winter. Regular flooding was eventually eliminated only after the outlawing of hydraulic mining. Reclamation Districts 744 and 745 were formed in 1903 (Sacramento Union 1881; U.S. Bureau of Reclamation 1964a:7-8).

Johnston was among the more prominant farmers in the area, and his Rosebud Ranch north of Hood is listed on the National Register (Boghosian 1979; Lokke 1980:230; Graham 1984:15). Also of note is George Hack, an English immigrant who established a farm immediately south of the present Freeport Bridge in 1853. His house, built in 1879, is a California Point of Historical Interest (Maniery 1993).

About 1.5 miles south of Freeport was the farm of Julius Beach, established in 1850. Beach's farm backed onto an arm of Beach Lake (Fig. 9), to which he lent his name. Beach Grove, located on his land, was in the 1870s and 1880s one of the Sacramento area's best-known picnic resorts. There "every season, when the green grass covers the earth as with a carpet and the delightful shade of the beautiful oaks softens the sun's rays, thousands, by steamer, barge and carriage transportation, gather and enjoy fresh air and a day's respite from the busy walks of trade" (Sacramento Union 1888; cf. Wright 1880:257 and illustration).

The district - combined with Merritt Island and the Lisbon District on the opposite side of the river - was described in 1911:

> The first villages below the city of Sacramento are Freeport and Clarksburg. About these two villages is a large district devoted largely to producing potatoes, melons, and vegetables of various kinds, and alfalfa hay... The number of persons residing throughout the year in this community is possibly 1,000, of whom 300 are Portuguese, 400 Japanese, a few Chinese, and something less than 300 members of other races, but chiefly Americans and Germans. This is by far the largest colony of Portuguese along the river. Most of the families of this race are settled on small farms which they own, while a few of them lease. The other land is owned almost exclusively by Americans and a few north European immigrants. A large part of it is held in large tracts, but whether owned in large tracts or otherwise, perhaps one-half of it is leased to Asiatics. Formerly the Chinese were conspicuous as tenants, but now few such are found. The Japanese occupy the economic position formerly occupied by that race. Approximately 6,300 of the 17,000 acres of the district is now leased to the Japanese. About 2,000 acres of this is leased for a share of the crops, the remainder for cash (Millis 1911:329).

Fruit orchards continued to be important in the area in the 20th century, although

more acreage was devoted to annual crops (U.S. Bureau of Reclamation 1964a: Table 5-7).

Freeport

Freeport was founded in 1863 as part of an attempt by the owners of the Sacramento Valley Railroad to move the western terminous of their line from Sacramento to eliminate the fees and restrictions imposed by the city council. Freeport was the highest point on the river that could be reached at all times by the steamers and the lowest from which a rail line could be established without crossing marshlands to the east. It was therefore chosen as the terminous of a branch line from Brighton on the SVRR's existing Sacramento-to-Folsom line. The new line was incorporated in March, 1863, as the Freeport Railroad, but it was clearly an attempt by the SVRR to bypass Sacramento. The line was completed in December of the same year (Gwinn 1971:2-4).

The Freeport townsite was laid out on land purchased in 1862 by the railroad's directors from local landowners Tobias Kadell and Caleb Gosling. Once the line was completed, facilities for handling freight and passengers were quickly built at the new town on the river:

> The new wharf, 250 feet long and 140 feet wide, supported a storehouse, offices and accomodations for company agents and passengers. Two large derricks were built opposite the warehouse entrance on the wharf, and a third larger derrick was constructed to hoist cobble stones and granite from the cars to river boats. By February 1864, Freeport had six buildings, and by August included a wharf and warehouse. One of the buildings was an old tavern that Gosling had built years before...(Gwinn 1971:4-5).

Freeport quickly attained a population of about 400 and a post office was established. The railroad, however, promptly came into competition with the Central Pacific and soon lost the competition, when control of the company was sold to the Central Pacific's major shareholders in late 1865. The Freeport line was promptly abandoned and the tracks were torn up in 1866 (Gwinn 1971:5-9; Davis 1890:223-223; Frickstad 1955:133).

As a result of the railroad closure, Freeport's business and its population dropped precipitously. It continued to be used as a river landing, but by 1880 it was noted only as "the local trading post for a good farming section." The hotel, built in 1863 by E. Grieve was long closed; a general store and saloon established in the same year was still in operation, by then run by P. J. Riehl (Sacramento Bee 1880; Wright 1880:219; Davis 1890:223-224).

In the 1890s the town's only businesses were the general store, a blacksmith shop, a boot and shoe shop and the Freeport Telephone Co. The last was established in 1889 by local merchant P. J. Riehl. Initially connecting Freeport with Sacramento, by 1894 its lines had reached Franklin, Walnut Grove, Clarksburg, Isleton and Rio Vista by 1894. With expansion of its service area south of Freeport, the company became the Delta Telephone and

Telegraph Co. Its offices moved to Courtland in 1917. The Sacramento Southern Railroad line reached Freeport in 1910. Freeport lost its post office in 1920 (Oakland Tribune 1957; Fitzgerald 1985; Sacramento Bee 1894:190; Blenkle 1952:38-39; Frickstad 1955:133).

Freeport continues to serve as a mercantile center for farms in the area. A ferry - reportedly established in 1852 - served the town until construction of the Freeport Drawbridge in 1929. (The bridge remains as one of five unmodified examples of the Strauss Heel Trunnion Bascule Bridge in California.) The town eventually became a center for recreational fishing. Population in 1950 was 125 (Walters 1988:19,35; Mikesell 1990:171; Cook 1959).

Freeport Brickyards

This factory was located about a mile below Freeport and was established by Davis & Roberts in 1878. The kilns were situated on the river bank, the clay being obtained from nearby pits. Common, ornamental and pressed bricks were produced, the product being shipped to San Francisco. Output was 2,000,000 bricks in 1878, and 4,500,000 the following year. The operation was eventually purchased by the Sacramento Transportation Company, which had a second plant at Riverside, further up the Sacramento. The Freeport plant closed about 1895 (Wright 1880:219; Census of Manufactures 1880; Sacramento Union 1888; Crawford 1894:383; 1896:617; see Watts 1890:506-508 for a relatively detailed description of the works).

Hood

This town is located at the southern margin of the district and extends into the South Stone Lake area. It is discussed in that section.

Webster

Webster was one of the ephemeral "paper towns" founded by land speculators during the gold rush. Like many others it failed to attract settlers and quietly vanished from local memory. The only contemporary account seems to be a brief newspaper reference:

> This town is on the east bank of the Sacramento River a few miles below Sutter city, and nine miles below Sacramento city. Franklin Bates is its proprietor - This point is said to be situated on the highest and healthiest ground on the Sacramento river. Besides this it is said to present peculiar and great advantages as a central position - a *point d' appui* - not only for the great northern valley of the Sacramento and its tributaries but also for that of the San Joaquin, and the middle ground between. In this particular, it claims to unite the advantages of Sacramento city and Stockton. There are as yet, very few inhabitants there. The price or size of lots is not known (Alta California 1849).

Two 1850 maps locate Webster near Freeport bend, placing it at or immediately

outside the northern boundary of the study area. One of these seems to locate the "Russian embarcadero" at the same site. This was presumably the landing used by the Russian American Company to collect the shipments of grain, hides and tallow used by Sutter to pay for acquisition of Fort Ross (Jackson 1850; Ringgold 1850). The same site was reportedly the location of a farm established by Tobias Kadell in 1848 (Grimshaw 1964:11).

Cartographic Survey

Historic maps indicate 76 historic site locations in the district. Of these, Rosebud Ranch (BS-55) is on the National Register (Boghosian 1979), and the Sacramento Southern (Southern Pacific) rail line (BS-76) and the Freeport Bridge has been determined eligible (Maniery 1991b; Mikesell 1990). The George Hack house (BS-05) has been nominated for listing as a California Point of Historic Interest (Maniery 1993).

Including the town of Webster, 25 site locations were settled prior to 1860, and these include the future townsites of Freeport and Hood. Settlement of at least 50 of the site locations was initiated prior to the second quarter of this centrury. The great majority represent farmsteads. One of the locations has been recorded as an archeological site (BS-65 = Sac-418H). (Two historic archeological sites, 419H and 421/H, are not represented by structures on historic maps).

Archeological Surveys

This area has a very high density of archaeological sites. Twenty-four prehistoric sites (Sac-46, -48, -50, -56, -57, -58, -59, -60, -61, -62, -83, -84, -85, -86, -87, -88, -89, -90, -188, -202, -326, -327, -417, and -420), two historic sites (Sac-418H, -419H), and one site with a prehistoric and an historic component (Sac-421/H). Four of the sites in this area are believed to have been associated with three historic Plains Miwok village locations (Sac-56, *Gualacomne*; Sac-85/86, *Hulpumne*; Sac-62, Chupumne).

Information Center records indicate that the Beach Lake Area is the second most thoroughly surveyed district within the study area: about half the land surface of the district has been surveyed.

SOUTH STONE LAKE AREA

This arbitrarily defined area extends from Hood-Franklin Road to Lambert Road, and from the Sacramento River to the eastern margin of the study area. It includes Reclamation Districts 746 and 813 as well as a much larger area of higher land to the east. At the northwestern corner of this area is the town of Hood, which extends into the Beach Lake district. The former settlement of Richland also was located in the area.

Surface elevation is about 10 ft above sea level along the Sacramento River, falling to near sea level in the back land immediately to the east, and rising gradually to about 15 ft above sea level at the eastern margin of the area. Surface soils are primarily alluvial sediments (Weir 1950a). Prior to Euroamerican settlement riparian forest dominated the natural levees along the Sacramento, with extensive stands of marsh vegetation on the lower areas and grasslands to the east. A large lake - South Stone (formerly Hollister, Pitt's or Bloom) Lake (now partially reclaimed) occupied the lowest area.

The South Stone Lake area is not directly impacted by any of the project alternatives.

Prehistoric Occupation

Archeological evidence of habitation in the South Stone Lake area extends back at least 2,500 years. Excavations have been carried out at three sites (Sac-21, -65 and -145), all of them located on the original shoreline of South Stone Lake, and all of them positioned there to exploit its resources. Occupation of Sac-65 was for only a brief period about 1400 A.D., but the other two sites were inhabited much earlier, with occupation continuing into protohistoric or early historic times. Artifacts, faunal remains and other evidence indicate that Sac-65 and Sac-145 were used primarily as fishing camps (although hunting and plant harvesting undoubtedly were carried out as well). Sac-21 is so large that it was probably a permanent village at one time (Schulz and Simons 1973; Schulz 1977; 1981; Schulz, Abels and Ritter 1979).

The specialized economic function at Sac-145 as a lakeshore encampment has been described as follows:

> Located on the shore of a large shallow lake two miles east of the Sacramento River, this site was occupied from about 100 B.C. until just before the historic period. At least in the later portion of this time range, and for perhaps the whole of it, the site was inhabited by the Plains Miwok, a group among whom the acorn was the staple plant food (Bennyhoff 1977:13-14). Investigation entailed excavation of nearly 170 m^3 of midden, all of it processed through 1/4 inch or finer mesh screen. A total of 21 burials were encountered, as were numerous pits which represent abandoned earth ovens. The recovered assemblage includes hundreds of flaked stone tools, dozens of bone implements, scores of baked clay artifacts (net weights, sling stones, zoomorphs), and thousands of amorphous baked clay cooking stones, as well as a variety of shell beads and other ornaments. Faunal remains were abundant, and the

fish remains alone represent well over two thousand minimum individuals. Yet this large and varied assemblage includes only a single milling stone - a fragment of a metate...

Both the faunal remains and the artifact assemblage indicate that the Stone Lake site was occupied to exploit the resources of the lake and its peripheral marshland and, to a lesser extent, the surrounding grasslands. Since the bulk of the available vegetable resources would be greens, shoots, bulbs and corms, stone milling tools would be of minor importance at the site. The nearest oaks were located along the river to west, and as the higher natural levees there would have provided greater protection from winter floods, presumably the population moved there during the late fall and winter.

The Stone Lake site thus provides clear evidence that, even within acorn-dominated economies, specialized sites may exist which are wholly devoted to the acquisition and processing of other resources (Schulz 1981:71-72).

Historic Native American Occupation

Most of the South Stone Lake area probably lay within the territory of Chupumne, located near Hood. This group is discussed under the Beach Lake area, above.

Euroamerican Settlement and Reclamation

The area's front lands were settled in the 1850s: Initial plat maps show four settlers along the river in 1859, and it may be presumed that they had located there early in the decade. Interestingly, six settlers had also taken up claims in the back land by 1855 (GLO 1855; 1859c).

The entire area was included in Swamp Land District 2 when it was formed in 1861, but it is doubtful that this resulted in much meaningful reclamation locally. Reclamation District 254 was formed in the area in 1875, and District 433 was organized in 1883. These two districts were incorporated into District 813, organized in 1910 when construction of the Sacramento Southern rail line provided a ready-made back levee. The railroad levee cut through the center of South Stone Lake, allowing the western portion to be reclaimed. District 746, immediately south of Hood, was formed in 1903 (Wright 1880:187-188; U.S. Bureau of Reclamation 1964a:7,8).

The area's most prominent 19th-century landowner was Dwight Hollister, an argonaut who settled in the southwestern corner of the district about 1851. One of the North Delta's more successful farmers, he had orchards, vinyards, a dairy and a stock ranch. He was a county supervisor in 1863-64 and served in the State Assembly 1865-66. In 1872 he built a two-story Italianate residence at a cost of $22,000. The house was demolished in the 1960s

(Wright 1880:259-260, illustration; Sacramento Union 1873; Graham et al. 1984:14).

Richland and Hood

The early history and relationship of these two settlements is somewhat confused. Richland was founded in the early 1860s, located at a bend in the Sacramento where the road from Georgetown (Franklin) struck the river. (This site was more than half a mile south of the later site of Hood.) A post office was established in 1864, and a map of the same year locates the "Richland Church" at or near the site. Richland was reportedly an active shipping point for grain at that time (Wright 1880:220; Frickstad 1955:134; Reece 1864).

The activity was evidently short-lived, since by 1880 it was noted that "there is now nothing left at Richland but a school-house," and that Methodist-Episcopal services were held at the school on Sundays. The post office was eliminated in 1888. This site continued to be labeled as Richland at least through 1903, and maps at least as late as 1911 show it as the location of the Richland school (Wright 1880:220; Frickstad 1955:134; Boyd 1903; Phinney 1911).

By 1906, however, the designation of "Richland" had been transferred to the present site of Hood. By that time the western end of the road from Franklin had long-since shifted to the new location, and a Methodist-Episcopal church had been built at its intersection with the River Road. The "town" at that time consisted of the church, three houses and a barn (USGS 1908; USACE 1908:Sheet 9).

Construction of the Sacramento Southern Railroad led to the establishment of Hood Station (named for William Hood, chief engineer of the Southern Pacific) in 1910, half a mile east of the settlement. This inspired the local landowner, M. P. Barnes, to lay out a town, to which he extended the name of the station. Barnes built a store and a wharf. A post office was established in 1912. A packing house and the Hood River Inn - patronized mostly by produce dealers - were established within a few years. Unlike most Delta towns, Hood remained dry from its founding until decades after Prohibition (Augusta 1956; Cook 1959b; Frickstad 1956:133; Gudde 1960:136).

Hood's population grew slowly until after World War II, when it became a bedroom community for factory, air depot and railroad workers who commuted to Sacramento. It had a population of nearly 400 in 1959. By that time the old church on the River Road was gone, as was the hotel, which burned in 1954 (Augusta 1956; Cook 1959b).

Carotgraphic Review

Review of historic maps indicates 68 historic site locations in the Stone Lake area. Of these 10 represent farmsteads settled before 1860, and 22 represent locations probably no older than the second quarter of this century. Except for Hood (SS-21), the Sacramento

Southern (Southern Pacific) rail line (SS-01), and location SS-23 which includes the original site of Richland, all appear to be associated with agricultural activity. The Sacramento Southern line has been determined eligible for inclusion in the National Register (Maniery 1991b).

Archeological Surveys

Eleven prehistoric sites have been recorded in the area designated as South Stone Lake (Sac-21, -63, -64, -65, -145, -309, -323, -324, -325, -328, and -395). The first six of these sites were recorded prior to the systematic documentation of surveys. The last five were recorded during a survey of the Morrison Stream Group by Johnson (1974), but the report does not specify the area of coverage or survey methodology. Information Center records indicate that subsequent surveys have been lineal transects. None of these encountered additional sites, although one did report the survival of the old Richland School (SS-23) as part of a house near the river (Peak and Associates 1982:18). Given the early reports of dual use as a church and school, this may be the "Richland Church" located on the Reece (1864) map.

RANDALL ISLAND

Randall (formerly, Hensley) Island is a 420-acre tract originally formed by two channels of the Sacramento River. The narrower eastern channel (Hensley or Deadman Slough) was dammed and filled during reclamation. Today only a levee separates Randall Island from the northern end of the Pierson District.

The present surface of Randall Island extends from sea level to about 10 ft above; soils consist primarily of alluvial sediments (Weir 1950a). Prior to reclamation much of the island was occupied by riparian forest. When surveyed in 1954, only 25 of the 420 acres on Randall Island were committed to non-agricultural uses, primarily levees (Thompson 1959:475).

The island is not directly affected by any of the project alternatives.

Prehistoric Occupation

No information is available on prehistoric occupation or use of Randall Island.

Historic Native American Occupation

It is unclear whether Randall Island was in the territory of Chupumne (in the South Stone Lake area) or Ochejamne (in the Pierson District).

Euroamerican Settlement and Reclamation

Compared to the Pierson District, immediately to the south, Euroamerican settlement of Randall Island came late. No homesteads are noted on Ringgold's map of the river in 1850, nor on the area's first plat map (GLO 1859b), nor are any noted on the map of Swamp Land District 2, five years later (Reece 1864). Indeed, when the Swamp Land Commissioners created the district, which stretched southward from Sacramento, Randall Island was the only tract above Tyler Slough that was excluded, the board feeling that it must be reclaimed in a separate district (Board of Swamp land Commissioners 1861).

Reclamation District 55, comprising the whole island, was formed in 1865, and the district was presumably reclaimed shortly thereafter. Hensley Slough was noted as being dammed at both ends by 1879 - and this was doubtless done during the original levee work on the island (Wright 1880:189; Tucker 1879d:16).

Blenkle (1952:14) reports that "a Chinatown was established at Elliott, a short distance above Courtland, and when that settlement went up in flames in 1885 the Chinese colony split up and established villages at the Deming Ranch, near Courtland, and at Paintersville." The reference is presumably to Elliott's Landing on Randall Island, but the allusion is unclear, since the landing did not receive that name until well after 1885.

Randall Island was reorganized as Reclamation District 755 in 1904. Crop records for the period 1924-1955 show most of the land in fruit orchards, undoubtedly perpetuating a pattern established soon after reclamation (U.S. Bureau of Reclamation 1964c:8-9, Table 9).

Cartographic Survey

Historic maps indicate 16 site locations on Randall Island. All are connected with farming operations and most probably date back to the 19th century.

Archeological Surveys

No archeological sites have been recorded on the island. The only reported archeological survey involved a short section of the Sacramento River levee: no sites were encountered (Werner 1988).

PIERSON DISTRICT

Pierson District - formerly known as Pearson or Runyon District - is an 8,990-acre tract lying within a long curve of the Sacramento River, its eastern boundary defined by Snodgrass Slough. The northern end of the tract is at Randall Island, while the southern end is formed by the Meadows Slough. The early settlements of Courtland, Onisbo, Paintersville and Vorden lie within this tract. The tract was named for J. W. Pearson, whose land manipulations provided a notorious episode in the history of the district.

The present surface of the Pierson District extends from 10 ft below to 5 ft above sea level. Soils consist primarily of alluvial sediments (Weir 1950a). Prior to reclamation natural levees along the Sacramento River were occupied by riparian forest, while the back lands were probably dominated by tule marsh.

Today the area is devoted to agriculture. In 1954, the 8,990 acres of the Pierson district included only 50 acres of business and residential area, 360 acres of levees and 15 acres of water surface (Thompson 1957:475).

The area is not directly impacted by any of the project alternatives.

Prehistoric Occupation

Of the six prehistoric sites in the Pierson District, excavations at two (Sac-72 and -73) were carried out in the 1930s and demonstrate occupation of the district for at least 2,000 years (Lillard, Heizer and Fenenga 1939:20). Site Sac-70 has been identified as being the location for the historic Plains Miwok village of *Ochejamne*.

Historic Native American Occupation

The village of Ochejamne, located opposite the head of Steamboat Slough (at archeological site Sac-70), is believed to have been the largest Plains Miwok village on the Sacramento. It was visited by a Spanish expedition in 1817, but it appears to have been aiding neighboring villages in resisting the Spanish several years previously. A total of 428 residents submitted to baptism between 1828 and 1836, more than from any other Plains Miwok group. The bulk of these baptisms, however, followed a military defeat in 1830 (Bennyhoff 1977:70-72).

Ochejamne seems to have been the most important village on the lower Sacramento, and to have been militarily allied with Junizumne (near Walnut Grove), Chupumne (in the South Stone Lake District), Siusumne (on Merrit Island?) and probably Guaypemne (on Tyler Island), stoutly resisting Spanish encroachment:

All [these villages] were characterized by resistance to missionization and do not

appear in the baptismal register in numbers until after all surrounding tribelets had been successfully approached by proselytizers. All but the Guaypemne appear to have fought as allies against the Spanish in 1813; the Ochejamne and Chupumne (and by inference the Junizumne) fled the Spanish explorers in 1817; the Ochejamne and Junizumne were allied against the Mexicans in 1830; and the Ochejamne and Siusumne made treaties with Vallejo in 1837 to resist the raids of the Mokelumne group (Bennyhoff 1977:72)

After secularization of the missions in 1836, most of the Ochejamne must have returned to their village, since it remained politically important for several years afterward. Their 1837 alliance with Vallejo led them to raid the Muqueleme to retrieve horses stolen from Sonoma. After 1839 the Ochejamne switched their allegiance to Sutter and in early 1840 raided the Napa Valley. This inspired a retaliatory campaign by Salvador Vallejo against the lower Sacramento tribes. As a result, the Ochejamne reportedly moved near New Helvetia, where they became laborers for Sutter (Bennyhoff 1977:72).

A Sutter letter written May 11, 1845 mentions "the Ochejamne Rancheria", referring to it also as "Clement's Camp" after the chief. Sutter's ensuing correspondence (Jan. 2, Feb. 8 and Feb. 20, 1846) indicates that the Ochejamne-New Helvetia alliance was having problems (Sutter 1981). It is uncertain whether the rancheria mentioned by Sutter was the old village site or a new location nearer the fort. The Ringgold (1850) map indicates an occupied Indian village on the original Ochejamne site. The village's location at the head of Steamboat Slough made it a common stopping place for travelers coming upriver from the Bay.

Ochejamne thus was probably the village visited in October, 1846, by Edwin Bryant who left a brief account:

> Continuing our voyage, we landed about nine o'clock, A.M., at an Indian *rancheria* situated on the bank of the river. An old Indian, his wife, and two or three children, were all the present occupants of the *rancheria*... Surrounding the *rancheria* were two or three acres of ground, planted with maize, beans, and melons. Purchasing a quantity of water and muskmelons, we re-embarked and pursued our voyage (Bryant 1936:324).

Unequivocal as to location, but less descriptive, are reports by Grimshaw (1964:11) in 1848 and Kingley (1914:323, 326) in 1849. Taylor (1850:218), who visited the site in the winter of 1849-50, mentions it as "a small village of Indian huts, built of dry tule reeds."

Ringgold (1850) depicts the village immediately adjacent to the Runyon homestead, where Onisbo was founded in 1853. Since Onisbo was named after an Indian "chief" (Wright 1880:220), the settlement's namesake was presumably one of the last native occupants of Ochejamne. A second Indian village (= Sac-69) is shown by Ringgold (1850) about a mile north of Ochejamne. This village, near the later town of Paintersville, is otherwise unknown and may have been a secondary settlement of Ochejamne people.

Euroamerican Settlement and Reclamation

The earliest Euroamerican settlers in the district, as depicted on the Ringgold (1850) map were "Barber, Jr." and "A. Runyon & Sons". Runyon settled on his ranch - later and briefly, the village of Onisbo - in 1849. It was described in May, 1850, by a passing argonaut, as "4 or 5 Shaties [=shanties] of rude structure. [T]hey are growing vegitables on the side of the river" (Kerr 1929:19).

By 1859, the front land along the Sacramento had been thoroughly settled, and one or two intrepid farmers had staked claims in the interior (GLO 1859a; 1859b).

The first levees in the area were built in 1856. These were small works, the settlers constructing them by digging ditches 6 ft wide and 3 ft deep, running parallel to the river, and piling the spoil on the outer side of the ditch. Most of the settlers connected their levees with those of their neighbors, but the character of the construction was irregular and there was no back levee. With the addition of tap ditches this work was sufficient to drain the higher land during normal years, but protection against high waters was minimal (Tucker 1879g:1-2; cf. Locke District account).

In 1861 Swamp Land District 2 was formed, stretching from the southern boundary of Sacramento to Walnut Grove and including the Runyon (later, Pierson) District. Although over $71,000 was spent on levee work, the district was so large that the cumulative effect was negligible (Wright 1880:187-188).

The inadequacy of District 2 as a vehicle for meaningful reclamation led to the separate reorganization of its component areas. In 1872 the Runyon District (including the future Locke area, but not apparently Walnut Grove) organized as District 149. A levee was then constructed to enclose the entire district, but since each landowner was again responsible for the works on his own property, the size and nature of the levee varied considerably. This work was completed in 1875 (U.S. Bureau of Reclamation 1964a:6; Tucker 1879f:1-2; see Tucker 1879d:14-21 for a description of this levee four years after completion).

In 1874 the district was again reorganized, this time as District 205. The process involved the exclusion of some peripheral tracts (presumably Randall Island, Locke or Walnut Grove) in order that the district's largest landowner, J. W. Pearson, could control reclamation work and assess his smaller neighbors for levee work whose primarily benefit would acrue to his own lands. This the smaller landowners - at least those along the river who were already fairly secure - resisted:

> The swamp land distsict [sic] which lies back of Courtland and between the front land and Snodgrass slough has had a splendid levee constructed around it and preparations are now being made to put the land in cultivation. The majority of acreage is owned by Pearson... and he has leased a good portion of the raw land for three years, receiving $19 an acre for that term. A hundred head of horses were brought up from San Francisco this week, and the work of plowing will at once begin.

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> Pearson had caused the land to be assessed $17 per acre recently for reclamation purposes, and this tax, coming at once, the settlers resisted: but we believe the matter has been compromised, all agreeing to pay $10 an acre. Such an assessment does not work much hardship to small landholders in this district because nearly all such own front or bank land which is not assessed, and which, of course, is very valuable, the owners being in nearly every instance well off. But in many other districts, where there is but little bank land, such an assessment coming at one blow would ruin small owners (Sacramento Bee 1875).

Hopes of an early and amicable solution to this conflict were evidently ill-founded. The impass went to court, where Pearson was defeated. This, however, left management of the district in stalemate, "so that now there is neither legal right nor harmonious action to complete the reclamation" (L. C. McAfee, in Tucker 1879d:20).

With the departure of Pearson the tract was again reorganized in 1881 as District 551. A detailed report on its levee system two decades later is provided by Van Loben Sels (1905).

The Pierson District by this time had become a prominent fruit-growing area, the front lands along the Sacramento being devoted to orchards, while the back lands were used for other crops. By the 1880s the landowners had begun leasing acreage to Zhongshan Chinese, many of whom were experienced orchardists. J. V. Sims, O. R. Runyon, Levi Painter and P. J. Van Loben Sels were among the local landowners who leased to Chinese tenants (Chan 1986:175-178, 202-203, 373).

About this time stone fruit orchards were being torn out and replaced with pear trees, the latter being better adapted to Delta soils and water conditions. These fruits found a lucrative market on the East Coast, which had been accessible by fast freight service since the 1870s (Thompson 1957:360-361).

The first Japanese tenant farmer to enter the district was Ito Hatsutaro, who arrived in 1894 (Ofu Nipposha 1909). By 1910 at least 76% of the district was leased to tenant farmers. Of the leased land, 33% was controlled by Japanese, 27% by Chinese and 20% by Portuguese tenants (Table 1):

> Courtland is the center of the next important agricultural district on the left bank as we descend the river. The higher land along the bank of the stream is devoted almost entirely to the growing of deciduous fruits of many kinds, the lower lands farther back to raising vegetables and alfalfa, and the higher land still farther removed to the production of grain and hay and dairying. Practically all of the orchards and the vegetable lands are leased either to Chinese or to Japanese. The holdings are not large, and usually the owners with their families reside on the farms and supervise all of the work. The land farther back from the river is usually farmed on the owners account. Most of the farmers are natives, though the Swedes are

prominently interested in the diary farming (Millis 1911:329).

Intermittent crop records from the 1920s to the 1950s show land committed to orchards declining from about 2,000 to 1,000 acres. Asparagus with a committment of about 1,000 acres in the mid-1920s declined appreciably thereafter, while investment in annual crops fluctuated greatly (U.S. Bureau of Reclamation 1964a: Table 3).

Courtland

This town was founded in 1871 by James V. Sims, a local landowner, who named it after his son:

> COURTLAND - A new town with this name has been established on the Sacramento at a point about two miles above the slough, or about twenty-eight miles by the river below Sacramento. A wharf is built there by Captain Albert Foster, which is 182 feet by 50. Two new buildings or stores, 25 feet by 60, will be opened by a ball July 8th. Application has been made for a post office at this place with the facilities of a daily mail. We understand that the cost of the wharf and improvements amounts to $6,000. The locality of this point is in the center of the finest fruit orchards in the state. The California Pacific Railroad Company's steamers Chrysopolis and Yosemite will land regularly at the wharf above mentioned every day (Sacramento Union 1871; cf. Wright 1880:222; Gudde 1960:73)

Courtland - at the center of an orchard industry employing large numbers of Zhongshan Chinese immigrants experienced in orchard work - soon had one of the largest Chinatowns in the Delta. In 1877, in response to a circular calling for expulsion of Chinese laborers from farms along the Sacramento, 60 local landowners met at Courtland, proclaimed their need for skilled immigrant labor and denounced those calling for Chinese exclusion (Chan 1986:373-374; Minnick 1988:71-72).

A fire that started in the Chinese section destroyed much of the town in 1879. It also reportedly destroyed plans by Chinese businessmen to build a clothing factory, but there are reports that such an operation was already in place. The town was quickly rebuilt (Wright 1880:222; cf. Chan 1986:196).

A salmon cannery, operated by the firm of McDowell & Taylor was started in 1880. This operation, based on an investment of $4,000, employed more than 30 Chinese fish cutters, who earned $1.00 per 10-hour day. Salmon canning at Courtland continued through 1884, but like most of the canneries on the river was gone by 1890 (1880 Census of Industries; Dibble, Buckingham and Redding 1884:32; Jordan and Gilbert 1887:733; Brock 1891:482).

In the late 1880s the town was noted as thriving but still small:

> J. W. Houston, ex-Assessor of Sacramento county, just about constitutes the town, and does a large business. He has a hotel, general merchandise store, wharf, livery

stable, is Postmaster, express agent, has Western Union telegraph office, and does a commission and insurance business. His son, Fred B. Houston, is a Notary Public and agent for the RECORD-UNION.

This is the great center for shipment of river fruits to the East. It is gathered here by buyers for Eastern and Sacramento houses, packed ready for shipment by the growers, and forwarded to Sacramento to be sent on with carload lots (Sacramento Union 1888).

The Courtland Chinatown, with a population of about 500, continued to thrive and during the early years of the 20th century was a center of political activity aimed at the overthrow of the Qing dynasty. Sun Yat Sen's secretary, LooHon Tung, lived in Courtland, and Sun himself reportedly visited the town frequently to organize support and raise funds. A Chinese school was established at Courtland in 1915, and by 1920 the town had a branch of the Bing Kung Tong and of the Kuomintang (Minnick 1988:277; Walters 1983:222-224; Leung 1984:24-25).

By 1926, even with Chinese population in the Delta declining, Courtland still had two dozen Chinese stores and lodging houses. A Japanese section immediately to the west comprised about a dozen structures, including a Japanese theater and community hall. After a fire in the Chinese section in 1930, however, the owners refused to renew the leases and many of the occupants moved to Locke or Walnut Grove (Sanborn Map Co. 1926; Chu 1970:33).

One of the area's most important institutions during this period was the Bank of Courtland. This institution was formed by local farmers and businessmen in 1919 with a capital of $25,000. The bank at first occupied a room in the Native Sons hall, but as business grew this proved inadequate. In 1920 the bank erected a new building - a classic Greek Revival structure intended to provide an "air of substantiality and strength" - that still survivies (Cross 1927:251-253).

The bank prospered through the following decade, its assets in 1926 exceeding $792,000. In 1929 it associated with the Calitalo Investment Corporation, a bank holding corporation which acquired controlling interest by the following year. Calitalo left bank operations in local hands, however. The association was evidently viewed as providing the bank with greater security, and an issuance of $40,000 in capital shares was over-subscribed within a month by local investors (Cross 1927:252; Delta News 1929c; 1930a; 1930b).

The depression however, brought a decline in the bank's assets, which by the end of 1932 had fallen below $464,000. In January 1933, the national banking crises was brought home to Delta residents when two large Sacramento banks closed. Fearful of a run on deposits, the Bank of Courtland and four other Northern California banks consulted with the State Banking Superintendent and then closed their doors (Sacramento Bee 1933).

The bank building was taken over in 1937 by the Delta Telephone and Telegraph

Company. This firm originated at Freeport in 1889 as the Freeport Telephone Co., its first line connecting that town with Sacramento. Its lines eventually reached Rio Vista, and in 1917 its headquarters were moved to Courtland, which was more centrally located. The company continued to occupy the Courtland Bank building at least into the 1950s (Blenkle 1952:38-39).

Onisbo

This early attempt at a town was founded on the Runyon homestead opposite the head of Steamboat Slough. Evidently named after one of the last occupants of the native village of Ochejamne (see above), the settlement had a post office from 1854 to 1872, when it was moved to Courtland. In 1880, the settlement was dismissed as "not much of a town", although it was noted that "a good school house, costing, with the Masonic hall over the school room, $2200, was erected in 1860" (Wright 1880:220; Frickstad 1955:134).

Paintersville

This settlement was founded by Levi Painter, who settled in the district in the 1850s. In 1877 he built a two-story structure known as Painter's Hall, the first entertainments being given there in the holiday season at the end of the year (Wright 1880:260 and illustruation). Paintersville is attributed, during Painter's career, with a river landing, a store, a saloon and a hotel. The settlement seemingly never acquired a post office. Paintersville does have some local reknown as the site of Painter's "post hole bank": a tin can beneath a fence post where Painter secreted money held for friends and associates (GLO 1859a; Wright 1880:260, illustration; Blenkle 1952:11, Gudde 1960:221; Walters 1983:226).

The settlement received an economic boost in 1918 when J.M. Buckley established a trucking headquarters there. The Paintersville Bridge was built in 1923 and remains one of five unmodified examples in California of the Strauss Heel Trunnion Bascale Bridge (Blenkle 1952; Mikesell 1990:172).

Vorden

This settlement grew up at a point about halfway between Onisbo and Walnut Grove, where a road across the Pierson District joined the river road. It was first called Trask's Landing or Trask, after C. F. Trask, the landowner. The site had a general store and acquired a post office in 1894. A tavern was established in 1898, and a hotel was built in 1913. In 1902 the name of the settlement was changed to Vorden, after the hometown of P.J. van Loben Sels, the district's largest landowner. In 1936 the post office was moved to Locke (Shepherd 1885; Frickstad 1955:135; Dewing 1966).

Vorden Cannery

The only cannery in the district was built immediately north of Vorden (then Trask's Landing) by the California Fruit Canners' Association at about the turn of the century. It was intended specifically for asparagus and packed 30,000 cases in 1901. The cannery, which in season employed about 250 Chinese workers is illustrated by Smith (1905: Fig.5; cf. Bentley 1902; Davis 1903:329; Pacific Rural Press 1902b; 1906; Dewing 1966).

In 1916 the California Fruit Canners' Association merged with several other large packing firms to form the California Packing Corporation. While the corporation continued to operate the Vorden plant for several years, its investments in asparagus canning were concentrated in its Rio Vista cannery. By 1929 the latter plant was the largest asparagus canner in the Delta, while no pack at all is reported for the Vorden plant. The Vorden cannery was demolished in 1933 (Braznell 192:35-37; Western Canner 1929a; Delta News 1933).

Cartographic Survey

Historic maps indicate the presence of 88 historic site locations in the Pierson District. The earliest of these are the village of Ochejamne, which later became the A. Runyon homestead and the village of Onisbo (here designated PD-17), an unnamed Indian village to the north which later became the Alice Bryan farm (PD-13), and the Barber homestead later occupied by J. Runyon (PD-07). Several other 1850s farmsteads occur, as do the 19th-century settlements of Courtland (PD-03), Paintersville (PD-09) and Trask's Landing or Vorden (PD-41). Except for the salmon cannery and clothes factory in Courtland, the only industrial site in the district was the Vorden cannery (PD-38). Except for a school site (PD-18) and a church site (PD-25) the remaining sites seem to be related to farming operations.

The Paintersville Bridge has been determined eligible for the National Register (Mikesell 1990).

Two properties located in Courtland, the Courtland Bank and Courtland Chinatown, have been suggested by informants as potentially eligible for the National Register. Given archeological integrity, the same would certainly be true for the site of Ochejamne.

Archeological Surveys

Six prehistoric sites have been recorded in the Pierson District, (Sac-69, -70, -71, -72, -73 and -74), all prior to systematic documentation of surveys. Site Sac-70 is identified with the historic village of Ochejamne (see above). Information Center records indicate archeological surveys of limited portions of the district by Peak & Associates in 1976, D. L. True in 1980 and Roger Wermer in 1988. No new sites were recorded.

LOCKE DISTRICT

This small district, located between the Sacramento River and Snodgrass Slough, extends from the Meadows Slough to an unnamed slough marking the northern edge of the Walnut Grove District. The town of Locke is located at the southwest corner of the tract.

Surface elevations range from about sea level to 10 ft above. Soils consist primarily of alluvial sediments (Weir 1950a). Prior to reclamation higher lands along the Sacramento were occupied by riparian forests, while the low-lying backlands were dominated by marshlands. In 1955 the district's 608 acres included 148 acres of irrigated land, 560 acres of non-irrigated land, 27 acres in industrial and urban use and 21 acres of levees (U.S. Bureau of Reclamation 1964a: Table 2).

The district is not directly impacted by any of the project alternatives.

Prehistoric Occupation

Three prehistoric sites have been recorded for the Locke area, but no excavations have been carried out.

Historic Native American Occupation

The Locke District lay within the territory of Junizumne. Soule (1976:10) has suggested that this village corresponds with archeological site Sac-75 in the Locke District, although it is possible that the village was actually situated at Walnut Grove.

Junizumne was attacked by a Spanish expedition in 1813, and visited by another in 1817. Between 1813 and 1836 119 villagers submitted to baptism, most of them in 1828, but the village was again attacked by a Californio expedition in 1830. The village was apparently associated with the northern Plains Miwok alliance led by Ochejamne (in the Pierson District) in opposing missionization. Although less resistant to baptism than their northern neighbors, the 1813 and 1830 attacks were evidently reprisals for harboring fugitives from the missions. No references to Junizumne occur after the 1833 epidemic (Bennyhoff 1977:73).

Euroamerican Settlement and Reclamation

The first Euroamerican settlement in the Locke District was presumably the Ludson homestead shown on the 1859 plat map. By 1870 the tract had been adquired by H. W. Odell, who had previously settled further north in the Runyon (Pierson) District. The tract was included within Swamp Land District 2 when the latter was formed in 1861, and was included with the Runyon District in the smaller District 149, formed in 1872. It is unclear whether it was included in District 205 during the reorganization in 1874. The Locke tract was not part of the Runyon District when it was reorganized as District 551, evidently in 1881 (GLO 1859a; Tucker 1879d:14-21; 1879g:1-4; Van Loben Sels 1905; U.S. Bureau of

Reclamation 1964a:6).

Odell, who had resided in the area since 1857, summarized the history of local reclamation efforts two decades later:

> Our first reclamation was not to protect the land from an entire overflow but to prevent the floods from washing away the loose plowed ground on the river banks.
>
> The larger portion of the first levees were built in 1856. Nearly all the settlers along the river from Walnut Grove to Freeport built small levees by digging ditches 6 feet wide and 3 feet deep and throwing the dirt outward toward the river. Most all of these small levees and ditches were connected.
>
> Tap ditches were dug from the levee ditch back to the low land and in this way from 10 to 40 rods of the front or bank land was kept dry enough to cultivate. These small levees were kept up till 1871 when the first general reclamation commenced.
>
> The levee began about the centre of section 26 T. 5 N., R. 4 E. and run up the Sacramento River to a point opposite the head of Randall Island, about the N.W. Cor. of Section 27 T. 6 N., R. 4 E.; thence, in a southeasterly direction about 2-1/2 miles to the head of Snodgrass slough; thence down the Western bank of that slough to section 25 T. 6 N., R. 4 E.; thence, across to point of beginning. The whole distance is 16 miles and there are 8000 acres of land enclosed.
>
> Each land owner built his levee to suit himself and the size and slopes varied greatly; on the river bank the height was about 4 feet, on an average, and in the tules it was from 6 to 8 feet.
>
> On the river bank the material is all sediment and it was taken from the outside to build the levee. All the back levee and the cross levees were built with slopes of 2 to 1 on the outside and 1-1/2 to 1 on the inside. The crown was 4 feet wide.
>
> One mile of the upper cross levee is built of peat but it is only 4 feet to good blue clay; all the rest of the levee is sediment.
>
> The work was finished in 1875 as everybody had a hand in it. I don't know what it cost.
>
> In the season of 1876 the people went to plowing and perhaps 2000 acres were plowed and seeded. We raised a good crop of beans, potatoes and alfalfa.
>
> In 1876 an addition of 4 feet was made to the inside of the back levee and it was raised to about 8 feet in height; the material was taken from both sides.
>
> In 1876 all the land was dry and I kept a band of sheep on it all winter.
>
> During the winter of 1876-7 the back levee broke and flooded the whole tract and it has never been repaired since. At present the land is in about the same general condition as it was in 1868 only we are cultivating nearly twice as much land on the river bank (H.W. Odell, in Tucker 1879g:1-2).

The tract was organized as Reclamation District 369 in 1880 (U.S. Bureau of Reclamation 1964a:5-6).

During the 1880s Odell's ranch was acquired by George W. Locke and Samuel Lavenson, who as partners had operated a Sacramento carpet and wall-paper store since 1855. Lavenson died in 1900, leaving Locke the ranch. Known as the Mound Ranch, most of the

land was used for livestock, although a 200-acre orchard along the river was leased to Japanese tenants (Guinn 1906:668; Thompson n.d.).

The Sacramento Southern Railroad line was built across the district in 1912, terminating at Walnut Grove, with a short spur returning north to the Locke District. Shortly afterward the town of Locke was built on the southwestern corner of the district and a cannery was built on the northwestern corner.

Locke

Several authors have provided accounts of the founding and growth of Locke or reports of life in the community. The most detailed are Arreola (1975), Gillenkirk and Motlow (1987), Kagiwada (1982), Leung (1984), Rossi (1976), Thomas (1934), Walter (1983), Yee (1975), and Yip (1977).

In 1912 the Southern Pacific built a river warehouse on the water frontage in the southwestern corner of the district at the northern end of the Sacramento Southern spur line. The site was to become an active center for shipping fruit and produce in season. Three Zhongshan immigrants, Chan Tin San Shan, Wing Chong Owyang and Yuen Lai Sing, in expectation of business from the Chinese workers who would form the labor force, built a store and saloon, a boarding house and a gambling hall across the road from the warehouse in 1914.

In October, 1915, a fire destroyed the Chinese section of Walnut Grove. Prior to the conflagration a majority of the Walnut Grove Chinese community had been Zse Yap immigrants, while those from the Zhongshan district formed a minority. Faced with rebuilding, the latter group, under the leadership of Lee Bing, a local merchant, determined to form their own community. They leased land from the Locke heirs adjacent to the nucleus formed three years earlier by Chan, Wing and Yuen and hired American carpenters to construct the town of Locke.

The new settlement included a small merchant community, as well as larger numbers of orchard and packing house workers. The population increased further during the asparagus boom of the 1920s and early 1930s. The residents during this period were all Chinese, the town's permanent population numbering about 250.

During Prohibition Locke became a notorious wet resort, its saloons, brothels and gambling halls attracting a clientelle of all ethnic backgrounds. The economic boom fostered by asparagus and alcohol ended in the early 1930s, however, the latter by Repeal and the former from the shift of the asparagus industry to the South Delta.

Locke's population has gradually declined, most of the children of its founders have moved away for better opportunities, and in recent decades some non-Chinese residents have settled in the town. Physically, however, it has escaped most of the redevelopment that has

affected most other towns.

Libby, McNeil & Libby Cannery

Libby, McNeil & Libby was organized in 1903, with headquarters in Chicago. The company built asparagus canneries at Isleton (1907) and Ryde (1910) before deciding to erect a much larger plant in the Locke District. This cannery - variously known as Libby's Locke, Lockeport or Walnut Grove plant - was located north of Locke in the northwest corner of the district and was built in the winter of 1916-17. It opened in April, 1917, and is detailed on the 1927 Sanborn map. In 1929 the cannery packed 200,000 cases of asparagus, the second highest total in the Delta (and, presumably, in the nation). Libby's other two Delta plants combined packed a little over half this amount. The company soon adapted its large Sacramento cannery to handle asparagus as well as other foods, thus eliminating the need for the small Delta plants. In addition to the canneries, Libby controlled asparagus plantations in various Delta localities, including Tyler Island and Canal Ranch (Burrows 1917; Western Canner 1935b; 1936:22,24).

Cartographic Survey

Historic maps indicate only six site locations in the Locke District. The earliest of these is the Ludson homestead (here designated LO-05), which subsequently became the Locke Ranch headquarters. The town of Locke (LO-01) is on the National Register of Historic Places, and the Sacramento Southern rail line (LO-06) has been determined eligible (Maniery 1991b). Site LO-04 is the Libby, McNeil & Libby Cannery site. Site LO-03 is the Locke Ranch Landing, while site LO-02 appears to be another landing.

Archeological Surveys

The Locke District contains three prehistoric sites (Sac-47, -75 and -76), all of them recorded prior to the initiation of systematically documented surveys. Site Sac-75 may be the location of the historic Miwok village of Junizumne.

Two archeological surveys have been carried out in the District. Greenway (1978) surveyed the town of Locke. No prehistoric sites were found. The town itself was not considered as a site, and a historic dump site and a former building site were noted and located but not otherwise recorded.

A survey along the Sacramento Southern (Southern Pacific) tracks by Foster (1985), recorded no sites, although the Sacramento Southern line itself has since been determined eligible for the National Register (Maniery 1991b).

A brief overview of the town's structures is provided by Lortie (1979). An illustrated review was published by Walters (1983:83-97).

WALNUT GROVE DISTRICT

Now connected to the upper end of Tyler Island, this small district is bordered on the west by the Sacramento River and Georgiana Slough, on the north by a small slough that separates it from the Locke District, and on the east by Snodgrass Slough. Tyler Slough, which once separated Walnut Grove from Tyler Island, was filled during reclamation. The district is now transected by the Delta Cross Channel which was completed in 1951. The town of Walnut Grove is located in the western portion of the district.

Land elevation is at about sea level except for the town area near the levee, where it is about 5 ft above. Soils consist primarily of alluvial sediments (Weir 1950). Prior to reclamation the natural levees bordering the various channels were occupied by riparian forest, the lower areas behind them were probably occupied by marsh communities. Today most of the district is used for agriculture, but a considerable portion of the western area is devoted to commercial and residential purposes.

The district is directly impacted by the Preferred Alternative (5B) in the form of gate improvements and channel excavation at the head of the Delta Cross Channel and channel dredging in Snodgrass Slough. Similar impacts would occur under Alternatives 2B, 3B and 4B. Alternatives 2A, 3A, 4A and 5A include only the channel dredging, while Alternative 6B would involve only changes in the Cross Channel.

Prehistoric Occupation

No prehistoric sites have been excavated in the Walnut Grove District. Excavations were carried out, however, at Sac-329 on the opposite side of Georgiana Slough (on Andrus Island). This was a seasonal campsite occupied intermittently between about 700 and 1700 A.D. Given that the native status of walnut trees in the Delta has sometimes been questioned, it may be noted that this site yielded a hearth full of burnt black walnut shells that have been radiocarbon dated at about 1600 A.D. (350 $\pm$ 150 BP) (Soule 1976; cf. West 1981).

Historic Native American Occupation

The Walnut Grove District lay within the territory of Junizumne. Although Soule (1976:10) has suggested that the village location corresponded with a site in the Locke District, it is possible that the actual site was in Walnut Grove. A brief account of the village is given above in the Locke District section.

Euroamerican Occupation and Reclamation

Euroamerican settlement of the district was initiated in 1851, when John W. Sharp

took up a land claim at the junction of Georgiana Slough and the Sacramento River. Two years later Joseph Wise took up the front land in the northern half of the district. Reclamation history of the district presumably parallels developments in the Locke and Pierson Districts to the north. In 1861 the area was included in Swamp Land District 2, which extended from Tyler Slough to the southern boundary of Sacramento. That organizational scheme soon proved unworkable, but Walnut Grove was apparently excluded from the reclamation districts subsequently organized to the north and south. The area was finally organized as Reclamation District 554 in 1893 (Wright 1880:187-188; U.S. Bureau of Reclamation 1964a:7).

The district was connected to Sacramento by rail in 1912 when the Sacramento Southern line reached Walnut Grove. The line was extended to Isleton in 1929 (Western Engineering 1912; Delta News 1929b).

Walnut Grove

Walnut Grove was the earliest Delta settlement that ultimately grew into a permanent town. Its history has been summarized in various National Register nominations:

> The site of Walnut Grove was established around 1851 as a boat landing by John Wesley Sharpe on what turned out to be a poorly traveled route. Although few steamers traveled to Sharpe's Landing in the 1850s, Sharpe remained at the location, building a frame hotel and general store for those few travelers who found their way to his dock...
>
> By 1870, Sharpe had been joined by several other families who were lured to the area by reclamation efforts, including the Dye, Sperry, and Salisbury families. Sharpe had built a brickyard, blacksmith shop, lumber mill, armory hall, school, ferry, and ran a post office in this store after 1857...
>
> Sharpe died in 1880, leaving behind a thriving town at the site of his landing. His widow sold the hotel and store to Alexander Brown, II, known as Alex. Agnes Brown, Alex's mother, had come to Walnut Grove in 1865 and rented the hotel from Sharpe. Alex came to the town in 1879 and began helping his mother operate the hotel, buying and selling fruit at the same time.
>
> In 1880, at the time of Sharpe's death, Walnut Grove had a "commodious wharf" belonging to the California Transportation Company, the hotel, a general merchandise store with a post office and Wells Fargo express inside, blacksmith and wheelwright shops, butcher shop, and seven residences. Four steamers traveling from San Francisco to Sacramento stopped daily and reclamation was well underway... While other towns were developing in the Delta (i.e., Rio Vista, Isleton, Courtland, Hood and Freeport), Walnut Grove was the largest and most visited, due to its midway location between the major cities of Northern California.
>
> Walnut Grove's commercial district grew rapidly in the eight years following the death of Sharpe. In 1888, the local newspaper reported that the "town is of considerable importance...it is the general supply center for all of Grand, Andrus, and

Tyler Islands and a good portion of Peirson District" [Sacramento Union 1888]. Fruits and vegetables from the surrounding agricultural areas were shipped to points throughout the United States from the Walnut Grove wharf on flat barges and the hotel continued to serve a large clientele from all over Northern California who disbarked from the steamers that frequently stopped in the town... Walnut Grove continued to serve as the primary supply and shipping point for the surrounding area well into the 1920s.

By the mid-1880s the town was becoming associated with Alexander Brown. A newspaper article published in 1886 noted that Brown recently raised the hotel one story, erected a large public hall, operated a general store, and was an agent for the Southern Pacific Company... By 1888, another general merchandise store was operating and Alexander Brown, aside from his hotel and store, was in charge of the wharf, post office, and express office. As postmaster, Wells Fargo and Western Union agent, and business man, Brown was a central figure during these commercial boom years.

Alexander Brown also tried his hand at agriculture. In 1884 he rented 300 acres in the Peirson district; by 1890 his leased holdings had increased to over 3,000 acres. He raised barley, vegetables, beans, and, after 1890, asparagus. He went into the cattle business in 1887, raising stock on a ranch in Colusa and transporting the cattle to Walnut Grove to be slaughtered and sold. An 1890 history of Sacramento County noted that by that year, Brown ran his hotel, store, and ranch business, was agent for the Southern Pacific Railroad line of steamers, Wells Fargo and Company Express, the Western Union Telegraph Company, was post master, owned and conducted the town warehouse, and raised crops on nearly 4,000 acres of rented land...

Brown was instrumental in establishing Walnut Grove as a center for shipping agricultural goods throughout the nation. He was the first Anglo person to successfully grow asparagus as a marketable product. Every year the first pickings of the asparagus crop were rushed to the Plaza Hotel and Waldorf-Astoria in New York City for use in their dining rooms. These two world renown establishments had standing orders for Brown's spring crop...

Apart from his business endeavors, Brown supported the Chinese American and Japanese American communities in town. Initially, he financially backed several Chinese businessmen and aided in them establishing enterprises in the town. Around the turn of the century he rented a portion of his store to a Japanese American man and allowed him to establish a Japanese American-oriented grocery in the building. In 1883, he began issuing drafts for gold coins entrusted to him for shipping to San Francisco by Chinese and non-Asian members of town. One thing led to another and by 1905 he was operating a bank out of the back of his store, issuing loans to farmers, and lending money to members of the local Asian communities. This modest start led to the establishment of the Bank of Alex Brown, chartered in 1913 by Alex's oldest son, John Stanford Brown, and named for his father.

When a fire broke out in the Chinese American section of town in 1915, Alexander Brown provided two fire tug boats that hosed water on the ruins for days to

put out the blaze. Although he suffered financial losses in the blaze, he was concerned about the welfare of the Asian community. Following the 1915 fire, he rented land to the Japanese people and encouraged them to build their own community north of the previously-established Chinatown. To aid in this endeavor, he constructed a building in the district capable of housing 14 businesses. He organized a water company and supplied water and sewer facilities to the two Asian districts, as well as to the Anglo community, and helped in the rebuilding effort.

Throughout its early history, the Asian population in town always outnumbered the non-Asian contingent. Assessment rolls dated 1914, for example, lists 62 Chinese, 34 Japanese, and only 16 non-Asians who paid personal taxes on property owned (excluding real estate) in that year. The Anglo population consisted primarily of the few original families who settled in Walnut Grove before 1880; namely the Dye's, Brown's, Salisbury's, and Wise's. These families resided in homes interspersed throughout the commercial district and facing the River.

In an attempt to encourage new people to move into "his" town, Brown subdivided his old racetrack/stables area behind the town hall into small lots around 1918 and began building bungalows. Brown's motives were both commercial and personal. The new residents would not only frequent his businesses but would also contribute to the social makeup of the community, ultimately strengthening the non-Asian population of town.

The subdivision along Brown Alley represents the first concerted effort towards community planning and development in Walnut Grove with the express purpose of attracting non-Asian residents to supplement the few old time families in town. The establishment of this small community within the commercial district was complete by his death, effectively fulfilling his dream for a viable residential community.

At Brown's instigation, and with his financial backing, the Imperial Theatre in Walnut Grove was constructed in 1920 by Mr. Takeda to serve the Delta region. Brown envisioned this theatre as a place for all the people in the region and it was used by Chinese, Filipinos, Japanese, Anglos, and Portuguese well into the 1970s. This theatre, with its large stage, was used for community dances and gatherings, rotary meetings, moving picture shows, plays, and other gatherings attended by people from all over the Delta.

By the time of his death in 1923, Alex Brown owned, operated, or backed most of the commercial enterprises in the non-Asian portion of town, was a silent partner in several of the Chinese businesses, and rented land and building space to the Japanese community. In addition to his store, hotel, wharf, and warehouses, he had a financial interest in the town bank, the local butcher shop, and post office, all owned by his sons. Brown also organized and owned the local water district, electric company, telephone company, and other public utilities.

While the commercial and residential history of Walnut Grove revolved around Alex Brown and his investments, other people were also operating businesses in the community. Auto garages, blacksmith shops, restaurants, and several residences not owned by Brown were dpicted on Sanborn maps dated 1921 and 1927. The majority of the commercial ventures, however, were either started or acquired by the Brown

family between 1880 and 1923 and the history of the community, both commercially and residentially, is directly associated with Brown. Most of the accomplishments and values maintained by Brown in his life were continued by his children and grandchildren after his death contributing to the sense of time and place and to the continuity of the district as a commercial center.

Four of the buildings in the district, a small cottage on Brown's Alley built by Fred Wicker, the town butcher, in the late 1870s, the original butcher shop, and Wicker residence, and the old public hall, all built around 1885, are reminiscent of this initial spurt of growth that occurred around the time of Sharpe's death in 1880. In addition, the buildings are the oldest in the community and are reflective of the early architectural heritage of Walnut Grove. Although three of the structures were built for Fred Wicker, the butcher, they were acquired by Alex Brown by 1900 and remained in use by the Brown family long after Alex's death...

The period between 1916 and 1923 represented a time of commercial and residential expansion within the district. The Bank of Alex Brown and a new brick general store (that replaced the earlier 1880s wooden structure) were constructed by Brown across the street from the public hall. These two structures completed the commercial district that fronted River Road and were architecturally unique when compared both to the older structures in the District and to others in town. The remaining buildings outside the commercial district were situated within the Asian community and were simplistic, wooden, false frame commercial structures. The elaborate facade of the bank and the use of brick during construction of both the bank and the store set the structures apart from the remainder of the town outside the commercial district, adding to the importance of the district. With the completion of the bank and store, the buildings within the commercial district represented the entire range of the architectural heritage of Walnut Grove, beginning in the late 1870s and extending to the end of the expansion period associated with Alex Brown.

In addition to the commercial buildings, a dozen residential cottages were constructed by Alex Brown below River Road, east of the business section. The buildings along the Brown's Alley differ from others in town. They appear as an isolated example of 1920s domestic architecture within the community, possess a very strong and positive character, and represent an important milestone in the eventual development of the non-Asian community.

While there are other sections of Walnut Grove, such as the Chinese American and Japanese American districts, the buildings contained within these sections were built at different time periods than the bungalows and are commercial in nature. The Japanese American community established a residential district in town in the late 1920s and early 1930s; however, these buildings do not share the same architectural style, nor were they designed and constructed as a cohesive unit. In light of this, the cottages along Brown's Alley are unique in Walnut Grove, both in architectural design and in period of construction. In addition, they are the only example of a group of buildings designed, built, and occupied by non-Asians in a predominately-Asian community and remain relatively unchanged since their initial construction.

One of the houses along the Alley was used by Brown's son as a residence and

is still used by his granddaughter today. At the time of Brown's death in 1923, 12 cottages had been constructed along "Dixie Lane" and were occupied by local farmers and businessmen.

The houses that line Browns Alley, combined with the commercial buildings that front River Road, have been little altered since their initial construction date. As such, they convey a strong sense of past time and place associated with an agricultural Sacramento Delta river town between 1879 and 1923 (Maniery with Cunningham 1990b).

The Chinese section of Walnut Grove was particularly important, since Chinese immigrants probably outnumbered all other residents in the decades immediately preceeding and following the turn of the century:

> The first documentation for Chinese Americans in [Walnut Grove] is found in the 1882 Personal Property Assessment Rolls for Sacramento County (earlier assessment books are not available and Chinese were probably established in town by 1875...). In this year the May Soon Company was listed as owning property in town. The Asian population increased in 1885, when residents of a Chinese settlement located on the North Fork of the Mokelumne River...relocated to Walnut Grove after a fire leveled their town... By 1887, eight Chinese owned property in the town (not real estate); this figure increased to 101 by 1916...
>
> On land rented from local owners Sperry and Dye, an Asian community was established which served hundreds of local workers. Although laborers were generally boarded in barracks near their job sites, they would typically visit towns on their one day off, making use of the business enterprises. Through 1915 this community was composed of both people from Chungshan and Sze Yup [districts]... Businesses operating in town included dry goods and grocery stores, shoe stores, fish and meat markets, saloons, gambling halls, boarding houses, herbal shops, a temple, barber shops and baths, and other businesses... This community was situated between Bridge Street on the south and C Street on the north and between the Sacramento River to the west and the Southern Pacific Railroad Levee...
>
> In 1915 a major fire broke out in the Chinatown, leveling 80 buildings in the three-block area. This fire resulted in radical changes in the makeup of the community. First, the Japanese people, then residing within the Chinese American community, took the opportunity to physically separate themselves by establishing their own "Japantown" one block north of the Chinese district. Second, those businessmen originating from the Chungshan [district] moved one mile north [to establish the town of Locke]. Finally, the Sze Yup people remained on the site of the destroyed Chinatown, rebuilding their former community as a replica of the town that had been destroyed...
>
> Walnut Grove continued to prosper following the 1915 fire. During the 1920s the Chinese American community had a reputation as being "wide open" with gambling, opium dens, and brothels. It must be kept in mind, however, that the Chinese American community consisted primarily of bachelors or married men whose

families were in China. There were very few family groups in the community prior to World War II...

Sanborn Maps dated 1921, 1927, and 1933 document the rapid growth of the Chinatown. Aided by the influx of Filipino labors during the 1920s, the three-block section contained over 60 buildings and had nine gambling halls, six grocery stores, four restaurants, and three barbershops. Other businesses included fish, show, plumbing, laundry, and tailer shops, hardware, dry goods, and general merchandise stores, a Chinese school, temple, and benevolent society headquarters... In addition to the businesses, there were 28 houses used to board laborers who came into town to live during the winter season.

Although the transient farm laborer population declined somewhat during the Depression era, the permanent Asian population of Walnut Grove prospered in the early 1930s. In 1926 the Isleton Chinatown burned... While the town rebuilt, some of the residents moved into Walnut Grove. Courtland's Chinese American community also suffered from fire in 1930. Unlike Isleton, the people from Courtland were unable to rent land to rebuild their community and the majority moved into Walnut Grove, adding to the population spurt of the early 1930s...

In 1937 a second fire broke out in the Chinese American section of Walnut Grove, decimating the community, and again destroying over 80 buildings within a three-block area. This conflagration killed four laborers and left over 500 people homeless...

Rebuilding efforts began immediately in the district, however, some lots remained vacant. Three of the gambling halls were rebuilt and remained in operation until the mid-1950s, and some people reestablished their businesses on the old sites. By rebuilding their community between 1937 to 1940, Walnut Grove became the last Chinatown established in the Delta after nearly 70 years of Chinese American residency. In addition, it was the only Chinese American community to use stucco and Art Moderne/Modernistic architectural styles, adapted through the use of lighting, geometric pattering, and Chinese elements, to reflect specific Asian preferences.

Of particular importance to the Chinese American communities throughout the Delta during the period of significance (1937-1940) was Walnut Grove's Bing Kong Tong branch office (Chinese Freemasons Hall). The Bing Kong Tong established a branch in Walnut Grove by the 1910s to regulate gambling and other businesses, to manage general employer-employee relations, and to aid the men to find work. The group also performed important functions, such as sending the bones of deceased back to China for burial, helping indigent Chinese return to their native land, and acting as a mail service and bank for the laborers.

The Bing Kong Tong also mediated quarrels between members of the Chinese community and helped secure the repayment of debts. According to Leung (1984:24), it was Chinatown's most important social organization. At its height, Walnut Grove's branch had over 400 active members from throughout the Delta. Although Isleton and Courtland also had branches, these were forced to close due to declining memberships or fire by 1930; the rebuilding of the Bing Kong Tong Delta headquarters following the fire was an important step in maintaining the continuity of Chinese American

social life in the Delta... The ornate, distinctive architecture of the building also attests to the important role the association played in the daily lives of the community.

Other buildings constructed after the fire and up to 1940 are also significant as examples of the type of construction employed by the Chinese occupants working in context with an Anglo builder and architect during a relatively late period of occupation by the Chinese Americans in the Delta. In an interesting partnership, the commercial buildings were designed by Mitch Landis, and architect employed by William Schauer, owner of the local Noah Adams Lumber yard in collaboration with individual Chinese businessmen. Mr. Schauer acted as general contractor for the rebuilding of the community in the Modernistic or Art Moderne style popular at the time.

Many of the buildings have distinctive Chinese elements, including the use of exterior lightbulbs and overhanging balconies, adding to their uniqueness. There is a cohesive architectural style throughout the district and it is the only section reflective of this architectural style in Walnut Grove (other sections of town date between 1880 and the 1920s and do not share the architectural style of the Chinese American district). In addition, other Chinatowns in the Delta that survived into the 1930s (Locke and Isleton) contain only wooden, false frame buildings; Walnut Grove's architecturally modernistic approach is reflective of the time period during which this last Chinese American community was established.

Although about one-third of the buildings within the district are vacant today, they retain their basic configuration and architectural character as when originally built, and have integrity of location, design, setting, feeling, workmanship, materials, and associations. There is a strong sense of time and place throughout the District, as well as a feel for the Asian community that constructed the buildings, particularly along Market Street. The community gardens, now planted in vacant lots instead on the the railroad levee, add to the importance of the district and represent a cultural continuity between the community of the past and that of the present.

Today, there are only a few Chinese Americn families living in the district and only three businesses are operated by the ethnic group. The benevolent society building is the most visible example of the long association of Chinese Americans in Walnut Grove, although a few of the remaining buildings have star-bracketed lights around the entrances and neon signs in the windows that speak of a busier time (Maniery and Cunningham 1990a).

From about 1900 until World War II, Walnut Grove also contained an important Japanese section:

Walnut Grove served as the center of social and economic life for many Japanese seasonal agricultural workers in the rural Delta area from circa 1896 to the relocation of Japanese during World War II. The first business, an udan-ya (noodle shop) was apparently started in the town by 1896 and marked the beginning of a rapidly growing community that developed out of a need to augment the Chinese agricultural work force in the Delta... At least seven businesses were operated by

Japanese by 1900, including boarding houses, stores, a bathhouse, and a barbershop...

By 1910, hotels, restaurants, dry goods, drug, mercantile, and grocery stores were also in operation. A 1911 county assessment book indicates that 29 Japanese owned property in that year in Walnut Grove, called "Kawa Shima" by the local Japanese community... An influx of "picture brides" into the town during the 1910s resulted in the establishment of a Japanese language school and hall and a Methodist Church. The community was thriving in 1915, with 49 businesses entered in the local assessment records, including a shoe shop, fruit stores, fish and meat markets, and numerous boarding houses or hotels...

During the period between 1910 and 1920, nihonmachi's were being established throughout California. This was in direct response to thousands of Japanese immigrants arriving in America and finding work during the period of economic expansion and exploitation by Anglo land owners during a California agricultural boom of the early twentieth century...Issei entrepreneurs cashed in on the swelling population of laborers and laborers felt comfortable in a place where they could buy some Japanese goods, eat Japanese food, and share company with other Japanese... Walnut Grove, centrally located between San Francisco and Sacramento in the asparagus belt of the United States, served as the commercial and social center for laborers working the farms between Florin, Stockton, and San Francisco. It became the center for Japanese Americans in the Delta. Although other Japantowns were established in nearby Courtland and Isleton, they were residential and did not have Walnut Grove's range of services, community associations, and churches that catered to the local Japanese Americans...

In 1915, a major fire broke out in the community, leveling over 80 buildings in a three-block-square area... According to one consultant, there was nothing left standing in the Asian section of town following this fire... Until the fire, the Japanese people occupied the northern section of the existing Chinatown, just south of C Street. The fire afforded them the opportunity to physically separate themselves from the Chinese. They rented land from Alex Brown, a local businessman and entrepreneur, and established their own commercial/residential district north of Chinatown, near a Japanese Methodist church and language school.

The new nihonmachi was established one block north of its previous location. Lots were randomly numbered and the numbers were drawn out of a hat by each family to determine business and residence locations. One large building was constructed by Alex Brown, the local landowner, and housed 14 businesses. The other buildings were constructed by Japanese American carpenters, builders, and laborers who volunteered from as far away as San Francisco, Sacramento, and Stockton to assist in the rebuilding effort...

The new houses were similar in design and were all painted white. In most cases, businesses were owned by families who had shops or stores downstairs and resided upstairs. Community gardens, consisting of flowers, herbs, and vegetables were planted along the west side of the railroad levee, which created an artificial boundary to the district. A small shack was also constructed along the levee and was used by a volunteer watchman who walked the streets of the district at night as a fire

prevention measure...

During this period of expansion when nihonmachi's were being established throughout California, Walnut Grove was unusual in that Japanese Americans designed and constructed the commercial district in a physically-separated section of town...

The buildings in Walnut Grove, while vernacular in style, are reflective of the Asian preferences in everyday architectural design... Most of the structures are two-story and simplistic in shape. The majority of the structures are false frame commercial in style and uniformly possess recessed entryways, storefront windows, and overhanging balconies. The balconies served as porches for the upper residential units. Several of the buildings were designed with rooms that contained large, tiled public baths used by the laborers who frequented the town on Sunday and during the off season. While most urban and some rural nihonmachi's contained at least one building with distinctive Japanese elements, these were usually community oriented (meeting halls, churches, community center, theaters)... Walnut Grove was, and remains, a rare example in California Japanese American vernacular architecture...

The new nihonmachi in Walnut Grove grew beyond expectation during the 1920s. A period of agricultural expansion and opportunity, combined with the influx of women from Japan immigrating to join their husbands and the subsequent rise in birth rates, contributed to the population boom within Japanese communities throughout the state... In Walnut Grove, the population of the Japantown swelled on weekends and evenings when laborers working in the nearby orchards and fields came into town for haircuts, baths, entertainment, and food. Some laborers stayed in rooming houses within the district. The Kobuke, Aichi, and Kubashi were just three of the boarding houses that catered to these men. During the 1920s the Japantown witnessed such a large population surge that housing within the commercial district was nonexistent and a separate residential area was constructed east of the railroad levee for the new residents...

Local residents fondly recall these boom years. One woman who owned a barber shop in town remembered that on weekends the town was teaming with people. She often cut hair from dawn to dusk with no breaks and estimated that 1,000 men would come into town every Sunday... Sanborn maps dating to 1921, 1927, and 1933 depict an active, viable community existing in Japantown. Two movie theaters, a Japanese Association, churches, a variety of commercial services, schools, a dentist, and a surgeon catered to the increasingly family-oriented population.

Japanese associations, the Methodist and Buddhist churches, and the local Japanese American theater all played important roles in the lives [of] the townspeople and transients during this period. As pointed out by Masumoto, community organizations in rural nihonmachis included the surrounding labor camp workers in their activities, giving them a sense of belonging and of home. Potlucks, picnics, plays, meetings, and social gatherings were attended by hundreds of people and were often held on Sundays or during the off season to accommodate the agricultural workers...

The Japanese American community thrived throughout the depression and into the early 1940s. Forced by the United States Government to relocate for the duration

of World War II, the Japanese left town, leaving behind their buildings and many of their belongings. Only a few individual familes were able to find storage for their furniture, china, and business equipment with local non-Asian residents of Walnut Grove... During the war, the district was occupied by Filipinos and Mexican laborers, who were brought in by the local farmers to take over the work in the orchards and fields. It was during this time that fire destroyed two buildings on the south side of A Street, as well as the Japanese auditorium on the north side of A at Tyler...

Most of the original occupants of the district returned to Walnut Grove following the end of the war. The majority of these families did not stay longer than a few years, some returning to Japan and others moving into the cities. The district has gradually declined through the years. Today, most of the structures are used as private residences and only five businesses operate in this area. Two of them, Kawamura Barber Shop and Hayashi Market, were started before 1913 and are still owned and operated by the original families. Kawamuras is located on the corner of Market and B Street while Hayashi is situated at B and Tyler. Both enterprises remain in their 1916 location.

Mat's Shoe store, located in the Alex Brown Building on Market Street, was established as a pool hall by H. Matsuoka in 1918 but was converted into a shoe repair shop soon after. This business is operated in the same location by Toshio Matsuoka, the son of the founder. Ben's Drugs, located next door to the shoe shop in the same building, was originally located on A Street but moved to its present location in the 1930s, replacing Maeta's fish shop. The remaining Japanese American business in this section of town, the Walnut Grove Market, was constructed on the location of the Japanese auditorium in 1948 (Maniery with Cunningham 1990c).

Cartographic Review

Review of historic maps indicates nine historic site locations in the Walnut Grove District. The oldest and largest of these is Walnut Grove itself (WG-01). The townsite includes the Sharp Homestead and the original Walnut Grove School site, both shown on the 1859 plat map. The oldest available map detailing a portion of the town appears to be the Dakin (1885) fire insurance map, which depicts the Alex Brown warehouse, a still extant structure now used as an auto shop (Mary Maniery, personal communication).

Walnut Grove includes five National Register properties: The Gakuen Hall (Sakai and Branan 1980), the Imperial Theatre (McCabe 1982), the Walnut Grove Chinese American Historic District (Maniery with Cunningham 1990a), the Walnut Grove Commercial/Residential Historic District (Maniery with Cunningham 1990b), and the Walnut Grove Japanese/American Historic District (Maniery with Cunningham 1990c). The Sacramento Southern rail line (WG-09) has been determined eligible for the National Register (Maniery 1991b). The Jean Harvie School is listed as a California Point of Historical Interest.

The 1853 Joseph Wise homestead site (WG-04) was evidently destroyed in the

C-074154

construction of the Delta Cross Channel in 1951.

The other locations include scattered building sites dating to the first decade of this century or earlier.

Archeological Surveys

No prehistoric sites have been recorded for Walnut Grove. However, a news report from 1929 notes that a site with burials was found during work on the rail line passing by the town (Delta News 1929a).

The only reported surveys in the district involved a short segment of levee (Johnson 1974) and a small parcel on the eastern edge of town (Peak and Associates 1989). Neither project encountered sites.

In 1984, archeological excavations undertaken in connection with a utility line project in the old Asian section of Walnut Grove uncovered a dense deposit of historic artifacts associated with the 1915 fire. These have been reported by Maniery and Costello (1986; Costello and Maniery 1987).

GLANVILLE DISTRICT

This arbitrarily defined 8,900-acre district is bordered on the north by Lambert Road, on the west by Snodgrass Slough, on the south by McCormack-Williamson Cut and the Mokelumne River, and on the east by Franklin Boulevard. This area corresponds to the Glanville Reclamation District (District 1002) plus the southern end of district 813 and a small area on the north side of the Mokelumne east of the McCormack-Williamson Tract. Local soils are primarily alluvial in origin (Weir 1950a). Surface elevation ranges from mean sea level to 10 ft above.

Prehistoric Occupation

Excavations have been carried out at only one prehistoric site in this district: Sac-66 on the Mokelumne River. Although a Meganos Culture component has been identified at the site (Bennyhoff 1968) most of the deposit is assigned to the Berkeley Tradition, documenting occupation of the area since about 500 B.C. (Lillard, Heizer and Fenenga 1939).

Historic Native American Occupation

No Plains Miwok village centers occurred in the Glanville District, and it is unclear which of the villages in the surrounding districts would have claimed the area. Junizumne lay to the southwest (near Walnut Grove or Locke), Ochejamne to the west (in the Pierson District), Chupumne to the northwest (near Hood), and Tihuechemne to the east (on the Cosumnes). It is possible that the area was used as a fishing, hunting and plant collecting area by all these groups.

Euroamerican Settlement and Reclamation

Euroamerican settlement began in 1849 when A. M. Woods and Edwin Stokes established what would become Benson's Ferry on the lower Mokelumne (cf. New Hope Tract, below). With this exception, settlement seems to have been slow. As late as 1910 much of the area was still unreclaimed (USGS 1910b), although 16 years earlier McClatchy & Co. (1894) had shown it - optimistically? - as devoted entirely to grain and hay. Reclamation was evidently inspired by the 1910-12 construction of the Sacramento Southern rail line. Reclamation District 1002 was formed in 1912, utilizing the railroad levee as its western boundary. District levees were thus needed only along the southern and northern boundaries (U.S. Bureau of Reclamation 1964a:9-10).

The southeastern portion of the district, as here defined, consists of higher land evidently never formally reclaimed, although it is protected by a local flood control levee along the Mokelumne.

Most of the land in the district has traditionally been devoted to pasture (U.S. Bureau

of Reclamation 1964a:Table 11).

Cartographic Review

Review of historic maps indicates only 18 historic site locations in the Glanville District. As might be expected, given the late reclamation of much of this district, 14 of these locations may have been occupied no earlier than the second quarter of this century. The earliest site is at the northern side of Benson's Ferry (BL-04). All but one of the locations are evidently related to agricultural use. The exception, the Sacramento Southern (Southern Pacific) rail line (BL-18), has been determined eligible for the National Register (Maniery 1991b).

Archeological Surveys

Seven prehistoric sites have been recorded in the Glanville District (Sac-23, -62, -66, -91, -92, -248 and -249), all recorded prior to systematic reporting of surveys. Information Center records include reports of five surveys in the district. None encountered additional sites.

MC CORMACK-WILLIAMSON TRACT

This 1,688-acre island forms a triangular wedge between Snodgrass Slough on the west and the Mokelumne River on the east. The southwestern margin was created by the excavation of Dead Horse Cut in the 1890s, which separated it from Dead Horse Island. The northern and northeastern margins were formed by an unnamed channel dredged to obtain levee material.

Surface elevation is at about sea level, and soils are alluvial in origin. Prior to reclamation this area was occupied by marsh communities, no doubt with riparian forest along the Mokelumne side.

McCormack-Williamson Tract is directly impacted by the Preferred Alternative in the form of channel dredging in the Mokelumne and adjacent levee setbacks. Dredging would also occur under Alternatives 2A, 2B, 3A, 3B, 4A, 4B and 5A, as would setbacks under Alternatives 4A, 4B and 5A. Under Alternatives 6A and 6B the tract would become part of a flood by-pass system.

Prehistoric Occupation

No prehistoric sites have been recorded on the McCormack-Williamson Tract.

Historic Native American Occupation

This tract presumably lay within the territory of Junizumne, a village located in either the Locke or Walnut Grove District.

Reclamation

This tract was too swampy to attract pioneer Euroamerican settlement and too small to inspire early speculative reclamation efforts. A structure was located on the natural levee of the Mokelumne by 1910, but reclamation was not undertaken until 1919 (USGS 1910b; Thompson 1957:505). The tract was subsequently inundated in 1955, 1958, 1964 and 1986.

Cartographic Review

Review of historic maps reveals only seven historic sites on this tract. All are associated with farming activity. The earliest of these sites (MC-01) pre-dated levee construction by a decade and eventually became the headquarters for operations on the island.

Archeological Surveys

Information Center records indicate that the northwestern corner of the tract was surveyed by Peak & Associates in 1978. No sites were recorded. About half of the Mokelumne River perimeter was surveyed by West (1991). This survey recorded one historic site, MW-1, with two surviving two-story bunkhouses. This site is equivalent to Location MC-01 recorded here, and served as the headquarters for farming operations on the tract in the 1920s and 1930s (Carter 1923; Boyd 1930).

DEAD HORSE ISLAND

This 220-acre island is located between the Walnut Grove District and New Hope Tract. It is bordered on the north and west by Snodgrass Slough and on the south by the North Fork of the Mokelumne River. Originally connected on the east to what became the McCormack-Williamson Tract, it was separated from that area in the 1890s by excavation of Dead Horse Cut.

Land surface on the island is at or just below sea level and soils are alluvial in origin (Weir 1950). Prior to reclamation the area presumably supported a mixture of marsh and riparian forest communities.

Dead Horse island is impacted by channel dredging under the Preferred Alternative (5B), as well as Alternatives 2A, 2B, 3A, 3B, 4A, 4B and 5A. Under Alternative 6B the island would be impacted by use as part of a flood by-pass system.

Prehistoric Occupation

No archeological investigations have been carried out on Dead Horse Island.

Historic Native American Occupation

Dead Horse Island presumably lay within the territory of Junizumne, a village located in either the Locke or Walnut Grove District.

Reclamation

The swampy condition of this tract and its susceptibility to overflow made it unappealing to early settlers, while due to its small size, it did not attract the attention of the speculative land reclaimers of the latter 19th century.

The island, which had been in single ownership for many years, was finally reclaimed in 1900. It has flooded several times since, most recently in 1955, 1980 and 1986.

Cartographic Review

Historic maps indicate only two historic site locations on Dead Horse Island, both dating to the early 20th century and undoubtedly associated with farming activity on the island.

Archeological Surveys

No archeological sites have been recorded on the island, and no records suggest that it has ever been surveyed.

TYLER ISLAND

Tyler Island is an 8,960-acre tract located immediately south of Walnut Grove. The western side of the island is formed by Georgiana Slough, the eastern by Snodgrass Slough and the North Fork of the Mokelumne River. It is now connected directly to the Walnut Grove District, although prior to reclamation a channel between Georgiana Slough and the Mokelumne separated the two areas.

Surface elevations range from about sea level to 10 ft below. The central and lower portions of the island are characterized by organic soils, with mixed alluvial and organic soils dominating the upper island and the western margin. Mineral alluvial sediments are found at the head of the island and the natural levee area immediately along Georgiana Slough (Cosby 1941). The natural levees were occupied by riparian forest prior to reclamation, while most of the island was given over to tule marsh:

> Around the borders of the island is a strip of land about three chains [200 ft] wide, that appears as though it was formed by the washing in and lodging of slickens. It abounds in trees of various varieties and a heavy undergrowth of blackberries... This strip is the higher part of the island, and by far the firmest, as the rest is old regulation peat, and grown up to tules of such height that a horseman is easily lost, and a man on foot can only get out by good luck (Antioch Ledger 1892).

Today the island is devoted almost entirely to agriculture. Surface area in 1954 was 8,960 acres, of which 360 acres were devoted to levees and 140 acres to non-agricultural uses (Thompson 1957).

Tyler Island is directly impacted by the Preferred Alternative (5A) in the form of channel dredging in Snodgrass Slough and dredging and levee setbacks along the North Fork of the Mokelumne. Dredging adjacent to the island is also proposed in Alternatives 2A, 2B, 3A, 3B, 4A, 4B, and 5A, while levee setbacks would impact the island under Alternatives 4A, 4B and 5A.

Prehistoric Occupation

Several prehistoric sites are recorded on southern Tyler Island most of them on consolidated sand mounds projecting through the adjacent peat. All the sites provided evidence of late prehistoric occupation, and one contained burials of much earlier age, interred before consolidation of the sand. Excavations have not been sufficient to clarify the cultural relationships or economy of these people (Cook and Elsasser 1956).

Historic Native American Occupation

The village of Guaypemne - one of the smallest of the independent Plains Miwok villages - was located on Georgiana Slough, probably at archeological site Sac-25 on Tyler

Island. It was visited by Spanish expeditions in 1811 and 1817 and submitted to missionization between 1821 and 1828. There is no indication that the inhabitants returned to the area after secularization of the missions (Bennyhoff 1977:73-76).

Reclamation

S. C. Tyler settled on the head of the island in the 1850s, cultivating "less than two thousand acres", apparently without levees. Tyler Island was recognized as Swamp Land District 4 in 1861, but evidently no land was actually reclaimed. Reclamation began at the head of the island in 1870 when Louis Winter constructed 7 miles of levees to reclaim 1,000 acres of what became Reclamation district 175 three years later. These were small levees with only a 5-6 ft base, 3 ft height and 2 ft crown. The work included a dam across the head of Tyler Slough. Winter planted an orchard and grew some crops on his bank land, but made no systematic efforts to cultivate the low back land (Wright 1880:188; Tucker 1879c:1,2; U.S. Bureau of Reclamation 1964c:5).

District 175 was purchased by John Miller in 1877. He erected new levees, making little use of Winter's old works. Along Georgiana Slough, the new system had a 20 ft base, was 5 ft high and had a 3 ft crown. In addition, a wagon road was gradually raised on the outside of the levee using alluvium deposited in the borrow trench. Along Tyler and Snodgrass Sloughs and the Mokelumne an even larger levee was constructed with a 30-40 ft base, 4-7 ft high and with a 4-7 ft crown. The Tyler Slough Dam was increased to a like size. A cross levee of similar dimensions was extended across the southern part of the district. By 1879, 11 houses, each with a large barn, had been erected in District 175. All the land was leased to tenants, including 65 acres to Chinese. Rates were $10 to $20 per acre per year (Tucker 1879c:1-3; Sacramento Union 1888).

District 136 - also located on the head of the island - was organized in 1872, and reclamation began at that time. The levees were 20 ft wide and 5 ft high with a 2 ft crown. About half was cultivated by 1878 and all by 1879 (Tucker 1879c:3; U.S. Bureau of Reclamation 1964c:5).

Further south along Georgiana Slough, J. Beedy enclosed 400 acres in 1879, his levee being 4 ft wide with a base of 6-8 ft. Smaller levees were built along the slough south of Beedy's, but none were connected with back levees. Most of the back land in this area was cultivated at the time, beans and potatoes being the principal crops (Tucker 1879e:33-34).

The majority of District 175 - excluding that portion directly south of District 136 - was reorganized as District 364 in 1880. The excluded portion was not reorganized until 1910, when it became District 807 (U.S. Bureau of Reclamation 1964:5-6).

The middle portion of the island was organized as Reclamation District 386 in 1881, but apparently any reclamation efforts were fugitive. The area was reorganized as District

563 in 1894. Meanwhile, the lower end of the island was organized as District 532 in 1891. These changes were connected with a major leveeing effort, the driving force behind them being San Francisco millionaire Henry Voorman, who had purchased over 4,600 acres in the two districts. Reclamation was underway in 1892 and included plans for a 2,000-acre dairy operation. The work was completed in 1894 and about 1902 Voorman had his country house moved by barge to Voorman's Landing on the southwestern corner of the island from its former location on Bouldin Island (Antioch Ledger 1892; Thompson 1957:476; U.S. Bureau of Reclamation 1964c:5; Paterson, Herbert and Wee 1978b:14).

The island was flooded in 1904 and 1907, but thereafter remained secure until 1986. The Voorman holdings - the largest on the island - were sold in 1919 for over a million dollars to the Tyler Farms Co. All of the reclamation districts were consolidated with District 563 in 1956 (Rio Vista Banner 1919b; Thompson 1957:476; U.S. Bureau of Reclamation 1964c:5).

Asparagus was the principal crop grown on Tyler Island from the 1920s to the mid-1930s. Thereafter through the mid-1950s the greatest acreage was devoted to grain and hay. The Southern Pacific branch line was built across the island in 1929 to connect Walnut Grove and Isleton (U.S. Bureau of Reclamation 1964c:Table 1; Delta News 1929a).

Cartographic Review

Review of available maps provides a total of 58 historic site locations on Tyler Island. The earliest of these is the Tyler homestead (TY-48) shown on the 1859 General Land Office map. In spite of reclamation activity, which commenced in earnest on the head of the island in the 1870s, no further cartographic records are available until the turn of the century. For the remainder of the island, the earliest useful map is that of Boyd (1895).

With two exceptions, the sites consist entirely of farms, farm labor camps and associated landings. One exception seems to be site TY-49, an early paint shop located adjacent to Walnut Grove. A second exception (TY-58) is the Isleton Branch Line of the Southern Pacific Railroad. Although this 1929 extension was not considered in the determination of eligibility for the Walnut Grove Branch Line, under the assumption that the Isleton extension was constructed after World War II (Maniery 1991b). Since the line was built in 1929 to service the asparagus boom, its eligibility should by evaluated.

Archeological Surveys

Four prehistoric sites have been recorded on Tyler Island (Sac-25, -45, -104 and -162), all of them prior to systematic documentation of surveys.

Three documented surveys have been undertaken. Werner (1988) surveyed two short sections of the Georgiana Slough levee, with negative results.

West (1991) carried out a more extensive survey of the western perimeter of the island, including about 3 lineal miles on the inside of the levee. He recorded four historic sites: TI-1 (equivalent to historic location TY-07 in this report), TI-2 (south of TY-06; possibly a dump for that camp), TI-3 (TY-05), and TI-4 (TY-03). None of the structures present in the 1930s along this side of the island remained at the time of survey. West (1991:16) concluded that, "It appears that agricultural activities and levee maintenance have virtually destroyed the integrity of any historical remains" along the western perimeter of the island.

Paterson, Herbert and Wee (1978a; 1978b) carried out a field survey to determine the historical significance of navigation hazards along Georgiana Slough and the North Fork of the Mokelumne. They evaluated 11 sites on Tyler Island. Their site TI-1 (here TY-24) was Voorman's Landing:

> Principal structures in the water were a boathouse that burned in the 1940s and a bulkhead made of 12 x 12 inch redwood posts that was used as a landing for barges loading grain and as levee protection... In 1949, there was a two-story house, an abandoned house, several equipment sheds and a small warehouse at the site...
>
> Although the site was once the home of one of the leading figures in the area in the early twentieth century it was apparently not a commercial center. The landing was solidly built, but there was no evidence that it was associated with packing sheds or warehouses [sic, see preceding paragraph]. The structures at the site have disappeared and the pilings themselves are in a deteriorated condition. It is also possible that the levee has been set back, changing the relationship of the pilings to the shore. The condition of the site and the fact that it is without outstanding historical significance make it ineligible for the National Register of Historic Places (Paterson, Herbert and Wee 1978b:14-15).

Since the site was the home of one of the most important figures in the reclamation of the Delta, the assessment that it is without outstanding historical significance is questionable. The site, however, does not appear to be eligible for the Register unless it could qualify under archeological criteria.

The remaining sites consist of two sites (TI-2 and -3, no historic locations) presumed to have been landings, but where no remnants existed; one site (TI-4 = TY-45) where piers had been used for levee reinforcement, one (TI-5 = TY-47) consisting of an old wing dam; one site (TI-6 = TY-49) where piers were all that remained of a slough-side structure; two sites (TI-11,-12 = no present number and TY-07) consisting of piers that may have represented old landings; two sites (TI-13,-14 = TY-08,-11) consisting of small and apparently recent docks; and a rotting boat hull (TI-15). None of the sites were considered to have sufficient significance or integrity for inclusion in the Register (Paterson, Herbert and Wee 1978b:17-18; 1978a:27-30).

ANDRUS ISLAND

Andrus Island is an irregular tract. The elongated northern portion is flanked on the south and east by Georgiana Slough and on the north and west by the Sacramento River. The lower portion of the island is bordered on the north by the Sacramento, on the east by Georgiana Slough and the Mokelumne River, on the south by the San Joaquin River and Seven Mile Slough. The western border was formerly marked by Jackson Slough, but this channel was dammed at each end during reclamation and partially filled, thus connecting Andrus with Brannan Island. The island was named after George Andrus who settled on the upper end of the island in 1852 (Wright 1880:221).

The only sizable settlement on the island is Isleton, originally located on the northwest corner of the island. This town has since expanded onto Brannan Island as well.

The island surface ranges from about mean sea level to 15 ft below. Surface soils on the upper and middle island consist of alluvial deposits on the natural levees with the interior basins consisting of mixed alluvial and organic deposits. On the lower island perimeter alluvial deposits are far less extensive and much of the interior basin consists of peat (Cosby 1935). Prior to reclamation wooded areas were presumbaly restricted to the edges of the stream channels, and most of the island would have been covered by tules.

In 1954 the island comprised about 8,700 acres, including 460 acres of levees and 195 acres of municipal or business land; while slightly more than 8,000 acres was in crops (Thompson 1957).

Under the Preferred Alternative (Alternative 5B), channel dredging in the Lower Mokelumne would occur along the southeastern side of the island. The same would occur under Alternatives 2A, 2B, 3A, 3B, 4A, 4B, and 5A. Under Alternatives 6A and 6B, the southeastern peninsula would become part of a flood by-pass system.

Prehistoric Occupation

The prehistoric occupants of Andrus Island are known only from the excavation of a single site, SAC-329. This deposit represented a seasonal campsite located near the head of the island and occupied intermittently between about 700 and 1700 A.D. (Soule 1976).

Historic Aboriginal Occupation

Bennyhoff (1977:74) ascribes occupation of Andrus Island to the Guaypemne, whose home village was on Tyler Island. The southern part of the island may have been in Bay Miwok territory.

Euroamerican Settlement and Reclamation

Andrus Island, having smaller and less densely wooded natural levees than did the tracts further up the Sacramento, was consequently less attractive to early settlers. George Andrus settled on the head of the island in 1852, but for the most part it was not until 1855 that farmers finally began taking up holdings cultivating the front lands along the Sacramento. By 1861, 13 such farms had been established (Tucker 1879f:17; Wright 1880:221, 263-264; Doherty 1861).

The island was organized as Swamp Land District 8 in 1861 and some levee construction was initiated. By the end of the year, however, this work amounted to only 1.5 miles of small levees built by George Andrus at the head of the island. These works were only 2 ft high, with a 6 ft base and a 1 ft crown (Wright 1880:188; Tucker 1879f:17).

The flood of January 1862 effectively convinced the farmers of the precariousness of their situation, and all began constructing levees around their own lands. These regularly failed, but landowners were unable to agree on reclamation, and the old District 8 eventually dissolved into five separate districts (Districts 75, 89, 215, 317 and part of 148), each dependent on the others for security from floods. Both ends of Jackson Slough were dammed in 1871, thus connecting Andrus with Brannan Island. Andrus was fully enclosed by levees in 1873 and the island as a whole was cultivated for the first time (Tucker 1879f:3-6,12,13,15,17).

The levees continued to be increased in the ensuing years, but were plagued by settling, cracking and lack of coordination. They failed during the flood of 1878 and both Andrus and Brannan islands were inundated. Following this disaster, the island's reclamation districts were gradually reorganized, District 317 (Lower Andrus) being formed in 1878, District 407 (Middle Andrus) in 1882 and District 556 (Upper Andrus) in 1893 (U.S. Bureau of Reclamation 1964c:7).

Isleton, founded in 1874, was devastated by the 1878 flood, but survived and expanded greatly during the asparagus boom of the 1920s. During this time three canneries operated in Isleton and a fourth - the Golden State - was situated south of town at the confluence of the Mokelumne River and Georgiana Sloughs (see individual cannery accounts, below). Southern Pacific extended its rail line from Walnut Grove to Isleton in 1929 and built a spur line to the Golden State Cannery in 1931 (Delta News 1929b; Dunscomb 1963).

Golden State Cannery

The firm of Goetjen and Metson was organized in 1899, and operated a cannery on Grand Island, opposite Walnut Grove. In 1901 they reorganized as the Golden State Asparagus Co. The following year the firm built a larger cannery on a 1,400-acre tract they owned on Andrus Island, at the confluence of Georgiana Slough and the Mokelumne River (Pacific Rural Press 1902a; 1902b; Jones and Robbins 1928:84).

A photograph of the cannery was published by Smith (1905:Fig.6). The operation

was taken over in 1920 by the Western Canning Association, which owned various other plants in California and Hawaii, but the Andrus Island plant continued to operate under the old name. By 1929 Golden State had 3,000 acres of its own land in cultivation, of which 1,800 acres were in asparagus. The pack that year was 100,000 cases (Western Canner 1920a; 1929c).

Late in 1929 a fire destroyed several buildings at the cannery. These were rebuilt the following spring along with several additional worker's cottages. By July, however the company was in financial difficulties. An extension of the Southern Pacific freight line from Isleton to the cannery was completed in 1931. Golden State was acquired in 1934 by Elmhurst Packers, but it is uncertain whether they ever operated the Andrus Island Cannery. The plant was closed by 1936 (Delta News 1929d; 1930d; 1930e; 1930f; 1930h; Western Canner 1936:21; Dunscomb 1963; Lord 1937).

Isleton

Isleton was founded in 1874 by Josiah Pool, who laid out the townsite and built a store and wharf. The town was assigned a post office the following year. By 1876 a hotel, drug store, harness shop and blacksmith shop had been added, the California Transportation Co. steamers were stopping at the wharf twice a day, and a sugar refinery was being erected. The flood of February, 1878, however, inundated the island, destroyed the sugar beet crop, and set back the town's prospects. Pool moved away after suffering from another flood, but his son-in-law P. H. Gardiner remained as the town's most important merchant and landowner (Sacramento Union 1888; Blenkle 1952:25; Frickstad 1955:133).

The town grew gradually, eventually expanding across the head of Jackson Slough, which had been dammed in 1871, the channel eventually being filled in behind the dam. Isleton's original Chinatown was built along the slough and contained 35 residents occupying seven households, four stores and a laundry. By 1880 Isleton had a population of 1,680 residents, of whom 880 were Chinese (Leung 1984:17):

> The use of Chinese labor was an essential element in constructing adequate levees and in the reclamation of Andrus and other Delta islands. Isleton's Chinatown was begun by 1878 on land rented from J. Gardiner and consisted of a contract labor office and businesses designed to meet the needs of the workers who came into the town on their day off... The 1880 census recorded 880 Chinese in the town...most working as farmers or farm laborers... The local newspaper in 1894 reported that the residents were constructing a "joss house" in town and that tong hatchet men were using the quarter as a temporary refuge from police raids in San Francisco and other cities... It is probable that the Bing Kung Tong's Isleton branch office was established during the 1890s...
>
> By the late 1890s or early 1900s the Chinese quarters of Isleton began to swell with Japanese workers. The Japanese came into the region partially in response to the

need for laborers to replace the dwindling numbers of Chinese and partially because of the asparagus boom that began in the Delta after 1895. Along with the workers came merchants who established businesses in the eastern section of the Chinatown to serve the growing numbers of Japanese transient workers...(Maniery and Cunningham 1990d).

The first wave of the asparagus boom arrived in 1907 with the construction of the Libby cannery just west of town. The Isleton Chinatown burned to the ground in December, 1915, and was rebuilt in a new location. The Bank of Isleton was established in 1919, and the town - by then with a population of 3,000 - was incorporated in 1923. Also in 1923, the present Isleton Bridge was built over the Sacramento. This remains one of five unmodified examples in California of the Strauss Heel Trunnion Bascule Bridge. A six-block area centered on Chinatown was destroyed in 1926. A smaller area burned in 1930 on the eve of the asparagus festival, an annual celebration which attracted thousands of visitors to the town (River News-Herald 1966c; Cross 1927:255-256; Blenkle 1952:25; Mikesell 1990:172; Delta News 1930j).

Isleton was connected by rail with Walnut Grove and Sacramento in 1929 (Delta News 1929b), but the depression and trends within the industry led to the gradual closure of most of the island's canneries.

The effect of 20th-century developments on the town's Asian community has been summarized in the district's National Register nomination:

> The Asian district of town grew rapidly during the first quarter of the twentieth century, aided by the construction of several asparagus canneries and the continued agricultural prosperity. In 1910 there were six asparagus canneries between Courtland and Rio Vista and Chinese and Japanese Americans supplied over 90 percent of the labor force... In addition, Asian-American workers planted, maintained and harvested the majority of the asparagus and other crops grown in the region...
>
> The Asian quarter burned down in 1915 but was immediately rebuilt into two separate sections... The Chinese American businesses were confined to the area west of F Street, while the Japanese American section was constructed east of F Street. Both sections included boarding houses, rooms, and hotels that housed countrymen working in the canneries or nearby fields, as well as restaurants, grocery stores, soft drink parlors or saloons, and other general businesses. In addition, numerous gambling halls, a "Joss" house, and the Bing Kung Tong building were present in the Chinese section. The Japanese section had several community bath houses, an Association meeting hall, and a movie theater. Aided by the agricultural boom that continued to focus on asparagus and potato production, the Asian population grew by leaps and bounds into the 1920s...
>
> On May 31, 1926 catastrophe once again visited the district. According to newspaper accounts, a fire, started by a kerosene lamp, began at the west end of the

district near the Asian school. Aided by fire hydrants that were rusted shut and by the fact that the majority of the men in town were out fishing due to a Memorial Day holiday, the conflagration spread virtually unchecked throughout the district... A reported 1,500 people lost their homes and belongings in the fire and the blaze devastated the entire Asian-American district of six square blocks, destroying 110 buildings...

The Asian-American population immediately began plans for reconstruction. The land owner, Gardiner Improvement Company, expressed plans to build several brick structures in the district as a deterrent to future fires... Other buildings were also constructed with fire hazards in mind. While Gardiner built a few brick buildings, the majority of the structures were wood framed with tin siding garnered from the local Noah Adams Lumber Yard Company.

According to long-time Isleton residents, many of the buildings were constructed by Dutch and German carpenters hired by the local lumberyard. An independent local contractor, H. C. Balsmeyer, was responsible for building the sidewalks, streets and for plumbing the buildings in the Asian district. He may also have constructed several of the buildings as well. Other buildings were built by Chinese American and Japanese American carpenters and laborers, and residents of Isleton...

A comparison of personal property tax rolls for Isleton from 1925 to 1927 indicates that the fire resulted in a restructuring of the Asian-American district. Before the blaze, 36 Chinese and 31 Japanese were assessed for personal property in town; most of these were business owners... In addition, in 1925 there were 40 buildings and 8 garages in the Chinese section and only 29 buildings and 7 garages in the Japanese section... In 1927 only 15 Chinese owned property in Isleton, compared to 41 Japanese... A 1928 fire insurance map of the district, however, indicates that there was a near-equal amount of buildings: 24 in the Chinese and 27 in the Japanese. Some of the Chinese-owned buildings, however, were rented out to Japanese and Filipino businessmen...

One Chinese American woman, who was born in Isleton in 1911 and still resides in the town, recalled that after the 1926 fire Japanese American families insisted on a more physical separation of the two sections within the Asian-American district as a way to prevent the spread of future fires. In consideration of their feelings, F Street, the roadway between the sections, was widened and the corner lots to the east were left vacant. The Japanese and Chinese Americn residents of Isleton, however, always got along and intermingled freely within their small community...

The majority of the population was transient, drifting in and out of town in response to the harvest season, holidays, and days off. Weekends and winter months saw the most activity in Isleton. During these times laborers employed by the canneries or at nearby ranches and farms came into town to gamble, socialize, bathe, get haircuts, and eat... Rooms were available in both the Chinese and Japanese American sections; the Kumamoto-ya Hotel provided a community dining room for those renters at the hotel, as well as a pool hall and saloon (Sanborn Fire Insurance Company 1928, 1931). The Japanese Association's hall and movie theater was also a

popular place. The Isleton branch building for the Bing Kung Tong was a focal point of the Chinese American community, providing social, religious, and employment support to fellow countrymen. The business owners and their families usually operated their commercial enterprises in the lower story front of their building and lived in the back or upstairs...

Also integral to both the Chinese Americans and Japanese Americans during the 1930s in particular, were the four gambling halls that fronted Main Street west of F Street. While gambling kept many an Asian worker in debt, it also provided a social setting and much needed form of relaxation. Customers of the halls were provided with hot cups of tea and were served one or two meals a day, free of charge. This became important during the depression when wages fell below one dollar a day... In addition to the Chinese workers, Filipinos, Japanese, East Indians, and Caucasians all visited the gambling halls on occasion. Isleton's gambling halls were well known throughout the Delta and were frequented well into the twentieth century; they operated until forced to close by state law in the 1950s...

Unlike many of the exclusively-Chinese American districts in the region, the Isleton Asian district was family oriented. Many of the buildings were owned by families, and Asian schools were established to teach Chinese and Japanese languages and customs. At the time of the 1926 fire, for example, over 200 children lived in the district... These children attended a segregated "Oriental" school during the day and their own language school in the afternoons. There was also a "migratory" school located just west of E Street that was used by children of migrant workers...

The district continued in its significance into the 1940s. Yet because significance has not been shown to be exceptional, the period of significance has arbitrarily been ended at 1941. However, when World War II broke out Isleton was a viable community with an agricultural focus. While more and more Filipino workers had moved into the district, replacing the transient Chinese American laborers, the Asian district was a bustling place, with the businesses owned by the Japanese American and Chinese American merchants and their families. With the bombing of Pearl Harbor in December, 1941, however, the Asian American district underwent a dramatic change. According to local residents who lived in town during that time, there was growing tension between the two sections of the district following the incident. This was particularly evident among the children... The incarceration of the entire Japanese American population in May, 1942, helped bring about a decline in the significance of the district.

Although a few Japanese returned to Isleton following the war, they found they had little to return to and soon left. Their community Buddhist church, finished in 1934, had been looted and heavily damaged. The members sold the building and disbanded, joining the Walnut Grove Buddhist Church congregation (Kato et al. 1974:337-228). The majority of the buildings in the old Japanese American section were occupied by other Asians or Mexican workers, and the original occupants could not recoup their losses. Only one Japanese American family remained in town in the 1950s but left Isleton in the early 1960s...

Today, the district retains the physical feel of the 1920s and 1930s boom

period. The gambling halls and Bing Kung Tong buildings retain their flagpoles and Chinese architectural elements. Asian characters are present on a few of the old buildings, particularly in the Chinese section. The Quong Wo Sing Company, owners of the local fish bait and grocery store, has been in Isleton since the 1880s and is still owned and operated by the same family. These connections to the past, combined with the high integrity of the buildings and the well-maintained vegetable and flower gardens, are reminders of another time when the streets bustled with activity every Saturday night and Sunday and the town provided a welcome respite from the hard physical demands of cannery and farm work. All of the buildings have cohesive design elements, workmanship, material, and associations and formed the core of the community in the past. The undeveloped nature of the district and the simplicity of the structures are examples of a cohesive, pre-World War II Asian American district in a rural, agriculturally-oriented community (Maniery and Cunningham 1990d).

Isleton Sugar Refinery

Interest in sugar refining was widespread in California in the 1870s, and several pioneer companies attempted to establish it on a practical basis. Most of the efforts focused on sugar beets, but in 1876 experiments were tried using watermelons. These attempts were successful enough to inspire a number of Andrus Island farmers, who formed the California Sugar Manufacturing Co. A factory was built on the eastern edge of Isleton, and $10,000 was invested to import machinery from Germany (Dodge 1877:161).

The enthusiasm for watermelon sugar proved ill-founded, however, and the company turned to sugar beets. Efforts to install the machinery and initiate production, however, met with frustrating delays and only a brief campaign was possible before the beet fields succumbed to the 1878 flood:

> This factory has been built on the diffusion principle, and the main part is constructed very well. The capacity of the works is, under the best circumstances, 30 tons of beets per day. The troubles of this company began before the machinery arrived, which was embargoed in New York. This factory, like the one at Sacramento, had a great number of technical managers in a wonderfully short time. Had the works been finished in proper time, and began sugar making when finished, the company could still have done well. The beets raised on the island where the factory is located are of a very rich quality, and the crops always large and safe. But when the factory at last did begin to work, it had been in operation but a short time when a flood came, swamping the harvested beets, the beet fields which had not yet been harvested, and with it the company. The sugar made at Isleton has been of a superior quality, the trouble lying in the finances and the peculiar organization. The factory does not work this year, but the company hopes to reorganize (Gennert 1879:386; cf. Sacramento Union 1888).

The refinery did not operate in 1879. The following year it was leased by H.M. Ames, who had been involved in an earlier refinery at Alvarado. The revival lasted only a

single year (Pacific Rural Press 1880a; 1880b; Shaw 1903:11-12).

Illustrations of the refinery were published by Shaw (1903:Plate Ia) and the River News-Herald (1966b). According to the latter source, the building was later incorporated into the plant of the California Cooperative cannery.

Isleton Canning Co.

This cannery was located on the eastern edge of Isleton. It was constructed by the J. F. Butts Co. in the winter of 1922-23. The J. F. Butts Co., with headquarters in San Francisco, was organized in September, 1922, with an approved capital $150,000, its objective being to establish a cannery at Isleton. It immediately entered into two exclusive contracts: one with the Curtis and Gardiner Estate to handle 2,500 acres of asparagus, the other with the Warmington-Duff Co. of San Francisco to market its product. It simultaneously acquired the Midland Farms, consisting of 3,400 acres of asparagus land (J.F. Butts Co. 1922; Western Canner 1922).

The cannery--touted at the time as "one of the most modern in the entire West"--had a daily capacity of 3,500 cases and began production in March, 1922. It operated throughout the year, canning asparagus, spinach, string beans, beets, peaches, apricots and pears. In later years vegetable juice, tomatoes, and even ginger ale were added (Western Canner 1922; 1923a; 1926a; 1931a; Delta News 1931; 1932).

A birdseye view of the plant used in the company's ads (Fig. 11), shows several structures known from later maps: the box factory and shipping office on the river wharf, the large cannery and warehouse building, and the boiler house and restroom building located behind the cannery. Buildings further back from the cannery do not accord with later maps and may not have been built as envisioned by the birdseye view. These include the cafeteria and about 38 workers' cottages (Western Canner 1922; 1923a).

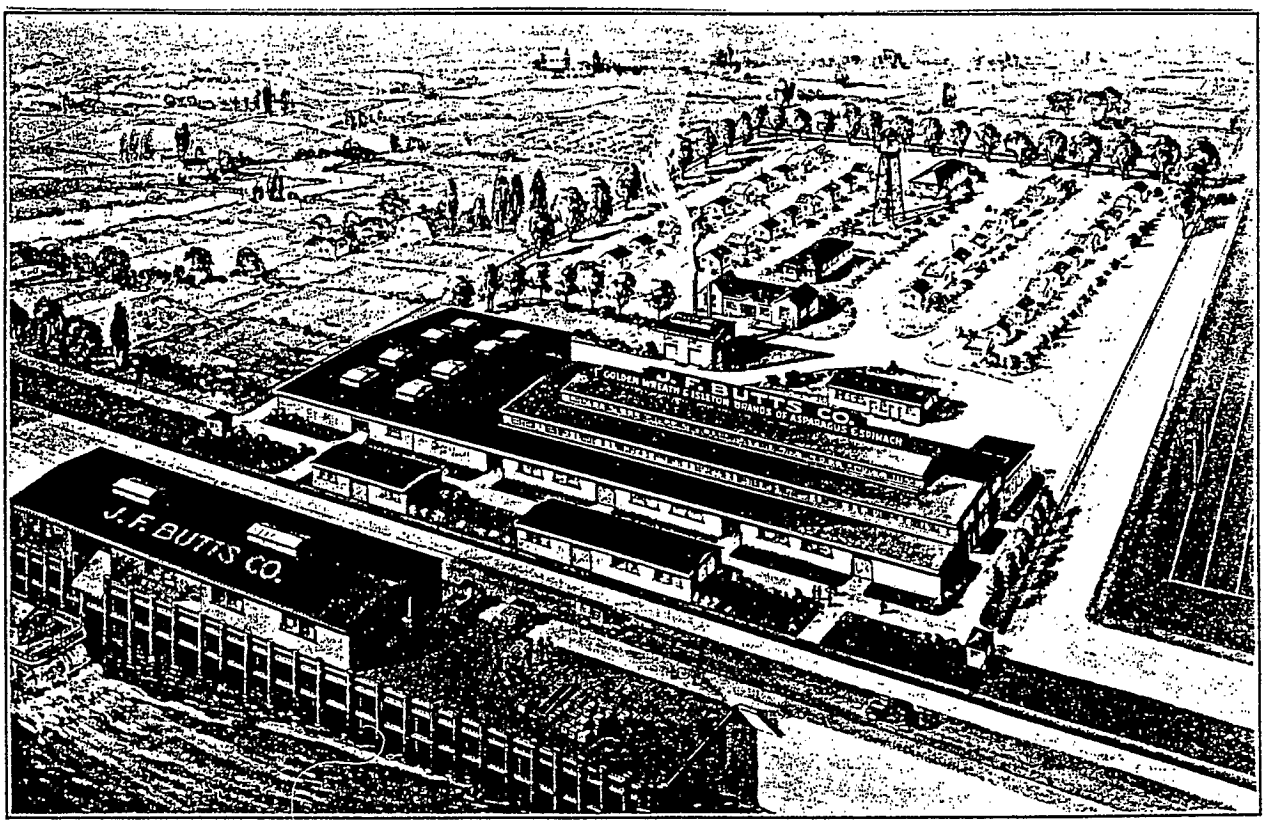

Figure 11. Birdseye view of the J.F. Butts (Isleton) Cannery during its first year of operation (Western Canner and Packer April, 1923).

In the fall of 1923, the operation was reorganized as the Isleton Canning Co. Photographs of the cannery and its operations were published in 1924 and 1929. The plant is detailed on the 1925 and 1928 Sanborn maps, which differ primarily in showing an expansion of the cannery and warehouse in the latter depiction (J.F. Butts Co. 1923; Western Canner 1924; 1929b; Sanborn Map Co. 1925; 1928).

The cannery burned Jan. 1, 1931, and was rebuilt, reportedly with little change. It was purchased in 1933 by Associated Canners, Inc. This company operated for at least two years. By 1936 the cannery was being operated by National Packing Co., and so continued at least through 1940 (Western Canner 1931b; 1933; 1935b; 1936:22; 1940; Lord 1937).

California Co-Operative Cannery

This cannery was established by California Co-Operative Canneries of San Francisco (which previously operated plants in San Jose, Visalia and Modesto) early in 1926. The cannery (located immediately east of the Isleton Canning Co.) reportedly cost $250,000 and was intended to operate throughout the year both as a cannery and pickling plant. The pickling plant included 120 tanks, reportedly the longest such operation in the world. In its first year of operation the cannery produced 73,000 cases of asparagus, 72,000 cases of peaches, 40,000 cases of tomatoes, and about 125,000 cases of pickles (Western Canner 1926a; May 1929:8-9; Rio Vista Banner 1926).

This cannery was erected on the site of the old Isleton sugar refinery, and one source reports that part of the old building was incorporated into the cannery. This claim is supported by the Sanborn maps, which show that the earlier packing house was expanded for warehouse, shook storage and box making, while the new cannery was built to the rear. To the east were the boiler house, cafeteria, at least 35 workers' cottages, and a dwelling, presumably for the manager. An additional warehouse was built in front of the plant over the river (River News-Herald 1966b; Sanborn Map Co. 1925; 1928).

According to the local press,

> The employee situation is run on the line of the Henry Ford plan. The workers live in the bungalows ranging from one to four rooms on the cannery grounds. With the beginning of the year round canning season many families have taken up their residences in the bungalows permanently.
>
> A clubhouse has been built on the grounds and the social events of the workers take place there...The hall has hard wood floors and is furnished with a piano for dances. The entire construction of the hall and the furnishings were financed by the workers. (Rio Vista Banner 1926).

Cal Co-Op ran into difficulties in 1932 when its arrangements with Armour were declared illegal. As a result some Co-op canneries were closed, apparently including the

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Isleton plant. In 1933 the cannery was operated by the Delta Packing Co. It did not run in 1934 (Western Canner 1932; 1934; 1936).

Early in 1935 Ensher, Alexander & Barsoom, large shippers of fresh asparagus and other vegetables, took over the Isleton plant. The company operated at least until 1941. The cannery was leased in 1955 by the Sun Garden Packing Company of San Jose, who operated it at least through 1966 (Western Canner 1935a; 1935b; 1936:24; 1941; River News-Herald 1966a).

Bay Side Canning Co.

The Bay Side Canning Co., which was operating plants at Alviso and Mayfield, built this cannery near the eastern edge of Isleton in the winter of 1919-20. The cost of $750,000 included "the very latest machinery of every description." The Isleton facility was intended specifically for asparagus, and thus, at least initially, it operated only in the spring. The company leased 3,000 acres of asparagus on Sherman Island and brought the crop to the cannery with a fleet of three trucks and two large boats. The asparagus pack in 1925 amounted to 150,000 cases; in 1929 it reached 170,000 cases, probably the third largest in the state in that year. Spinach was soon added to the pack, and other fruits and vegetables followed (Western Canner 1920a; 1925a; 1929a; Sylvia Sun Minnick, pers. comm.).

The 1925 Sanborn shows the plant as consisting of a spinach shed, box factory and shipping shed on the river; a cannery, warehouse and superintendent's house immediately behind the levee. Behind the cannery were a boiler house, four dwellings, eight dormitories, 14 cottages and a dining room. By 1928 the cannery had been expanded and nine cottages had been added. The company expanded its warehouse space in 1929. The following year employment during the asparagus season reached 450 people (250 women, 200 men) and the company built 50 new four-person cottages "as an aid in the relief of present unemployment" (Western Canner 1929a; 1930; Delta News 1930c; 1930g).

A pictorial record of Bay Side's 1930 asparagus canning operations was published at the end of the year (Delta News 1930i). The company last operated in 1936. It reportedly burned to the ground in 1937 (Western Canner 1936; Carey 1937; Lord 1937).

Cartographic Review

Historic maps document a total of 120 historic site locations on Andrus Island. The earliest are 13 homestead sites (AN-05, -06, -14, -17, -19, -22, -25, -27, -32, -37, -38, -41 and -118) pre-dating 1860. Of these, An-118 was situated within the later boundaries of Isleton, the only populous settlement on the island.

The historic significance of Isleton has been recognized by inclusion of the Isleton Chinese and Japanese Commercial District as a property on the National Register (Maniery with Cunningham 1990d). The Isleton Bridge has also been determined eligible for the

National Register (Mikesell 1990). Particularly important to the growth of Isleton were the canneries in the eastern portion of the townsite.

The Isleton Branch Line of the Southern Pacific rail line (AN-119) was constructed in 1929, while the spur south from Isleton (AN-120) was laid in 1931. These extensions were not considered in the determination of eligibility for the earlier Walnut Grove Branch Line, under the assumption that they were constructed after World War II (Maniery 1991b).

At the end of the southern spur lay the Golden State Asparagus Cannery site (AN-90). Much of the cannery complex survived at least until 1949 (Paterson, Herbert and Wee 1978c:44-44b).

The island contained a number of landings which were active enough that their names appear on local maps. All were associated with farm camps. The most notable was Frodsham (AN-105, -106), which had a store and - from 1910 to 1922 - a post office (Frickstad 1955:133). Others include Denicke Landing (AN-93) and San Andreas Landing (AN-98). Although none of the Andrus Island landings - unlike those on Staten Island - were associated with Chinese names, Chinese and Japanese tenant farmers in 1910 controlled 57% of the farm land on Upper Andrus, 35% of that on Middle Andrus and 64% of that on Lower Andrus (Table 1). It thus seems likely that at least half of the Andrus Island locations dating from that period are associated with Asian tenant farmers.

Of the 120 mapped locations, 46 appear to date no earlier than the second quarter of this century.

Archeological Surveys

Only two prehistoric sites have been recorded on Andrus Island. One (SAC-203) was recorded prior to the systematic documentation of surveys. The other (SAC-329) was recorded during a survey of levee improvement project sites in 1974 (Johnson 1974a). It was partially excavated shortly thereafter (Soule 1976).

Information Center records indicate surveys of several small sections of levee in the ensuing years, but these projects recorded no sites.

A field survey to determine the historical significance of navigation hazards along Georgiana Slough was carried out by Paterson, Herbert and Wee (1978b). They evaluated 12 sites on Andrus Island. Their site AI-1 (here, AN-89) was the Golden State Cannery site. It was inspected with particular attention to surviving pilings from the docking facilities. These "were so scattered and deteriorated that they were deemed of negligible historic value and thus subject to removal" (Paterson, Herbert and Wee 1978c:44). They concluded:

> The Golden State Asparagus Company cannery was one of the area's leading enterprises in the first several decades of the twentieth century and it featured extensive dockage facilities... The remaining pilings are probably the remnants of

wharf structures or they may have supported buildings that may have extended out over the levee. The deteriorated condition of the remaining pilings and the loss of integrity at the location due to extensive subsequent development and the lack of any evidence that the Golden State Cannery represented anything unique makes it ineligible for the National Register of Historic Places (Paterson, Herbert and Wee 1978b:8).

Four of the inspected sites appeared to be pilings associated with historic landings. Site AI-2 (here, AN-88) was believed to represent Watson's Landing, Site AI-3 (AN-87) Jansen Landing, and Site AI-4 (AN-84 or -85?) Voorman's Landing. These attributions are based on Punnett Brothers maps (1901, 1907), however, and the attributions are uncertain. Site AI-5 (AN-83) appeared to be the remnants of a landing, but no historic reference was identified. None of the sites had sufficient structural integrity to be eligible for the National Register (Paterson, Herbert and Wee 1978b:8-10).

The remaining sites (AI-6, -7, -8, -9, -10, -11, -12) appeared to consist of pilings installed as levee reinforcement. None were eligible for the National Register (Paterson, Herbert, and Wee 1978b:10-14).

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BRANNAN ISLAND

Brannan Island is a 7700-acre tract located at the western extent of the study area. The northern and western sides of the island are formed by the Sacramento River, while the southern side is formed by Three Mile and Seven Mile Sloughs. The eastern extent was originally marked by Jackson Slough, a narrow channel that once connected Seven Mile Slough with the Sacramento River. During reclamation the northern end of Jackson Slough was dammed and filled; in that area Brannan Island now connects directly with Andrus Island.

Most of the island surface ranges from 5 to 15 ft below mean sea level. Surface areas on the southwest peninsula (Brannan Island State Recreation Area) are 20-40 ft above sea level. The later elevations result from the area serving as a spoil dumping site during dredging of the lower Sacramento in the 1920s. Surface soils include alluvial sediments along the northern edge and much of the western portion of the island. The remaining area is characterized by organic or mixed organic and mineral soils (Cosby 1935).

Most of the island is devoted to agriculture; only 2.3% is in other uses, including levees (Thompson 1957:482).

Brannan Island is not directly impacted by any of the project alternatives.

Prehistoric Occupation

No information is available on prehistoric occupation of Brannan Island.

Historic Native American Occupation

It is unclear which groups claimed or utilized Brannan Island. The village of Anizumne was located directly across the Sacramento near Rio Vista, while the southern part of the island may have been used by the Bay Miwok. The Arguello expedition in 1817 fought with an unnamed group along Jackson Slough. The expedition reportedly reencountered the same group near the head of Andrus Island, suggesting that they may have been from Junizumne (near Walnut Grove), although Bennyhoff (1977:74) assigns upper Andrus Island to Guaypemne.

Euroamerican Settlement and Reclamation

Settlement on Brannan Island began about 1855 and was initially restricted to the front lands along the Sacramento. The first levee on the island appears to have been that built in 1858 by Hart F. Smith. It was unusual in that the intent was not only to obstruct tidal water crossing the island from the south, but to capture sediment during floods:

My first levee was built in 1858 and was designed to keep out tide water from the San

Joaquin River. I built about one mile of levee along Jackson Slough, commencing at the Sacramento River. I then ran westerly, from there, across the head of two sloughs till I struck my west line; then I ran northeasterly about 45 rods till I got back to the high bank land.

I cleared off all my front land, removing trees and brush, and left nothing to obstruct the flow of water in time of flood. My object was to catch all the sediment possible.

I succeeded in filling up all my land from seven feet down to a few inches, in some places in the low land it was filled up as much as eight feet.

This work required a number of years and considerable patience.

The flood of 1861-2 filled it up two feet or more.

All the levee built in 1858 was 7 feet wide on base and 4 feet high; after standing two years it sunk down and I built it up again the same way. I think the back levees cost me about $5,000.

All the settlers on this and Andrus Island thought I was crazy to let sediment deposit on my land but I worked hard to do it nevertheless (H. F. Smith, in Tucker 1879f:11-12).

Brannan Island was organized into Swamp Land District 31 in January, 1862. Levee building efforts, however, were fitful and commenced in earnest only in the early 1870s. The island was fully enclosed by levees for the first time in 1873. The unanimity of effort by the landowners was only superficial, however, each owner building levees to suit himself. By the middle of the decade three reclamation districts (Districts 74, 76 and 129) occupied the northern half of the island, District 148 extended across the southern half of both Brannan and Andrus Islands, and the southwestern peninsula was unorganized but being reclaimed by a single owner (Wright 1880:189; Tucker 1879f:3-14).

An example of the difficulties that plagued peat levees occurred in 1876 when cracks began to form in the southern levee near the mouth of Jackson Slough. These fissures eventually formed a network hundreds of yards long and more than 24 feet deep, cutting directly across the levee in three places. Attempts to repair the damage taxed the ingenuity of the levee superintendant as well as the patience and resources of the adjacent owner:

I left the island before my work was complete as Dr. Zeile wished to have the owners of the land on Andrus Island withdraw from his district and form one of their own. They refused to do so, and the owners of land in other districts on Brannan Island refused to join with him in one large district and pay the expenses of stopping the cracks and building a large levee on Seven-Mile Slough.

The Doctor became very much enraged and swore he would tear down his levee and drown out every district on Brannan Island, so he stopped all his work (E.S. Tucker, in Tucker 1879f:7).

Zeile's conflicts with other farmers lasted at least two more years, and he was the last owner to reestablish his levees after the 1878 flood (Tucker 1879f:13).

The island flooded again in 1879, and the greater portion of it remained unreclaimed

until about 1890, when more substantial levees were built. The island flooded in 1904 and 1907. The whole island was finally organized into a single district - District 2067 - in 1924 (U.S. Bureau of Reclamation 1964d:8).

The 20th century development of the island's southwestern peninsula followed a course distinct from the rest of the island. Once the family farm of Gilbert Crum, who seceded from District 148, the area became a spoil deposit site for the Corps of Engineers, and eventually a state recreation area:

> At Brannan Island, spoil had been periodically deposited by the Corps of Engineers beginning in 1911... In 1917 a comprehensive plan for improvements in the river channel had been initiated by the Corps in conjunction with the California Debris Commission... With the widening and deepening of the deep-water channel on the Sacramento River from 1927 to 1932, vast amounts of sand and silt were deposited on the southern tip, raising the level of this portion of Brannan to over 40' above river level... What prompted the decision to choose this particular site for disposal is not clear. The property had been deeded in 1905 to Peter Cook, a resident of Rio Vista and prominent landholder of properties in the Delta. Cook had served on the State Reclamation Board as treasurer of the Sacramento Drainage District (Bryon Times 1924-1925). In 1921, after title had passed to G. L. Proctor and to Peter Cook, Jr., the land was granted to the Sacramento and San Joaquin Drainage District, the successor to the Sacramento Drainage District. After this time until acquistion by the California Department of Parks and Recreation [in 1954], land use on the southern end of Brannan island appears to have been limited to the drilling of natural gas wells, borrow excavation by a local construction company, and deposition of spoil. There were year-round squatters on the property, and much informal recreational weekend use was given tacit approval by the District... The lone structure on this property was a small house that was leased until 1956 to S. F. Cook, the tender for the bridge linking Sherman to Brannan Island. The structure evidently was disposed of after Park acquistion along with the remnants of squatter camps...(Waugh 1986:29-30).

Isleton

Isleton is located at the former head of Jackson Slough. Initially built on the Andrus Island side of the slough, it has since expanded onto Brannan Island. It is the only town on either tract. Its history is discussed under Andrus Island.

Libby Cannery

This cannery, always referred to as the Isleton cannery of Libby, McNeil & Libby, was actually located on Brannan Island, about 3/4 mile downstream from Isleton.

Libby, McNeil & Libby was organized in 1903, with headquarters in Chicago. The cannery was built in 1907 to can asparagus, and it generally operated only for the asparagus season. The plant is detailed on all three Isleton Sanborn maps. The first two depict a large

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"Chinese Boarding House" behind the cannery, along with numerous "Employees' Dwellings", suggesting a mixed labor force (Western Canner 1936:22; Sanborn Map Co. 1919b; 1925; 1928).

Substantial improvements to the plant were made in 1920, but it was rapidly becoming obsolete. Libby had established larger asparagus canneries at Ryde in 1910 and at Locke in 1917, and they operated an even larger plant at Sacramento which was later equipped to handle asparagus. By 1929 the asparagus pack of the Isleton cannery was one of the smallest in the Delta. Operation was discontinued within a few years thereafter (Western Canner 1920a; 1929a; 1936).

Cartographic Review

Review of historic maps provides 82 historic site locations on Brannan Island. Ringgold's (1850) map shows no homesteads on the island, although it does label the northwestern corner of the island "Pt. Ellis". The original plat maps for this area are apparently not available. Doherty (1861), however, has included the homestead sites (unlabeled) on his map of Sacramento County swamp lands, and seems to indicate six or seven such locations (here numbered BR-10, -11, -16, -24, -31 and -33).

The only sizable settlement on the island is Isleton, most of which is located on Andrus Island and is discussed under that heading. The remaining site locations are primarily farmsteads, farm camps or associated landings. A prominent exception is the Libby, McNeil & Libby cannery site (BR-45), between Ida Island and Isleton on the Sacramento River. This was Libby's first asparagus cannery and one of the first canneries built after the destruction of the Bouldin Island industry. It operated from 1907 to about 1930.

Of the 82 identified locations, 40 were apparently occupied no earlier than the second quarter of this century. Eight of the site locations (BR-02, -03, -04, -05, -27, -28, -31 and -32) were destroyed during channel improvement work on the Sacramento River in the 1920s.

Archeological Surveys

A survey of Brannan Island State Recreation Area was carried out by Waugh (1986). No historic structures were present and no archeological sites were found.

Information Center records indicate that sporadic surveys have occurred on the rest of the island, but these have been restricted to short stretches of levee. None have encountered archeological sites.

STATEN ISLAND

Staten (formerly, Elk or Stayton) Island is a tract of more than 9000 acres enclosed by the North and South Forks of the Mokelumne River. The present ground surface is generally between 5 and 15 feet below sea level. Soils on the southern three-fourths of the island are almost entirely organics, while those at the northern end are mixed organics and mineral deposits (Cosby 1941).

Prior to reclamation, the bulk of the island was dominated by marsh vegetation with riparian forest possibly occupying the head of the island and extending southward immediately along the river channels. Surface area in 1954 totalled 9250 acres, with 8710 acres in farmland, 510 acres occupied by levees, 15 acres by an elevator and packing sheds, and 10 acres by water surface (Thompson 1957:478).

Staten Island is directly affected by the preferred Alternative (5B), the effects including dredging of all adjacent channels and levee setbacks along much of the east side. It is likewise affected by dredging under Alternatives 2A, 2B, 3B, 4A, 4B and 5A, and by levee setbacks under Alternatives 4A, 4B and 5A. Under Alternatives 6A and 6B the entire island would be affected by use as a flood bypass.

Prehistoric Occupation

No information is available on the prehistoric occupation of Staten Island.

Historic Aboriginal Occupation

Bennyhoff (1977:76) suggests that the Miwok village of *Musupumne* was situated on the west bank of the Mokelumne River on Staten Island. So far the archaeological survey of this area has been inadequate to determine the accuracy of this suggestion.

Musupumne was a small village which may have been closely associated with the Julpun group of Bay Miwok. It submitted to missionization between 1818 and 1824. There are no known references to Musupumne after secularization of the missions (Bennyhoff 1977:76).

Reclamation

The earliest evidence of Euroamerican settlement encountered thus far is an 1861 map (Twitchell 1861) showing two houses on the head of the island. The occupants are not identified.

The first attempts at reclamation were made about 1865 by J.T. Bailey and C.F. Juilard, who owned 1,200 acres at the head of the island. Bailey constructed a plow-like

machine, pulled by horse or ox teams, that cut a ditch 2 ft deep and 2 ft wide, turning over the sod which was then used for levee construction. About the same time, E.S. (?) Dennison leveed a large tract along the east side of the island, using a plow (Tucker 1879a:4; 1879e:3). No reports have been found as to the fate of these levees, but it is presumed that they failed.

Following passage of the Greene Act in 1868, much of the island was acquired by the Tideland Reclamation Co. (Gibbes 1869). In 1872 1,000 acres at the head of the island were purchased by Clay & McAfee, 600 acres were retained by Juilard, and the remainder of the island was purchased by Haggin & Tevis. Reclamation of the tract then commenced, 9 miles of levees being constructed by Chinese labor crews and 16.5 miles being built by a Sullivan ditcher. The levee was 5 ft high with a 12 ft base and 2 ft crown (Tucker 1879a:4,6).

By 1874, settlers "poured in quite rapidly", the reclaimed land selling at $25.00 per acre. A levee break occurred on January 1875, however, and flooded almost the entire island. The levee was repaired, and good crops were reported in 1877, but several levee breaks occurred in the winter of 1877-78 and the island flooded again (Tucker 1879a:6).

M.C. Lawton was then hired as the district engineer. After a study of the levee system, he recommended placing the levee, so far as possible, atop the mineral soils immediately adjacent to the river and straightening it wherever feasible, all new construction to be with sediment rather than peat. An innovation was the recommendation to construct 6-ft-high timber bulkheads along the inside foot of the old peat levees and filling between the levee and bulkhead with sediment, and raising the crown an additional 2 ft using sediment. This plan was carried out (Gilbert 1879:133; Lawton 1879; Tucker 1879a:7). In spite of this, further breaks occurred in 1881 and 1886. By 1888, the owners had spent a total $607,500 on reclamation work, but the levees then held for fifteen years (Thompson 1957: 477).

Initially, the assignment of Staten Island to Sacramento or San Joaquin County was unclear, although prior to reclamation this was of little importance, the land being of nominal value. Once the island was reclaimed however, land values increased greatly. In 1877 the tract was assessed in Sacramento County, and the owners began to agitate for transfer to San Joaquin, when assessments were lower. A bill to this effect was drawn up and introduced by Assemblyman R.C. Sargent - himself the owner of a considerable acreage of swampland - and passed by the legislature (Tinkham 1880:19).

In 1879 the island had a population of about 200 people. The only settlements of any size on the island were Hagginsville (located about halfway along the western side), Eagle Tree (about 2 miles north) and perhaps Valentine's Landing (at the southwest corner of the island). Hagginsville had a post office from 1877 to 1881, and in 1879 was credited with a store, hotel and blacksmith shop. A school was reportedly about to be built. A "Staten" post office was established in 1894, but its location is uncertain. An 1895 map locates the "Bouldin Island P.O." at Valentine's Landing, however, and this may be a mislabeling of the Staten post office. In any case, the Staten office was moved to Eagle Tree in 1903. It was

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removed to New Hope a year later (Gilbert 1879:123; Frickstad 1955:133, 160, 162; Thompson 1957:421-422).

Arreola (1975b:11) has suggested that one of the first Chinatowns in the Delta was located "on the North Fork of the Mokelumne at a point about six miles south of Walnut Grove" - a placement which would position it on either Tyler Island or Staten Island, in the vicinity of Hagginsville. This Chinese settlement burned in 1885. The source for this location (Blenkle 1952:14), however, places it east of Walnut Grove, and the reference may be to a Chinese settlement on New Hope Tract.

Cartographic Review

Review of historic maps indicates 52 historic site locations on Staten Island. All appear to be early farmsteads or farm camps and associated landings. Except for eight that date only to the second quarter of this century, they appear to have been in use by 1910 or earlier. Chan (1986:172) has pointed out the number of early Staten Island camps and landings associated with Chinese tenant farmers, although statistics from 1910 indicate that most of the island (88%) was leased by Italian tenant farmers, and no land was leased by Chinese at that time (Table 1). The largest of the island's landings were presumably Hagginsville (ST-36) and Eagle Tree (ST-41).

Archeological Surveys

No prehistoric sites have been recorded on Staten Island. The initial NDP survey of proposed levee setback areas along the North Fork of the Mokelumne recorded two sites. One site (SJO-243H) was a historic trash scatter containing Chinese and Japanese ceramics. The location is equivalent to ST-35, identified in the cartographic review. It was designated Camp 10 in the 1910s and Camp 9 in the 1930s. A second site (SJO-244H) consisted of a later trash scatter, the location of which does not correspond to any historically known site.

BOULDIN ISLAND

Bouldin Island is a tract of more than 6,000 acres on the southern edge of the study area. The southwestern corner of the island is formed by the confluence of the San Joaquin River and the North Fork of the Mokelumne. The island is bounded on the south by Potato Slough, on the east by Little Potato Slough, and on the north by the South Fork of the Mokelumne River.

The present ground surface is quite level, most of the island being about 15 ft below sea level. Soils consist primarily of locally developed organic soils, especially peaty mucks, with some alluvial deposition of mineral soils, particularly in the northwestern peninsula (Cosby 1941). Prior to reclamation, the island's vegetation was probably limited to tules and other emergents characteristic of a freshwater marsh community. Today it is devoted almost entirely to agriculture. Surface area in 1879 was reported as 6,400 acres (Tucker 1879a:1). By 1954 total area had been reduced to 6,016 acres, of which levees occupied about 6%, with 170 acres of water surface and 70 acres of fishermen's camps and other residences (Thompson 1957:479).

Bouldin Island is directly affected by the Preferred Alternative (5B), the effects including channel dredging on the west and north sides of the island and levee setbacks along the west side. Dredging of adjacent channels also would occur under Alternatives 2A, 2B, 3A, 3B, 4A, 4B, and 5A, while levee setbacks would likewise occur under Alternatives 4A, 4B and 5A. Under Alternatives 6A and 6B the northwestern peninsula would be affected by use as a flood bypass.

Prehistoric Occupation

No information is presently available on prehistoric use of Bouldin Island. The depth of peat deposits indicates that the island has been occupied by marshland for thousands of years.

Historic Aboriginal Occupation

No historic native villages are known from the island. Bennyhoff (1977:Maps 2-3) places it in the territory of Julpun, the northeasternmost of the Bay Miwok groups. Presumably the island was used as a hunting and plant collecting area.

Reclamation

Bouldin Island seems to have been virtually without natural levees. Consequently no farmers squatted in the area prior to reclamation. Swamp land speculators, however, found it

attractive, and by the beginning of the 1860s ownership was dispersed among a score of title holders. These claims were consolidated by 1867 in the hands of Sargent Brothers & Smith, who owned much of the swamp land on neighboring tracts as well (Handy 1862; Gilbert 1879:133).

Reclamation began in 1871, when Stevens, Baker & Co. of San Francisco bought the island for $12,000 and built a peat levee using Chinese labor. This levee system (9-ft base, 3-ft crown, 4.5-ft height) was subject to recurrent cracking, and the land flooded year after year. By 1874 the company had spent $65,000, all without ever harvesting a crop. In 1874 the island was abandoned to the tides (Tucker 1879a:1-2).

A second, and more lasting, reclamation attempt was initiated in 1877 when the island was purchased for $64,000 by the Pacific Distillery Co. of San Francisco, the company's object reputedly being to raise grain and potatoes for conversion into alcohol. Reclamation began promptly, and involved use of a long-boom clamshell dredge, built for the project: reportedly the first successful use of such a machine. With it the peat levees were capped with mud from the river bottom. The new system which incorporated the remnants of the earlier levees, had a 16 ft base, a 4 ft crown and was 6 ft high, with weighted brush mats along the San Joaquin side, to prevent wash. Desperate labor saved the island during the 1878 flood, but so much seepage penetrated the levees that planting had to be delayed. Later in the year the levees were raised and broadened again and piling-anchored plank bulkheads were used to add strength to the works. By 1879 the company had spent $250,000 on Bouldin Island (Tucker 1879a:2-3; Peatfield 1894:317; Thompson 1957:478; Paterson, Herbert and Wee 1978c:16).

The Pacific Distillery Co. at first farmed the island directly, but later adopted the practice of leasing the land (including horses, buildings and seed) to tenants in exchange for a percentage of the yield. The island produced two crops a year, one of grain and one of potatoes. Initial yields were 50-60 bu. barley and 150-200 casks of potatoes per acre (Paterson, Herbert and Wee 1978b:16; Gilbert 1879:133).

The island received a post office in 1878 but where it was located is unclear. The likeliest initial candidate is Bouldin Landing (located on the southwest corner of the island), which appears on local maps by 1879. The island's only other settlement, Central Landing, about a mile north on the Mokelumne, does not make its first cartographic appearance until 1901, although accounts from a few years later give the impression that this was the island's largest settlement (Frickstad 1955: 159; Gilbert 1879:map; Punnett Brothers 1901). Surprisingly, the one source that specifically locates the Bouldin Island Post Office is an 1895 map by J.C. Boyd that places it on the southwest corner of Staten Island.

By 1883 the land had been distributed among Pacific Distillery's individual owners (Henry Voorman, George Oulton, and Frederick and Louis Schultz), and the county directory of that year listed 41 individuals who resided on the island or at least used it as their post office. Included were a merchant (Henry Wrobioff, who undoubtedly served as the

postmaster as well), about two dozen farmers, a cook, two engineers, two butchers, a physician, two levee superintendents, two blacksmiths, and an "agent" (Paterson, Herbert and Wee 1978c:16; 1883-4 directory).

The number of individuals listed at Bouldin Island declines over the following two decades, dropping to 20 by 1902 (McKenney & Co. 1884:257-258; Husted 1893:327-328; 1902:243). This apparent decline is presumably due to an increase in Chinese tenants who began leasing land on the island in 1884, but who were omitted from the directories. Presumably the early pattern of double cropping grain and potatoes continued during this time. By 1886 Bouldin Island was the principal source of potatoes for the San Francisco market and the island supported at least 600 acres of barley in 1891 (Antioch Ledger 1891; Minnick 1988:70; Paterson, Herbert and Wee 1978c:16). This pattern changed, however, in 1892, when a pioneer asparagus canner made the island the focus of a new industry.

Hickmott Asparagus Canning Co.

This company was the creation of Robert Hickmott, who is credited with establishing here the Pacific Coast asparagus canning industry. Hickmott was an English immigrant who worked in canneries in Oakland and Sacramento in the 1870s and 1880s. While working for the Capital Packing Co. in Sacramento, he reportedly canned the first asparagus in California, but this was an experimental attempt. He operated a small cannery of his own in Oakland in 1890, but decided that the peat soils of the delta offered great potential for growing asparagus--at the time an expensive specialty crop--and canning it in the fields. He established the Hickmott Asparagus Canning Co., and erected a cannery in 1892 (Pacific Rural Press 1902b; May 1937:197-198).

Hickmott's first cannery was located in an old barn, but by 1900 this had been torn down and replaced with two new canneries, each 100-by-375 feet, one on the north side of the island (Cannery 2), the other on the east side of the island north of Central Landing (Cannery 3). These wood-frame structures and the large warehouses and other buildings that surrounded them reportedly comprised, at the time, the largest canning operation in the world devoted primarily to asparagus (Fig. 12; cf. Hexamer 1901:Figs. 39-41; Smith 1905:Figs. 1-2; Yardley photos, Haggin Museum; Stockton Independent 1901; Pacific Rural Press 1902b).

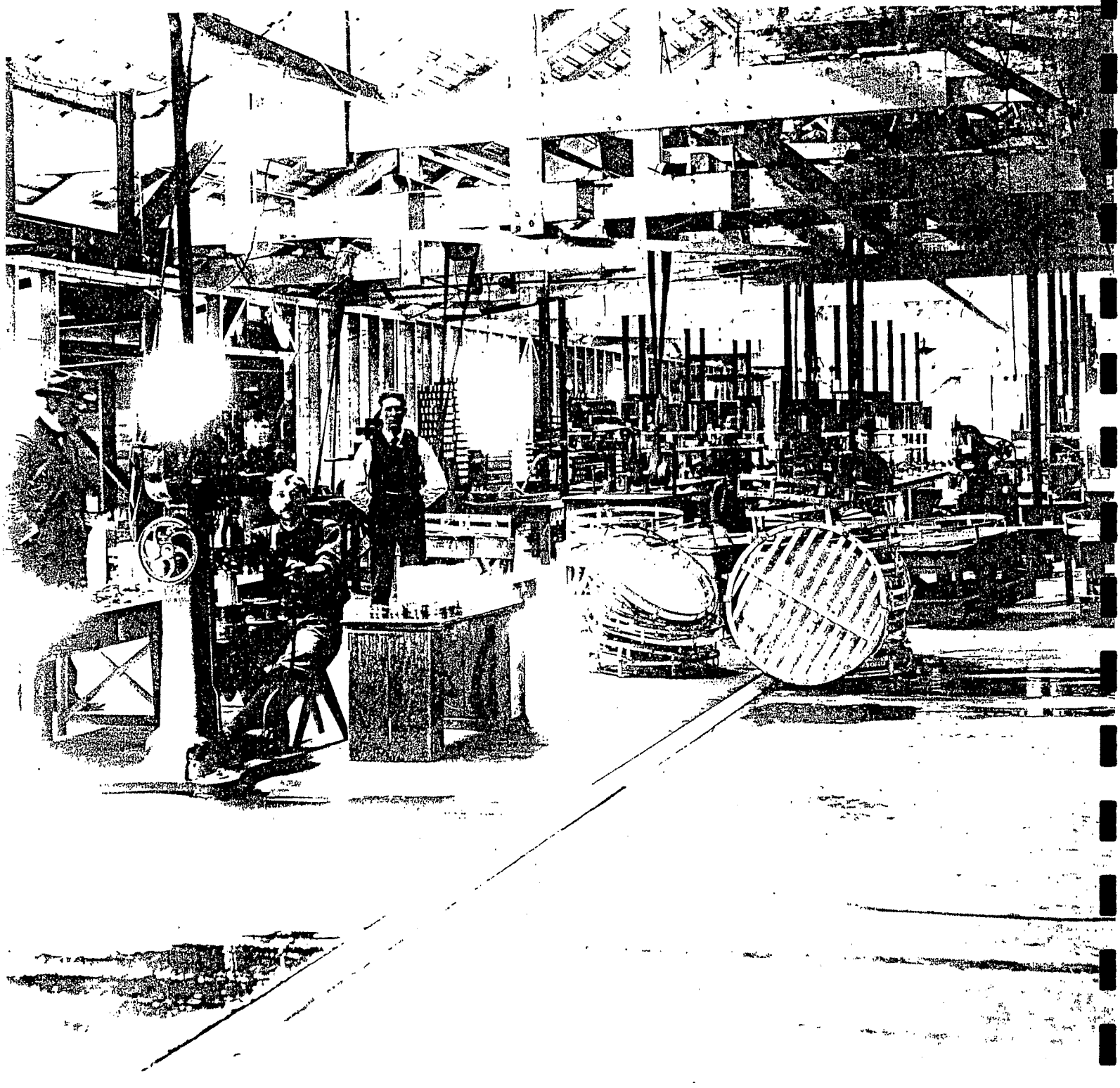

Figure 12. Interior view of one of the Hickmott Canneries on Bouldin Island, c.1900 (Haggin Museum).

The Hickmott Company did not grow its own asparagus. Land on the island was leased in 50-acre tracts to Chinese (and a few Portuguese) tenants, who cultivated and harvested the "grass". Each tract employed about 25 field workers. The crop was contracted with the growers at specified prices per pound, the grower to receive 60%, the land owners 40% of the return (Stockton Independent 1900; 1901). This arrangement was standard in the industry for several decades, the owners providing tools, equipment, and buildings to house the workers.

By the turn of the century Hickmott was employing 500-600 cannery workers each season (mid-March to mid-June). As the company expanded its contracted acreage and more fields came into bearing, output reached 85,000 cases in 1900, 100,000 in 1901, and nearly 120,000 in 1902. About 1900 Hickmott shipped an entire trainload (9,000 cases) of Bouldin Island asparagus from San Francisco to New York (Stockton Independent 1900; 1901; Pacific Rural Press 1902b; Hexamer 1901:118-122; Wells 1904:519).

While asparagus was always the primary focus of the Bouldin canneries, other products were canned as well. An early mention of peas may have been a temporary measure until enough grass came into bearing to supply the new canneries, but Hickmott was clearly an innovator. In 1901 the canneries put up experimental packs of artichokes from the bay area, red turtles from the Mexican coast and terrapin (Pacific pond turtles) from the Mokelumne River (Stockton Independent 1900; 1901).

Thompson (1957:478) has suggested that Hickmott's selection of Bouldin Island may have been based on its long-standing security against inundation. If so, his confidence was eventually betrayed. On March 23, 1904, with a $1,250,000 sale of his operation nearing completion, the levees gave way, and Bouldin Island was under water. Accounts of the disaster note that the canneries were on piles and thus escaped inundation, and that the island store also escaped. The Chinatown at Central Landing - including 30 or 40 buildings - was washed away, with no loss of life (May 1937:200-201; Sacramento Bee 1904; San Francisco Chronicle 1904; Stockton Independent 1904; Stockton Mail 1904; Stockton Record 1904).

1904-1905 Reclamation

The 1904 levee break consisted of a 700-foot-wide opening near Central Landing. About 200 feet at either end of the opening involved merely the washing away of the levee, but in the middle was a 300-foot-wide rupture that the force of the water had scoured to a depth of 97 feet. The attempts to salvage the island involved three separate efforts, extended over the following year, and these have been described and illustrated by the project engineer:

> Seven dredgers were engaged... Night and day for thirty days these dredgers poured their material into the break, the result being that the 400 feet of levee on each side of the break proper was restored; the depth to bottom of break was now 85 feet

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and no increased effort could decrease this...

Further effort along these lines being futile...two floating pile drivers and two hundred 100-foot piles were secured, including three barge loads of brush mats. Two clam-shell dredgers were retained. In this second effort it was proposed to drive pipes in bents of six piles each every 10 feet apart across the break to sink brush mats, which would be held in place, in part, by the piles, thereby breaking the flow of the sub-surface currents, that material might be deposited and remain. Night and day gangs worked at this breach of 300 feet... Work progressed from each end with fair success until the last 60 feet was reached, when it was found that the current was so swift--due to the contracted passage--the depth so great and the supporting surface for the piles so meager that all hope of closing the same by this method had to be abandoned. Piles 14 inches in diameter, 100 feet long, driven into 10 feet of sand and into a stiff clay strat[um] and anchored at the top, were readily torn away by returning current after a tide. This second effort occupied about three months, and while not successful, was contributing to the final closing of the break.

In the third effort it was decided that nothing but rock would ever baffle this current. Accordingly plans were made to lay a base of 80 feet, and as the deposit increased in height to make it narrower. Contracts were made for rock and hauling and the work began... [T]he nearest available quarry was some 30 miles away... About the time the first 20 feet of the base was in place it was decided to secure an unworthy sea-going ship of 25 feet beam and 250 feet in length to sink across the break, to intercept the current and assist in filling. The ship was secured and sunk on the island side of the break...

Depositing rock continued until within 40 feet of the surface, when...it was decided to drive two rows of piling 10 feet apart and fill in the intervening space with rock, thereby reducing the amount to one-third of what it was estimated was yet required. Work of piling was begun on each side and the filling followed after, when the piling was brought within 25 feet of each other. No further piles were driven until the rock was well carried forward and brought up to 7 to 10 feet below the surface, when it was discovered that the current was so strong as to be actually able to carry the rock away. This was overcome by depositing the rock in a diagonal manner...and in this manner the work proceeded until in November, 1904, eight months after the break, the same was closed and the river excluded. Suction dredgers were again set at work and reinforced the rim of rock embankment. Pile work now proceeded to reinforce the material that had been put in place and to provide foundations for the largest reclamation pumping plant ever placed on the river.

...It was estimated that the water to be handled was between fifteen and sixteen billion gallons. The height to which it was to be raised was from zero at initial pumping to 12 feet maximum, with a possible 16 feet at high tide. The average pumping head for the entire mass of this water would be about 5 feet.

The time apportioned to accomplish this work was ... sixty days [since] it was necessary to remove the water by March 1, 1905, that the 1905 crop would be available [and so] the sun would not heat up the water and sicken the asparagus plants. Accordingly purchase was made of four large centrifugal pumps, to be direct

connected to short-stroke, cross-compound, high-speed engines, and contract was made with the United Iron Works of San Francisco, Cal., for the installation of the same. Owing to the unstable condition of the embankment, where it was necessary to place the pumping plant to most effectively drain the island, it was a matter of first importance to drive additional piles for foundation...

Heretofore all the large pumping plants have been placed on the island side of the levee ... so low as to permit the discharge pipes to pass through the embankment. This was impossible..., as the water on the island was on a level with the water without... [T]he only thing to do was install siphon plants [Fig. xxx].

Steam was supplied by a stationary plant of 550 H.P. and a river steamer (City of Stockton) having a rated capacity of 450 H.P. The river steamer was moored to the wharf and steam carried ashore through 125 feet of 8-inch pipe. As the tide varied the water level 3 to 4 feet twice a day, it was necesary to have a flexible connection between steamer and shore line.

With all pumps in operation the capacity was about 165,000 gallons per minute--equivalent to 10,000,000 gallons per hour. During the time of pumping no less than 6 inches of rain fell on the island, which increased the duty to be performed about 1,200,000,000 gallons.... The oil consumption ranged from 60 to 110 barrels per day of twenty-four hours.

Pumping was begun on December 8, 1904, before the plant was entirely completed. All pumps were in operation by January 10, 1905, and operated continuously for thirty days, after which time stops were made on first one pump and then another to lower the suction pipe. By February 15, 1905 the island was practically drained, although intermittent pumping was continued to July 1, 1905... (Yeatman 1905: 36-37).

The fate of the submerged asparagus fields is uncertain, but since the plants were submerged for the entire 1904 growing season, it may be doubted that they survivied. No records have been found of Bouldin asparagus production in 1905, although a brief note concerning the reclamation mentions "considerable land planted to [unspecified] crops," while stating that "a large portion of the land is used for pasturage, and 12,000 sheep are now grazing there" (Pacific Rural Press 1905). Likewise no production records are available for 1906, and if the crop had to be replanted, none would be expected.

The island flooded again in March, 1907 and January, 1908. The landowners were unable to agree on how to again reclaim the island and it remained a tidal lagoon for the following decade (Thompson 1957:478-479).

Unable to reestablish his Bouldin operation, Hickmott briefly leased a cannery at Pittsburg before moving operations to Orwood and establishing the R. Hickmott Canning Co. The product again was asparagus. Hickmott, however, was unable to regain his dominant position in the market. The collapse of the Bouldin operation provided an opening which other canners were quick to exploit. The Orwood cannery operated until 1920, when the company moved to Antioch. Hickmott died in 1922, but the company continued to operate

into the 1940s (May 1937:202; Hickmott Canning Co. n.d.; Smith 1905:10; Western Canner 1920;)

Post-Cannery Era

The Bouldin Island post office was moved to Frodsham on Andrus Island in 1918. The island was finally reclaimed the same year by the California Delta Farms, which had purchased the entire submerged tract. It has been in single ownership and devoted entirely to agriculture ever since (Frickstad 1955; Thompson 1957:429).

Comparison of maps from before and after this reclamation project demonstrates an extensive resort to levee setbacks and levee straightening which cut off numerous small land projections. Total loss of land may have exceeded 350 acres.

Shortly after reclamation, the island was leased for several years by George Shima (a successful Japanese immigrant popularly known as the "Potato King" of the Delta, and a stockholder in California Delta Farms) and subleased to tenant farmers of various nationalities:

> Initially, Shima built farm camps, landings, and other structures on Bouldin, equipping the island with 18 camps and 21 landings by 1920 (Budd and Widdows 1926). An informant reported that when he first came to the island in the late 1940s the camps around the perimeter of the island were generally supplied with either four or five rectangular one-story bunkhouses or one or two two-story dwellings to house the workers, although several of them had up to eight bunkhouses. A cookhouse and bathhouse accompanied the housing units. Most of the camps had horse corrals, while many also had barns and additional shed structures. A school for the tenant farmers' children was present on the island at Central Landing on the west side of the island by 1926 (Maniery and Fryman 1993:46).

The bathhouses were built to a Japanese design and may suggest that the initial tenants were of that nationality (Maniery and Fryman 1993:38).

Celery was the most heavily planted crop on the island throughout the 1920s, followed by corn and milo in the 1930s, asparagus and sugar beets in the late 1930s, and asparagus from 1940 through the mid-1950s (U.S. Bureau of Reclamation 1964c).

State Highway 12 was built across the island in the early 1940s. With mechanization and other changes in Delta agriculture the camps were gradually abandoned. Most were burned or dismantled in the 1970s (Maniery and Fryman 1993:63-64).

Cartographic Review

Review of available maps reveals a total of 33 historic sites on Bouldin Island. Of these, the most important were undoubtedly Bouldin Landing, Central landing and the two Hickmott

cannery sites. These maps also clearly document the reduction in the island's margins resulting from the 1918 reclamation effort. In that project, not only did levee setbacks eliminate much of the western margin of the tract, but several peninsular extensions on the south (and, to a lesser extent, east) side of the island were cut off by dredged channels, leaving formerly reclaimed areas to revert to tule islands. In some cases these cut-off areas had been occupied by settlements or work camps prior to the project.

The earliest maps show Bouldin Landing positioned mid-way along the San Joaquin face of the southwestern peninsula (a site designated here as BO-02). From 1895 onward, however, Bouldin Landing is consistently shown about 1/2 mile to the south, on the southern corner of this frontage (BO-01). During the inundation years (1905-1917) this site is alternately referred to as Schultz Landing. After 1918 it became the location of Camp 1.

Central Landing (BO-04) was located along the western shore of the island, along the inward curve of the Mokelumne. This was the scene of the 1904 levee break. Presumably this location continued to pose problems beyond those temporarily solved by Yeatman (1905), since the 1918 work involved a major levee setback. Much of the old townsite was destroyed in the effort, although some portions appear to have survived on the old levee which became a series of small mid-channel islands. One late map labels the area directly to the east behind the new levee (BO-05) as Central Landing, but there is no indication that it ever regained its earlier significance.

Paterson, Herbert and Wee (1978a) have noted the confusion among different maps as to the locations of the Hickmott canneries. These seem to result from mislabeling on county maps and delta landing charts; maps based on instrument survey are unequivocal in their placement. Hickmott's Cannery 3 (also evidently the site of the earlier Cannery 1) was at the west shore site later occupied by Camp 5 (BO-07). Cannery 2 was along the north shore at the site later occupied by Camp 15 (BO-15).

Of the other early sites, one appears to have been destroyed by a dredged channel, while five (including Central Landing) may survive wholely or partially on cut-off islands.

Archeological Surveys

No prehistoric sites have been recorded for Bouldin Island, however, one deeply buried site was found nearby on Terminous Tract (SJO-225). It is possible that this long-submerged piece of land may have been used in the remote past when the sea level was much lower and the Delta area would have been drained.

On the other hand, six historic sites (SJO-205H, -206H, -207H, -208H, -209H and -210H) and seven historic isolates (SJO-I-16H, I-17H, I-18H, I-19H, I-20H, I-21H, and I-22H) were recorded for Bouldin Island. These sites and isolates were all associated with farming operations and labor camps on the Island.

Records are available of four cultural resource surveys carried out on Bouldin Island (Fig. 13). The first of these was a survey of remnant features along the channels bordering the north and west sides of the island (Paterson, Herbert and Wee 1978a). The survey - conducted prior to a navigation hazards removal project - was carried out by boat and evidently was restricted to seven specific sites where navigation hazards had been identified.

The investigated features at all seven sites consisted of pilings near extant or former levees, and none were considered nominable to the National Register. In two cases no specific historical developments could be associated with these features. In two cases, however, clear historic associations were identified, while in three cases there were potential associations with an important site.

Site BI-2 (here designated BO-04) was located on the mid-river berm in the Mokelumne River, above its confluence with the San Joaquin. This berm marks the original Bouldin Island levee and the location corresponds to that of Central Landing. Although not noted as such by Paterson, Herbert and Wee (1978a), the pilings may be those whose emplacement was recorded by Yeatman (1905). These remnants were not viewed as eligible for inclusion in the National Register, they were considered to have local interest "as graphic evidence of the manner in which the Delta's geography has been altered and realtered" (Paterson, Herbert and Wee 1978a:16). The report recommended removal of only those pilings posing significant navigational hazards. [In view of the scale of the 1905 reclamation project, and its detailed recordation by Yeatman (1905), as well as the site association with the Delta's original asparagus industry, the negative recommendation should be reassessed.]

Site BI-3 (here, BO-07) was located along the present levee, upstream from Site BI-2. The location corresponds to that of Hickmott Cannery 3 (and, evidently, of Cannery 1), the site being later designated as Camp 5. Since no other structures survived at the site, the piles were not considered eligible to the Register (Paterson, Herbert and Wee 1978a:17). The possibility of significant archeological remains was not assessed.

Sites BI-5, BI-6 and BI-7 (here, BO-13, BO-15 and BO-17, respectively) are all located along the northern edge of the island. In the early 1930s, these sites corresponded to Camps 14, 15 and 17 respectively (USCGS 1931). Based on conflicting early maps, any of the three could have been associated with Hickmott Cannery 2. (The present study concludes that the actual site was BI-6[=BO-15]). Given the uncertainty and the fact that no buildings associated with the cannery seem to have survived, none of these sites was considered eligible for the Register (Paterson, Herbert and Wee 1978a:18-20). (The possibility of significant archeological remains at BO-15 was not assessed).

The island's southwest peninsula was surveyed the following year. No sites were reported (Dietz 1979), although it is presumed that the focus of the survey was on prehistoric resources.

A more extensive survey of the island itself was carried out in 1988-89. Coverage

included approximately 20% of the island (Fig.). Six historic sites and eight artifact scatters were recorded. All six sites seem to have been associated with Shima's labor camps, and at one site (SJO-209H [=BO-20]) two houses survive from that era. Test excavations at two of the sites - SJO-206H(=BO-24) and SJO-208H(=BO-01) - were carried out in 1993. Two depositional features encountered at the former site date to the 1940s or 1950s. The site is thus ineligible for nomination to the National Register. Most of the artifacts from SJO-208H, however, are attributable to a Japanese camp occupied during the Shima period. The site was thus considered eligible to the Register under archeological criteria (Maniery and Fryman 1993:63-107).

A further survey of the eastern edge of the island was carried out in 1991 as part of the present project (Fig.). No additional sites were found and no historic structures were encountered in the surveyed area (West 1991).

C-074198

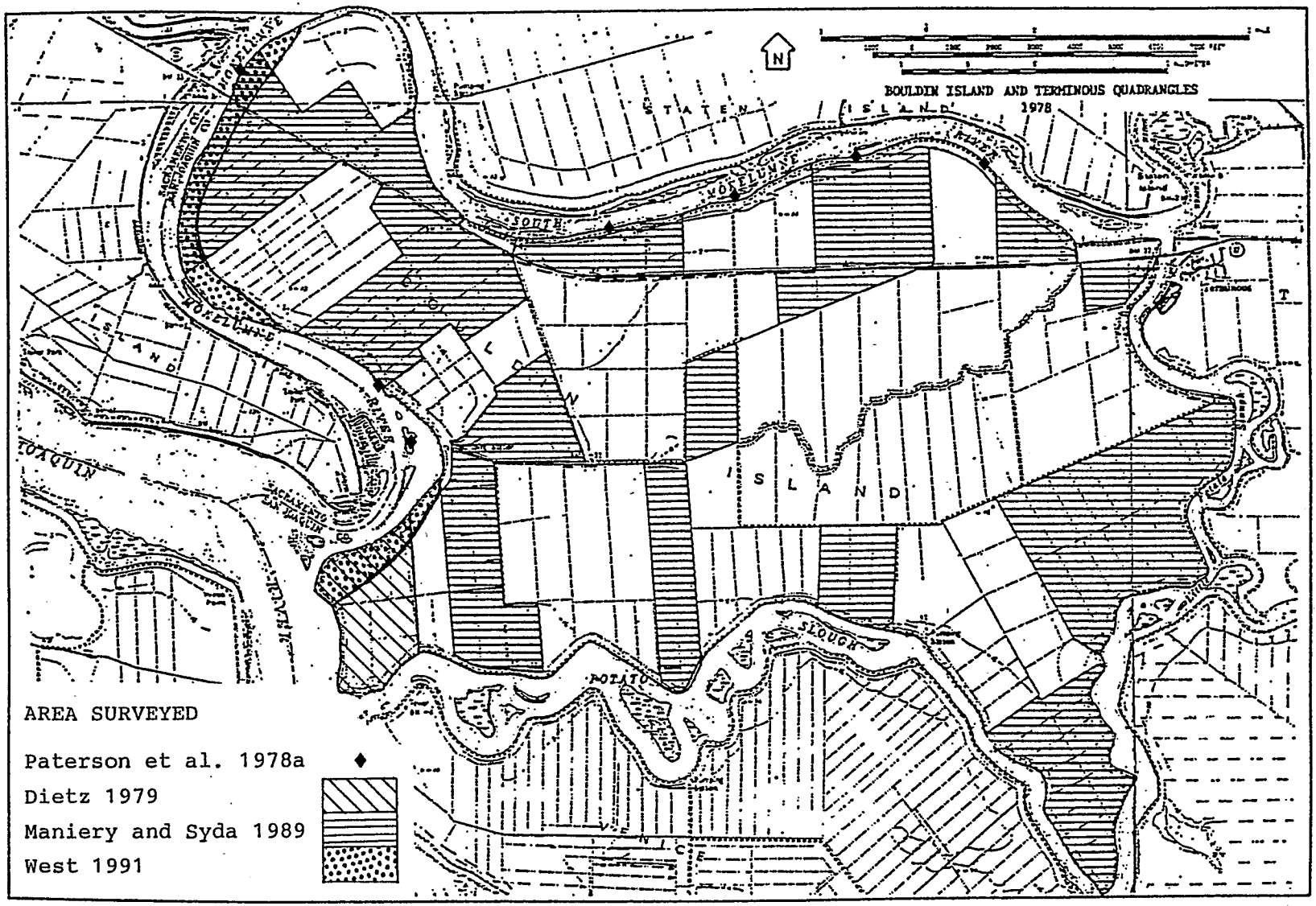

Figure 13. Bouldin Island, showing extent of archeological surveys (modified from Maniery and Syda 1989).

TERMINOUS TRACT

This tract is bordered on the east by Little Potato Slough and the South Fork of the Mokelumne River, on the south by White Slough and the Shin Kee Tract, on the east by Interstate 5, and on the north by Sycamore Slough. Terminous Tract, per se (Reclamation District 548), has an area of about 12,360 acres, although the area discussed here includes an additional 1,100 acres between the reclamation district and Interstate 5.

Surface elevation ranges from more than 10 feet below sea level in the western portion of the tract, to more than 10 feet above along the eastern margin. Surface soils are primarily organics, with upland sandy loams on the eastern margin (Cosby 1941). Most of the tract was covered with freshwater marsh vegetation prior to reclamation, although the eastern portion was undoubtedly grassland.

The only sizeable settlement in the district is Terminous, although several named landings occurred around the margins.

Prehistoric Occupation

One prehistoric site (SJO-225) has been found on Terminous Tract. It was a burial site that was not seen on the surface, but was found during a construction project. Its presence is indicative of the possibility of other unnoticed sites that may exist in the areas of the Delta that were historically below sea level.

Historic Aboriginal Occupation

Native affiliation of Terminous Tract is uncertain. The nearest village was presumably the Plains Miwok settlement of Musupumne on Staten Island. Part or all of the tract, however, may have been claimed by the Tauquimne Yokuts or by the Julpun Bay Miwok (cf. Bennyhoff 1977: Map 3).

Reclamation

The earliest evidence of Euroamerican settlement in the area consists of a house and barn (owner not specified) near the northeastern corner of the tract on the 1864 General Land Office map. Most of the tract at that time was a vast expanse of tules. Four reclamation districts (Districts 46, 58, 169 and 210) were organized between 1864 and 1874, but the earliest reclamation attempt was not made until 1871 when 7,310 acres north of Sargent's Slough (District 46) was leveed. This work was carried out by R. C. and J. C. Sargent who had acquired all the land in the district, which for many years was known as Sargent's Tract. By 1878 the entire tract was reclaimed, but the levees failed and the districts became inoperative (Gilbert 1879:44; U.S. Bureau of Reclamation 1964b:5).

Reclamation District 548 was formed in 1892, incorporating the entire tract. It

flooded in 1904 and 1907, but was drained each time, and thereafter remained secure until 1958. Asparagus was the most extensively grown crop from the mid-1920s to the mid-1930s, followed by celery in the late 1930s (U.S. Bureau of Reclamation 1964b:5, Table 1).

State Highway 12 was built across the tract in 1942.

The Town of Terminous

The settlement of Terminous was established in the 1890s, named for its location at the end of a gravel road built westward from Lodi to the Bouldin Island ferry on Little Potato Slough. The road was largely the work of John Doughtery who built a general store at the site. A post office - located in the general store - was established in 1895 and remained until 1918. The store, which later became a tavern, remained in operation until about 1960 (Hillman and Covello 1985:226).

Terminous received an economic boost in 1927 when the Western Pacific freight line was extended westward to the site from the main-line at Kingdon. This made Terminous a transshipment point for crops barged to the railhead from adjacent delta islands. A packing house was established. During the 1929-30 season 2,264 cars of celery were packed at Terminous, in addition to nearly 600 cars of potatoes, 200 cars of onions and 200 cars of sugar beets (Hillman and Covello 1985:227).

A labor force of about 350 men was required for this shipping and processing point. About 150 of these men drove in from the surrounding area, the remaining 200 lived at the settlement. Housing was provided in a "Box Car City" consisting of old boxcars taken off the rails and positioned along the base of the levee opposite the warehouses, the cars being clustered in two groups so that Japanese and Filipino workers could be segregated from Caucasian laborers. The packing operations disappeared in the late 1930s as a result of competition from refrigerated trucks, which allowed growers to establish packing operations independent of the rail lines (Hillman and Covello 1985:227).

Cartographic Review

Historic maps indicate 69 historic site locations on Terminous Tract. Except for Terminous and the adjacent Western Pacific Wharf and the Western Pacific rail line (TT-57, -58 and -69), all appear to have been farming camps and associated landings. Of the sites, 28 appear to be no older than the second quarter of this century. The oldest (TT-13) consists of an otherwise unidentified house and barn located on the 1864 plat map.

Archeological Surveys

No reports of archeological surveys seem to be available for Terminous Tract. The

only site recorded in the district was accidentally uncovered during construction of the Terminous Bridge.

C-074203

SHIN KEE TRACT

Considered under this heading are the actual Shin Kee Tract, with an area of about 990 acres, and a slightly larger zone (1,244 acres) to the east. This is the southeastern corner of the study area, located between Terminous Tract and Interstate 5, north of White Slough.

Elevation of most of the tract is about mean sea level, rising to more than 5 ft above sea level at the eastern margin. Surface soils consist of organics in the western quarter of the area and of upland clay loams and sandy loams on the remainder (Cosby 1941). These soil differences probably approximate the areas of marshland vs. grassland prior to reclamation.

The area is not directly impacted by any of the project alternatives.

Prehistoric Occupation

No information is available on prehistoric use of Shin Kee Tract.

Historic Aboriginal Occupation

It is unclear whether Shin Kee Tract lay within the territory of Musupumne (Plains Miwok), Julpun (Bay Miwok) or Tauquimne (Northern Valley Yokuts). No historic village sites are known. The tract was presumably used as a hunting and collecting area (cf. Bennyhoff 1977: Map 3).

Reclamation

Date of the reclamation of this tract is uncertain. As early as 1870 it was organized as Reclamation District 79 (Wallace 1870), but it is uncertain whether any levee work ensued.

The tract did not receive its name until about 1912, and it is unique in being the only tract in the Delta owned by a Chinese entrepreneur prior to repeal of the alien land law. The entrepreneur was Chin Lung, a Heungshan (Chungshan) immigrant who often operated under the business name Sing Kee.

Chin Lung was born about 1864 and immigrated to California when he was 18. He worked for a while in San Francisco before moving to the delta. Although initially he knew little about farming, his close attention to detail, his organizational skill and his knowledge of English allowed him to prosper in large scale tenant farming. His first contract was for 200 acres on Andrus Island in 1898, but within two years his leases were for well over 1,000 acres annually. He employed about 500 men each year to work his fields, hiring only Chinese workers. Although known as a "Potato King", he planted other crops as well and even raised seed for a seed supply house (Crissey 1911:16; Chan 1986:207-212).

He evidently purchased the Shin Kee tract in 1912 and placed it under the

management of his nephew, Chin Bow, who by that time regularly managed his farming operations (Chan 1986:211; Walker 1992:80).

By 1926 the tract was owned by Bigger and Inman and it is sometimes referred to by these names. Crops on the tract in the 1920s included grain and hay, corn and milo, and sugar beets. After 1931 the majority of the land was used as pasture (U.S. Bureau of Reclamation 1964b:11, Table 16).

Cartographic Review

Historic maps indicate six historic site locations on Shin Kee Tract. All appear to be associated with agricultural use. Only one (SK-03) can be dated prior to the second quarter of this century.

Archeological Surveys

Records were found of only one archeological survey of a small area in the southeastern portion of Shin Kee Tract (Wohlgemuth 1990). No archeological sites have been recorded on the tract.

BRACK TRACT

This tract is bordered on the north by Hog (formerly Otter) Slough, on the west by the South Fork of the Mokelumne River, and on the south by Sycamore Slough. Most of the tract is included in Reclamation District 2033, which in 1955 contained 4,667 acres of irrigated farm land, 26 acres of water surface and 162 acres of levees (U.S. Bureau of Reclamation 1964b: Table 4). As designated here, however, Brack Tract also includes a much smaller area between the Reclamation District and Interstate 5.

Surface elevations range from 10 ft below sea level in the west to about 10 ft above along the eastern margin. The western two-thirds of the tract consists of organic soils, while the remaining area is composed of alluvial deposits and upland sandy loam (Cosby 1935). The difference in soils probably differentiates the area occupied by marshland prior to reclamation, from that occupied by grassland.

Brack Tract would be directly affected by levee setbacks under Alternatives 4A and 4B. Under these alternatives as well as the Preferred Alternative (5B) and alternatives 2A, 2B, 3A, 3B and 5A, dredging would occur in the adjacent South Fork of the Mokelumne.

Prehistoric Occupation

No information is available on the prehistoric occupation of Brack Tract.

Historic Native American Occupation

Brack Tract presumably lay within the territory of Musupumne, a Plains Miwok village that Bennyhoff (1977:76) tentatively places on Staten Island.

Euroamerican Occupation and Reclamation

The earliest Euroamerican settler on the tract was Samuel Fisher, who established a farm in 1856. The 1864 plat map places "Fisher's Stable and Barn" in the northeast corner of the present tract, and he undoubtedly occupied only the upland area (Gilbert 1879:135; GLO 1864).

In 1875 the tract - and evidently considerable surrounding acreage - was purchased by Joseph Brack, a Swiss immigrant who arrived in California during the gold rush, settling near Woodbridge in 1850. In 1879 Brack was cultivating 2,000 acres on the tract which acquired his name, mostly in wheat, and owned 5,000 acres of still unreclaimed tule land. His farmstead, evidently located about a quarter mile south of Fisher's original site was illustrated in the county history of that year (Gilbert 1879:135; Tinkham 1909).

Brack was clearly an active farmer and an astute businessman with an eye for profitable ventures. He began reclaiming his land and had a deep water channel dredged to a

landing on his property.

Like other farmers in the region Brack was deeply concerned about high freight rates leveed by the Central Pacific on shipments of grain and other produce. General dissatisfaction with the situation led to a series of public meetings late in 1881, at which farmers and businessmen in Lodi and the surrounding area decided to build their own rail line from a railhead on the Mokelumne through Woodbridge and Lodi to the foothills. The company - the San Joaquin & Sierra Nevada Railroad - was formed early in 1882. In exchange for $20,000 in stock, Brack transferred to the company 10 acres for a depot next to the deep water channel he had dredged, the right to use his levees for a roadbed, a steamboat and two barges. He stipulated only that the line be narrow gauge (so as to be incompatible with the Central Pacific's equipment), and that the transfer revert to him should the company ever fall into the hands of a monopoly. The new depot site - Brack's Landing - became the western terminous of the line (Stindt 1966; Wagers 1975).

The SJ&SNRR prospered for several years, the line eventually extending eastward as far as Valley Springs in Calaveras County, and Brack's Landing handled 30,000 tons of wheat per year. On the death of the line's president in 1886, however, his heirs sold a controlling interest of the company's stock to the Southern Pacific. As a result of Brack's contract, all of his property was returned to him, although the SP continued to use that portion of the line for several years. Perpetuating the diversion of freight shipments to Brack's Landing was not in SP's interest, however, and the line west of Woodbridge was eventually shut down (Stindt 1956; Wagers 1975).

Undaunted, Brack returned to channel dredging and levee construction. In 1887 he had a dredge built at a cost of $20,000. This machine burned in 1890, killing one man and injuring three others. Brack replaced it with another at a cost of $17,000 (Wagers 1975:86; Antioch Ledger 1890; Stockton Iron Works 1913:90).

In 1891 Brack was reported to have reclaimed 5,000 acres and to have dredged a new channel for 4 miles up Otter Slough. The channel was 60 ft wide and ended in a harbor 1200 ft long and 160 to 180 ft wide. Brack intended to add wharf facilities and warehouses the following year (Wagers 1975:86).

The gradual abandonment of the rail line eventually sealed the fate of Brack's continued attempts at a profitable landing site. In 1897 SP tore up all the tracks west of Woodbridge. Brack continued to farm (leasing at least some of his land to tenant farmers) and operate his dredging business until 1906, when he retired to Lodi, leaving the ranch in the hands of two of his sons (Tinkham 1909:222, Wagers 1975:86; Walker 1992:73-74, 243).

Brack Tract flooded in 1904 and 1907 but seems to have escaped the disasters which plagued neighboring tracts in other years. Although historical accounts of Brack seem to stress his role as a wheat farmer, by the mid-1920s asparagus was the tract's most important crop until superseded by grain again in the late 1930s (Thompson 1957:460; Antioch Ledger

1907; U.S. Bureau of Reclamation 1964b: Table 4).

Cartographic Review

Historic maps indicate 38 site locations on Brack Tract. The earliest of these is the Fisher farm mentioned above (BT-12). The only located source for Brack's farmstead is Gilbert (1879) and the indicated location is designated BT-13. The location is cited with caution however, since two of Brack's sons were reportedly still living on the ranch in 1909, and the 1910 topographic map - based on a 1907-1908 survey - shows no structures in the indicated position. This map does indicate a site (BT-11) a short distance to the north, however, and this may be the actual Brack farmstead.

Histories of the SJ&SNRR demonstrate some confusion about the location of Brack's Landing, seemingly placing it on Hog Slough. Reid (1883), Compton (1894), and Manson and Grunsky (1895), however, all agree in showing it on the South Fork of the Mokelumne at about the location of the later Camp 12 (BT-02). It seems likely that Brack's channel dredging in 1891 was intended to create a new landing near the head of Hog Slough, avoiding problems experienced earlier in extending the rail line (BT-38) across peat lands to reach the Mokelumne. An upper Hog Slough site (BT-09) is labeled by Quail (1905:1912) as Bracks Landing and by Behrens (c.1930) as "Bracks Whse." This is presumed to be on Brack's new harbor of 1891. However, caution is warranted regarding exact location since neither the 1910 or 1931 maps depict structures in this position. Since the slough widens appreciably about a half mile downstream, the designation may have been misplaced by Quail and the error copied by Behrens.

The remaining sites are all farm camps or associated landings. Several of these may date to Chinese tenant operations on Brack's land, although 11 of them seem to date no earlier than the second quarter of this century.

Archeological Surveys

No archeological sites have been recorded on Brack's Tract, and no systematic archeological surveys have been reported.

C-074209

CANAL RANCH

This tract is bordered on the north by Beaver Slough, on the west by the South Fork of the Mokelumne River and on the south by Hog (formerly, Otter) Slough. Canal Ranch is generally equated with Reclamation District 2086, which in 1955 contained 3,122 acres of farm land, 24 acres of water surface and 168 acres of levees (U.S. Bureau of Reclamation 1964b: Table 9). For purposes of this study, an area of similar size between the reclamation district and Interstate 5 is included as well.

Surface elevation ranges from 10 ft below sea level to 5 ft above, the lowest portion being near the western end of the tract. Soils in the western area are primarily organics. Mixed mineral and organic soils occupy the central area, while the eastern area contains mineral soils of alluvial origin and upland sandy loams (Cosby 1935). Prior to reclamation, the western half of the tract was undoubtedly occupied by tulare vegetation, while the eastern half was grassland.

Canal Ranch would be directly impacted by levee setbacks under Alternative 4A and 4B. Dredging in the adjacent South Fork of the Mokelumne would occur under Alternatives 2A, 2B, 3A, 3B, 4A, 4B, 5A and 5B.

Prehistoric Occupation

No archeological information is available concerning prehistoric occupation of Canal Ranch.

Historic Native American Occupation

Canal Ranch presumably lay within the territory of Musupumne, a Plains Miwok village that Bennyhoff (1977:76) tentatively places on Staten Island.

Reclamation

No records of Euroamerican settlement have been found dating prior to reclamation, which Thompson (1965) assigns to the 1880s. This was presumably undertaken by R.C. Sargent, who owned most of the tract during this period (Reid 1883).

The earliest located reference to this tract as Canal Ranch is the Quail map of 1903. Since Joseph Brack is reported to have dredged a deep-water channel up Hog Slough in 1891 (see Brack's Tract, above) this may be the source of the name.

Farming operations are denoted by scattered camps shown on early 20th century

maps. Crop records are not available until the 1920s, but these show asparagus as the dominant crop through the 1930s. During this time most of the tract was owned by Libby, McNeil & Libby, its 3,000 acres being divided into 12 camps. The asparagus was destined for the fresh market and as a source of supply for Libby's Sacramento cannery. From the late 1940s to the mid-1950s most of the land was devoted to grain and hay. Reclamation District 2086 was formed in 1954 (Western Canner 1936:24; U.S. Bureau of Reclamation 1964b: 10, Table 9).

Cartographic Review

Historic maps indicate 18 site locations on Canal Ranch, all of them undoubtedly farm camps and associated landings. The earliest of these records dates to 1905, but at least some of these sites by that time must have been occupied for at least 20 years.

Archeological Surveys

Only one prehistoric site (SJO-73) has been recorded on Canal Ranch. There are no records of systematic surveys.

NEW HOPE TRACT

This tract of nearly 10,000 acres is bordered on the east and north by the Mokelumne River, on the west by the South Fork of the Mokelumne and on the south by Beaver Slough. The tract is now transected by the Western Pacific Railroad line and by Interstate 5. Present and former settlements in the area include Thornton (formerly New Hope), New Hope Landing, Benson's Ferry and Mokelumne City.

Elevation in the western half of the tract is at about sea level, rising gradually to 10 ft above along the eastern margin. Most of the surface area consists of alluvially deposited mineral soils, while mixed alluvial and organic deposits occur along the western edge (Cosby 1941). Prior to reclamation, the western two-thirds of the tract was evidently dominated by marsh vegetation, since this was the area segregated as swamp and overflowed land in the initial land surveys. Land to the east was presumably grassland, with riparian forests occuring immediately along the river channels.

Total area in 1954 was 9,860 acres, 95% of which was devoted to farm land, 2.5% to levees and 2.5% to other uses (Thompson 1957:497). Subsequent freeway construction and residental expansion has reduced the area of farmland somewhat.

New Hope Tract is marginally impacted by channel dredging under the Preferred Alternative (5B), as well as under Alternatives 2A, 2B, 3A, 3B, 4A, 4B and 5A. Under Alternatives 4A and 4B it would be directly impacted by levee setbacks.

Prehistoric Occupation

Most of the known Windmiller Tradition ("Early Horizon") sites are located on the New Hope Tract: nine such sites were recorded in the 1920s and 1930s. Of these, excavations have been conducted at SJO-56, -68, -142 and -145 (Lillard, Heizer and Fenenga 1939; Heizer 1949; Ragir 1972; Schulz and Ritter 1977). None of these sites contained well-developed middens and the first three at least appear to be specialized cemeteries with the extended, westerly-oriented burials and abundant grave offerings typical of Windmiller sites.

It is unclear whether the New Hope Tract supported a particularly dense population during this period (2500-500 B.C.), or whether similar sites elsewhere have been mostly washed away or buried.

Historic Native American Occupation

The native affiliation of New Hope Tract is uncertain. Junizumne (near Walnut Grove), Musupumne (on Staten Island?) and Locolomne (further east on the Mokelumne)

appear to be the likeliest claimants.

Euroamerican Settlement and Reclamation

Euroamerican settlement in the New Hope Tract began in 1849 when A. M. Woods and Edwin Stokes established what would soon become Benson's Ferry on the Mokelumne. At this time the area was still being used by the Plains Miwok, but after an armed conflict in 1853 (see Cosumnes District, Historic Native American Occupation) the Americans were left in undisputed occupation. Settlement of the tract was slow, however, since the western two-thirds lay in the tulare while lands in the eastern portion were subject to flooding and yet not as productive as alluvial lands further north. Early settlement here, as on the tracts to the south, focused on stock raising. The low nature of the terrain and the frequency of floods may be gauged by the report that two farmers on the northwestern edge of the tract lived in a house built in a tree (Bancroft Scraps 1879).

Reclamation began in the late 1870s. In 1879 an observer riding along the river from the old Mokelumne City site to New Hope Landing noted eight separate farms protected by levees where once there was a "vast tule sea," the land had changed beyond recognition:

> Now magnificent fields of grain, interspersed with carefully tilled stretches of potatoes, beans, onions and other vegetables greet the eye along this whole extent of country; and where an extensive but shallow lake of water stood less than two years ago, today are barley fields of 2000 acres that will yield 60 to 70 bushels to the acre (Bancroft Scraps 1879).

New Hope Tract was organized as Reclamation District 348 in 1880, over the long term, however, the levees have been far from secure. The tract flooded in 1889, 1899, 1900, 1904, 1907, 1928, 1955 and 1986 (U.S. Bureau of Reclamation 1964a:5; Thompson 1957:457-463; California Department of Water Resources 1993:46,48).

Crop records from the 1920s to the 1950s indicate that alfalfa has consistently been one of the most extensively grown crops on the tract. After 1931, however, it fell to second or third place in acreage committment, being surpassed consistently by asparagus, and intermittently by grain and hay, pasture, and tomatoes (U.S. Bureau of Reclamation 1964a:Table 1).

Benson's Ferry

Benson's Ferry was the location of the first ferry crossing on the Lower Mokelumne. Dating to at least 1849, it was first owned by A.M. Woods and Edwin Stokes and was purchased by John A. Benson in 1850. A saloon was established above the ferry in the latter year by Samuel Parker. In 1851 J.H. Stanly and Samuel Monday gardened below the ferry. In 1852 Benson built a house on the south side of the river and hired Green Palmer to run the

ferry and occupy the house. In the spring or summer of that same year Benson joined with G.W. Woods to lay out a road from Stockton to Sacramento that would utilize the ferry (Gilbert 1879:134). The following spring (1853) Benson is cited in a newspaper account of a fight between some white settlers and the Indians inhabiting a village on lower Dry Creek (Sacramento Union 1853). On February 14, 1859, Green Palmer killed Benson and subsequently committed suicide by poisoning (Gilbert 1879:134).

Testifying in 1859 concerning aspects of the Chabolla Grant Claim, a toll bridge tender at Wood's Ferry, J. Van Scoyk, stated that formerly he had been a hunter and trapper below Benson's Ferry, and that "Benson's is between a ¼ and a ½ mile below the junction of the Moquelumne and the Cosumnes River" (Land Grant Case 406 N.D. 1859:251). Another resident of Benson's Ferry in 1858-59 was C.L. Thayer who worked as a ferry tender (Land Grant Case 406 N.D. 1859:385-404). A map dated 1861 shows Benson's Ferry on the Mokelumne River with two buildings on the Sacramento side and two on the San Joaquin side (Twitchell 1861). In 1862 came a great flood that is known to have washed away the fledgling community of Mokelumne City, a short distance upstream. Benson's house at the Ferry is said to have escaped this fate by being lashed to a tree (Hillman and Covello 1985:174). A map based on a survey in July 1864 shows Benson's Ferry apparently still in the same location as before the flood (Reece 1864).

On January 21, 1873 Edward P. Gayetty came to Benson's Ferry and married Benson's daughter. As of 1879 Gayetty was the proprietor of the ferry (Gilbert 1879:134). His home and the small cluster of buildings surrounding the ferry are shown in a drawing (Gilbert 1879:Plate CLXIX). A contemporary description of the area around Benson's Ferry stated:

> A new road direct to Galt, on the railroad, only seven miles away, is in contemplation, and as a beginning the course of the road to Benson's has recently been changed, and now runs further east and strikes the river above Benson's, at what was once known as Mokelumne City. All that remains of that prominent village in the pioneer history of this county, is a dilapidated, weather-beaten, two story building which shelters a few leprous pests - Chinese - and a farm house (Bancroft Scraps 1879).

The official California Landmarks list states that Benson's Ferry (CHL 149) was located "100 feet west of County Road J8, 3 miles north of Thornton" (California Historical Landmarks 1990:209), a placement that was presumably consistent with the remains of the Gayetty saloon pictured in the drawing of Benson's Ferry in 1879 (Gilbert 1879) and a photograph purporting to be the same building from 1983 (Hillman and Covello 1985:174). This placement, however, does not coincide with the 1861 and 1864 maps. A USGS Quad sheet (1910b) shows the remnants of a levee that probably had carried the old Lower Stockton Road to Benson's Ferry before the relocation mentioned in the 1879 article. County Road J8 represents the relocated Benson's Ferry crossing and coincides with the spot specified in the California State Landmark description. On a more current USGS Bruceville sheet (USGS

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1968), the former roadbed has largely disappeared and the only remnant is the last short section of dirt road leading up to the Mokelumne River, lying about halfway between the current Franklin Boulevard bridge crossing (sometimes called Benson's Bridge) and the new Interstate 5.

Mokelumne City

This town was situated on the south bank of the Mokelumne, just above its confluence with the Cosumnes. The site was laid out in 1850, and 100 lots were sold. The town eventually had three stores, two hotels, a blacksmith shop, a saloon, a warehouse and various other buildings - including some reportedly built of brick. In 1856 S. H. Davis established a lumber yard and boat yard in the town. There he built two sloops, the Ceres and the R. W. Allen, which he placed in service in the river trade between Mokelumne City and San Francisco. By 1861 Mokelumne City was the third largest town in San Joaquin County (Gilbert 1879:134; Hillman and Covello 1985:219).

The town was devastated by the flood of January, 1862, most of the buildings being destroyed or swept away. The town never recovered. A saloon carried off by the current eventually settled near the head of Beaver Slough and became the core of the Housken residence (still standing). In 1879 only two structures - "a dilapidated, weather-beaten, two-story building" and a farm house - remained on the townsite. The former was occupied by Chinese tenants, presumably workers at the Thornton & Borland brickyard (Hillman and Covello 1985:218; Bancroft Scraps 1879).

New Hope Landing

New Hope Landing was established in the late 1870s to serve New Hope (Thornton), located 3 miles to the east. In 1879 the only buildings were a warehouse and a boathouse for the tender who operated the ferry to Staten Island (Bancroft Scraps 1879).

Thornton

Originally known as New Hope, this town was established in 1876 by Arthur Thornton, who presumably chose the name as an optimistic title for a new career after being disposed of his land and home in the litigation over the Chabolla Grant. In partnership with A. Borland, he established a general store and blacksmith shop. A post office was established in 1878. By 1879, the settlement consisted of "one store, a good country hotel, and one other dwelling" (Bancroft Scraps 1879; Gilbert 1879:135; Frickstad 1955:162).

When the Western Pacific began planning a line through the district in 1904, Thornton donated a right-of-way across his own land and worked to obtain the remaining right-of-way among local landowners. When the line was built in 1907, the station at New Hope was named after Thornton. In 1909 the name of the town was changed accordingly. The town had a population of 200 in 1910 (Hillman and Covello 1985:173; Frickstad 1955:163; San

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Joaquin County Board of Supervisors n.d.:76).

The Farm Security Administration established a camp for migratory farm workers on the east side of the town in the late 1930s. The settlement included 105 10-by-14-ft corrugated metal buildings and 30 wooden "garden homes". It was demolished in the early 1950s (Stein 1973:179,185; Hillman and Covello 1985:173).

Thornton & Borland Brickworks

The exact location of this factory is not presently known, although it seems to have been near the original Benson's Ferry crossing:

> Driving along the levee [westward from the old Mokelumne City site] we pass a large brickyard, where some of the finest brick in the State are manufactured. And here again is to be seen California's curse, the omnipresent Chinamen, who are monopolizing this lucrative branch of industry, having leased the brickyard, including 11 acres of land, for a term of years. This land was part of the Benson estate, and was sold recently to Ed Gaiety and wife, the latter a daughter of Benson (Bancroft Scraps 1879).

The 1880 Census of Manufactures notes that the brickyard entailed an investment of $3,000 and employed 22 men working - surprisingly - an 8 hr day. Production during the first six months of the year totalled 1,500,000 common brick and 100,000 pressed brick, valued in total at $11,000.

The last reference found to the yard is the 1884 directory, which listed Jabez Clay as the superintendant. As noted elsewhere, a reference to a Mokelumne River Chinatown which burned in 1885 may refer to the residences of the brickyard workers (and, doubtless, farm and levee workers employed elsewhere in the district). If so, the fire evidently marked the end of the brickmaking operation as well (McKenny & Co. 1884:305; Blenkle 1952:14).

Thornton Cannery

Expansion of orchards and vegetable growing in the Thornton area led to establishment of a cannery in 1928. The plant was built by W. P. Hammond, a local fruit grower, and operated by the Sacramento Valley Packing Co. It packed 250,000 - 300,000 cases of fruits and vegetables annually in the 1930s. The cannery was leased in 1938 by the Thornton Canning Co., which has operated it since. Annual production in the early 1950s was 1,000,000 cases, when a soft drink bottling line was added by the Thornton Beverage Co. (Blenkle 1952; Tideway 1954b:7; Hillman and Covello 1985:177).

Cartographic Review

Review of historic maps indicates 80 historic site locations on New Hope Tract. The oldest of these sites is Benson's Ferry (NH-04). As discussed above, the ferry crossing was moved upstream to near the future bridge crossing site (NH-05) in 1879. A short distance to the east was the 1850s townsite of Mokelumne City (NH-06).

The town of Thornton is here assigned three designations, corresponding to the New Hope townsite (NH-36), the Thornton Migratory Labor Camp (NH-37), and the Thornton Cannery (NH-35). New Hope Landing (NH-13), established in the 1870s, lies about 3 miles west of Thornton, while the Western Pacific tracks (NH-80), first laid about 1904, transect the tract from north to south. The site of the Thornton & Borland brickyards has not been identified.

The remaining historic locations in the tract represent early farmsteads, farm camps and associated landings.

Of the New Hope Tract locations, 37 appear to date no earlier than the second quarter of this century. Most of the remainder probably date from settlement and reclamation of the tract in the 1800s. No National Register properties are present, but the sites of Benson's Ferry and Mokelumne City are listed as California Historical Landmarks.

Archeological Surveys

This area has a large number of sites. Twenty-three prehistoric sites have been recorded in this area (SJO-53, -54, -55, -56, -57, -58, -59, -61, -62, -63, -64, -65, -67, -68, -69, -70, -71, -72, -116[?], -142, -143, -144, and -145). One other site (SJO-161) is listed but is somewhat uncertain. The area and was on somewhat higher ground with more natural levees. Most of the archeological sites associated with the Early Horizon are found in this area (SJO-56, -68, -69, -70, -71, -142, -143, -144, and -145) (Lillard, Heizer, and Fenenga 1939:22).

All of these sites were recorded prior to systematic reporting of surveys. Survey of several areas in the southeastern corner of the tract by Derr (1990) relocated SJO-53 but was unable to locate SJO-54 or -55. This survey also reported that the Hartog Ranch work buildings appeared to be of historic age but did not record them. The report also illustrates several houses on the southern edge of Thornton outside the survey area.

Jablouski (1990) surveyed the Mokelumne River levee from the southeastern corner of the tract to about 1/2 mile west of the Thornton Road Bridge. No prehistoric sites were encountered. Two historic sites were noted but not recorded. These were Field Site 1 and Field Site 2. These correspond to locations NH-06 and NH-04 in this study: the original sites of Mokelumne City and Benson's Ferry.

Field Site 1 (NH-06) consisted of a horse barn, hay barn and dairy barn - "all

abandoned and in poor condition" - as well as a modern residence. Field Site 2 (NH-04) consisted of "a collapsed 2 story end-gabled house with horizontal lapped siding and square nails; a small collapsed cabin on the river side of the levee; a corral; a grove of fig trees; and numerous large English walnut trees" (Jablonski 1990:3-4). The collapsed building is presumably the structure illustrated by Hillman and Covello (1985:174) and described as "the shell of the old Gayetty House Saloon."

The Galt Area Historical Society is currently considering several properties in the district for possible nomination to the National Register (Appendix 1).

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COSUMNES AREA

This district is arbitrarily defined as that portion of the study area lying east of Franklin Boulevard and the Mokelumne River and south of Lambert Road. It includes the lower reaches of Dry Creek and the Cosumnes River.

Surface elevation ranges from 5 to 20 ft above mean sea level. Most of the soils are of alluvial deposition (Weir 1950a). Native vegetation in the area consisted of riparian forests along the principal river courses, with tule marshes occupying the lower areas, oak woodlands on the margins and grasslands on higher soils away from the rivers.

The area is not directly impacted by any of the project alternatives, although an area between New Hope Road and Bear and Grizzly Sloughs may be used as a borrow pit and wetland enhancement site.

Prehistoric Occupation

At least two Windmiller Culture sites have been identified along the Cosumnes River, and one of these - SAC-168 - lies within the present district. Excavations undertaken in 1952 recovered 30 burials from the lower component at SAC-168. Though badly disturbed, the burials exhibit the westerly-oriented extended position typical of Windmiller cemeteries as well as artifacts characteristic of that culture. The only radiocarbon date from the component places it at about 3,000 years ago (3070±170 BP). That this component represented a habitation site as well as a cemetery was the somewhat hesitant conclusion of the original analysis:

> "Negative evidence" such as absence or very slight occurrence of food debris, charcoal, feature structures (hearths, storage pits and shelter remains), artifact manufacturing waste, and shallow depth of deposit, suggest that the [Early] midden does not represent an occupation accumulation.
>
> The presence of food preparation paraphernalia, such as mortars and pestles, may be taken as positive evidence that some habitation of the mound during the formation of the brown midden did occur. The presence of living debris, animal bone, baked clay and unassociated artifacts, in larger amounts than found in most other Windmiller sites supports the conclusion that a group of people lived on or near the mound during both [Windmiller and later] phases of its formation (Ragir 1972:17-18).

Subsequent reviews cast doubt on the reliability of the artifactual and faunal evidence, and suggest that the early component at this site may indeed represent a specialized cemetery (Schulz 1981; Meighan 1987).

The upper midden at SAC-168 derives a much later occupation, dating between 1400 and 1750 A.D. - an Augustine Pattern component undoubtedly representing a Plains Miwok village. The excavated area included a cemetery plot with 15 graves. Living debris included hunting and fishing implements but few milling tools (Ragir 1968:35-70).

Historic Native American Occupation

At least two independent Miwok villages were located in the Cosumnes District, both of them along the Cosumnes itself. An additional village was located on the Mokelumne, evidently a mile or so east of the study area.

Tihuechemne - situated on the west bank of the Cosumnes near the present twin cities road, - was a small independent from which 35 individuals were taken to the missions between 1820 and 1836. In the late 1830s Tihuechemne men assisted the Muqueleme in raids on Sonoma to steal horses, and in the ensuing battles with the Vallejos and their Indian allies. There are no references to the Tihuechemne after 1840, and they probably amalgamated with the larger Muqueleme population (Bennyhoff 1977:97-98).

About a mile and a half north of Tihuechemne on the Cosumnes was Sotolomne. This small group was allied with Cosomne, further up the river, in an uprising against Sutter in 1841. By 1844, however, the Cosomne - and doubtless the Sotolomne with them - had moved to New Helvetia. There they remained until 1848 when they returned to the upper Cosumnes near Sloughhouse (Bennyhoff 1977:98-100).

Locolomne was the first tribe on the Mokelumne River above its confluence with the Cosumne. The precise location of the main village is uncertain, although the archeological site SJO-48, a mile east of the study area, has been suggested. Even if the village lay outside the area, this group seems to be the likliest native claimant of the southwestern portion of the Cosumnes District and the western portion of New Hope Tract.

Locolomne was allied with Muqueleme in the late 1830s warfare with the Vallejos. They had apparently moved to the foothills near Ione in 1845. The following year the Locolomne population was listed as 43 men and 45 women. In 1851 the Locolumne became the only Plains Miwok group to sign one of the never-ratified treaties between California Indians and the United States government (Bennyhoff 1977:112-113).

In 1853, an incident occurred in the vicinity of the confluence of Dry Creek and the Mokelumne River in which local Indians were accused of having raided the home of two men named Drew and Bragg. This was followed by an attack on a nearby Indian village, identified as being on Dry Creek, "not far from the Moquelumne River." The twenty villagers fought back fiercely but were ultimately overwhelmed by a large number of whites brought into the fray. The Indians finally managed to escape into the *tules* (Sacramento Union 1853a). Another, later, account of the confrontation stated that the Indians involved lived on the land known as the Slater Ranch (Wright 1880:218). The exact location of this

ranch has not been determined. Such altercations between the Indians and whites during the Gold Rush were so common as not to warrant special attention, but in this case the village had been drawn by some unknown artist shortly before and was published as a lithographic letterhead (Sacramento Union 1853b; Sacramento Pictorial Union 1853). This makes it the only known rendering of what may have been a Plains Miwok village (Fig. 14). The drawing is particularly interesting because it portrays a stockade fence, two types of houses (conical tule houses and bark houses more like those found in the mountains), and an earth-covered sweat lodge.

So far it has not been possible to identify this village with any of the historically known ones (cf. Bennyhoff 1977). Even though Kroeber (1925:445) did show a village, Ocheh-ak, as being on lower Dry Creek, this identification has been disputed by Bennyhoff (1977:71). The two known archeological sites identified in the vicinity are SAC-191 and SJO-24. They were mentioned by Schenck and Dawson (1929:321, 324) and said to have been destroyed. SAC-191 was said to have been 40 feet in diameter (Schenck and Dawson 1929:313, 321). The original size of SJO-24 was said to have been 60 feet long by 25 feet wide and it was characterized as a burial and living site (Schenck and Dawson 1929:310). In neither case do we have information on the age of the site.

Euroamerican Settlement and Reclamation

The earliest non-native settlement in the area was at Rancho Sanjon de los Muquelumnes, a tract of 8 leagues granted to Anastasio Chabolla on January 24, 1844 by Governor Manuel Micheltorena, the western edge of which lies in the present district. Chabolla did not occupy the ranch but placed it in the charge of an overseer, Jose Salinas. The ranch headquarters lay outside the present district. It was described as having 300 head of cattle, 40-50 horses, corrals and land under cultivation, and Indian servants. The house and corrals were on the south bank of the Cosumnes River and there was a lake nearby the house (Land Grant 93 N.D. n.d.:6-7; Land Grant 406 N.D. 1859:44-45).

With the death of Chabolla in 1852 and the demise of his wife (Maria Josepha Higuera de Chabolla) in 1856, the ownership of the Sanjon de los Muquelemes Grant devolved into a confused contest among Chabolla's heirs, squatters, and purchasers under

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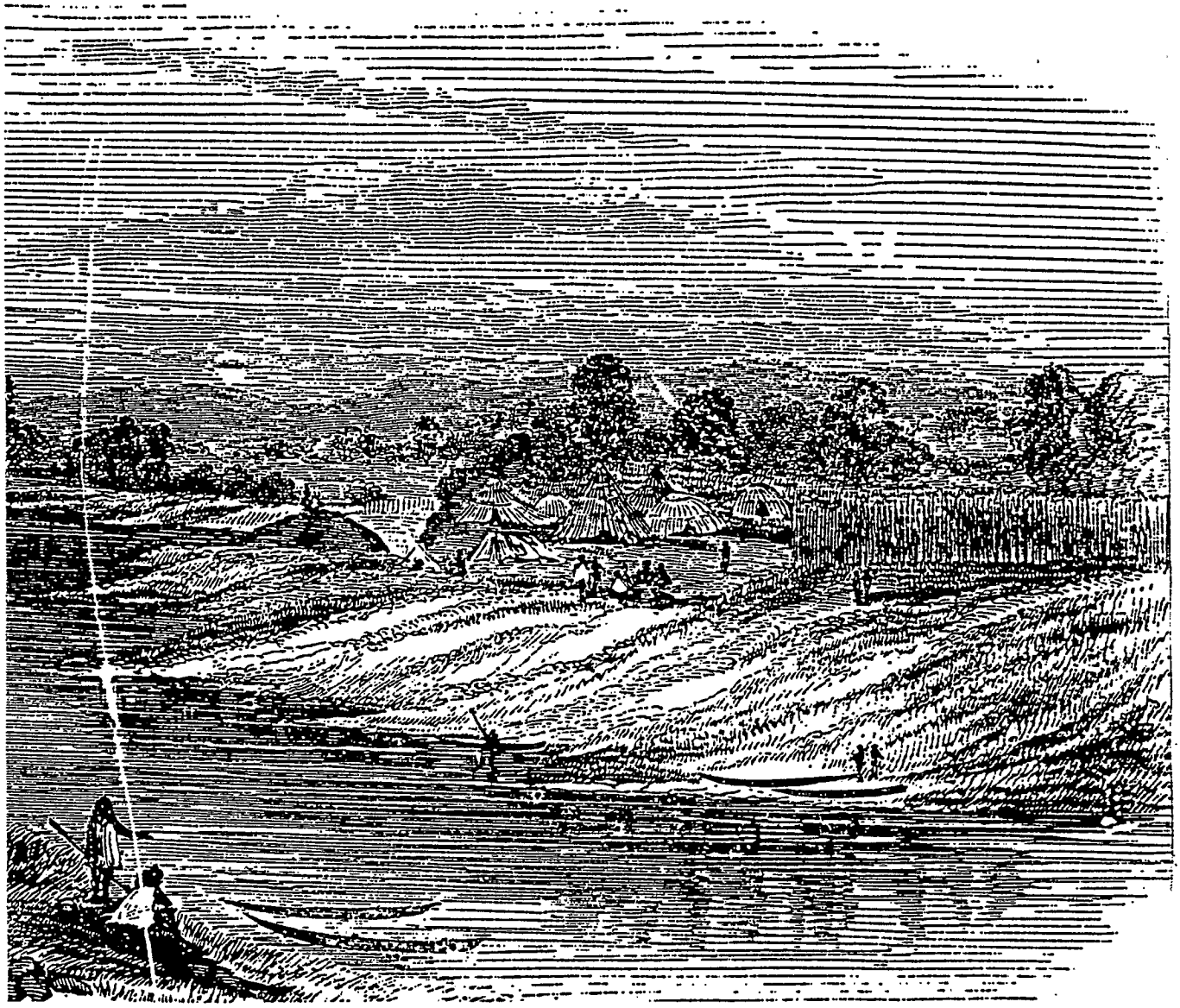

Figure 14. Indian village on Dry Creek in 1853 (Bancroft Library).

various titles (Land Grant 406 N.D. n.d.:72). Title was finally confirmed to the heirs in 1865. The 1862 plat map of the grant shows two farms in the present district (Thompson 1862).

Several reclamation districts (Districts 13, 15, 39, 43, 49 and 71) were organized along the lower Cosumnes beginning in the early 1860s and initiated levee construction. Except for District 71 - which extended from the mouth of the Cosumnes to the edge of the Chabolla Grant - neither their exact placement nor their subsequent history has been determined. Most of the area's land was in grain and hay by the 1890s (Winn 1871; Wright 1880:189; McClatchy & Co. 1894).

Cartographic Review

Review of historic maps indicates 43 historic site locations in the Cosumnes area. The earliest (CO-10, -17 and -37) are three early farmsteads. Except for the Bradford Winery (CO-18) and the Western Pacific rail line (CO-43), all the site locations in the district appear to be related to farming activites.

Of the 43 locations, 14 appear to date no earlier than the second quarter of this century.

Archeological Surveys

The area of the Cosumnes River, immediately above its confluence with the Mokelumne River, is rich with prehistoric sites. Thirty-nine have been recorded (SJO-24; SAC-8, -9, -10, -11, -12, -13, -14, -19, -20, -49, -67, -137, -138, -139, -140, -141, -144, -149, -151, -153, -154, -168, -169, -171, -186, -187, -190, -191, -257, -258, -259, -260, -264, -265, -310, -313, -314, and -330). Two sites in this area have been associated with historic Plains Miwok villages (SAC-144, *Tihuechemne*; and, SAC-168, *Sotolumne*.

Information Center records indicate that several surveys of very small tracts and restricted lineal transects have been conducted in the district. The only extensive survey reported is a survey of the Cosumnes River Preserve. The field investigation failed to locate site SAC-12, recorded in the 1920s. It was suggested that the site was mislocated or subsequently destroyed. No other sites were found (Flynn 1988).

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TABLE 3

Summary of Present and Potential Cultural Resources

District	Archeological Sites	Historic Site Locations	NRHP (and eligible) Properties	California Landmarks - Points of Interest
Beach Lake	27	76	1 (2)	1
South Stone Lake	11	68	0 (1)	0
Randall Island	0	16	0	0
Pierson	6	88	0 (1)	0
Locke	3	6	2 (1)	0
Walnut Grove	0	9	5 (1)	1
Glanville	7	18	0 (1)	0
McCormack-Williamson	1	7	0	0
Dead Horse Island	0	2	0	0
Tyler Island	8	58	0	0
Andrus Island	2	120	1 (1)	0
Brannan Island	0	82	0	0
Staten Island	2	52	0	0
Bouldin Island	6	33	0	0
Terminous Tract	1	69	0	0
Shin Kee Tract	0	6	0	0
Brack Tract	0	38	0	0
Canal Ranch	1	18	0	0
New Hope Tract	24	80	0	2
Cosumnes	39	43	0	0
TOTAL	138	889	9(4)	4

SUMMARY AND RECOMMENDATIONS

The North Delta Program Study Area includes 136 recorded archeological sites and 889 historic sites locations identified from early maps (Table 1). Nine National Register properties are located within the study area and four additional properties have been formally determined eligible for the National Register (Fig. 15). All 13 of these properties are included on the California Register of Historic Resources. Four other properties are listed as California Historical Landmarks or Points of Historical Interest. In the following discussion and recommendations, attention is focused specifically on those districts directly affected by one or more project alternatives.

Beach Lake Area

This district includes 27 recorded archeological sites, and 76 historic site locations have been identified in the cartographic review. One National Register property is located in the district, and two other properties have been determined eligible. One additional property has been nominated as a California Point of Historic Interest. Several archeological sites, including three ethnographic villages, are obvious candidates for Register eligibility assessment.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

South Stone Lake

This district includes 11 recorded archeological sites, and 68 historic site locations have been recorded in the cartographic review. The district includes one National Register-eligible property. Several prehistoric sites are potentially eligible, and at least one historic structure has been noted as being of at least local historical importance.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

Randall Island

This district is virtually unsurveyed, and no archeological sites have been recorded. Sixteen historic site locations have been identified in the cartographic review. No properties have been evaluated for National Register eligibility. Some historic structures persist which are of at least local significance (Lokke 1980:234). The Elliott Landing Chinatown site would be a potential candidate for listing if archeological remains survive.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

Pierson District

This district includes six recorded archeological sites, of which one is an ethnographic village. A total of 88 historic site locations have been identified in the cartographic review. The only property determined eligible is the Paintersville Bridge. The Courtland Chinatown and the Bank of Courtland have been suggested by local informants as potentially eligible, and other surviving structures are of at least local historical significance (Lokke 1980:225, 235). Historic settlement sites such as Courtland, Paintersville, Onisbo and Vorden could also be of archeological significance.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

Locke District

This district includes three recorded archeological sites, one of which may be a historic Miwok village. Six historic site locations have been identified in the cartographic review. Two National Register properties are located in the district, and a third property has been determined eligible.

Because none of the project alternatives directly affect this district no further survey or assessment is recommended here.

Walnut Grove District

This district includes no recorded archeological sites, although at least one prehistoric site is known to have existed in the district and been disturbed during railroad construction work in 1929 (Delta News 1929a). The cartographic review identified nine historic site locations. Five National Register properties are located within the district and an additional property has been determined eligible for the Register.

This district is directly affected under several project alternatives by construction of a new channel at the western end of the Delta Cross Channel, and installation of new gates. The area was surveyed by West (1991) who reported:

> The expansion of the Delta Cross Channel gates will not affect cultural resources. The area has been totally modified and it is currently covered with a modern business building. Although adjacent to the town of Locke the modifications to the channel will not affect the historic values of this community. Expansion of the gates will have

no additional visual effect than the current structure (West 1991:16).

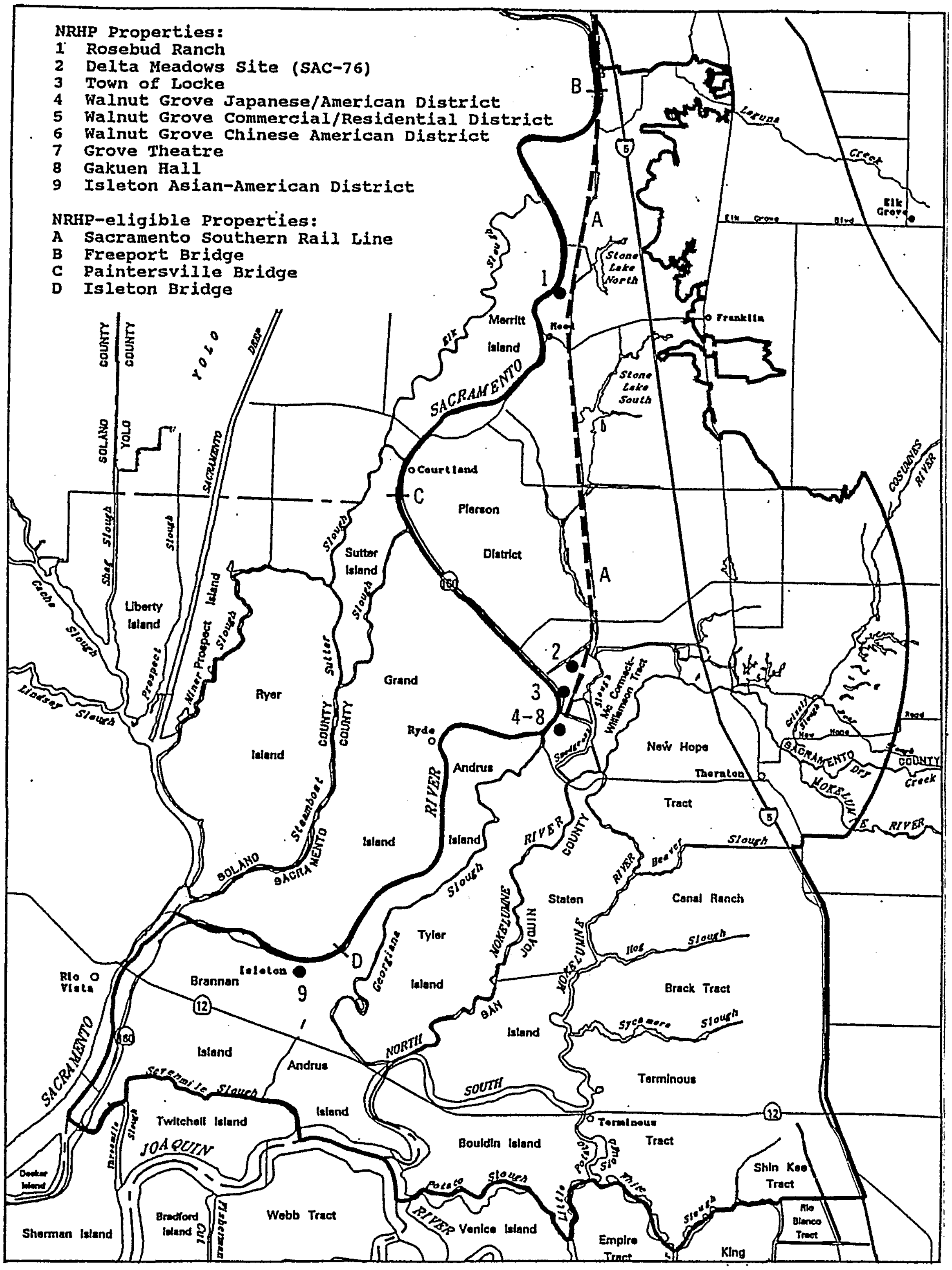

Figure 15. National Register and determined eligible properties in the study area.

Subsequent to the survey, however, the Sacramento Southern rail line (Walnut Grove Branch of the Southern Pacific) was determined eligible for the National Register. It is thus necessary to assess the integrity of this property within the area affected by the Cross Channel project. A field assessment is required and should determine: 1) the integrity of the subject historic property in this area; 2) whether (if the property possesses integrity here) damage to the property would impact its significance as a whole; and 3) whether the damage can be mitigated and in what ways this might be accomplished.

Glanville District

This district includes seven recorded archeological sites, and 18 historic site locations have been identified in the cartographic review. One historic property has been determined eligible for the National Register.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

McCormack-Williamson Tract

The cartographic review identified seven historic site locations, of which one is the district's only recorded archeological site. No prehistoric sites have been found. No National Register properties exist in the district.

The McCormack-Williamson Tract is directly affected by various project alternatives, either by levee setbacks (along the entire Mokelumne River levee) or by inclusion of the whole tract in a flood bypass system.

About half of the proposed levee setback area was surveyed in an earlier phase of the NDP. One historic site (trinomial not yet available) was recorded. This site (=MC-01 on the cartographic survey) contains two historic wood-frame structures. The site served as the headquarters for farming operations on the tract in the 1920s and 1930s.

The original survey report provides the following assessment of this site and its structures:

> Owens (1990) reports structures present on a 1931 map at the current location of a facility for farm implement repair, fuel, and storage. This facility consists of metal farm buildings, tanks, two wooden residential structures, and an associated pump house-water tower. The later residential structures are of balloon-frame construction, two stories high, 12/6 pitch roof, with clapboard siding. One of the structures has a shed addition and the other has a more recent-age deck and corregated iron roofing. Outhouses/wash rooms are adjacent to the structures. The wooden structures are in poor condition and appear not to have been used for a long time; the most northerly

structure is posted with a county notice of "Uninhabitable Structure" and the other is undergoing some limited renovation. The buildings are very similar to other local farm structures, possibly bunkhouses, in the Delta and have no special features. The structures do not appear eligible for listing in the NRHP based on their lack of architectural integrity, lack of association with persons or events historically important at the local, state, or national level of significance, and there are numerous better preserved examples in the Delta (West 1991:17-18).

We concur that this property is probably not eligible for the National Register but believe that insufficient data is available to make a satisfactory determination. First, it is unclear from information at hand whether the other structures at the site are contemporary with the two wood-frame buildings, which presumably date from reclamation of the tract in 1919. Second, it is unknown whether any of the other early McCormack-Williamson camps survive. While it is probably true that many other better-preserved farm structures of this era survive in the Delta, it is also evident that most such structures, in most districts, have long since been demolished. Survival of an appreciably intact farming camp from this era would be of at least local significance and therefore should be eligible to the California Register. If other camps on this tract survive, it is conceivable that the tract would be eligible to the National Register as a rural historic landscape (cf. McClelland et al, n.d.).

Since two project alternatives call for inclusion of this district in a flood by-pass system, it is recommended that a field survey be carried out of all identified historic site locations. If camp complexes dating to the 1920s or earlier are present, an assessment of the tract's eligibility as a rural historic landscape should be carried out.

In any case, a historic structures recordation should be carried out at MC-01 and at any other sites with surviving historic structures. Recordation should include photo documentation, measured drawings, differentiation between historic fabric and subsequent modifications, and determination through archival research, oral history or physical analysis of whether other structures at the site(s) are contemporary with the early use of the surviving wood-frame houses. On the basis of the survey and recordation, eligibility of the site(s) to the California Register or National Register should be assessed. Should the properties be eligible, recommendations for preservation or mitigation should be formulated.

Dead Horse Island

No archeological sites have been recorded on Dead Horse Island, and only two historic site locations were identified in the cartographic review. No National Register properties are located on the island.

Under most project alternatives the only affect to this district would involve dredging in adjacent channels. Under one alternative, however, the island would become part of a flood by-pass system. Because no archeological surveys have been carried out on the island,

it is recommended that the island be surveyed, with particular attention to the identified historic site locations. Should sites or historic structures be located, their significance - and the effect of the project - should be evaluated, and appropriate recommendations should be prepared.

Tyler Island

Tyler Island includes eight recorded archeological sites, one of which may be a historic Miwok village. The cartographic review identified 58 historic site locations. No National Register properties are present, although Giusti's Restaurant (TY-02) has been noted as of at least local historical significance (Appendix 1).

Under the preferred alternative the island would be affected by extensive levee setbacks along the Mokelumne River. Most of the setback area was surveyed by West (1991), who recorded four archeological sites. Three of these sites correspond to historic site locations identified in the cartographic review, but field evidence consists of only recent trash scatters. No material evidence of 19th-century or early 20th-century occupation was encountered, and specifically no artifactual evidence of Chinese or Japanese occupation was observed (G.J. West, personal communication).

The same survey also addressed the structures that once formed the work camps that extended along the Mokelumne side of the island:

> Owens (1990) has identified nine structures or groups of structures on historic maps that cover the APE. As noted above, the 1935 Delta Soil Map [Cosby 1935] shows approximately 30 structures along the inside of the levee. None of the structures, with the exception of the partially destroyed cast concrete foundations of a pumping plant, remain in the APE.
>
> ...Other than a few pieces of iron pipe, the pumping plant has been stripped of all machinery. Two stripped and abandoned cars full of bullet holes as well as modern-day trash adjacent to the pumping plant suggest that the area is a modern-day illegal dump. It appears that agricultural activities and levee maintenance have virtually destroyed the integrity of any historical remains in the APE on Tyler Island (West 1991:16).

An earlier survey of features on the river face of the levee was carried out by Paterson, Herbert and Wee (1978a) in preparation for a navigation hazards removal project. No significant features were encountered. The survey did examine and research a wrecked boat situated along the levee (between locations TY-17 and TY-18 in this study). Only limited information was obtained on this boat, and it was assessed as ineligible to the National Register. The NDP survey was unable to relocate it (West 1991:16) and it is presumed that it was destroyed during the hazards removal project.

In view of the absence of resources in the surveyed area, the only recommendations

provided here focus on completing the survey and protecting a prehistoric site adjacent to the APE. Although the survey covered most of the area of levee setback, five short stretches were flooded at the time and not surveyed. These areas include three locations (TY-06, TY-17 and TY-18) identified during the cartographic review, and should be surveyed. Should any significant resources be encountered, further recommendations for preservation or mitigation should be prepared.

The initial NDP survey noted that prehistoric site SAC-162 is located a short distance west of the APE. We concur with the recommendations of the survey report:

> Only one site that may not be destroyed entirely, CA-Sac-162, is near the APE. Since it is one of the few areas of relatively high ground and mineral soils, it is recommended that during construction of the levee setback on Tyler Island the east side of the Sac-162 mound be fenced and the area placed off-limits to construction equipment (West 1991:19).

Andrus Island

This district includes only two recorded archeological sites, although 120 historic site locations were identified during the cartographic review. Also present are one National Register property and one property determined eligible to the Register.

The Mokelumne River along the southeastern frontage of the island is subject to dredging under most project alternatives, and under two alternatives the southeastern peninsula would become part of a flood by-pass system. Consequently, consideration here will be restricted to the latter area.

The southeastern peninsula of Andrus Island has not been surveyed but includes five historic site locations (AN-94, -95, -96, -97 and -98). All are named landings, and at least one (San Andreas Landing, AN-98) was occupied by the 1880s. This area thus requires survey, with particular attention to these historic locations. If historic structures or archeological resources are present, an assessment of project effect should be prepared. In the event of potential adverse impact to significant resources, recommendation for preservation or mitigation should be prepared.

Brannan Island

No archeological sites have been recorded in this district, but 82 historic site locations were identified in the cartographic review. No National Register Properties are present.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

Staten Island

This district includes one recorded archeological site; 52 historic site locations were identified in the cartographic review. No National Register properties are present on the island. The island has been suggested as the location of a historic Miwok village, but no corresponding archeological site has been identified.

All perimeter channels are affected by dredging under most project alternatives. Under two alternatives levee setbacks would occur along the west side of the island, while under other alternatives setbacks would occur along the east side. Finally, under two further alternatives Staten Island would become part of a flood by-pass system.

The initial NDP survey covered the levee setback area along the west side of the island. This survey recorded two archeological sites. One site (SJO-244H) is a relatively recent trash scatter not associated with any historic site location. The other site (SJO-243H) is equivalent to location ST-35 identified in the cartographic review. This site was designated Camp 10 in the 1910s and Camp 9 in the early 1930s. The site assemblage includes Chinese and Japanese ceramics, which presumably derive from early occupation by Asian tenant farmers (West 1991). No other archeological remains were encountered, including the site of Hagginsville (ST-36).

In spite of the paucity of surface remains at SJO-243H (ST-35) and the absence of surface remains at Hagginsville (ST-36), both locations are potentially significant, and both would be directly impacted by the Preferred Alternative. It is recommended that both locations be tested for subsurface remains.

The alternative levee setback area along the east side of the island includes the vicinity suggested by Bennyhoff (1977) as the location of the historic Miwok village of Musupumne. An archeological survey of this area is necessary to evaluate the effects of these alternatives.

In addition, in view of the island's inclusion in a flood by-pass system under other alternatives, it is recommended that field inspection be conducted of the historic site locations identified on the remainder of the island.

Should significant resources be identified as a result of this field work, the impact of the various project alternatives should be evaluated and recommendations be prepared for protection of the resources or mitigation of the impacts.

Bouldin Island

This district includes six recorded archeological sites, and 33 historic site locations were identified in the cartographic review. No National Register properties are present, although two properties have been suggested as eligible (West 1991:20; Maniery and Fryman

1993:63-107).

Channels along the northern and western perimeter of the island are affected by dredging under several project alternatives. Under two alternatives the western margin of the island is directly affected by levee setbacks. Under two other alternatives the entire northwestern peninsula would be affected by inclusion in a flood by-pass system.

The area of these developments is particularly sensitive because it includes the historic townsite of Central Landing (BO-04), the site of the first and third Hickmott canneries (BO-07) and several farm camp sites dating to George Shima's operations on the island. Recommendations here will focus on these three sets of potential resources.

Central Landing was, until the 1904 flood, the largest settlement on Bouldin Island. The site was the scene of the major levee break in that year and the Chinese section of the town was swept away in the deluge. The levees were repaired but the island flooded again in 1907 and 1908. It was then abandoned for a decade. The 1918 reclamation work involved a major levee setback in the vicinity of Central Landing that evidently destroyed part of the old townsite and left the remainder on a mid-channel island.

The site was examined by Paterson, Herbert and Wee (1978a), who viewed the site as potentially significant but not eligible for the National Register:

> The pilings once used to reinforce a portion of the old Bouldin Island levee, represent one phase in the reclamation history of that island and coincide with what may have been an important steamboat landing. They also represent the insecure character of the Delta levees and underline the fact that changes in Delta geography over the years have been rather commonplace. The site has deteriorated as a result of its long submergence and it embodies no historical associations sufficiently important to qualify it for the National Register of Historic Places. However, as graphic evidence of the manner in which the Delta's geography has been altered and realtered it does have some local interest. We recommend that only pilings posing significant navigational hazards in this area of heavy small boat traffic be removed in order to preserve as much as possible of the old levee site. The site should be re-examined from this point of view and, in consultation with the State Lands Commission, appropriate maps and/or photographs should be marked to insure that as much of the site remains intact as possible. The berm and the pilings located close enough to the berm to present minimal navigation hazards can contribute to an understanding of the problems involved in the reclmation of the Sacramento-San Joaquin Delta (Paterson, Herbert and Wee 1978a:16).

The final report of the survey noted the Central landing site as "among the most noteworthy encountered during the project" (Paterson, Herbert and Wee 1978c:43), and provided an additional summary:

> Photographs of Central Landing after the [1904] break show that it had a hotel and various houses and barns and a steamboat wharf. With water depth of 75 feet at the

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break site, Henry Voorman, an adjacent land owner, sank derelict sailing ships loaded with rocks in an unsuccessful attempt to close the hole. Pilings were driven in a double row as a preliminary step in levee repair but further breaks in 1906 and 1908 resulted in the abandonment of the island until Lee A. Phillips reclaimed it in 1916-1918. At that time the levee at Central Landing was relocated to the east, leaving the original levee line marked by berms and pilings in the middle of the modern-day Mokelumne River. Many of these pilings are still visible, including some that may have been part of the Central Landing dock. The site illustrates how Delta geography has been altered and realtered in progressive stages of reclamation and is a testimony to the problems involved in reclaiming the Delta islands (Paterson, Herbert and Wee 1978c:45).

This site was not reinspected during the NDP survey, but the 1978 assessment was reevaluated:

> Central Landing and the possibility of associated buried ships would appear to be historically significant and eligible to the National Register of Historic Places based on criteria c and d. Central landing and the buried ships may be representative of a type and period of California's early maritime and Delta history. The remains also may contain information important to maritime history that can be addressed only through archeological research (e.g., specific construction techniques) (West 1991:20).

Based on evidence available in this study, we concur that this site may be eligible to the National Register. If the features observed during the 1978 survey survive, they represent an early Delta townsite, the establishment of which was possible only after reclamation and which has been abandoned for at least 76 years. Furthermore, if the surviving portion of the Central Landing levee includes the area of the reclamation project described by Yeatman (1905) - previously cited at length - it may represent a unique example of early levee construction, described in contemporary reports and unaffected by further levee work over the last 80 years.

Determination of National Register eligibility, however, requires an assessment of the integrity of the site's features and of their relationship to the townsite and the 1904 reclamation project. It should also be determined whether the site contains other significant archeological remains.

Given the immediate proximity of the proposed channel dredging, a field inspection of this site is recommended, including mapping and photo recordation of surviving features, as well as further research to determine their historical function and relationship to the town or the reclamation work. The inspection should also determine whether archeological testing is appropriate. If significant resources are present, recommendations for their preservation should be prepared.

The site of Hickmott Canneries 1 and 3 (here designated BO-07) was situated at the northern end of the 1918 levee setback area. The effect of that project on the site is not

known. Paterson, Herbert and Wee (1978a:17) recorded a "substantial number of piles" along the river face of the levee at this location, but did not consider them eligible for the National Register. This location was partially within the area surveyed by Maniery and Syda (1989), who found no surviving structures and no archeological remains.

Given the importance of this site in the development of the California asparagus industry, and its location on the periphery of the area surveyed in 1989, a resurvey focusing specifically on this location is warranted. This survey should determine whether archeological remains attributable to the Hickmott operation are present, and if so, whether archeological testing to determine National Register eligibility is appropriate.

Maniery and Syda (1989) and Maniery and Fryman (1993) have discussed the historic importance of George Shima's involvement in farming operations on Bouldin Island. Three farm camps dating to this period were located on the northwestern peninsula: Camp 5 (here designated BO-07, also the site of the earlier Hickmott Canneries 1 and 3), Camp 7 (BO-08) and Camp 9 (BO-09). The survey status of Camp 5 has just been described. The area of Camp 7 was surveyed by West (1991); no archeological evidence was found. The area of Camp 9 has not been surveyed.

It is recommended that archeological surveys of the Camp 5 (BO-07) and Camp 9 (BO-09) locations be conducted. If archeological remains potentially dating to the Shima operations are present, recommendations should be made concerning further assessment and testing to determine National Register eligibility (cf. Maniery and Fryson 1993).

Terminous Tract

This district includes only one recorded archeological site, but 69 historic site locations were identified in the cartographic review. No National Register properties are present.

The adjacent channel of the South Fork of the Mokelumne River would be dredged under several project alternatives. Under two alternatives levee setbacks would occur along this channel as well.

At least one historic site location (TT-01) is situated in the proposed setback zone, and a buried prehistoric site is located near the channel, about a mile to the south. An archeological survey of the setback zone is necessary to determine the presence or absence of cultural resources and to determine the effects of the project.

Shin Kee Tract

This district includes no recorded archeological sites, and only six historic site

locations were identified in the cartographic review. No National Register properties are present.

Because none of the project alternatives directly affect this district, no further survey or assessment is recommended here.

Brack Tract

This district includes no recorded archeological sites; 38 historic site locations were identified in the cartographic review. No National Register properties are present.

Under most project alternatives, the adjacent channel of the South Fork of the Mokelumne would be dredged. Two alternatives would also include a levee setback along the southwestern margin of the district. The affected area includes one historic site location (BT-30). An archeological survey of the setback zone is required to determine the presence and significance of cultural resources.

Canal Ranch

This district includes one recorded archeological site; 18 historic site locations were identified in the cartographic review. No National Register properties are present.

Most project alternatives include dredging of the adjacent channel of the South Fork of the Mokelumne River. Two alternatives also include a levee setback zone along the southwestern margin of the district. The affected area includes two historic site locations (CR-20 and CR-21). An archeological survey of the setback zone is required to determine the presence and significance of cultural resources.

New Hope Tract

This district includes 24 recorded archeological sites, while 80 historic site locations were identified in the cartographic review. No National Register properties are present, although several properties have been reported as of at least local historical significance (Appendix 1).

Adjacent channels of the Mokelumne River and the South Fork of the Mokelumne would be dredged under several project alternatives. Additionally, a levee setback would occur under two alternatives.

The proposed levee setback zone along the South Fork of the Mokelumne includes at least four historic site locations (NH-17, NH-18, NH-19 and NH-20). In addition, several

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prehistoric sites - including some associated with the Windmiller Tradition - are located to the east along present and former river channels. Archeological survey of the setback zone is necessary in order to determine the presence of cultural resources and to assess the impacts of the project.

Cosumnes District

This district includes 39 recorded archeological sites. The cartographic review identified 43 historic site locations. No National Register properties are present, although two archeological sites believed to represent the historic Miwok villages of Tihuechemne and Sotolomne.

None of the project alternatives directly affect this district. The district does, however, include a proposed borrow area. This area is located north of New Hope Road and bordered by Grizzly Slough and Bear Slough. The general area includes two historic site locations (CO-32 and CO-33) and three recorded archeological sites (SAC-8, -9 and -10). A field survey of the borrow area is required to determine the extent and significance of cultural resources.

Summary of Recommendations

Various NDP project alternatives will potentially affect significant cultural resources in 12 districts: Walnut Grove, McCormack-Williamson, Dead Horse Island, Tyler Island, Andrus Island, Staten Island, Bouldin Island, Terminous Tract, Brack Tract, Canal Ranch, New Hope Tract and Cosumnes. Recommendations are detailed above for field survey, recordation or testing in each of these districts (Fig. 16).

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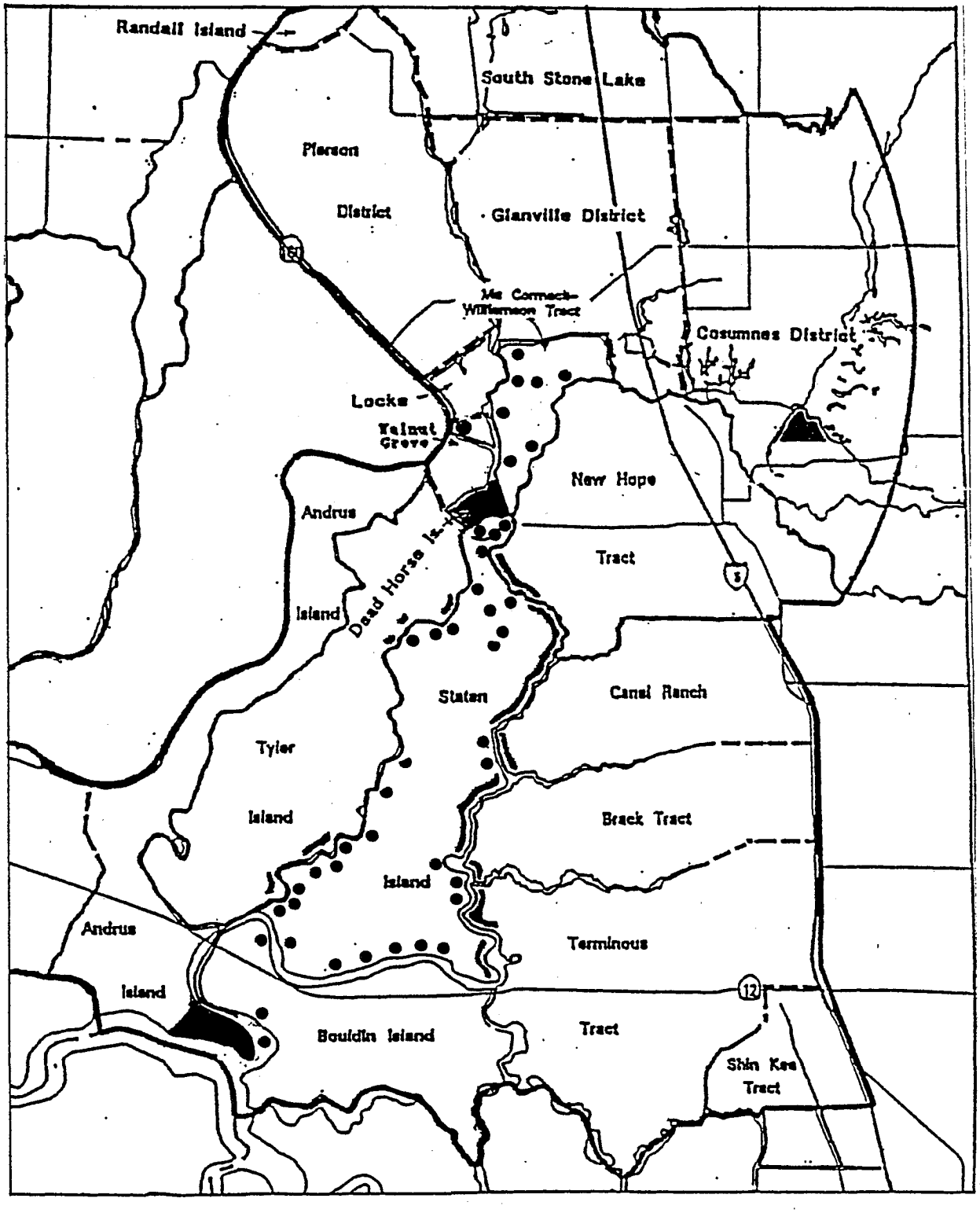

Figure 16. Location of recommended field assessment projects in 12 districts.

REFERENCES CITED

Maps and Plans

Map location references:

BLM U.S. Bureau of Land Management, Sacramento
CDPR California Department of Parks and Recreation, Sacramento
CDT California Department of Transportation, Sacramento
CSA California State Archives, Sacramento
CSL California State Library, Sacramento
CSLC California State Lands Commission, Sacramento
CSRRM California State Railroad Museum, Sacramento
LC Library of Congress, Washington
UCB Bancroft Library, University of California, Berkeley
UCD Shields Library, University of California, Davis

Atherton, G.A. and R.R. Thornton
1892 Map, Plans and Specifications for a Wooden Drawbridge Across the South Fork of the Mokelumne River at New Hope Landing. [CSLC]

Behrens, C.A.
c.1930 Sacramento River, San Joaquin River, California. (Publisher and location unknown). [CSLC]

Boyd, J.C.
1889 Plat of Proposed County Road on Andrus Island, Sacramento Co. J.C. Boyd, Sacramento. [CSLC]

1895 Map of Portion of Tyler Island, Sacramento Co., Cal., Showing Lands of H. Voorman. J.C. Boyd, Sacramento. [CSLC]

1896 Plat of Tract of Land Owned by Alfred Gonzalez [on Brannan Island]. J.C. Boyd, Sacramento. [CSLC]

1902 Plot of Lands Owned by Estate of L.C. Rubble. J.C. Boyd, Sacramento. [CSLC]

1903 Official Map of Sacramento County. Britton & Rey, San Francisco. [CSL]

1905 Plat Showing Subdivision of Tract of Land Formerly Owned by Joseph Wise [Walnut Grove District]. J.C. Boyd, Sacramento. [CSLC]

1909 Plat of Survey of Tract of Land Owned Margaret O'Toole Located in Sections 11, 12, 13, & 14, T. 7 N. R. 4 E., Sacramento County, California. J.C.

Boyd, Sacramento. [CSLC]

1911 Map of Freeport. J.C. Boyd, Sacramento. [CSLC]

1912 Map of Freeport Acres. J.C. Boyd, Sacramento. [CSLC]

1930 Map of Tract of Land Owned by McCormack-Williamson Co., Sacramento Co., Cal. J.C. Boyd, Sacramento.

1933 Map of Tract of Land Owned by B.B. Green in Swamp Land Survey 488, Sacramento County Surveys [Randall Island]. J.C. Boyd, Sacramento. [CSLC]

1935 Map of Dead Horse Island. J.C. Boyd, Sacramento. [CSLC]

Budd & Widdows

1916 Map of San Joaquin County, California. Oakland Blue Print, Oakland. [CSL]

1926 Map of San Joaquin County, California. Oakland Blue Print, Oakland. [CSL]

Butler, Drury

1924 Map of the County of Sacramento, California. D. Butler, Sacramento. [CSL]

California Fruit Exchange

c.1900 Sacramento River to Sacramento. [Hand drawn map showing landings from Collinsville to Sacramento] no scale. California Fruit Exchange, Sacramento. [CSLC]

Carter, C. M.

1923 Map of McCormack-Williamson Tract, Sacramento Co., Calif. C.M. Carter, Sacramento. [CSLC]

Central Pacific Railway Co. [CPRR]

c.1912 Right of Way and Truck Map, Walnut Grove Branch, Sacramento to Walnut Grove. [Sheet 7a] Central Pacific Railway Co., San Francisco. [CSRRM]

Compton, H. T.

1894 Map of the County of San Joaquin. Britton & Rey, San Francisco. [CSL, UCB, HM, CSRRM]

Cosby, Stanley W.

1935 Soil Map, Sacramento-San Joaquin Delta Area, in Cosby (1941).

Dakin Publishing Co.
1885 California Warehouse Book. Dakin Publishing Co., no loc. [UCB]

Denny & Co.
1913 Denny's Pocket Map of Sacramento County, California. Edward Denny & Co., San Francisco. [CSL]

Doherty, John
1861 Plat of the Swamp and Overflowed Land in Sacramento County. John Doherty, Sacramento. [CSLC]

Gardiner, P. H.
1901 Portion of Map of Town of Isleton, Situated in Sacramento County, California. Hand drawn copy. [CSLC]

General Land Office [GLO]
1855a Map of Township No.6 North, Range No.5 East, of Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1855b Map of Township No.7 North, Range No.5 East, of Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1859a Map of Township No.5 North, Range No.4 East, Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1859b Map of Township No.6 North, Range No.4 East, Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1859c Map of Township No.7 North, Range No.4 East, Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1864 Map of Township No.4 North, Range No.5 East, Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

1870 Map of Township No.5 North, Range No.5 East, Mount Diablo Meridian. U.S. Surveyor General's Office, San Francisco. [BLM]

Gibbes, J.T.
1869 Map Showing the Lands of the Tide Land Reclamation Company. Britton & Rey, San Francisco. [CSL, CSLC]

Gilbert, F.T.
1879 Map of San Joaquin County, in Gilbert (1879).

Handy, H.P.
1862 Index Map of San Joaquin County. H.P. Handy, Stockton [?]. [CSL]

Jackson, William A.
1850 Map of the Mining District of California. Lambert & Lane, New York. [LC]

Manson, Marsden and C.E. Grunsky
1895 Yolo Basin, Lower Portion, from Maine Prairie to Suisun Bay. California Commissioner of Public Works, Sacramento. [CSL]

McClatchy & Co.
1894 Map of Sacramento County, California, Showing Uses of the Soil. James McClatchy & Co., Sacramento. [CSLC]

Metsker, Chas. F.
1940 Metsker's Map of San Joaquin County, California. C.F. Metsker, San Francisco. [CSL]

Phinney, C.M.
1911 Official Map of the County of Sacramento, California. Phinney, Cate & Marshall, Sacramento. [CSL]

1913 Official Map of the County of Sacramento, California. Phinney, Cate & Marshall, Sacramento. [CSL]

Punnett Bros.
1901 Chart of the Sacramento and San Joaquin Rivers, Showing All Landings to Sacramento and Stockton. Punnett Bros., San Francisco. [N.Wilson Collection]

1907 Chart of the Sacramento and San Joaquin Rivers, Showing All Landings to Sacramento and Stockton. Punnett Bros., San Francisco. [CSL]

1912 Chart of the Sacramento and San Joaquin Rivers, Showing All Landings to Sacramento and Stockton. Punnett Bros., San Francisco. [CSLC]

Punnett and Parez
1929 Chart of the Sacramento and San Joaquin Rivers, Showing Landings in the River Delta from Pittsburgh to Sacramento and Stockton. Punnett and Parez, San Francisco. [UCD]

Quail, F.C.
1905 Official Map of San Joaquin County, California. F.C. Quail, Stockton. [CSL]

1912 Official Map of San Joaquin County, California. F.C. Quail, Stockton. [CSL]

1922 Road Map of San Joaquin County, California. F.E. Quail, Stockton [CSL]

Reclamation District 551 [RD551]
1923 Contour Map of Reclamation District No. 551, Sacramento County, Cal. Reclamation District 551, Courtland. [CSLC]

Reece, T.W.
1864 Map of the Swamp Lands in District No.2. T.W. Reece, Sacramento [?] [CSLC]

Reid, John C.
1883 Map of the County of San Joaquin, California. S.B. Linton, Philadelphia. [CSL]

Ringgold, Cadwalader
1850 Chart of the Sacramento River from Suisun City to the American River, California. U.S. Government, Washington. [CSL]

San Joaquin and Sierra Nevada Railroad (SJSNRR)
c.1882 Station Plans: Woodbridge to Bracks. San Joaquin and Sierra Nevada Railroad, San Francisco. [CSRRM]

Sacramento Southern Railroad Co. [SSRR]
1909 Sacramento to Walnut Grove: Walnut Grove Station Grounds. [1907 Base map with station plan revisions through 1909.] Sacramento Southern Railroad, Sacramento. [CSRRM]

c.1910 Sacramento Southern Railroad Constructed Line, Sacramento to Walnut Grove. Sacramento Southern Railroad, Sacramento. Sheets 1-5. [CSLC]

1912 Passing Tracks and House Tracks at Hood. [Drawing 12086]. Sacramento Southern Railroad Co., Sacramento. [CSRRM]

1915 Walnut Grove: Extension of Wharf and Track Changes. Office of Division of Engineering, Sacramento Southern Railroad, Sacramento. [CSRRM]

Sanborn Map Company
1919a Courtland, Sacramento Co., Cal., May, 1919. [1 sheet] Sanborn Map Co., New York. [CDT]

1919b Isleton, Sacramento Co.,Cal., May, 1919. [2 sheets] Sanborn Map Co., New York. [CDT]

1921 Walnut Grove, Sacramento Co., Cal., Nov., 1921. [1 sheet] Sanborn Map Co., New York. [CDT]

1925 Isleton, Sacramento Co., Cal., Dec., 1925. [3 sheets] Sanborn Map Co., New York. [CDT]

1926 Courtland, Sacramento Co., Cal., Aug. 1926. [2 sheets] Sanborn Map Co., New York. [CDT]

1927a Locke, Sacramento Co., Cal., Dec., 1927. [1 sheet] Sanborn Map Co., New York. [CDT]

1927b Walnut Grove, Sacramento Co., Cal., Dec., 1927. [2 sheets] Sanborn Map Co., New York. [CDT]

1928 Isleton, Sacramento Co., Cal., Nov., 1928. [3 sheets] Sanborn Map Co., New York. [CDT]

Shepherd, Fred A.

1885 Official Map of Sacramento County, California. F.A. Shepherd, Sacramento. [UCB]

Southern Pacific Co. [SPCo]

n.d. Station Map, Walnut Grove. Southern Pacific Transportation Company, San Francisco. [CSRRM]

c.1927 Map of Location Survey: Branch Extension-Walnut Grove South. [Drawing S-503-b] Southern Pacific Co., Sacramento. [CSRRM]

1928 Proposed Extension of Walnut Grove Branch, Walnut Grove-Isleton. Southern Pacific Co., San Francisco. [CSRRM]

1929 Steamer Shed at Isleton, California: Plans. [Drawing 8849: 7 Sheets]. Southern Pacific Co., San Francisco. [CSRRM]

c.1950 Station Map: Walnut Grove, Sacramento County, California. Map V-III/S-7a. Valuation Department, Southern Pacific Transportation Company, San Francisco. [CSRRM]

Talbot, Frank D.

1930 Survey of the Property of the Gardiner Investment Co. Located on Andrus

Island..., Sacramento County, California. Frank D. Talbot, Sacramento. [CSLC]

Thompson, A.W.
1851 Untitled, hand-drawn Map of Sacramento County. Copy on file, California State Library, Sacramento. [CSL]

Thompson, G.H.
1862 Plat of the Rancho Sanjon de los Mokelumnes Finally Confirmed to the Heirs of Anastasio Chabolla. U.S. Surveyor General's Office, San Francisco. [CSA]

Tucker, E.E.
1879f Map of levee failure at mouth of jackson Slough between Brannan and Andrus Islands; in Tucker 1879f:5.

Twitchell, E.
1861 Map of a Portion of the Boundary Line Between Sacramento and San Joaquin Counties. Surveyor General's Office, Sacramento. [CSA]

U.S. Army Corp of Engineers [USACE]
1908 Map of Sacramento River, California: from the Mouth of Feather River to Suisun Bay at Collinsville. [Sheets 7-16, 20-22]. U.S. Army Corps of Engineers, San Francisco. [CSLC]

1933 Sacramento River, California, from Sacramento to Collinsville. U.S. Army Corps of Engineers, Sacramento. [CSLC]

1934 San Joaquin and Suisun Bay, California, 30 Foot Channel Project. [Sheet 13]. U.S. Army Corps of Engineers, Sacramento. [CSLC]

1940 Sacramento River, California: Mouth of Cache Slough to Collinsville. [Drawings 1-3]. U.S. Engineer Office, Sacramento. [CSLC]

US Coast and Geodetic Survey [USCGS]
1931 California: Sacramento and San Joaquin Rivers, Air Photo Compilations. [Sheets T:4686, T:5001-5003, 5005-5007, 5010-5011, 5013, 5018-5019, 5026] United States Coast and Geodetic Survey, Washington. [CSLC]

US Department of Agriculture
1954 Soil Map - Sacramento Area, California. [Topography and Structures from earlier USACE maps and 1934 aerial photos.] In, Soil Survey: Sacramento Area, California. Soil Conservation Services, U.S. Department of Agriculture, Washington. [UCD]

U.S. Geological Survey [USGS]

1908 Courtland Quadrangle. United States Geological Survey, Washington. [CDPR]

1909 Florin Quadrangle. United States Geological Survey, Washington. [CDPR]

1910a Bouldin Quadrangle. United States Geological Survey, Washington. [CDPR]

1910b Bruceville Quadrangle. United States Geological Survey, Washington. [CDPR]

1910c Headreach Quadrangle. United States Geological Survey, Washington. [CDPR]

1910d Isleton Quadrangle. United States Geological Survey, Washington. [CDPR]

1910e Jersey Quadrangle. United States Geological Survey, Washington. [CDPR]

1910f New Hope Quadrangle. United States Geological Survey, Washington. [CDPR]

1910g Rio Vista Quadrangle. United States Geological Survey, Washington. [CDPR]

1910h Vorden Quadrangle. United States Geological Survey, Washington. [CSLC]

1910i Galt Quadrangle. United States Geological Survey, Washington. [CDPR]

1941 Lodi Quadrangle. United States Geological Survey. Washington: War Department Edition. [CDPR]

1942 Franklin Quadrangle. United States Geological Survey, Washington. [CDPR]

1968 Bruceville Quadrangle. 7.5 Minute Sheet [Photorevised 1980]. United States Geological Survey, Washington. [CDPR]

Wallace, John

1870 Map of the County of San Joaquin. Britton & Rey, San Francisco. [CSL]

Winn, A.G.

1871 Map of Swamp Land District No. 71. A.G. Winn, Sacramento. [CSL]

Wright, George F.

1880 Map of Sacramento County, California. In Wright (1880).

Other References

Adams, Edward F.
1909 Our Great Reclamation Problem. Commonwealth Club of California, Transactions 4(5):200-232.

Agricola
1862 What the Floods Have Taught Us In Regard to the Swamp Lands. San Francisco Bulletin April 24, 1862:3.

Alekseev, A.I.
1987 The Odyssey of a Russian Scientist: I.G. Voznesenskii in Alaska, California and Siberia, 1839-1849. Alaska History No. 30. Limestone Press, Kingston, Ontario.

Alta California
1849 Webster. San Francisco Alta California July 2, 1849:1.

Antioch Ledger
1890 Coast Noes. Antioch Ledger July 12, 1890:4.

1891 Miscellaneous Notes. Antioch Ledger Aug. 1, 1891:3

1892 A Tuneful Tule Liar. Antioch Ledger Jan. 2, 1892:2

1907 Flooded Islands: Loss of Millions. Antioch Ledger Mar. 30, 1907:4.

Arreola, Daniel D.
1975a Locke, California: Persistence and Change in the Cultural Landscape of a Delta Chinatown. MA thesis, California State University, Hayward.

1975b The Chinese Role in the Making of the Early Cultural Landscape of the Sacramento-San Joaquin Delta. California Geographer 15:1-15.

Atwater, Brian F.
1980 Attempts to Correlate Late Quaternary Climatic Records Between San Francisco Bay, The Sacramento-San Joaquin Delta, and the Mokelumne River, California. Ph.D. dissertation, University of Delaware, Newark.

Atwater, Brian F. and D.F. Belknap
1980 Tidal Wetland Deposits of the Sacramento-San Joaquin Delta, California. In Quaternary Depositional Environments of the Pacific Coast [Pacific Coast Paleogeography Forum 4], edited by M.E. Field, et al., pp.89-103. Pacific

Section, Society of Economic Paleontologists and Mineralogists, Los Angeles.

Atwater, Brian F., C.W. Heidel and E.J. Helley
1977 Late Quaternary Depositional History, Holocene Sea-Level Changes, and Vertical Crusted Movement, Southern San Francisco Bay, California. U.S. Geological Survey, Professional Paper 1014:1-15.

Augusta, Dorothy
1956 Son of Hood Founder Stirs Town Toward Memorial Plan. Sacramento Bee April 13, 1956:26.

Bailey, W.F.
1916 Asparagus in California: The Culture, Marketing Problems and History. California State Commission Market, Bulletin 1:1-23.

Bancroft Scraps
1879 Farming on the Tule Lands of San Joaquin County. Clipping labeled San Francisco Post June 16, 1879. Found in Bancroft Scraps 18(2):348-349, Bancroft Library, University of California, Berkeley.

Banner of the Delta
1927 600 Filipinos Reach Delta Farm Work. Rio Vista Banner of the Delta Feb. 8, 1927:1.

Barnhill, O.H.
1930 A Million Dollars a Year: California Asparagus Growers Have Built Up a Fifteen-Million Dollar Industry in 15 Years. Canning Age 11(9):581-584, 604.

Barrett, Samuel A.
1908 The Geography and Dialects of the Miwok Indians. University of California Publications in American Archaeology and Anthropology 6(2):333-368.

Basgall, Mark E.
1987 Resource Intensification Among Hunter-Gatherers: Acorn Economies in Prehistoric California. Research in Economic Anthropology 9:21-52.

Baumhoff, Martin A.
1963 Ecological Determinants of Aboriginal California Populations. University of California Publications in American Archaeology and Ethnology 49(2):155-236.

Beardsley, Richard K.
1954 Temporal and Areal Relationships in Central California Archaeology. University of California (Berkeley) Archaeological Survey Reports 24, 25.

Bennyhoff, James A.
1968 A Delta Intrusion to the Bay in the Late Middle Period in Central California. Ms. on file, Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.

1977 Ethnogeography of the Plains Miwok. Center for Archaeological Research at Davis, Publication 5:1-181.

Bennyhoff, James A., and Richard E. Hughes
1987 Shell Bead and Ornament Exchange Networks between California and the Western Great Basin. Anthropological Papers of the American Museum of Natural History 64(2):79-175.

Bentley, C.H.
1902 The California Canned Fruit Industry. Pacific Rural Press Aug. 30, 1902:132-133.

Bickel, Polly McWhirter
1978 Changing Sea Levels along the California Coast: Anthropological Implications. Journal of California Anthropology 5(1):6-20.

Bitting, A.W.
1924 Progress in Canning in California. Canning Age 5(1):16-17, 45.

Blackburn, Thomas C. and Kat Anderson
1993 Before the Wilderness: Environmental Management by Native Californians. Ballena Press, Menlo Park.

Blenkle, Joe A.
1952 Stories of the Sacramento River Delta. Delta Herald Press, Sacramento.

Board of Swamp Land Commissioners
1861 Resolution regarding Districts 2 and 3, June 30, 1861. Journal of Swamp Land Business, Book 1 (1861-70):22-23. Journal on file, California State Lands Commission, Sacramento.

Boghosian, Paula
1979 National Register of Historic Places Inventory - Nomination Form: Rosebut Ranch. State Office of Historic Preservation, Sacramento.

Bonacich, Edna
1984 Asian Labor in the Development of California and Hawaii. In Labor Immigration Under Capitalism: Asian Workers in the United States Before World War II, edited by L. Cheng and E. Bonacich, pp. 130-185. University

of California Press, Berkeley.

Bouey, Paul D., and Rand Herbert
1990 Intensive Cultural Resources Survey and National Register Evaluation: Sacramento Urban Area Flood Control Project. Study done for the U.S. Army Corps of Engineers by Far Western Anthropological Research Group, Inc. Davis, CA.

Brabender, Ingrid
1965 Beitrag zur Paläobiologischen Rekonstruktion prähistorischer kalifornischer Populationen. Homo 16(4):200-230.

Braznell, William
1982 California's Finest: The History of Del Monte Corporation and the Del Monte Brand. Del Monte Corporation, San Francisco.

Brock, S.G.
1891 Report on the Internal Commerce of the United States for the Year 1890, Part II of Commerce and Navigation. U.S. Treasury Department, Washington.

Brookes, Langley
1929 Asparagus Washing by Machinery. Western Canner and Packer 21(1):14-15.

Browne, J. Ross
1873 Reclamation and Irrigation. California State Agricultural Society, Transactions 1872:390-426.

Browning, George W.
1851 Letter to his father dated May 24, 1851. Bancroft Library, University of California, Berkeley.

Burrows, W.F.
1917 Libby, McNeil & Libby on the Pacific Coast. Western Canner and Packer 8(10):36-37.

California Office of Planning and Research
1986 CEQA: California Environmental Quality Act: Statutes and Guidelines. State Printing Office, Sacramento.

Callaghan, Catherine A.
1982 Ethnolinguistic Study. In Los Vaqueros: A Cultural Resource Study, Vol. 1, pp. 67-79, (prepared under the supervision of David A. Fredrickson, principal investigator). Ms. on file, Department of Water Resources, Central District.

1984 Plains Miwok Dictionary. University of California Publications in Linguistics, Vol. 105. Berkeley: University of California Press.

1987 Northern Sierra Miwok Dictionary. University of California Publications in Linguistics, Vol. 110.

CALTRANS
1989 Request for Comments pursuant to CFR 800.11, Effect on the Potato Slough Mound Archaeological Site by Construction of the Potato Slough Bridge, on Route 12, San Joaquin County. Ms. on file, California Department of Transportation, Office of Environmental Analysis, Sacramento.

Carey, C.J.
1937 Official List of Commission Merchants, Dealers, Brokers, Processors and Agents. California Department of Agriculture, Special Publication 148:1-120.

Carr, Ezra S.
1875 The Patrons of Husbandry on the Pacific Coast. A.L. Bancroft and Company, San Francisco.

Chan, Sucheng
1984 Chinese Livelihood in Rural California: The Impact of Economic Change, 1860-1880. Pacific Historical Review 53(3):273-307.

1986 This Bitter-Sweet Soil: The Chinese in California Agriculture, 1860-1910. University of California Press, Berkeley.

Chin, Ping
1967 Chinese Labor in California, 1850-1880: An Economic Study. State Historical Society of Wisconsin, Madison.

Chu, George
1970 Chinatowns in the Delta: The Chinese in the Sacramento-San Joaquin Delta, 1870-1960. California Historical Society Quarterly 49(1):21-37

Cook, John
1959a Beyond the Present, A Link to the Past. Sacramento Union Oct.11, 1959:1,6.

1959b Like Other Towns, But It's Different. Sacramento Union Dec. 27, 1959:1,10.

Cook, Sherburne Friend
1951 The Fossilization of Human Bone: Calcium, Phosphate, and Carbonate. University of California Publications in American Archaeology and Ethnology

40(6):263-280.

1955 The Epidemic of 1830-1833 in California and Oregon. University of California Publications in American Archaeology and Ethnology 43(3):303-326.

1960 Colonial Expeditions to the Interior of California: Central Valley, 1800-1820. University of California Anthropological Records 16(6):239-292.

1962 Expeditions to the Interior of California: Central Valley, 1820-1840. University of California Anthropological Records 20(5):151-214.

Cook, Sherburne F., and Albert B. Elsasser

1956 Burials in Sand Mounds of the Delta Region of the Sacramento-San Joaquin River System. University of California Archaeological Survey Reports 35:26-46.

Cook, Sherburne F., and Robert F. Heizer

1947 The Quantitative Investigation of Aboriginal Sites. American Journal of Physical Anthropology 5(2):201-219.

1951 The Physical Analysis of Nine Indian Mounds of the Lower Sacramento Valley. University of California Publications in American Archaeology and Ethnology 40(7):281-312.

Cook, Sherburne F., and Adan E. Treganza

1950 The Quantitative Investigation of Indian Mounds, with special reference to the relations of the physical components to the probable material culture. University of California Publications in American Archaeology and Ethnology 40(5):223-262.

Cosby, Stanley W.

1941 Soil Survey of the Sacramento-San Joaquin Delta Area, California. U. S. Departmento of Agriculture, Bureau of Plant Industry, Soil Survey Series 1935, No. 21:1-48.

Costello, Julia G. and Mary L. Maniery

1987 Rice Bowls in the Delta: Artifacts Recovered from the 1915 Asian Community of Walnut Grove, California. University of California, Los Angeles, Institute of Archaeology, Occasional Paper 16:1-98.

Crawford, J.J.

1894 Structural Materials. California State Mineralogist, Report 12:379-405.

1896 Structural Materials. California State Mineralogist, Report 12:612-641.

Crissey, Forrest
1911 John Chinaman as a Crop-Coaxer. Saturday Evening Post 184(12):15-17, 48-50.

Cross, Ira B.
1927 Financing an Empire: History of Banking in California, Volume IV. S. J. Clarke, Chicago.

Cruess, W.V.
1924 Commercial Fruit and Vegetable Products. McGraw-Hill, New York.

Cruess, W.V. and A.W. Christie
1923 The Culture and Canning of Asparagus. Canning Age 4(4):12-17.

Cubbins, Thomas
1860 About Tule Lands. California Culturist 2(7):324-326, (8):364-366.

Curtice, Clifford G.
1961 Cultural and Physical Evidences of the Prehistoric People of Sacramento County. MA thesis, Sacramento State College, Sacramento.

Daniel, Cletus E.
1981 Bitter Harvest: A History of California Farmworkers, 1870-1941. University of California Press, Berkeley.

Davis, Winfield J.
1890 An Illustrated History of Sacramento. Lewis Publishing Company, Chicago.

1903 Sacramento County. California State Agricultural Society, Transactions 1901:318-348.

Delta News
1929a Indian Mound is Unearthed. Sacramento Delta News May 3, 1929:1.

1929b Isleton Chamber of Commerce Plans Celebration for Entry of S.P.R.R. Sacramento Delta News Oct. 11, 1929:1.

1929c Calitalo Corporation and Local Bank Affiliate. Sacramento Delta News Oct. 11, 1929:4.

1929d Fire Destroys Buildings of Cannery. Isleton Delta News Dec. 6, 1929:1.

1930a Calitalo Investment Corporation. Isleton Delta News Jan.31, 1930:8.

1930b Over-Subscribe Bank Shares. Isleton Delta News Feb. 7, 1930:1.

1930c Canneries Are Preparing for Busy Season. Isleton Delta News March 14, 1930:1.

1930d Contract for New Cottages Given Dewing. Isleton Delta News March 31, 1930:1.

1930e Golden State Cannery in Difficulty. Isleton Delta News July 25, 1930:1.

1930f Golden State Will Still Operate. Isleton Delta News Aug.1, 1930:1.

1930g New Cottages To Be Built By Bay Side. Isleton Delta News Nov. 7, 1930:1.

1930h Henry Dewing Sues Cannery. Isleton Delta News Nov. 7, 1930:1.

1930i A Picture Story Of Asparagus From Field to Cannery. Isleton Delta News Dec. 12, 1930:10-12.

1930j Isleton Has $100,000 Fire on Eve of Asparagus Festival. Isleton Delta News June 6, 1930:1.

1931a Future of Asparagus Discussed at Meeting. Isleton Delta News Jan. 16, 1931:1.

1931b Cannery Makes New Product. Isleton Delta News Aug. 28, 1931:1.

1932 Tomato Pack is Started. Isleton Delta News Sept. 9, 1932:1.

1933 C.P.C. Plant Being Wrecked. Isleton Delta News March 3, 1933:1.

Dempsey, Paul, and Martin Baumhoff
1963 The Statistical Use of Artifact Distributions to Establish Chronological Sequence. American Antiquity 28(4):496-509.

Department of Water Resources [DWR]
1990 Draft Environmental Impact Report/Environmental Impact Statement: North Delta Program. California Department of Water Resources, Sacramento.

Derr, Eleanor H.
1990 A Cultural Resources Study for the Forest Oaks General Plan, San Joaquin County. Prepared for J.F. Builders and Developers, Stockton. Ms. on file,

Central California Information Center, California State University, Stanislaus, Turlock.

Dewing, Louise Simoni
1966 The Forgotten Town of Vorden. Rio Vista River News-Herald Jan. 5, 1966 (75th Anniversary Edition): n.p.

Dibble, A.B., R.H. Buckingham and J.D. Redding
1884 Report. California Commissioners of Fisheries, Report, 1883-4:1-33.

Dickel, D.N., P.D. Schulz and H.M. McHenry
1984 Central California: Prehistoric Subsistence Changes and Health. In Paleopathology at the Origins of Agriculture, edited by M.N. Cohen and G.J. Armelagos, pp. 439-461. Academic Press, New York.

Dietz, Stephen A.
1979 Final Report of a Cultural Resources Survey of Four San Francisco Bay to Stockton Disposal Areas, Sites S-6A, S-8A, S-9A, S-16A. Archaeological Consulting and Research Services, Santa Cruz.

Dodge, J.R.
1877 Sugar from Watermelons. U.S. Commissioner of Agriculture, Annual Report 1876:161.

Doran, Glen
1980 Paleodemography of the Plains Miwok Ethnolinguistic Area, Central California. Ph.D. dissertation, University of California, Davis.

Dunscomb, Guy L.
1963 A Century of Southern Pacific Steam Locomotives, 1862-1962. Guy L. Dunscomb, Modesto.

Elsasser, Albert B.
1978 Development of Regional Prehistoric Cultures. In Handbook of North American Indians, Vol. 8, California, ed. by Robert F. Heizer. Washington, DC:Smithsonian Institution.

Farris, Glenn J., Peter D. Schulz, and Michael V. Speer
1982 Cultural Resource Evaluation of the Proposed Delta Peripheral Canal. November, 1982. Ms. on file, CRM Unit, DPR, Sacramento.

Fenenga, Franklin
1953 The Weights of Chipped Stone Points: A clue to their functions. Southwestern Journal of Anthropology 9(3):309-323.

n.d. The Archaeology of Sac-104. University of California Archaeological Survey Ms. No. 65. One file at Phoebe Hearst Museum, U.C. Berkeley.

Fitzgerald, Esther Hunt
1985 Early Freeport as known by a Pioneer Child. Ms. on file, PAR Environmental Services, Sacramento.

Flynn, Katherine
1988 Archaeological Survey of a Portion of the Nature Conservancy Consumnes [sic] River Preserve (APN 146-20-11) in Sacramento County, California. Archaeological Resource Service, Novato.

Foster, John W.
1992 A Cultural Resources Survey and Assessment of Proposed Fish Barrier Sites on Georgiana Slough, Sacramento County, California. Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.

Franks, Jo
1972 Present Status of Archeological Resources in Sacramento County. Department of Anthropology, Sacramento State College, Sacramento.

Fredrickson, David A.
1973 Early Cultures of the North Coast Ranges, California. Ph.D. dissertation in Anthropology, University of California, Davis.

Frickstad, Walter N.
1955 A Century of California Post Offices: 1848 to 1954. Philatelic Research Society, Oakland.

Fuller, Levi V.
1939 The Supply of Agricultural Labor as a Factor in the Evolution of Farm Organization in California. Ph.D. dissertation, University of California, Berkeley.

Gerow, Bert A.
1974 Comments on Fredrickson's "Cultural Diversity." Journal of California Anthropology 1(2):239-246.

Gilbert, F. T.
1879 History of San Joaquin County, California. Thompson & West, Oakland.

Gillenkirk, Jeff and James Motlow
1987 Bitter Melon: Stories from the Last Rural Chinatown in America. University

of Washington Press, Seattle.

Graham, Kathleen M., J.A. Gualco, J. Quesenberry and C. Spencer
1984 Historic Houses of the Sacramento River Delta. Sacramento River Delta Historical Society, Walnut Grove.

Greenway, Gregory
1978 An Archeological Survey of the Town of Locke, Sacramento County, California. Archeological Study Center, California State University, Sacramento.

Greenway, Gregory and William E. Soule
1977 Sacramento-San Joaquin Delta Investigations: Cultural Resources Reconnaissance. Report submitted to U.S. Army Corps of Engineers, Sacramento.

Grimshaw, William R.
1964 Grimshaw's Narrative, edited by J.R.K. Kantor, Sacramento Book Collectors Club, Sacramento.

Gudde, Erwin G.
1960 California Place Names. University of California Press, Berkeley.

Guinn, J.M:
1906 History of the State of California and Biographical Record of the Sacramento Valley. Chapman Publishing Co., Chicago.

Gwinn, William H.
1971 The Freeport Railroad, 1863-1865. Sacramento County Historical Society, Golden Notes 17(1):1-10

Haag, William G., and Robert F. Heizer
1953 A Dog Burial from the Sacramento Valley. American Antiquity 18:263, 265.

Hale, Horatio E.
1846 Ethnography and Philology: U.S. Exploring Expedition, 1838-1842. Vol. 6. Philadelphia:Sherman Publishing.

Handy, H.P.
1862 Index Map of San Joaquin County. H.P. Handy, [Stockton?].

Harney, P.J.
1908 History of River Transportation. Sacramento Union Nov. 26, 1908:6-7.

Harper, K.I.
1974 Archaeological Survey Sacramento Interstate 5. Letter report to District 3, California Department of Transportation, Sacramento.

Heipel, Steve
1990a Cultural Resources Inventory Report for the Elliot Ranch Wetlands Compensation Area, Sacramento County, California. PAR Environmental Services, Sacramento.

1990b Cultural Resources Inventory Report for the North Stone Lake Land Use and Management Plans, Sacramento County, California. Report on file, PAR Environmental Services, Sacramento.

1991 Cultural Resources Investigation of the Laguna West Off-Site Wetland Mitigation Area, Sacramento, California. PAR Environmental Services, Sacramento.

Heizer, Robert F.
1949 The Archeology of Central California I: The Early Horizon. University of California Anthropological Records 12(1).

1974 Studying the Windmiller Culture. In Archaeological Researches in Retrospect, ed. by Gordon R. Willey. Cambridge, MA:Winthrop Publishing, Inc.

Heizer, Robert F., and Franklin Fenenga
1939 Archaeological Horizons in California Archaeology. American Anthropologist, 41(3):378-399.

Heizer, Robert F., and Gordon W. Hewes
1940 Animal Ceremonialism in Central California in the Light of Archaeology. American Anthropologist 42(4, Pt.1):587-603.

Hexamer, F. M.
1901 Asparagus: Its Culture for Home Use and for Market. Orange Judd, New York.

Hickmott Canning Co.
n.d. Why Hickmott's Canned Asparagus is Superior to All Others. R. Hickmott Canning Co., San Francisco. [Advertising pamphlet, Haggin Museum collection, Stockton.]

Hillman, Raymond W. and L.A. Covello
1985 Cities and Towns of San Joaquin County Since 1847. Panorama West Books, Fresno.

Hume, W.G.
1911 Early History of the Salmon Industry. Western Canner and Packer 2(10):18.

Hurtado, Albert L.
1988 Indian Survival on the California Frontier. Yale University Press, New Haven.

Husted, F. M.
1893 Directory of Stockton City and San Joaquin, Stanislaus, Tuolumne and Calaveras Counties. F.M. Husted, San Francisco.

1902 Directory of Stockton City and San Joaquin County. F.M. Husted & Co., San Francisco.

J.F. Butts Co.
1922 Certificate of Incorporation of J.F. Butts Co. Affidavit on file, California State Archives, Sacramento.

1923 Certificate of Amendment of Certificate of Incorporation of J.F. Butts Co. Affidavit on file, California State Archives, Sacramento.

Jablonski, Michael
1990 An Archaeological Study of a Portion of the South Levee of the Mokelumne River, New Hope Tract, San Joaquin County, California. Sonoma State University Academic Foundation, Rohnert Park.

Jackson, Robert
1985 An Archaeological Survey of the Proposed Hood Water System Improvement Project, Town of Hood, Sacramento County, California. California Office of Historic Preservation, Sacramento.

Jackson, Thomas Lynn
1974 The Economics of Obsidian in Central California Prehistory: Applications of X-Ray Fluorescence Spectrography in Archeology. M.A. thesis, Department of Anthropology, San Francisco State University.

1986 Late Historic Obsidian Exchange in Central California. Unpublished Ph.D. dissertation in Anthropology, Stanford University, Palo Alto, CA.

Jackson, Thomas L., and Peter D. Schulz
1975 Typology, Trade and Trace Analysis: A test of local manufacture of Sacramento Valley obsidian tools. Journal of New World Archaeology 1(2):1-8.

Jacobs, Isidor
1904 How Canning of California Products Has Grown Into a World-Famous Industry. San Francisco Chronicle Jan. 1, 1904 (Sect. 2):6.

Johnson, Jerald J.
1974a Reconnaissance Archeological Survey of 151 Locations on the Sacramento River Drainage from Elder Creek in the North to Rio Vista in the South. Ms. on file, Army Corps of Engineers, Sacramento.

1974b Reconnaissance Archeological Survey of the Morrison Stream Group in Sacramento County, California. Ms. on file, U.S. Army Corps of Engineers, Sacramento.

Johnson, Patti
1975 Archeological Survey, Proposed Isleton Levee. U.S. Army Corps of Engineers, Sacramento.

Jones, H.A. and W.W. Robbins
1928 The Asparagus Industry in California. University of California, Agricultural Experiment Station, Bulletin 446:1-105.

Jordan, David Starr and C.H. Gilbert
1887 The Salmon Fishing and Canning Interests of the Pacific Coast. In The Fisheries and Fishery Industries of the United States, edited by George B. Goode, Section 5, Vol. 1, pp. 729-753. U.S. Government Printing Office, Washington.

Kagiwada, George
1982 Report on Locke: A Historical Overview and Call for Action. Amerasia 9(2):57-78.

Kelley, Robert
1989 Battling the Inland Sea. University of California Press, Berkeley.

Kerr, Thomas
1929 An Irishman In the Gold Rush. California Historical Society Quarterly 8(1):17-25.

Kielusiak, Carol M.
1982 Variability and Distribution of Baked Clay Artifacts from the Lower Sacramento-Northern San Joaquin Valleys of California. Unpublished M.A. thesis, Department of Anthropology, California State University, Sacramento.

Kingsley, Nelson
1914 Diary of Nelson Kingsley, A California Argonaut of 1849, edited by F.J.

Teggart. Academy of Pacific Coast History, Publications 3(3):235-413.

Kroeber, Alfred L.
1908 On the Evidences of the Occupation of Certain Regions by the Miwok Indians. University of California Publications in American Archaeology and Ethnology 6(3):369-380.

1925 Handbook of the Indians of California. Bureau of American Ethnology, Vol. 78. Washington, D.C.:Smithsonian Institution.

Land Case 93 N.D.
n.d. Land Grant Case Number 393 for Sanjon de los Muquelemes. Bancroft Library, University of California, Berkeley.

Land Case 406 N.D.
1859 Land Grant Claim, Case Number 393, Anastasio Chaboya vs. United States, for the place named Sanjon de los Muquelemes. Bancroft Library, University of California, Berkeley.

Lawton, M.C.
1879 Reclamation of Staten Island. Engineer of the Pacific 2(1):6-7.

Le Conte, L.J.
1898 Correspondence on Levee Sections. American Society of Civil Engineers, Transactions 39(825):227-229

Leung, Peter C.Y.
1984 One Day, One Dollar. Chinese/Chinese American History Project, El Cerrito.

Leung, Peter C.Y. and L. Eve Armentrout Ma
1988 Chinese Farming Activities in the Sacramento-San Joaquin Delta: 1910-1941. Amerasia 14(2):1-18.

Levy, Richard
1978 Eastern Miwok. In Handbook of North American Indians, Vol. 8, California, ed. by Robert F. Heizer. Washington, DC:Smithsonian Institution Press.

Lillard, Jeremiah B., Robert F. Heizer, and Franklin Fenenga
1939 Sacramento Junior College Bulletin, #2. Sacramento: Sacramento Junior College.

Lokke, Janet
1980 "Like a Bright Tree of Life...": Farmland Settlement of the Sacramento River Delta. California History 59(3):222-239.

C-074265

Lord, Myrtle Shaw
1937 Asparagus Festival Will Lure 50,000 to Isleton. Sacramento Union May 16, 1937:22.

Lortie, Frank
1979 The Cultural Resources of the Town of Locke. Ms. on file, Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.

Maloney, Alice Bay
1944 Fur Brigade to the Bonaventura, John Work's California Expedition of 1832-33 for the Hudson's Bay Company. California Historical Society Quarterly 23(1):19-40; 23(2):123-146.

Maniery, Mary L.
1985 Cultural Resources Investigation and Evaluation of Laguna Creek Ranch and Elliot Ranch Properties, Sacramento County, California.

1988 Cultural Resources Assessment of the Bedford Properties Project. Ms. on file, Jones & Stokes Associates, Sacramento.

1991a Mokelumne River and Tributaries, California: Cultural Resources Summary. PAR Environmental Services, Sacramento, CA.

1991b National Register of Historic Places Significance Evaluation of Walnut Grove Branch Line Railroad, Sacramento County, California. PAR Environmental Services, Sacramento.

1993 George Hack House, Sacramento County: Application for California Point of Historical Interest. PAR Environmental Services, Sacramento.

Maniery, Mary and Julia G. Costello
1986 Celadons and Sake Bottles: Asian History Underground. Pacific Historian 30(4):36-46.

Maniery, Mary and Judith Cunningham
1990a National Register of Historic Places Registration Form: Walnut Grove Chinese American Historic District. State Office of Historic Preservation, Sacramento.

1990b National Register of Historic Places Registration Form: Walnut Grove Commercial/Residential Historic District. State Office of Historic Preservation, Sacramento.

1990c National Register of Historic Places Registration Form: Walnut Grove Japanese/American Historic District. State Office of Historic Preservation,

Sacramento.

1990d National Register of Historic Places Registration Form: Isleton Chinese and Japanese Commercial Districts. State Office of Historic Preservation.

Maniery, Mary and Leslie Fryman
1993 National Register of Historic Places Determination of Eligibility Report for Three Historic Sites in Contra Costa and San Joaquin Counties, California. PAR Environmental Services, Sacramento.

Maniery, Mary and Keith Syda
1989 Cultural Resources Inventory and Evaluation of Delta Wetlands Water Storage Project, Contra Costa and San Joaquin Counties, California. PAR & Associates, Sacramento.

May, Earl Chapin
1937 The Canning Clan. MacMillan, New York.

McCabe, Bob
1982 National Register of Historic Places Inventory - Nomination Form: Imperial Theatre. State Office of Historic Preservation, Sacramento.

McClelland, Linda Flint et al.
n.d. Guidelines for Evaluating and Documenting Rural Historic Landscapes. National Register Bulletin 30:1-33.

McIvers, Kenneth J.
1985 An Archeological Survey for the Harbor Marina and RV Resort Project, Sacramento County, California. Foundation of California State University, Sacramento.

McKenney & Co.
1884 Stockton City, San Joaquin, Stanislaus, Calaveras, Tuolumne and Contra Costa Counties, Directory. L.M. McKenney & Co., San Francisco.

McWilliams, Carey
1971 Factories in the Field: The Story of Migratory Farm Labor in California. Peregrine Smith, Santa Barbara and Salt Lake City.

Meighan, Clement W.
1987 Re-examination of the Early Central California Culture. American Antiquity 52(1):28-36.

Merriam, C. Hart

1966-67 Ethnographic Notes on California Indian Tribes. edited by Robert F. Heizer. University of California Archaeological Survey Reports 68.

Mikesell, Stephen D.
1990 Historic Highway Bridges of California. California Department of Transportation, Sacramento.

Millis, H.A. (editor)
1911 Japanese and Other Immigrant Races in the Pacific Coast and Rocky Mountain States: Volume II, Agriculture. Reports of the Immigration Commission: Immigrants in Industries, Part 25. 61st Congress, 2d Session, Senate Doc. 633 (Serial Set 5684), Washington.

Minnick, Sylvia Sun
1988 Samfow: The San Joaquin Chinese Legacy. Panorama West Publishing, Fresno.

Moratto, Michael J.
1984 California Archaeology. Orlando, FL:Academic Press.

Moratto, Michael J., T.F. King and W.B. Woolfenden
1978 Archaeology and California's Climate. Journal of California Archaeology 5(2):147-162.

Newman, Russell W.
n.d. A Comparative Analysis of Prehistoric Skeletal Remains from the Lower Sacramento Valley. UCAS, No. 39. Ms. on file, U.C. Archaeological Research Facility, Berkeley.

Newmarch, George
1980 Subsidence of Organic Soils in the Sacramento-San Joaquin Delta. California Department of water Resources, Sacramento.

Nordhoff, Charles
1874 Northern California, Oregon and the Sandwich Islands. Harper and Brothers, New York.

Oakland Tribune
1957 Editorials. Oct. 20, 1957.

Odahashian, David R.
n.d. Brannan Island State Recreation Area, Inventory of Features. Resource Protection Division. California Department of Parks and Recreation, Sacramento.

Ofu Nippo Sha
1909 Sakuramento Heigen Nihonjin Taisei Ichiran. [Sacramento Valley: An Overview of the Japanese.] Ofu Nippo Sha, Sacramento. [Partial translation, Sacramento History Center, Sacramento.]

Owens, Kenneth
1990 Sacramento-San Joaquin Delta, California, Historical Resources Overview. Report on file, U.S. Army Corps of Engineers, Sacramento.

Pacific Rural Press
1880a Revival of the Isleton Sugarie. Pacific Rural Press Feb. 7, 1880:85.

1880b Beet Sugar at Isleton. Pacific Rural Press Feb. 14, 1880:104.

1902a Asparagus on Bouldin Island. Pacific Rural Press March 1, 1902:155.

1902b Asparagus Growing for Canneries. Pacific Rural Press July 19, 1902:37.

1905 Bouldin Island. Pacific Rural Press July 29, 1905:71.

1906 Canning Asparagus. Pacific Rural Press April 7, 1906:215.

Paterson, Alan M., R.F. Herbert and Stephen Wee
1978a Historical Evaluation of the Delta Waterways: Report No. 2. Report on file, State Lands Commission, Sacramento.

1978b Historical Evaluation of the Delta Waterways: Report No.3. Report on file, State Lands Commission, Sacramento.

1978c Historical Evaluation of the Delta Waterways: Final Report. Report on file, State Lands Commission, Sacramento.

Peak and Associates
1979 Cultural Resource Assessment of the Klotz Property, Pocket Area, Sacramento County, California.

1982 Class III Archeological/Historical Survey Along the Alignment of the Hood-Clay Connector, Auburn-Folsom South Unit, Central Valley Project. Peak & Associates, Sacramento.

1983 Cultural Resources Assessment of the Proposed Extension of Sixth Street in Isleton, Sacramento County, California. Peak & Associates, Sacramento.

1984 Cultural Resource Assessment of the Klotz Property, River Oaks East,

Sacramento County, California. Report submitted to Mr. L. Pappas, Sacramento, California.

1989 Cultural Resource Assessment of the Walnut Grove Self-Help Project, County of Sacramento, California. Peak & Associates, Sacramento.

Peatfield, J.J.
1894 Dredging on the Pacific Coast. Overland Monthly 24(141):315-327.

Peterson, Richard H.
1974 The Failure to Reclaim: California State Swamp Land Policy and the Sacramento Valley, 1850-1866. Southern California Quarterly 56(1):45-60.

Phelps, William D.
1983 Alta California: 1840-1842, The Journal and Observations of William Dane Phelps, Master of the Ship "Alert", edited by Briton Cooper Busch. Arthur H. Clark, Glendale.

Phillips, George Harwood
1993 Indians and Intruders in Central California, 1769-1849. Norman, OK: University of Oklahoma Press.

Pinart, Alphonse
1894 Etudes sur les Indiens Californiens: Sur les Tcholovones de Chorris. Revue de Linguistique et de Philologie Comparee 27:79-87.

Ragir, Sonia
1968 The Early Horizon in Central California Prehistory. Ph.D. dissertation, University of California, Berkeley.

1972 The Early Horizon in Central California Prehistory. University of California Archaeological Research Facility, Contributions 15:1-329.

Ragir, Sonia, and John Stromberg
1972 A Statistical Approach to Determining Which Members of a Group of Burial Sites are Distinct. University of California Archaeological Research Facility, Contributions 14:1-15.

Reed, G. Walter
1923 History of Sacramento County, California. Historic Record Company, Los Angeles.

Rio Vista Banner
1919a 1919 'Grass' Cutting Is Finished. Rio Vista Banner July 3, 1919:5.

1919b Valuable Delta Property Sold. Rio Vista Banner Aug. 28, 1919:1.

1920 Walnut Grove. Rio Vista Banner April 8, 1920:6.

1923 Orientals Not Wanted. Rio Vista Banner Aug. 2, 1923:1.

1926 First Pickle Year Shows Large Output. Rio Vista Banner of the Delta Dec. 2, 1926:1.

River News-Herald

1966a Sun Garden Is One of State's Major Independent Canners. Rio Vista River News-Herald Jan. 5, 1966:n.p.

1966b Vignettes from the Past: Turning Back History's Pages. Rio Vista River News-Herald Jan. 5, 1966:n.p.

1966c Destroyed Twice by Fire: The Old 'Chinatown.' Rio Vista River News-Herald Jan. 5, 1966:n.p.

Rossi, Jean

1976 Lee Bing: Founder of California's Historical Town of Locke. Pacific Historian 20(4):351-366.

Sacramento Bee

1875 Down the River. Sacramento Bee Nov. 5, 1875:3.

1880 Review of sacramento County Towns. Sacramento Bee Dec. 24, 1880:8.

1894 Sacramento County and Its Resources: A Souvenir of the Bee. H.S. Crocker Co., Sacramento.

1904 Bouldin Island Is Under Water. Sacramento Bee March 24, 1904:5.

1933 Five Banks in Protective Closing Move. Sacramento Bee Jan.23, 1933:9.

Sacramento County Road Book

1850-1862 Sacramento County, Road Book, 1850-1862, (Sacramento County Recorders Office). Ms. at Sacramento City-County Historical Museum.

Sacramento *Pictorial Union*

1853 Indian Rancheria, on Dry Creek. Sacramento *Pictorial Union*, April 1853:3.

Sacramento Union

1853a Indian Robberies on Dry Creek -- Arming of the People -- Fights with the

Indians, etc. Sacramento Union February 3, 1853:2.

1853b Letter Sheet Engravings [Advertisement]. Sacramento Union Feb. 22, 1853:3.

1871 Courtland. Sacramento Union June 26, 1871:2.

1873 Our Tule Islands. Sacramento Union April 12, 1873:2.

1881 Debris. Sacramento Record-Union Nov. 24, 1881:3.

1888 Along the Sacramento; The River Islands. Sacramento Record-Union Jan. 2, 1888:3.

1926 1500 Homeless in Isleton Fire. Sacramento Union June 1, 1926:1,7.

Sakai, Toshio and Carol Branan
1980 National Register of Historic Places Inventory - Nomination Form: Walnut Grove Gakuen Hall. State Office of Historic Preservation, Sacramento.

Saloutos, Theodore
1975 The Immigrant in Pacific Coast Agriculture, 1880-1940. Agricultural History 49(1):182-201.

San Francisco Chronicle
1904 Serious Floods in San Joaquin. San Francisco Chronicle March 24, 1904:1.

San Joaquin County Board of Supervisors
n.d. San Joaquin County for the Farmer. Sunset Magazine Homeseekers Bureau, San Francisco.

Schenck, W. Egbert
1926 Historic Aboriginal Groups of the California Delta Region. University of California Publications in American Archaeology and Ethnology 23(2):123-146.

Schenck, W. Egbert and Elmer J. Dawson
1929 Archaeology of the Northern San Joaquin Valley. University of California Publications in American Archaeology and Ethnology 25(4):289-413.

Schulz, Peter D.
1970 Solar Burial Orientation and Paleodemography in the Central California Windmiller Tradition. Center for Archaeological Research at Davis, Publication 2:185-198.

1977 Task Activity and Anterior Tooth Grooving in Prehistoric California Indians.

American Journal of Physical Anthropology 46(1):87-91.

1981 Osteoarchaeology and Subsistence Change in Prehistoric Central California. Ph.D. dissertation, University of California, Davis.

Schulz, Peter D., David M. Abels and Eric W. Ritter
1979 Archeology of the Jonson Site (CA-Sac-65), Sacramento County, California. California Archeological Reports 18:1-31.

Schulz, Peter D., and Eric W. Ritter
1977 Archeological Investigations at the Safflower Site (CA-SJo-145), San Joaquin County, California. Ms. on file, California Department of Parks and Recreation, Sacramento.

Schulz, Peter D., and Dwight D. Simons
1973 Fish Species Diversity in a Prehistoric Central California Indian Midden. California Fish and Game 59(2): 107-113.

Shlemon, Roy J.
1971 The Quaternary Deltaic and Channel System in the Central Great Valley, California. Association of American Geographers, Annals 61(3):427-440.

Shelmon, Roy J. and Eugene L. Begg
1975 Late Quaternary Evolution of the Sacramento-San Joaquin Delta, California. In Quaternary Studies, edited by R.P. Suggate and M.M. Cresswell, pp. 259-266. Royal Society of New Zealand, Wellington.

Smith, Ralph E.
1905 Asparagus and Asparagus Rust in California. University of California Agricultural Experiment Station, Bulletin 165:1-99.

Soulé, William
1976 Archeological Excavations at Sac-329 Near Walnut Grove, Sacramento County, California. Archeological Study Center, California State University, Sacramento.

Stein, Walter J.
1973 California and the Dust Bowl Migration. Greenwood Press, Westport, Conn.

Stewart, Earl D.
1929 Control of Raw Material and Its Pre-Factory Treatments Essential to Quality Production: Why the Asparagus Canner Must Be a Farmer as Well as Manufacturer. Food Industries 1(15):705-710.

Stindt, Fred A.
1956 San Joaquin & Sierra Nevada RR. Western Railroader 19(6):2-11.

Stockton Independent
1900 Asparagus Cannery. Stockton Independent March 25, 1900:5.

1901 Asparagus Industry of Bouldin Island. Stockton Independent June 12, 1901:3.

1904 Conflicting Reports Regarding Bouldin. Stockton Independent March 24, 1904:5.

Stockton Iron Works
1913 A "Muddy" Subject: The Stockton Dredge. Stockton Iron Works, Stockton.

Stockton Mail
1904 Bouldin Island Is Flooded By Water From the Sacramento River. Stockton Mail March 24, 1904:1

Stockton Record
1904 Flood Rolls In On Bouldin Island. Stockton Record March 24, 1904:8.

Sutter, John A.
1981 J.A. Sutter's Correspondence to P.B. Reading, April 24, 1844 to May 11, 1846. Typescript with annotated index by Lucinda M. Woodward. Ms. of file, Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.

Taylor, Bayard
1850 Eldorado, or, Adventures in the Path of Empire. Volume I. George P. Putnam, New York.

Thomas, Esther A.
1934 A Chinese Town on the Sacramento. Missionary Review of the World 57(90:407-408.

Thompson, John
n.d. Historical research notes on the Delta Meadows area, on file, California State Lands Commission, Sacramento.

1957 The Settlement Geography of the Sacramento-San Joaquin Delta, California. Ph.D. dissertation, Stanford University, Menlo Park.

1965 Reclamation Sequence in the Sacramento-San Joaquin Delta. California Geographer 6:29-35.

1980a From Waterways to Roadways in the Sacramento Delta. California History 59(2):144-169.

1980b The People of the Sacramento Delta: 1860 to 1880. Sacramento County Historical Society, Golden Notes 28 (3 and 4):1-40.

1981 The Ferry System of the Lower Sacramento River. Pacific Historian 25(1):59-68.

1982 Discovering and Rediscovering the Fragility of the Levees and Land in the Sacramento-San Joaquin Delta, 1870-1879 and Today. California Department of Water Resources, Sacramento.

Thompson, John and Edward A. Dutra

1983 The Tule Breakers: The Story of the California Dredge. University of the Pacific, Stockton.

Tibbetts, Fred H.

1931 Flood Control on Alluvial Rivers. Engineering Record News 107(14):520-524, (16):606-609.

Tideways

1954a The Amazing Story of California's Fabulous 'Prima Donna' Crop - Asparagus. Tideways 3(3):8-11.

1954b California Canning Industry. Tideways 3(10):4-7, 13-14.

Tinkham, G.A.

1880 A History of Stockton. W.M. Hinton, San Francisco.

1909 History of the State of California and Biographical Record of San Joaquin County, Volume II. Historic Record Publishing Company, Los Angeles.

Tobin, John

1890 Miscellaneous Manufactures. California Bureau of Labor Statistics, Biennial Report 4:46-101.

Tremaine, Kim J.

1992 Research Design for Phase II Testing of Archaeological Site CA-SAC-84. Prepared for Caltrans District 3, Marysville, CA.

1994 Palustrine Adaptation in the Central Valley, California. Paper presented at the Society for California Archeology annual meeting, Ventura.

Tucker, E.E.

1879a Book No.1. State Engineering Department, Field Notes Book 89. [Typed copy on file, CSL.]

1879b Book No.2. State Engineering Department, Field Notes Book 90. [Typed copy on file, CSL.]

1879c Book No.3. State Engineering Department, Field Notes Book 91. [Typed copy on file, CSL.]

1879d Book No.4. State Engineering Department, Field Notes Book 92. [Typed copy on file, CSL.]

1879e Book No.5. State Engineering Department, Field Notes Book 93. [Typed copy on file, CSL.]

1879f Book No.6. State Engineering Department, Field Notes Book 94. [Typed copy on file, CSL.]

1879g Book No.7. State Engineering Department, Field Notes Book 95. [Typed copy on file, CSL.]

U.S. Bureau of Reclamation

1963a Central Valley Project, California. Delta Uplands Service Area Investigations, Report Area DU-1: Sacramento to Mokelumne River. United States Bureau of Reclamation, Sacramento.

1963b Central Valley Project, California. Delta Uplands Service Area Investigations, Report Area DU-2: Mokelumne River to Stockton. United State Bureau of Reclamation, Sacramento.

1964a Central Valley Project, California. Delta Lowlands Service Area Investigations, Report Area DL-3: Clarksburg to Walnut Grove and Vicinity. United States Bureau of Reclamation, Sacramento.

1964b Central Valley Project, California. Delta Lowlands Service Area Investigations, Report Area DL-4: Beaver Slough to Stockton. United States Bureau of Reclamation, Sacramento.

1964c Central Valley Project, California. Delta Lowlands Service Area Investigations, Report Area DL-5: Walnut Grove to Isleton. United States

Bureau of Reclamation, Sacramento.

1964d Central Valley Project, California. Delta Lowlands Service Area Investigations, Report Area DL-6: Isleton to Antioch. United States Bureau of Reclamation, Sacramento.

U.S. Commissioner of Agriculture
1874 Reclamation of Swamp and Overflowed Lands in California. United States Commissioner of Agriculture, Annual Report 1872:179-187.

Van Loben Sels, E. D.
1905 Description of a California Reclamation District. California Journal of Technology 5(3):141-150. [Reprinted as: How Rich Land is Saved from California Rivers, Pacific Rural Press 70(1):4-5.]

Vioget, J.J.
1843 Mapa de los Terrenos para la Colonia de Nueva Helvetia, 1843. Berkeley: Bancroft Library.

Wagers, James C.
1975 The San Joaquin and Sierra Nevada Railroad. San Joaquin Historian 11(3):81-90.

Walker, Donald B.
1992 Race Relations and Specialty Crops: San Joaquin County Horticulture, 1900-1925. MA thesis, Sacramento State University, Sacramento.

Wallace, Rose-Ann
1971 SAC-66. Ms. E-494, on file at Central California Information Center, Sacramento State University.

Walters, Bob
1983 Delta: The Cruising Wonderland of California's Sloughs and Rivers. Cordrey & Walters, Fullerton.

Walters, Shipley
1988 Clarksburg: Delta Community. Yolo County Historical Society, Woodland.

Watts, W.L.
1890 Sacramento County. California State Mineralogist, Report 10:496-514.

Waugh, Georgie
1986 Cultural Resource Survey Brannan Island and Franks Tract State Recreation Areas. Ms. report prepared by the University of California, Department of Environmental Design for the California Department of Parks and Recreation.

Weaver, Richard
1989 Cultural Resources Survey, Sacramento River Flood Control Test Section, Sacramento County, California. Report on file, U.S. Army Corps of Engineers, Sacramento District.

Weir, Walter W.
1949 Peat Lands of the Delta. California Agriculture 3(7):6, 15.

1950a Soils of Sacramento County. University of California Agricultural Experiment Station, Berkeley.

1950b Subsidence of Peat Lands of the Sacramento-San Joaquin Delta, California. Hilgardia 20(3):1-56.

Wells, A. J.
1904 California's Netherlands. Sunset Magazine 12(5):380-389, (6):511-523.

Werner, Roger H.
1988 Cultural Resources Inventory and Evaluation, Sacramento River Bank Protection Project, Units 42 and 43. Archaeological Services, Inc., Stockton.

West, G. James
1977 Late Holocene Vegetation History of the Sacramento-San Joaquin Delta, California. Ms. on file, Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.

1981 Walnut Pollen in Late-Holocene Sediments of the Sacramento-San Joaquin Delta, California. Madrano 28:44-45.

1991 Class II Archeological Survey, North Delta Program, Sacramento - San Joaquin Delta, California. United States Bureau of Reclamation, Sacramento.

Western Canner
1917 Libby, McNeil and Libby Asparagus Cannery at Locke Opened. Western Canner and Packer 8(12):35.

1920a Isleton Asparagus Notes. Western Canner and Packer 11(12):13.

1920b California Canneries. Western Canner and Packer 12(5):76 [Sept., 1920].

1922 J. F. Butts Company to Be Notable Factor in California Canned Food Industry. Western Canner and Packer 14(8):44-45.

1923a San Joaquin Valley Canneries. Western Canner and Packer 14(12):80.

1924 Isleton Canning Co. [pictorial ad]. Western Canner and Packer 15(10):17.

1925a Big Pack By Bay Side Company. Western Canner and Packer 17(3):38.

1925b A History of California Would Be Incomplete Without Reference to Its Great Cannery Enterprises. Western Canner and Packer 17(6):6-11.

1926a Isleton Canning Co. Will Erect New Building. Western Canner and Packer 17(9):7.

1926b New California Co-Operative Cannery. Western Canner and Packer 17(9):57.

1926c Housewives Urged to Buy More Canned Asparagus. Western Canner and Packer 18(2):5-6.

1929a Asparagus Yields $15,000,000 a Year. Western Canner and Packer 21(1):8-9.

1929b Swift Transportation for "Grass". Western Canner and Packer 21(1):16-17.

1929c Canner Packs Own Asparagus. Western Canner and Packer 21(1):54.

1929d Asparagus Now Sorted by Machines. Western Canner and Packer 21(1):21.

1930 New Cottages. Western Canner and Packer 22(8):48.

1931a Isleton Canning Co. [ad] Western Canner and Packer 22(9):45.

1931b Rebuilding at Isleton. Western Canner and Packer 22(10):44.

1931c Asparagus Pack Cut Down. Western Canner and Packer 23(1):7.

1932 California Coop. Canneries. Western Canner and Packer 24(3):36.

1933 Consolidation of Plants Is Made. Western Canner and Packer 24(11):39.

1934 Grass Season Early. Western Canner and Packer 25(13):10.

1935a New Asparagus Packers. Western Canner and Packer 26(10):13.

1935b Many Improvements in the Delta Plants. Western Canner and Packer 27(3):6-7.

1936 Product Survey No.10: Canned Asparagus. Western Canner and Packer 28(3):17-33.

1940 Asparagus Pack Rising Toward Limit. Western Canner and Packer 32(7):7-8.

1941 Stripped for Action on New Asparagus. Western Canner and Packer 33(7):19.

Western Engineering
1912 Railway. Western Engineering 1(1):76.

Whitney, J.P.
1873 Fresh Water Tide Lands of California. Riverside Press, Cambridge.

Wohlgemuth, Eric
1990 A Cultural Resources Inventory of Four Alternative Power Plant Locations for the Northern California Power Agency Stand Alone Combined Cycle Project, Placer and San Joaquin Counties, California. Far Western Anthropological Research Group, Davis.

Wright, George F.
1880 History of Sacramento County, California. Thompson & West, Oakland.

Yeatman, J. A.
1905 How an Island Was Saved: Reclaiming of Bouldin Island. Pacific Rural Press 70(3):33, 36-37 [July 15, 1905].

Yee, Mrs. Dale
1975 Remembering 'Tai Han' or 'Lockee'. East/West Chinese American Journal Feb. 19, 1975:8.

Yip, Christopher
1977 Locke California, and the Chinese Americans. MA thesis, University of California, Berkeley.