

A GEOGRAPHIC HISTORY OF SAN LORENZO CREEK WATERSHED

LANDSCAPE PATTERNS UNDERLYING HUMAN ACTIVITIES

IN THE

LANDS OF THE YRGIN

MISSION SAN JOSE RANCHO, 1796-1834

SAN LEANDRO, SAN LORENZO, AND SAN RAMON RANCHOS, 1830s-1849

TOWNS OF HAYWARD'S, SQUATTERSVILLE, AND MT EDEN, 1850s

CITIES OF HAYWARD, SAN LORENZO, AND CASTRO VALLEY



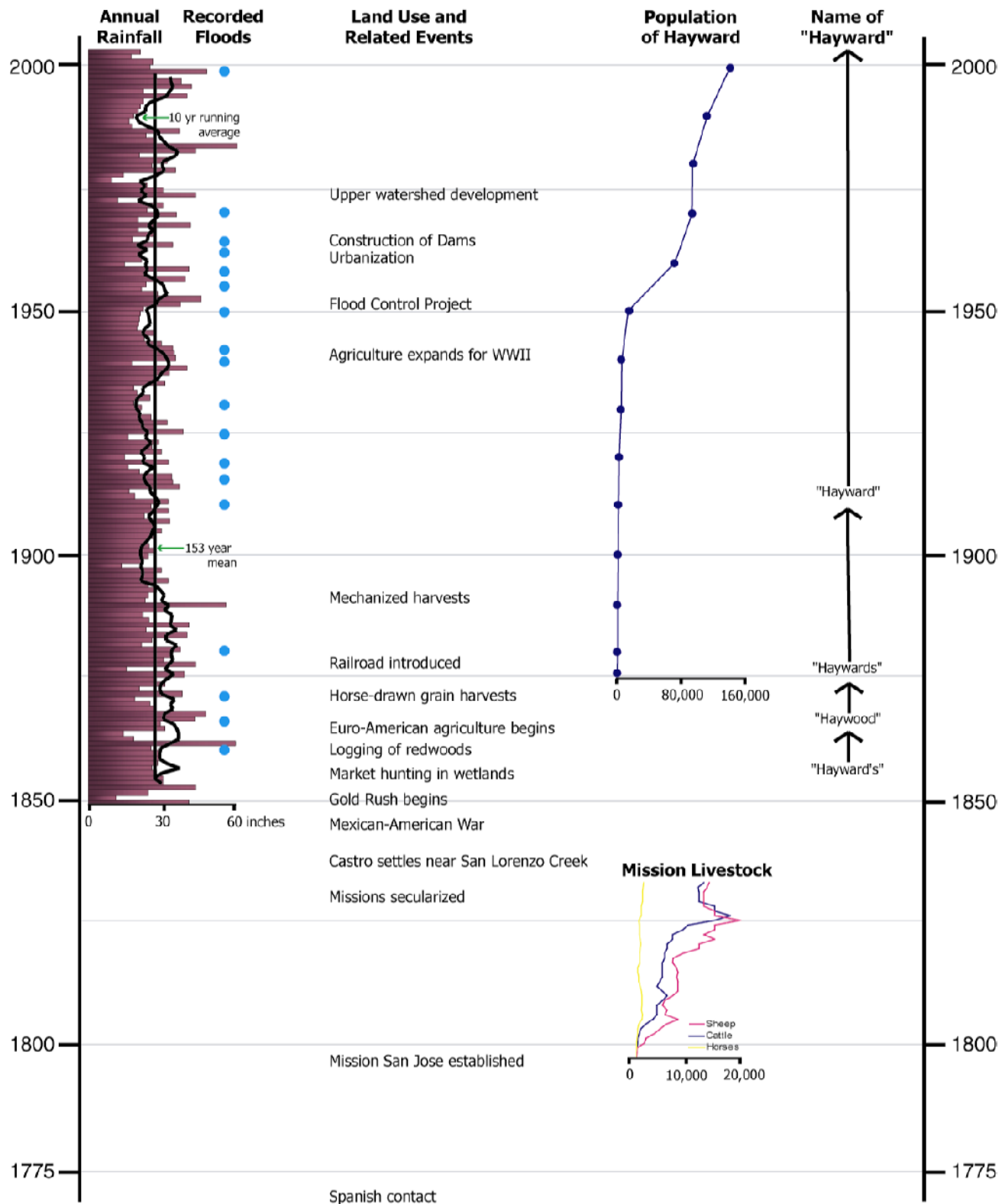
Robin Grossinger and Elise Brewster

San Francisco Estuary Institute Regional Watershed Program

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Some agents of change in the San Lorenzo Creek watershed, 1769-2003. Rainfall data (July-June year) compiled by Lester McKee from Hayward data, using correlation to early San Francisco rainfall records that were developed by Jan Null (ggweather.com). Local flooding data from FEMA 1986 and Modrell (pers. comm.). Mission livestock data from Jackson 1994. Population data from Eden Writers 1975.

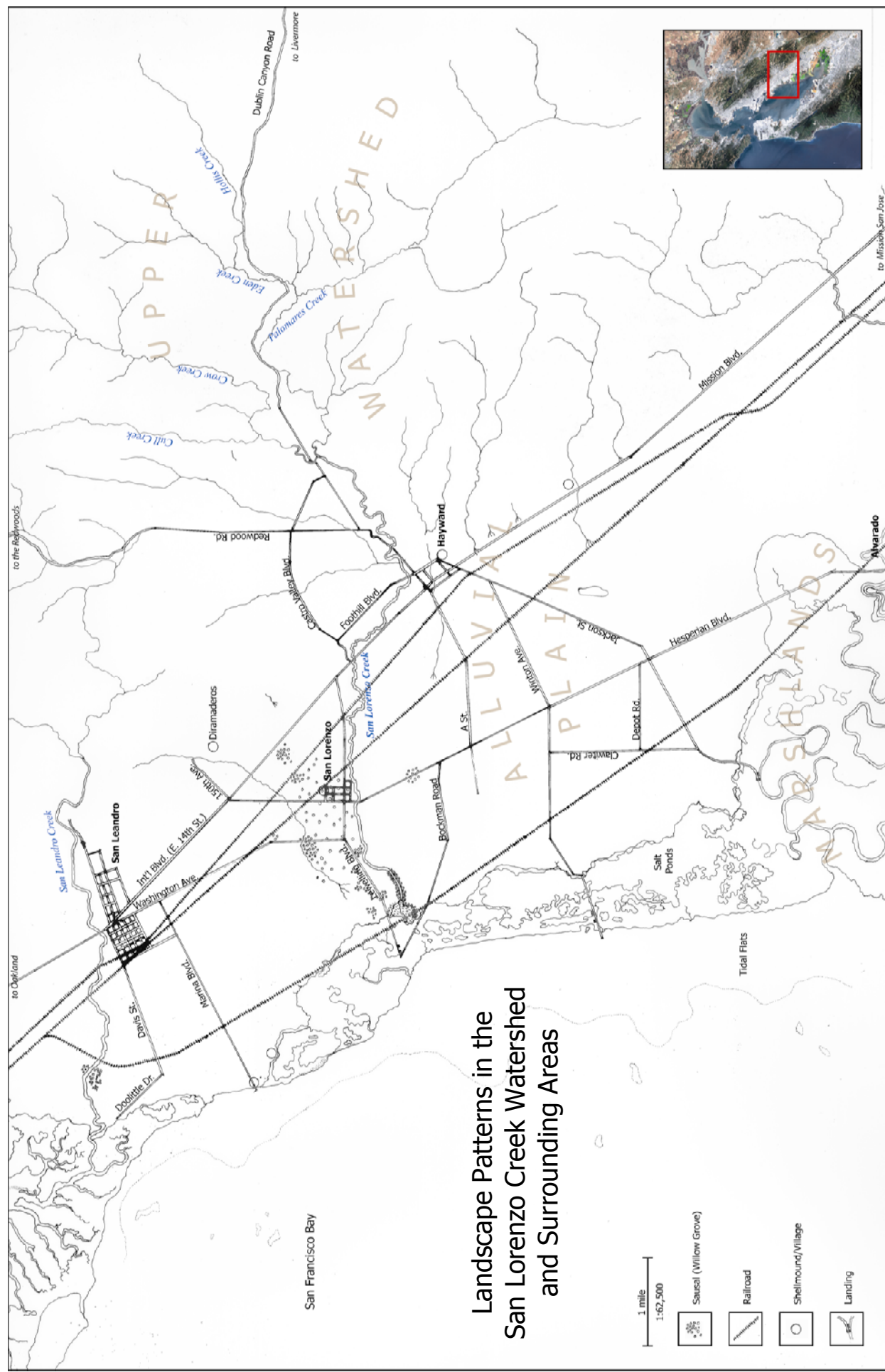


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Preceding page: Map drawn by Elise Brewster; USGS Landsat 7 Image (2001) courtesy of the Center for Land Use Interpretation and SATimaging

This report investigates the historical characteristics of San Lorenzo Creek, a stream in Alameda County, CA, on the east shore of San Francisco Bay. The report documents the recent history of cultural and physical transformation, while describing the distinctive geographic patterns that continue to define places and guide human activities in the area. These ecological and geological features persist to varying degrees, despite substantial modification and relative obscurity.

The report is organized around these geographic elements, with each section corresponding to features on the watershed basemap.

San Lorenzo Creek Watershed

The San Lorenzo Creek Watershed drains 48 square miles of the portion of California's Coast Ranges locally referred to as the East Bay Hills. The creek flows almost due west from these hills towards San Francisco Bay, entering near the Bay's broadest part, directly across from South San Francisco.

The upper watershed includes eight perennial tributaries, which join to form the larger creek we call San Lorenzo. These small creeks are arranged in a fan-shaped pattern, with the three largest — Crow Creek, Cull Creek, and Palomares Creek — meeting within 2 miles of each other. They then flow generally west as San Lorenzo Creek, through a nearly enclosed valley named for the first Mexican landowner (Castro Valley), and through a break in the hills onto the bayside alluvial plain.

The canyons of this west side of the East Bay Hills form dozens of small streams that gather waters in the hills and spill out onto the flatlands bordering the Bay. But only a few of these were supplied with enough water to carve continuous, incised channels across the broad plain to tidal waters. In the southern part of the early East Bay — the 25 mile alluvial plain from the great Oak Grove of Oakland to the southernmost tip of the Bay — only two creeks traversed the flatlands with distinct, formidable-to-cross stream channels: San Leandro and Alameda.

A third stream, San Lorenzo Creek, maintained a substantial channel across nearly the full width of the plain, before spreading out into the marshes alongside the Bay. These three creeks reached beyond the front faces of the hills into their internal canyons and valleys to create sizable watersheds with distinct channels — streams of major ecological and cultural significance.

San Lorenzo Creek

The first recorded description of San Lorenzo Creek comes from an entry on November 27, 1770 in the journal of Lt. Pedro Fages. Translated by Dr. Alan Brown in the 1960s, from a text published by the historian Herbert Bolton in 1911, the account records the first full Spanish expedition through the East Bay (a smaller scouting team reached as far as San Leandro Creek in 1769). We would expect the details of San Lorenzo Creek to be well observed, as they camped overnight on its banks:



East Bay Hills looking northeast towards Mt. Diablo (Alaska Airlines approach to Oakland Int'l Airport, November 2003).



The *Plan de San Lorenzo* (ca. 1840) accompanied Castro's land grant request. It effectively captures the branching pattern of tributaries forming Arroyo de San Lorenzo, and the proximity of San Leandro Creek before it curves to the north (upper center).

"... we crossed a creek with a good amount of water, all overgrown with sycamores, laurels and other trees unknown to us, and stopped on a flat next to it." (Stanger and Brown 1969: 119)

Sixteen months later, on March 25, 1772, Father Juan Crespi describes the creek, which served again as campsite on this second expedition led by Fages. Crespi confirms its relative size and substantial riparian canopy:

"... we halted on the bank of a large arroyo close to the mountains skirting the broad plain. The bed of the arroyo is very full of alders, cottonwoods, and willows." (Bolton 1927: 287).

A half-century later, a Mexican *diseño*, or sketch (right), fills in the general picture. It shows a continuous but narrow riparian tree canopy marking the creek's location along the plain.

Further details about the creek emerge from later documents of Euro-American colonization. It is clear that San Lorenzo Creek provided a locally significant, unusually reliable source of water for people, livestock, and crops. San Leandro Creek (redwood forests in its upper watershed; currently supplies large reservoirs) or Alameda Creek (watershed size 10 times San Lorenzo) might be expected to have provided the more valuable local water supplies during early Euro-American development. But, although these two streams play much more significant roles in modern water management, San Lorenzo was the more important historical water source, prior to dams, diversions, and groundwater pumping.

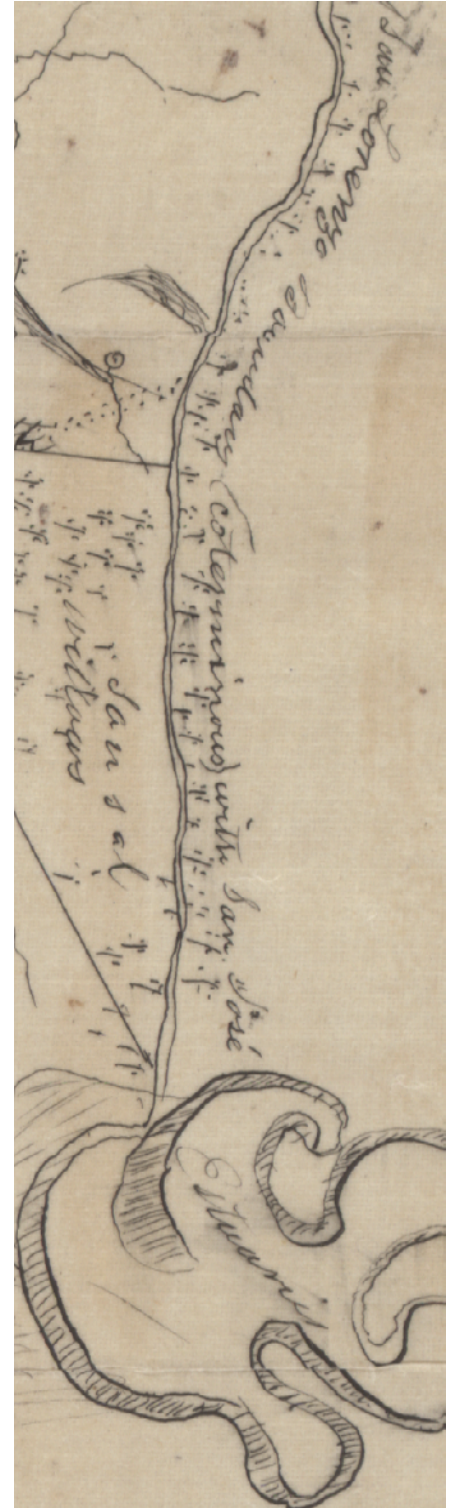
This characteristic led to San Lorenzo Creek's central role in the Mission San Jose Rancho (despite the creek's location more than three-quarters of the way from the Rancho boundary). The creek was noted by Father Duran in the 1820s, as part of a description of the Mission territory, which extended from the Santa Clara-Alameda County line to San Leandro Creek:

"Mission cattle both large and small feed on this corridor and through its center, some fourteen miles from the mission, flows the San Lorenzo Creek, the only abundant and permanent supply of water in the stretch. On its banks lies a mission rancho." (McCarthy 1958: 182)

Later, the position of the two most important local American towns, Hayward and San Lorenzo, would be influenced by the creek's route.

San Lorenzo Creek was also characterized by the extreme seasonal changes typical of Mediterranean climates. Thirty years into American settlement, new residents were still coming to terms with this annual pattern. For example, the local newspaper described nearby Sulfur Creek (a much smaller creek just 1200 feet to the south of San Lorenzo at one point in downtown Hayward):

"... the dry, insignificant ditch becomes a raging torrent sweeping out everything which impedes its way."



The *Plan of San Leandro* shows a riparian corridor along San Lorenzo Creek between the hills and the marshes ("Estuaries"), with their circuitous tidal sloughs. Courtesy of The Bancroft Library at UC Berkeley

San Lorenzo Creek was described as having uncontrollable flows every winter. Large debris routinely swept downstream, often washing out bridges (Sandoval 1991: 232-33, 235). This conflict with adjacent development eventually led to the construction of larger artificial channels and revetments to contain flood flows along the creek.

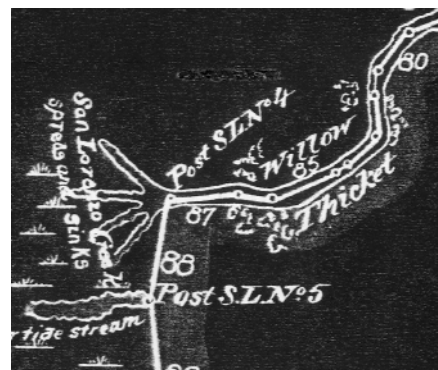
The stream supported a significant steelhead fishery, as indicated by 19th-century newspaper articles. For example, the *Hayward Daily Journal* reports in April 1885 that two fishermen caught 60 trout on the first day of the season, and in November, it notes the catch of a 14 pound salmon at the narrow gauge railroad crossing. One hundred and five trout were reportedly taken from the Palomares Creek tributary in a single day (Sandoval 1991: 279, 337). Local resident Steve Morris recalls a proclamation made by a local judge that "San Lorenzo Creek steelhead fishing is the finest in the world" (Modrell 2000).

Although the creek was relatively well supplied with summer base flow and maintained a channel across most of the alluvial plain, it appears to have terminated or spread out before reaching the tidal marshes and Bay. The first map showing fluvial features in the area, by Capt. Beechey in 1827-8, does not depict San Lorenzo Creek at all, presumably because it was not visible as a channel through the marshlands. The first detailed, professionally-produced local maps (by the US Coast Survey (USCS) in 1857, and La Croze in 1858-63) each suggest that the creek spread into a distributary system encompassing freshwater marsh and sausals (willow groves) at the edge of the tidal marsh, and spread broadly across the marsh plain. The land grant confirmation survey by La Croze shows this condition with a pictographic representation and the words "San Lorenzo Creek spreads [sic] and sinks."

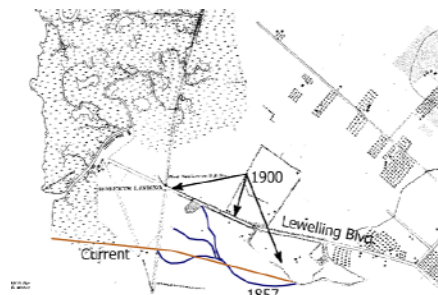
Some aspects of this complex system may have been affected by cattle grazing during the previous fifty years. For example, willows may have colonized slightly higher ground created by increased sediment deposition along older distributaries (Collins, pers. comm.). However, it is likely that San Lorenzo Creek was only shallowly incised in its lower reaches at the time of European contact, spreading water and sediment over a broad area at the edge of the marsh during high flows.

In 1900, the US Coast and Geodetic Survey (formerly USCS) carried out a "Resurvey." By this time, the lower reach of San Lorenzo Creek had been diverted north to run along Lewelling Boulevard below Farnsworth Street, more than a quarter-mile north of both its mid 19th-century and present-day routes. At this intermediate time, the stream, despite the redirection, was still shown as spreading diffusely into the marsh. The current flood control channel, which removed the creek from its lower floodplain and the tidal marshes, was constructed in the 1950s and early 1960s as part of a project that extended from the Bay to Foothill Boulevard.

The midsection of the creek (from the base of the hills to the Southern Pacific Railroad) has been mapped by a number of different surveyors since American statehood, resulting in different depictions. In general, most of these maps show a similar route across the plain. In particular,



The lowest reach of San Lorenzo Creek, depicted by La Croze (1858-63).
Courtesy of The Bancroft Library at UC Berkeley



US Coast and Geodetic Survey 1900, with routes of prior and subsequent channels. The lower reach of San Lorenzo Creek has been extremely dynamic: multiple channels were shown in 1857 (see also p.6) and subsequent constructed channels have occupied completely different locations.

the most reliable early cartography of the channel — the surveys by the USCS and La Croze — shows similar patterns.

Another map, produced under State Geologist J.D. Whitney in 1873, shows a much more widely meandering stream. This map raises the possibility that the earlier maps are less detailed and that the stream straightened post-1873, perhaps in response to changing conditions of water, sediment, or bank vegetation. However, the close correspondence between surveys both before and after the Whitney map suggests that the differences in Whitney's depiction more likely reflect variation in mapping technique rather than on-the-ground changes. Additional data sources may further improve our understanding of the channel's evolution.

Alluvial Plain

The solid ground supporting the populous cities now surrounding San Lorenzo Creek was constructed by the creek and its neighboring streams. During larger storms, and prior to modern flood control projects, the creeks would overflow their channels, delivering sediment from the canyons out onto the flatlands, or alluvial plain. Over time, Bay Area streams built a broad river valley that has been filled by the rising seas over the past 10,000 years. At the time of European contact, only a thin strip of flat land remained between the hills and the line of high tide — about three miles at San Lorenzo Creek — to support most of the activities of human inhabitation.

Evidence of earlier characteristics of the alluvial plain is provided by historical accounts. For example, in late March of 1776, Font, on the third Spanish expedition through the East Bay, describes the plain in the vicinity of San Lorenzo Creek as lush but empty of trees:

"All the rest of the road is through very level country, green and flower-covered all the way to the estuary, but with no other timber or firewood than that afforded by the trees in the arroyos which we encountered, which were five." (Bolton 1933: 356-357)

One of the greatest changes in the East Bay is the creation of a new urban forest where trees were once rare outside of the unique "Oakland" and the immediate environs of larger creeks. The replacement of the native grasslands removed major food sources from the indigenous landscape, particularly native grains and the onion-like bulb *amole*, "in which those plains greatly abound" (Bolton 1933: 357).

On this grassy plain, the Spanish explorers describe encountering tule elk, which they initially mistook for cattle but, up closer, found to be "the size of an ox, and with horns like that of the deer, but so long that their tips were eight feet apart." The explorers do not mention waterfowl here, perhaps because they took the high road, avoiding the wetter parts of the plain. Descriptions of similar moist grasslands in other parts of the Bay Area, however, give some indication of the area's likely use by waterfowl:

Near Mission Dolores, Oct. 21, 1837: "... the plain is covered with flocks of wild geese in incredible numbers." (Simpkinson [1837] 1969: 7)



Early 20th-century tinted photograph of the stone bridge across San Lorenzo Creek at Foothill Boulevard. Courtesy of Paul Modrell and the Hayward Historical Society.



The "Swinging Bridge" near downtown Hayward. Courtesy of Paul Modrell and the Hayward Historical Society.

Near Huichica Creek, adjacent to San Pablo Bay, circa 1870: "My father told of running through the fields when he was a boy, about 1868-1875 in April and May and having to be careful not to step on any of the myriad of baby ducks and geese rising from their feeding grounds . . ." (Duhig 1990: 2)

The open character of the alluvial plain was likely due substantially to native efforts. In the absence of repeated controlled burns carried out by indigenous Californians over many generations, it is probable that substantial areas that were open grassland at the time of European contact would have otherwise been vegetated by chaparral or woodland (Stewart 2001).

The Bay — Tidal Marshland

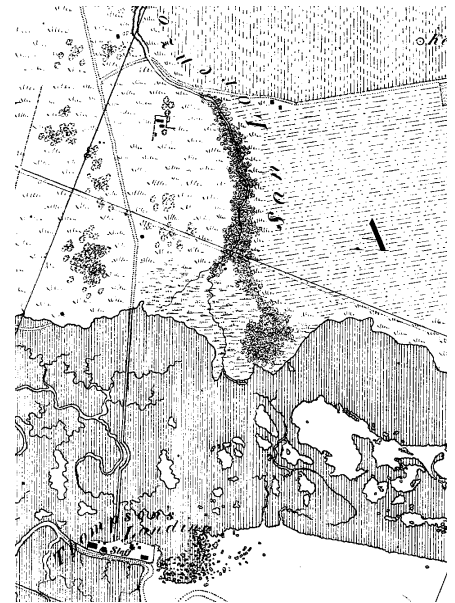
The relationship between San Lorenzo Creek and San Francisco Bay has substantially determined the watershed's human history. The edge of the Bay provided not only a set of abundant, easily available resources but also an efficient way to transport them to a major market, San Francisco. Bayside landings made agricultural products marketable and enabled transport of the nearby redwoods, whose location was itself due in large part to the moisture-providing coastal fog. The specific arrangement of these resources and points of access set many of the persistent routes of human movement.

The Bay was formed by the melting glaciers, which caused the world's seas to rise and spill into adjacent low-lying valleys. Initially, the rate of submergence was too rapid for extensive marshlands to take hold, but when sea level rise slowed, between 2000 and 3000 years ago, tidal mudflats and marshlands began to develop at the edges of the Bay. Because of its broad and shallow shape, the Bay/Delta developed extensive wetlands, comprising one-half of California's coastal wetlands circa 1850. Their ecological productivity, including shellfish, fish, waterfowl, tule reeds, salt, and other resources, supported the development of a large aboriginal population.

The marshlands near San Lorenzo Creek, and their abundant waterfowl, were actually the first local resources tapped by Americans, prior to agricultural and industrial development. During the Gold Rush, waterfowl from the Bayshore marshes brought high prices in San Francisco markets, leading to a lucrative trade. In the month of February 1852, for instance, Moses Wicks and Thomas Mulford sent the following quantities to San Francisco:

"125 wild geese, 52 canvas-back ducks, 69 teal, 63 broad-bill ducks, 192 curlews, 207 plovers, 48 dowitches, 156 'peeks,' 48 snipe, and one rabbit." (Sandoval 1988: 43)

Initially drawn by the easy financial success of market hunting (on lands which could be construed as having dubious ownership), many of these market hunters soon developed salt ponds and freight landings on the sites of their hunting grounds. This relatively short-lived interest in wetland habitat, which nevertheless shaped the names and places of local economic development, would return to the region 150 years later, as part of environmental restoration efforts.



San Lorenzo Creek spreads out as it approaches the marshlands and Thompson's Landing (USCS 1857).

Salt Ponds

At its lower end, San Lorenzo Creek happened to intersect a unique feature of the Bay: the massive salt pond complex centered around Crystal Salt Pond. The feature appears to have been associated with a sandy berm built by wave action and may have been significantly managed and/or shaped by the indigenous Yrgin people.

Salt concentrated by evaporation from the broad, shallow ponds was harvested and traded by the Yrgin and later utilized by Mission San Jose. Other large salt ponds dominated the surrounding marshlands, including one that served as Castro's private salt pond, used for both cuisine and curing hides. Use of these ponds led directly to the extensive salt industry in San Francisco Bay, one of the few salt manufacturing processes based on passive solar evaporation in the world today. While there were natural salt pans in other parts of the South Bay marshlands, those near San Lorenzo and Alameda Creeks were of such large size that they led to extensive and rapid commercial development during the 1850s, generating American development in the area.

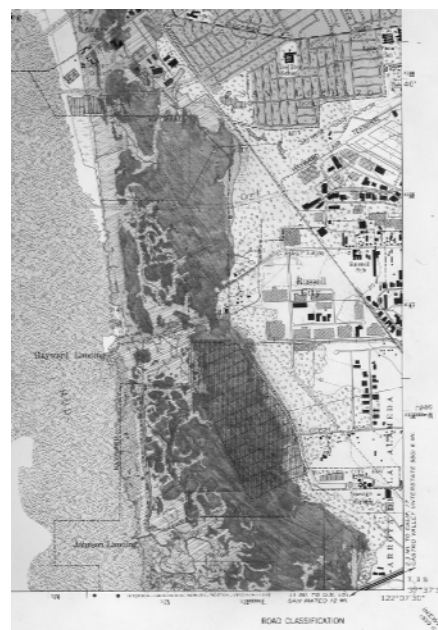
Following the Gold Rush, salt became particularly valuable and the ponds promised easy wealth. Local landings were established initially to transport the mineral products from these salt ponds, and only later used for distribution of agricultural products. The co-incidence of San Lorenzo Creek, the dividing line between two land grants (San Leandro and San Lorenzo Baja), with the salt ponds also meant that the marshlands were in uncertain and vulnerable ownership status.

Because of their potential for salt production, these marshes were modified relatively rapidly compared to the rest of the South Bay. By the beginning of the 20th century, the few thousand acres of marshland between San Lorenzo Creek and Alvarado were extensively dissected by levees, ditches, and fences, while the rest of the 56,000 acres of South Bay tidal marshlands remained largely untouched. Even in these active areas, however, commercial salt farmers still largely used the original forms of the salt ponds during these decades. As a result, the overall acreage of ponds showed little increase, despite the modifications, until the 20th century.

Landings

While San Francisco Bay's expansive wetlands provided a wide range of valuable local resources, this characteristic of the shoreline conversely precluded convenient movement between the Bay and most of the surrounding land. Prior to reclamation, nearly half (47%) of the Bay was exposed at low tide, in the form of tidal flats and marshlands, and 80 percent was shallower than 18 feet below MLLW (Mean Lower Low Water). Even at high tide, only relatively small parts of the Bay reached as much as six feet deep — and that briefly — with a full third of the Bay still less than one foot deep and mostly unnavigable.

The twice-daily inflow and outflow of water through the intertidal habitats did, however, scour deeper tidal channels into the marshes and mudflats.



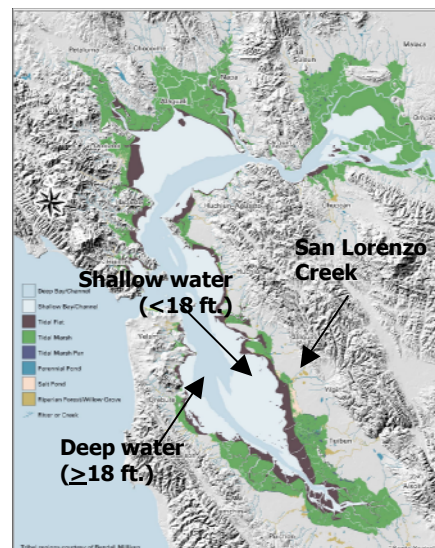
The shapes of Crystal Salt Pond, drawn over a modern USGS quadrangle. Elise Brewster 1994.

Most of these channels branched into progressively smaller dead-end sloughs, but a few reached further towards the shore, in some cases connecting directly to freshwater creeks. Points of commerce often developed where these sinuous marsh sloughs met the fertile valleys, effectively extending tidal waters inland, where they were bordered by dry land rather than soft marsh. Towns such as Alvarado, Alviso, Redwood City, Petaluma, Napa, and Fairfield thus became entry points to these narrow but navigable corridors through the otherwise impassible marshlands.

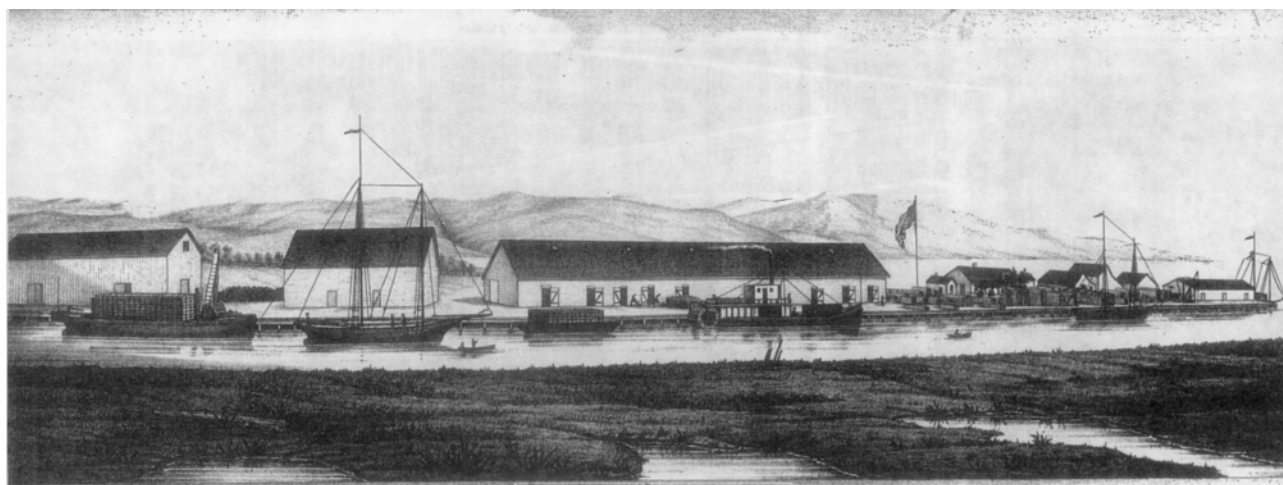
Another type of natural Bay landing occurred where steeper topography excluded marshes and mudflats, so that solid land directly intersected deep water. The general lack of such access along the East Bay shore necessitated the construction of the East Bay mole, a railroad wharf extending across the intertidal habitats to deeper water. When the proximity of deep water to dry land at Point Richmond was recognized in the late 1890s, it rapidly became a continental terminus for the railroad and an industrial center (see SFEI 2001).

In this geographic context, the San Lorenzo Creek shoreline presented a number of distinct and problematic characteristics with regard to aquatic transportation. The tidal marshland was narrow, but the adjacent mudflats were broad and continuous. The creek intersects San Francisco Bay at its widest point, where the deeper waters — navigable by larger boats and less limited by the tides — are particularly distant from the shoreline. As a result, the shoreline in the vicinity of San Lorenzo Creek was effectively about seven miles from fully navigable water.

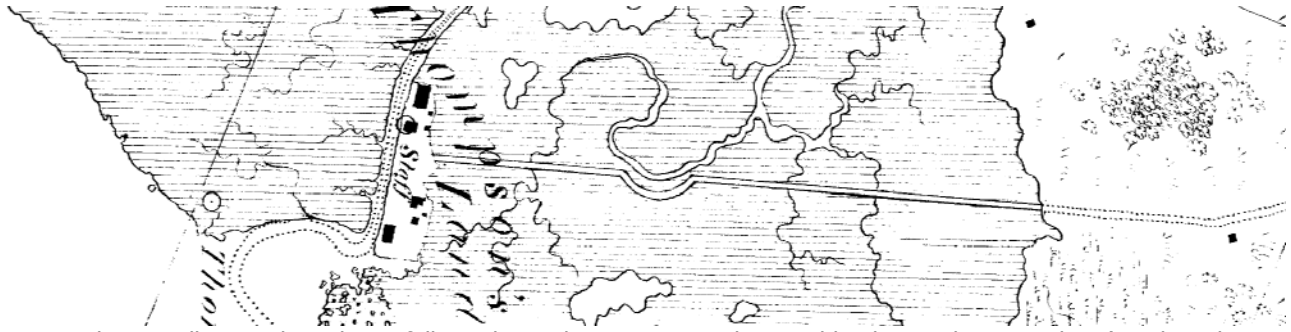
Furthermore, the creek itself did not carve a channel into the marshlands, precluding the convenient link between tidal and fluvial channels, and any direct value of San Lorenzo Creek as a landing or port. Also, to a greater extent than in any other part of the Bay, the marshlands in this vicinity were dominated by large marsh ponds, rather than tidal channel networks. Without the channel systems to focus tidal water flow, there were few deeper water channels through the mudflats and shallow bay.



SFEI Historical View of the Baylands shows the relationship between San Lorenzo Creek and the Bay.



Roberts Landing, on a marshland slough near the mouth of San Lorenzo Creek (Thompson and West 1878).



Present-day Lewelling Boulevard now follows this early route across the marshlands to Roberts Landing (purchased by William Roberts from Robert Thompson), except for the curve around a sinuous slough (USCS 1857).

Access to water transportation was nevertheless critical to the distribution and sale of local resources, so several effective sites were developed. The most important American landings were established by former market hunters and squatters on the two largest tidal sloughs in the vicinity— Roberts Landing to the north, and Mt. Eden Landing to the south. Roads were built across the marshlands to reach the edge of the slough, crossing smaller sloughs and avoiding larger ones. Mt. Eden Landing was successful largely because the mouth of Eden Slough was only 3.5 miles from deep water. But despite the fact that it was twice as far from deep water, Roberts Landing became “the great shipping point for all this valley and for the Livermore and San Ramon valleys also,” (Sandoval 1988: 47) probably because it was the first to establish regular commercial schooner transportation to San Francisco. Some of the other important landings in the vicinity were Mulford’s, at the gap in tidal marshland just north of San Lorenzo Creek and Hayward’s, at the narrow point in the Crystal Salt Pond complex.

Mission San Jose — Rangeland

In 1796 the alluvial plain surrounding San Lorenzo Creek, from which the Yrgin had harvested grains and hunted wildlife for generations, became part of the Mission San Jose Rancho. Established 15 miles south of San Lorenzo Creek, Mission San Jose constitutes the first major European land use of the area, and a potentially significant early impact to the watershed. The Mission is also the initial center of European development of the southern East Bay.

Upon its establishment, Mission San Jose received livestock from the neighboring missions in San Francisco, Santa Clara, and San Carlos. While several hundred cattle were apparently delivered, many of these must have been quickly consumed, as only 100 were reported in the annual tally at the end of that year. With no ability to deliver water, grazing lands were effectively excluded from the dry hills and limited to the East Bay plain (from the present day Alameda County/Santa Clara County line to San Leandro Creek) and the Livermore/San Ramon valleys to the east. The number of reported cattle remained below 1000 through 1803, but by the end of 1805 the herds exceeded 3000. By this time it is likely that cattle substantially occupied the lands along San Lorenzo Creek, particularly because of its importance as a water source.



Rodeo (cattle enclosure) on the Rancho San Lorenzo. Located on the lower part of the alluvial plain near the Bay (“MAR”) in present-day Hayward. From the *Diseno de Rancho San Lorenzo*, courtesy of The Bancroft Library at UC Berkeley

In the winter, the herds were moved north through the San Ramon Valley into the valley oak savanna of the Walnut Creek Valley. This seasonal pattern of livestock rotation somewhat complicates the assessment of cattle density. For example, Father Duran characterizes Valle de San Jose (described above) in 1822 as providing summer pasturage for 9000 cattle and 10,000 sheep, but the annual reports for 1822 and 1823 list only 7000 cattle each year.

The use of pasturelands at greater distance, though, suggests that the East Bay plain was well-stocked, necessitating additional range. A general sense of the land use intensity during this time can be established by comparing reported livestock numbers (using the more conservative annual report values) with roughly corresponding areas. The area encompassed by the Mission San Jose East Bay rancho, as described by Duran (see p. 3), was approximately 50,000 acres. Combining the numbers of cattle and sheep (4-5 sheep requiring the acreage of one cow (Bancroft 1890: 55)), if all livestock were maintained here, by 1810 the density would have been approximately 6 1/2 acres per cow (6000 cattle and 7000 sheep; see inner cover). This is a fairly high stocking rate, as Bancroft cites standard cattle densities during the Mexican and early American eras of one cow per "5 acres of valley land," "10 acres on San Joaquin plains," and 7 acres "in the more humid coast counties of Humboldt and Mendocino."

From these rough determinations, we can infer that pasturage would have been used fully by this time or soon after, and that the grazing density in the vicinity of San Lorenzo Creek, where livestock would have tended to concentrate for daily access to perennial water, would have been particularly high. Intensive European use of the San Lorenzo Creek area can thus probably be dated to 1805, by which time herds had rapidly expanded to 3,162 cattle and 8,000 sheep, for a combined rate of one "cow" in 10 acres for the overall East Bay area. Based on previous studies (SFEI 2001), we would expect to see effects upon sediment supply and runoff by about 1810.

Livestock levels continued to increase through the first decades of the 19th-century. Evidence of overgrazing was suggested by 1837, when 6000 head of cattle were moved to the Livermore Valley:

"owing to the quantity of cattle on the Mission lands, feed is becoming scarce and they have died in considerable numbers of pure starvation."

After the secularization of the California missions in 1834, the lands around San Lorenzo Creek were granted by the Mexican government to several men — including Joaquin Estudillo (San Leandro), Guillermo Castro (San Lorenzo Alto), Francisco Soto (San Lorenzo Baja), and Jose Amador (San Ramon) — for the establishment of ranchos. During this period, grazing density may have reached even higher levels than during the Mission era. Some accounts put Castro's herd at 10,000–15,000 head in an area of less than 30,000 acres (a density of 1 cow/2-3 acres).

As the herds expanded into the Yrgin's lands during this period, the Yrgin themselves probably served as vaqueros, herding the cattle on lands that



The *Diseno de Rancho San Lorenzo* shows a creek emanating from the springs at "Deramadero," and a corral. Courtesy of The Bancroft Library at UC Berkeley

had been previously their own. The high human mortality rate at the mission necessitated continual recruitment of converts, often using force to cause relocation to the mission. After 1810, many of the converts brought to the mission each year were from the larger populations of the Central Valley, who became the new labor force for Mission system.

The relationship between native peoples and the land has typically been denigrated since European contact (e.g. "In this land of plenty they had scarcely wits enough to keep alive" (Stuart 1951)). Yet local tribes not only helped shape the open grassland ecosystem that facilitated the Spanish cattle-based economy, but also largely built the Mission landscape, as the primary source of labor for Mission activities. A rare recognition is found in a cemetery marker near Mission San Jose:

"Here sleep Four Thousand of the Ohlone Tribe who helped the Padres build this Mission San Jose de Guadalupe. Sacred be their memory." (Stuart 1951: 39)

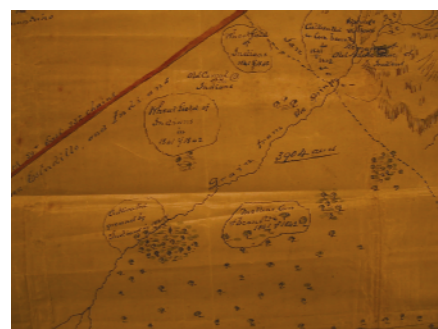
Diramaderos - Sausals - Indian Grant - San Lorenzo Grove

The Diramaderos, or "overflowing of the springs", was an array of mineral springs associated with the Hayward Fault. The springs produced a sizable flow (est. 3000 gallons of water per minute, ~6.7 cfs) that had a large zone of spatial influence. Early maps show stream channels extending from the springs across nearly the entire alluvial plain.

The spreading of these waters toward San Lorenzo Creek created an area between the spring channels and the creek that had an unusually high water table and supported extensive willow marshes, or "sausals." The sausals supplied native peoples with building materials and were likely managed, with techniques such as coppicing, to provide straight branches for arrows, baskets, and houses. The groves also provided shade on an open plain, shelter from the winds off the Bay, and probably contained smaller springs. In fact, the one native village in the area that was not associated with the Bay or the base of the hills was located in these groves, and later became downtown San Lorenzo. The water supplied by the Diramaderos may also have been partly responsible for San Lorenzo Creek's perennial flow along its lower reaches. The flowing of the springs at Diramaderos is said to have ended with the 1868 Hayward fault earthquake.

Some writers speculate that as many as 150 people lived in the native village at Diramaderos during the early 19th century, in a community that received unusual legal recognition from the Mexican government. As a condition of the grant to Estudillo, the Indians at the Diramaderos were granted the land "on the meadows" north of San Lorenzo Creek. These wet meadows and "overflow lands" were to be used by the Yrgin as a hunting and fishing preserve (Sandoval 1988: 43).

This stipulation was a rare instance of explicit transfer of lands to an Indian group in the Bay Area. It appears to have contributed to the general confusion regarding the boundary between Estudillo and Soto, making their claims more difficult to pursue in the American courts. Eventually both the Yrgin and the Mexican Rancheros lost ownership of the land to immigrant Americans. A map produced as part of these court



The survey by Gray shows native settlement in 1841/42. Courtesy of The Bancroft Library at UC Berkeley.

cases, describing the area as of 1841/42, nevertheless shows “an agreed line between Estudillo and Indians” and areas explicitly used by Indians, including a corral, fields of wheat and “mellons [sic], corn and beans” (Gray 1855). The map provides a glimpse into an organized and extensive (> 1000 acres) Indian community persisting in the heart of the Bay Area through a half-century of Spanish occupation.

The willow groves were also valued for a time in the American era. One was developed into a popular vacation spot. In 1893, the *Hayward Journal* described “The Picnic Paradise of California,” proclaiming that:

“There is not a more beautiful picnic or pleasure resort on the coast than San Lorenzo Grove, situated in the charming village of San Lorenzo, on the line of the Oakland, San Leandro and Haywards Railway, owned by this company, who have spent a large amount of money in erecting a handsome and spacious pavilion and providing every accommodation for pleasure seekers. The electric cars run every half-hour to this grove . . .”

In striking contrast to current conceptions of willow marshes as unpleasant and mosquito-producing, these features were selected by leading citizens and molded into elegant gardens and homesites.

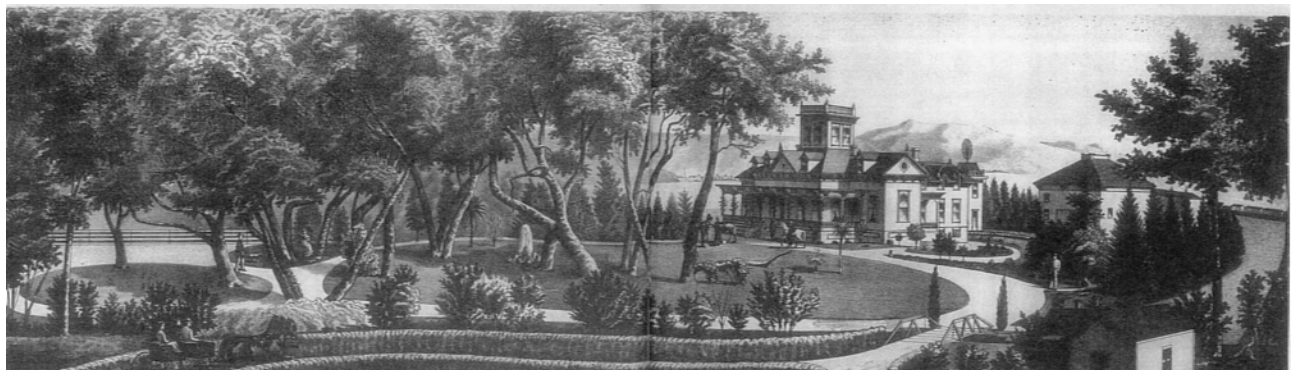
Towns

At the time of European contact, San Lorenzo Creek watershed was part of the lands of the Yrgin people. The Yrgin appear to have been closely related to their neighbors to the north, the Jalquin, who lived in the vicinity of San Leandro Creek and the Redwoods, and the Seunen, of the present San Ramon-Dublin area to the east. The Yrgins entered Mission San Jose primarily between 1799 and 1805, due to a variety of pressures, including aggressive missionary work, disease, and decreasing food supply.

In their initial contacts, the native people were generally peaceful in response to the newcomers. In an indicative description by Father Font, he reports that “[o]ne Indian who carried his provisions on the end of a pole invited us to eat some of them” (Bolton 1933: 357). In the vicinity of San Lorenzo Creek, Father Font describes the local language as “distinct from all those we had formerly heard,” reflecting the cultural diversity of the Bay Area, which supported several dozen distinct tribes at the time of European contact (Milliken 1985).



Drawing of the San Lorenzo Grove (“A Savory Spot”). The renowned willows can be seen to the left of the building (Eden Writers 1975).



The elegant residence of John Marlin in the San Lorenzo willow groves (Thompson and West 1878).

Studies of the Alameda Creek area, several miles to the south, and other parts of the Bay Area, suggest that indigenous residences shifted seasonally to utilize the resources available at different times of year. Because of the year-round availability of shellfish and other aquatic foods, however, tribes usually maintained some permanent presence in a village on the shores of the Bay. In the San Lorenzo area, the shellmounds located at the northern edge of the vast South Bay marshlands may have been such a village. During winter, migratory waterfowl were hunted in the marshes. During spring and summer, groups spread out to the collect bulbs, greens, and grass seeds from the alluvial plain. They developed base camps and brought materials back to the bayside village for winter storage. In summer and fall, the hills were utilized for hunting deer and the intensive gathering of acorns from groves of oak trees. Seasonal villages were associated with these activities.

Artifacts and historical information suggest that seasonal villages in the San Lorenzo Creek area were probably located at the Diramaderos springs, in downtown Hayward, in the vicinity of the San Lorenzo Cemetery, and at the Holy Sepulcher Cemetery. These summer and fall habitations are located at springs or creeks at the base of the hills that would provide water sources later into the year, or, in the case of downtown San Lorenzo, along the creek in the willow groves downstream of the large spring at Diramaderos. Miller suggests that the Hayward Civic Plaza was a key village site because San Lorenzo Creek provided the only perennial source of freshwater (1975: 10).

Most of the early Spanish and American town centers in the vicinity — including San Lorenzo, Hayward, Alvarado (numerous shellmounds), and Mission San Jose (the Indian village of Oroysom) — were established on native village sites, which had already been identified as the best spots for human settlement. In fact, some of these sites, such as San Lorenzo and Alvarado, had been physically constructed by indigenous communities. Shellmounds several stories high provided an elevated position above the valley floor, removed from floods, and often planted with buckeye trees for shade.

Despite persistent Indian presence in the vicinity, squatters such as Mulford and Roberts were able to establish an American settlement in the shellmounds and willow groves near the Bay during the 1850s. "Squattersville" became the town of San Lorenzo, well-positioned for access to the waterfowl and salt resources of the marshes, and a natural crossroads (leading to its other historical name: "Four Corners").

In 1839, Guillermo Castro took advantage of the shelter of the San Lorenzo Creek canyon mouth, near the creek and springs, and built a small adobe in what is now Hayward. Within a few years the Mexican government granted him the San Lorenzo Alto Rancho, which he operated from this location. A decade later, William Hayward established a store in tents among the oaks on land purchased from Castro, which soon became the major local institution, Hayward's Hotel.



The *Casa de los Indios* at the Diramaderos. From the *Diseno de Rancho San Lorenzo*, courtesy of The Bancroft Library at UC Berkeley



The densely populated area (gray/white pattern) now surrounding San Lorenzo Creek (red arrows) has expanded from two towns established near its banks, Hayward and San Lorenzo (black circles). They were built upon the sites of previous Indian settlements.

As the town expanded around "Hayward's Place," it experienced a convoluted etymological evolution to arrive at its current name. When the local use of "Hayward's" was disallowed by the U.S. Postal Department because Hayward was a living person, town leaders came up with the creative solution of "Haywood." This name lasted for almost a decade until the town was officially chartered as "Haywards," without the apostrophe, and approved by the Postal Department. In 1911 the name was streamlined to Hayward.

Redwoods

The redwoods in the canyons of neighboring San Leandro Creek represented a valuable, locally-rare building material — large, closely spaced trees with straight, durable, easy-to-work wood. The road from Castro Valley to the redwoods was an essential route to acquire lumber for both local use and distribution to San Francisco and other markets. As early as the Rancho era, Castro obtained lumber for his corral, barn, and fence posts from the redwood groves. Substantial deforestation did not take place, though, until the 1850s, when the tremendous growth of San Francisco during the Gold Rush necessitated large amounts of building material. Consumption was so rapid that most of the Oakland-San Leandro redwoods had been depleted by the end of the decade (Sandoval 1943-1944).

Roads

When Europeans first explored the Bay Area, they generally didn't have to blaze trails through thick chaparral or tall grass. Rather, they followed the road — "el camino." The first Spanish expeditions commonly record "well-beaten paths," even in places where few native peoples were encountered (e.g. Bolton 1927: 285). Coming up the East Bay in 1776, Font comments that "the road is apart from the estuary, at first about a league and then farther and farther away" (Bolton 1933: 359) and "the road followed the foothills" (Bolton 1933: 361). Anza's diary from the same expedition summarizes the route near San Lorenzo Creek, also notes the grassland-covered hills, conspicuously lacking forest: "the road



The old bridge across San Lorenzo Creek at Foothill Boulevard. Courtesy of Paul Modrell and the Hayward Historical Society.

runs close to a small range completely bare of trees, for none are seen except some which grow in the canyons" (Bolton 1930: 135).

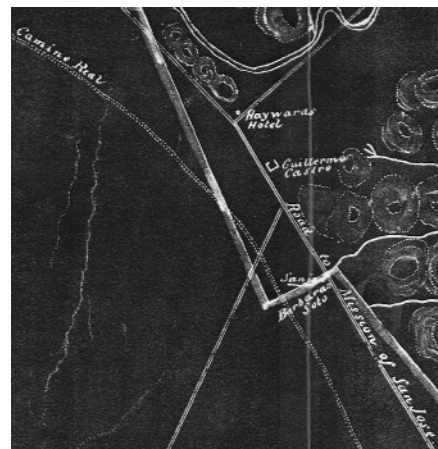
The roads encountered by the Spanish had been etched into the landscape through centuries of indigenous use, connecting villages or towns to local resources and more distant destinations. The Indian road described above linked the Santa Clara Valley with the Oakland area. With the assumption of control by the Spanish government, it became El Camino Real, the only continuous road along the East Bay plain in historical times. Present-day Mission Boulevard (East 14th St./International Blvd. in Oakland) largely follows the original Indian and subsequent Spanish road, but some adjustments were made. While the ancient and early historical roads tended to make adjustments for small hills and swales, modern roads reduce both vertical and lateral variation with road cuts and fill. Additionally, while earlier roads usually make perpendicular crossings at creek narrows (to minimize bridge length), larger modern bridges tend to be aligned for maximum linearity. While generally similar, the displacement of the straight modern route from the ancient route can be substantial.

Despite these variations, many important modern roads generally follow ancient routes. Redwood Road carried felled trees from the neighboring San Leandro Creek watershed down through the less rugged Castro Valley. Marina Boulevard crossed the alluvial plain to Mulford Landing, the shellmounds, and a large salt pond. Similarly, Hesperian Boulevard split off from El Camino south of San Leandro to reach the important shellmounds, salt ponds, and landings on Alameda Creek at Alvarado.

From San Leandro, a second road along the plain splits from El Camino, becoming Washington Boulevard. Specifically constructed to transport redwood lumber from the forest to Roberts Landing, Washington turns towards the Bay as it approaches San Lorenzo, precluding a direct route between the two towns and creating a peculiar but persistent road pattern in that area.

Many of the other original roads radiated outwards from Hayward, ultimately shaping the region's geographic pattern. The town center of Hayward occupied a natural position as a crossroads between El Camino and the most convenient route through the hills to the lush Livermore Valley. This route through the canyons to the extensive freshwater marshes and willow groves that characterized Livermore Valley was also presumably used by the local tribes. As Livermore became an important area for ranching and agriculture, the road became a well-used route by Euro-Americans, from the private wooden plank toll road developed by Dougherty in the 1850s, along which his stagecoach line operated, to Dublin Canyon Road and Highway 580.

From the central, habitable location that became Hayward, roads extended across the plain to the three neighboring towns — San Leandro, Squattersville/San Lorenzo, and Alvarado — and to the major bayside landings. Thus Castro Valley Boulevard-Mattox Road-Lewelling Boulevard, A Street-Bockman Road, Winton Avenue, and Jackson Street connect the Hayward area to the many important sites along the Bay, in



1862 map shows the curve of El Camino Real, several hundred feet from the line of Mission Boulevard, near the crossroads at Hayward's Hotel (Stratton 1862).

a roughly radial rather than orthogonal pattern. These destinations were also important sites of native activity, so these roads probably substantially follow indigenous routes.

These patterns reflect the greater significance of roads between the hills and the Bay through most of human history, when local resources were more important for local sustenance and economics. Today the dominant routes of transport and commute run parallel to the Bay, and through the canyons to the interior valleys of the county. Roads angling across the alluvial plain — the routes for gathering salt, bringing acorns to bayside villages, visiting waterfowl hunting sites, launching tule canoes for Bay fishing and transport, carting grain and redwoods to Bay schooners — have become less important. The intersection of the more angular transverse routes with the parallel routes along the plain has created an idiosyncratic local street pattern, with a preponderance of irregularly-shaped plots and major streets which do not directly connect.

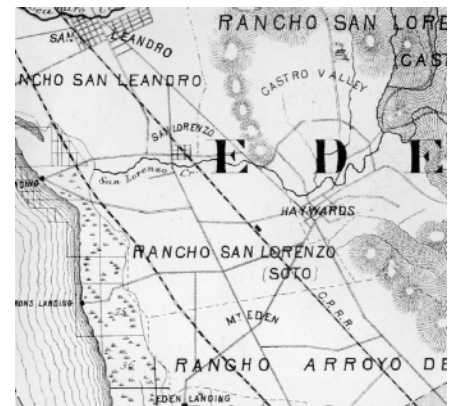
The street grids that dominate the present-day landscape are, for the most part, established within these large triangular and trapezoidal shapes created by the ancient road network. For example, the newer streets Research Road, Trust Way, and Investment Boulevard subdivide land bounded by the older Jackson Street and Eden Landing Road.

Dense internal patterns have been developed to allow intensive access to parcels within this framework and a supra-transportation system of railroads and freeways created for frequent travel over longer distances. However, the organizational system of the area is still largely structured by springs, sloughs, and redwoods now non-existent or hidden away. A “destinational” system developed to connect naturally distinctive local places has become the organizational system for a more homogenous use of the landscape. Interestingly, Bay-to-Hills trails proposed for local creeks may re-establish some of the cultural importance of these historical routes.

Railroads

The first railroad across San Lorenzo Creek was a local railroad between Alameda and Hayward that began operation in 1865. The line was designed to transport local agricultural and industrial products and to deliver clients to the spa-hotel at Warm Springs. Its conception aroused great fanfare and boosted the growth of Hayward, but damage from the 1868 earthquake and the completion of the juggernaut transcontinental railroad led to its demise. The *Alameda and Haywards* tracks never reached Warm Springs and were torn up in 1873.

In 1869, the transcontinental Western Pacific Railroad, paralleling and superseding the earlier railroad, came through Niles Canyon to Hayward, connecting Oakland to the East Coast of the United States. The new railroad initiated the decline of the commercial landings, particularly with the establishment of the South Pacific Railroad in 1878 immediately adjacent to, and in places, through the marshlands.



Early roads in the vicinity of San Lorenzo Creek (Haynes 1878).



Diagonal street patterns in Hayward reflect relationships between natural landscape features.

Farmland

Following the acquisition of California by the United States in 1848 through the Mexican-American war, the lands surrounding San Lorenzo Creek were rapidly transformed into farmland. Despite the previous half-century of grazing and associated ecological changes, the gentle underlying topography of the San Lorenzo Creek alluvial fan still offered remarkable fertility to American squatters and settlers. Future city namesakes Hayward and Meeks described the incredible height of wild oats and mustard (20 ft tall!), both referring to non-native species advancing in a changing landscape in the early 1850s. The common seasonal flooding that had produced these rich soils still continued alongside American development for a full century, until the construction of the major flood control projects of the 1950s.

Agricultural ventures grew rapidly in the second half of the 19th-century, associated with the disintegration of the massive Mexican land grants. Smaller plots were sold off by Castro and others to raise cash for the legal costs of proving title in the American courts. These parcels were developed into farms by immigrants such as Meeks and Lleweling, who established the political and economic framework that evolved into the present-day cities. Locally produced potatoes, grain, hay, fruit, and vegetables from these farms were transported to the rest of the Bay Area through the landings.

By 1864, Meek's orchards employed 100 people and used an irrigation reservoir in the foothills 3 1/2 miles away (Sandoval 1943-44: 326). Four years later, the orchards included 20,000 almond trees, 3,000 plum trees, and 32,000 currant bushes (Stuart 1951; Sandoval 1943-44: 327). Agricultural production in the area surrounding San Lorenzo Creek continued to be the dominant use of the land through World War II and into the 1950s.

Canyons

Spatially removed from the more intensive cultural development of the alluvial plain, the canyons tributary to San Lorenzo Creek nevertheless have experienced a dramatic land use history. By contributing water and sediment to the creek, they also contribute fundamentally to characteristics downstream.

While the canyons comprising the upper watershed of San Lorenzo Creek were too dry to support grand redwood forests, they were surprisingly lush a century ago. In her memoirs, Amy Jensen (1892-1977) of the Jensen Ranch family describes the Eden Canyon of her childhood, recalling that "[t]he banks [of the stream] on either side were covered with maiden-hair and sword ferns and lace flowers and hair bells and other lovely flowers in between." She recounts wildflowers in detail: "the lovely fields of lupines, poppies, cream cups, butter cups, wild hollyhocks and the delicate wind poppies . . . are all gone." Jensen ascribes these changes to "the cattle and sheep [that] have roamed the hills and dells and nibbled busily away at everything green" (Jensen 1999).

European use of the canyons initially focused on cattle grazing. Castro established herders' camps at the mouths of each canyon, while using the



"SCOOP . . . Huge shovels began scooping out the dirt near the mouth of San Lorenzo Creek this week. Photo shows present three-foot depth of creek bed under a Southern Pacific railroad bridge. Second dotted line shows 11-foot depth to which the Creek will be dredged under the bridge." (Original caption in the Daily Review, 1954; courtesy of Hayward Historical Society)

adjacent Castro Valley for summer fattening. Americans quickly established agricultural practices in the canyons, despite steep hillsides that made plowing and harvest challenging. Barley, oats, and hay were put in using single horse-drawn plows, wooden binders, and bundle wagons. More mechanized equipment appeared in the latter part of the 19th century (including traction engine harvesters weighing as much as 11 tons, introduced in the 1880s) and diversified crops were developed. Fred Jensen recollects prunes, apricots, plums, and almonds, an entire hillside of peas, olive trees mixed “among the oaks and brush,” and 400 tons of tomatoes (Jensen 1993).

In the mid part of the 20th century, after nearly a century of agriculture in the canyons, most farming operations reverted to sheep and cattle grazing — an unusually circular pattern of development. Fred Jensen looked back upon this history in 1965:

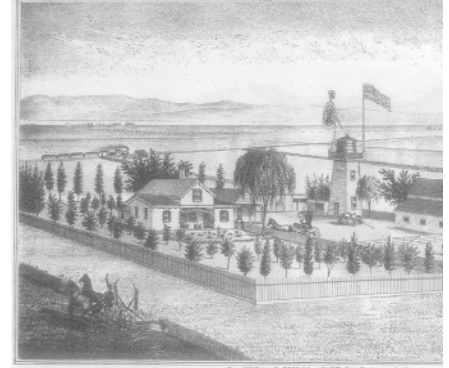
“As time went on and circumstances changed, the Ranch was leased and sheep do most of the harvesting now. Maybe an easier way to do it.” (Jensen 1993)

In more recent decades, suburban development has expanded into some parts of the canyons. The Euro-American transformations of the canyons — from grazing to agriculture to grazing to residential development — have modified how the canyons function as part of the watershed. Some of these effects include the replacement of native hillside vegetation with plants more tolerant of intensive grazing, increased exposure of soils to erosion, and more rapid runoff following storms (Collins, pers. comm.). Greater delivery of sediment and water to the stream has likely decreased the quality of fish habitat and increased the potential for flooding. These effects are being studied in greater detail for Crow Canyon, as part of the Crow Canyon Watershed Science Project (Collins, in progress).

Flood Control — Urbanization

While residential development has begun to enter the canyons in recent decades, intensive urban development has already transformed the flatlands. After 50 years of cattle grazing and a century of agriculture, most of the alluvial plain was converted to residential and commercial use within a decade. Intensive development of San Lorenzo Creek’s floodplain only became possible with the Army Corps of Engineers Flood Control Project. Between 1954 and 1961 the creek’s lower reach was converted into a concrete flood control channel, and numerous other modifications were made between the Bay and the base of the hills. During the early 1960s, dams were also constructed on two of the main tributaries, Cull Creek (Cull Creek Dam) and Palomares Creek (Don Castro Reservoir).

In the ten years between 1950 and 1960, the population of Hayward increased a remarkable 500 percent — from 14,246 to 72,700 people. Part of the post-World War II population boom, the growth of cities here was made possible largely by the changes to the creek. Among the many major developments built in the subsequent decades was Southland, one of the West Coast’s first and largest fully enclosed commercial malls.



Grain harvest depicted as part of a farm scene in the *Official Historical Atlas Map of Alameda County* (Thompson and West 1878).

The landscape continues to change, in response to natural processes, the human modifications, and larger climatic shifts. For example, peak flows in the creek appear to be increasing, due to development of the watershed. As a result, it is likely that the flood control channel will become less effective at restraining floods in the future. In recent years, local residents have found rainbow trout 20 inches long in the creek above Hayward, indicating that fish may still migrate up San Lorenzo Creek from the Bay, despite the changes. Interactions between the creek and its inhabitants will continue to evolve, shaping life alongside the Bay.



"MULTI-MILLION DOLLAR POTENTIAL . . . Above is 2000 acre flood plain of San Lorenzo creek which will be freed of flood threat by \$369,000 channel widening and deepening project to be accomplished in the next six months by Alameda County Flood Control and Water Conservation district. Good drainage will open up the area for industrial and residential development."

Drawing on the left from a 1954 newspaper article (caption above) shows the planned flood control channel on San Lorenzo Creek, with surrounding open space and discrete townships. Photograph on the right, 50 years later, shows the completed channel and adjacent development. (Daily Review 1954 courtesy of Hayward Historical Society; aerial view on the approach to Oakland International Airport November 2003)

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References

Timeline Graphic

- Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
- FEMA (Federal Emergency Management Agency) 1986. *Flood Insurance Study. Alameda County, California Unincorporated Areas*. Vol I. 60 pp.
- Jackson, Robert H. 1994. "The Development of San Jose Mission, 1797-1840." In Lowell John Bean (ed) *The Ohlone Past and Present*. Ballena Press, Menlo Park, CA. 373 pp.

San Lorenzo Creek

- Bolton, Herbert Eugene 1927. *Fray Juan Crespi: Missionary Explorer on the Pacific Coast 1769-1774*. University of California Press, Berkeley, CA.
- Bowman, J. 1947. *The Area of the Mission Lands*. Manuscript from Bancroft Library, University of California, Berkeley.
- Collins, Laurel. Watershed Sciences, Berkeley, CA.
- Feng, Arleen. Alameda County Countywide Clean Water Program.
- La Croze, John 1858-63. *Plat of the Rancho San Lorenzo*. U.S. Surveyor's General Office, San Francisco, CA. Earth Sciences Library 64362 32286 1863 L3 Case D, University of California, Berkeley.
- McCarthy, Francis Florence 1958. *The History of Mission San Jose California 1797-1835*. Academy Library Guild, Fresno, CA.
- Modrell 2000. Interview notes from meeting with Steve and Cordelia Morris, August 2, 2000.
- Modrell, Paul. Alameda County Flood Control and Water Conservation District Clean Water Program.
- Sandoval, John S. 1991. *The Rancho of Don Guillermo: a History of Hayward, Castro Valley and San Lorenzo, Volume I: The Early Years 1843-1890*, etc.
- Stanger, Frank M. and Alan K. Brown 1969. *Who Discovered the Golden Gate?* San Mateo County Historical Association.
- United States Coast Survey (USCS) 1857. *San Francisco Bay, CA*, Topographic Register No. 635. Lead surveyor David Kerr.
- United States Coast and Geodetic Survey (USCGS) 1900. *San Francisco Bay, San Leandro Bay to Roberts Landing, CA*. Topographic Register No. 2486. Lead surveyor Fremont Morse.
- Whitney, J.D. 1873. *Map of the Region Adjacent to the Bay of San Francisco*. State Geological Survey of California.

The Alluvial Plain

- Bolton, Herbert Eugene 1933. *Font's Complete Diary*. University of California Press, Berkeley, CA.
- Duhig, S.M. 1990. *Huichica: Recollections of Stewart M. Duhig*. Viola Duhig, Napa County, CA. 99 pp.
- Sandoval, John S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Mt. Eden Historical Publishers, Hayward, CA. 240 pp.
- Simpkinson, Francis Guillemard [1837] 1969. Midshipman Simpkinson's Account. In Richard A. Pierce and John H. Winslow (eds) *H.M.S. Sulphur at California, 1837 and 1839. Being the accounts of Francis Guillemard Simpkinson and Captain Edward Belcher*. The Book Club of California, San Francisco, CA.
- Stewart, O.C. 2002. *Forgotten Fires: Native Americans and the Transient Wilderness*. University of Oklahoma Press, Norman, Oklahoma. 364 pp.

The Bay Tidal Marshland

- Atwater, B.F., S.G. Conard, J. N. Dowden, C. W. Hedel, R. L. MacDonald, and W. Savage 1979. History, landforms, and vegetation of the Estuary's tidal marshes, p. 347-384. In T. J. Conomos, (ed) *San Francisco Bay: the Urbanized Estuary*. Pacific Division, Amer. Assoc. Advance. Sci., San Francisco, CA.
- Atwater, Brain F. and Charles W. Hedel 1976. *Distribution of Seed Plants with Respect to Tide Levels and Water Salinity in the Natural Tidal marshes of the Northern San Francisco Bay Estuary, California*. U.S. Geological Survey, Menlo Park, CA. 41 pp.
- Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
- Goals Project 1999. *Baylands Ecosystem Habitat Goals*. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U. S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, CA. 295 pp.
- McCann, William E. and Hinkel, Edgar J. (eds) 1937. *History of Rural Alameda County*. Vol I. Works Progress Administration Project 165-03-6504. Sponsored by Alameda County for the Alameda County Library, Oakland, CA.

Salt Ponds

- Brown, A.K. 1960. Salt for the scraping: origin of the San Francisco Bay salt industry. *California Historical Society Quarterly* 34(2):117 – 120.
- Sandoval, John S. 1943-44. *Your Town and Mine -- a Short History of Hayward*. From Hayward Historical Society 979S.
- Sandoval, John S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Mt. Eden Historical Publishers, Hayward, CA. 240 pp.
- Ver Planck 1958. *Salt in California*. Bulletin 175. State of California Department of Natural Resources, Division of Mines. 168 pp.

The Landings

- Caltrans 1995. *Historic Property Report for the Proposed Project to Widen Route 92 from the Route 92/I-880 Interchange in the City of Hayward, Alameda County to the Midpoint of the San Mateo Bridge in San Mateo County*. Prepared for the Department of Transportation, U.S. Coast Guard by Office of Environmental Planning, South California Dept. of Transportation. Oakland, CA. 67 pp.
- Sandoval, Johgn S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Mt. Eden Historical Publishers, Hayward, CA. 240 pp.
- San Francisco Estuary Institute (SFEI) 2001. Wildcat Creek Watershed: A Scientific Study of Physical Processes and Land Use Effects. A Technical Report of the Regional Watershed Program. Oakland, CA.
<http://www.sfei.org/watersheds/wildcatreport/wildcatindex.html>

Mission San Jose Rangeland

- Bancroft, H.H. [1890] 1970. *The Works of Hubert Howe Bancroft, Volume XXIV: History of California Volume VII 1860-1890*. Wallace Hebbard Publishing, Santa Barbara, CA. 826 pp.
- Bowman, J. 1947. *The Area of the Mission Lands*. Manuscript from Bancroft Library, University of California, Berkeley.
- Jackson, Robert H. 1994. "The Development of San Jose Mission, 1797-1840." In Lowell John Bean (ed) *The Ohlone Past and Present*. Ballena Press, Menlo Park, CA. 373 pp.
- Quesada, William Gonzalo 1981. *The Agricultural Lands and Farming Practices of Mission San Jose:1820-1830*. Master's Thesis, University of California, Berkeley. 36 pp.
- Stewart, O.C. 2002. *Forgotten Fires: Native Americans and the Transient Wilderness*. University of Oklahoma Press, Norman, Oklahoma. 364 pp.
- Stuart, Reginald R. 1951. *San Leandro . . . A History*. First Methodist Church, San Leandro, CA.
- Stokle, John Gerald 1968. *Mission San Jose and the Livermore Valley, 1798-1842: Demography And Ecology of a Mission Hinterland*. Master's Thesis, University of California, Berkeley. 186 pp.

Diramaderos Sausals The Indian Grant San Lorenzo Grove

- Gray 1855. Map of a Survey of Lands Situated between San Leandro and San Lorenzo Creeks, the Bay of San Francisco and the Range of Mountains to the East, Exhibiting the Boundaries of the "Rancho San Leandro" and adjoining lands as Surveyed by Nicholas Gray, Deputy Surveyor, U.S., November 1855. From the UC Berkeley Bancroft Library, U.S. District Court Land Case Map F 524 (234 ND, p. 747).
- Hayward Journal 1893. In Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
- Sandoval, John S. 1943-44. *Your Town and Mine -- a Short History of Hayward*. From Hayward Historical Society 979S.

Sandoval, John S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Mt. Eden Historical Publishers, Hayward, CA. 240 pp.
Thompson and West 1878. *Official Historical Atlas Map of Alameda County*. Oakland, California.

Towns

Bolton, Herbert Eugene 1933. *Font's Complete Diary*. University of California Press, Berkeley, CA.
Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
Miller, Don 1975. *An Historical Survey of the Land of Hayward Civic Plaza*. Unpublished manuscript. Treganza Museum, SFSU.
Milliken, Randall 1995. *A Time of Little Choice: the Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810*. Ballena Press, Menlo Park, CA. pp. 244-46, 284, 261.
Nelson, Nels 1907. Map of South San Francisco Bay Region Showing Distribution of Shell Heaps. Univ. Calif. Publ. Am. Arch. Ethn. Vol 7, Map 1.
Sandoval, John S. 1991. *The Rancho of Don Guillermo: a History of Hayward, Castro Valley and San Lorenzo, Volume I: The Early Years 1843-1890*, etc.
Simpkinson, Francis Guillemard [1837] 1969. Midshipman Simpkinson's Account. In Richard A. Pierce and John H. Winslow (eds) *H.M.S. Sulphur at California, 1837 and 1839. Being the accounts of Francis Guillemard Simpkinson and Captain Edward Belcher*. The Book Club of California, San Francisco, CA.
Stuart, Reginald R. 1951. *San Leandro . . . A History*. First Methodist Church, San Leandro, CA.

The Redwoods

Sandoval, John S. 1943-44. *Your Town and Mine -- a Short History of Hayward*. From Hayward Historical Society 979S.

Roads

Bolton, Herbert Eugene 1927. *Fray Juan Crespi: Missionary Explorer on the Pacific Coast 1769-1774*. University of California Press, Berkeley, CA.
Bolton, Herbert Eugene 1930. *Anza's California Expeditions, Volume III*. University of California Press, Berkeley, CA.
Bolton, Herbert Eugene 1933. *Font's Complete Diary*. University of California Press, Berkeley, CA.
Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
Haynes, M.B. 1878. *Map of the County of Alameda*. Thompson and West, Oakland, CA.
Milliken, Randall 1995. *A Time of Little Choice: the Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810*. Ballena Press, Menlo Park, CA. pp. 244-46, 284, 261.
Simpkinson, Francis Guillemard [1837] 1969 Midshipman Simpkinson's Account. In Richard A. Pierce and John H. Winslow (eds) *H.M.S. Sulphur at California, 1837 and 1839. Being the accounts of Francis Guillemard Simpkinson and Captain Edward Belcher*. The Book Club of California, San Francisco, CA.
Stratton 1862. *Topographic Map of the Rancho de San Lorenzo*. From the UC Berkeley Earth Sciences and Map Library.

Railroads

Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
Sandoval, John S. 1943-44. *Your Town and Mine -- a Short History of Hayward*. From Hayward Historical Society 979S.
Sandoval, John S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Mt. Eden Historical Publishers, Hayward, CA. 240 pp.

Farmland

Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
Hall, n.d. Reference No. 630, Hayward Historical Society.
Sandoval, John S. 1991. *The Rancho of Don Guillermo: a History of Hayward, Castro Valley and San Lorenzo, Volume I: The Early Years 1843-1890*, etc.
Sandoval, John S. 1943-44. *Your Town and Mine -- a Short History of Hayward*. From Hayward Historical Society 979S.
Stuart, Reginald R. 1951. *San Leandro . . . A History*. First Methodist Church, San Leandro, CA.

The Canyons

Collins, Laurel. Watershed Sciences, Berkeley, CA.
Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.
Hall, n.d. Reference No. 630, Hayward Historical Society.

Jensen, Fred 1993. *Jensen Ranch: Early School, Home and Ranch Activities -- Memories of Fred Jensen*. Edited and Printed by Erwin R. Jensen and Edith (Gunn) Jensen. Jensen Ranch Collection, Castro Valley, CA.

Jensen, Amy 1999. *Jensen Ranch: Childhood Memories*. Edited and Printed by Erwin R. Jensen and Edith (Gunn) Jensen. Jensen Ranch Collection, Castro Valley, CA.

Jensens 1964. *The Centennial of Jen's Christian Jensen's Arrival in California*. Program presented by the grandchildren and great-grandchildren of Jens Christian Jensen and Emilie Heinsen Jensen, July 4, 1964.

Modrell, Paul. Alameda County Flood Control and Water Conservation District Clean Water Program.

Flood Control Urbanized Land

Alameda County Public Works Agency Map and File Room, Index of Microfilm Drawings, Zone 2, Line B.

Daily Review (Hayward) 1954a. "SCOOP." October 18, 1954.

Daily Review (Hayward) 1954b. "MULTIMILLION DOLLAR POTENTIAL," June 28, 1954.

Eden Writers 1975. *Hayward ... the First 100 Years*. Hayward Centennials Committee, Hayward, CA. 184 pp.

Feng, Arleen. Alameda County Countywide Clean Water Program.

Modrell, Paul. Alameda County Flood Control and Water Conservation District Clean Water Program.