PART III //

HISTORICAL LANDSCAPE CONDITIONS AT THE LOCAL SCALE

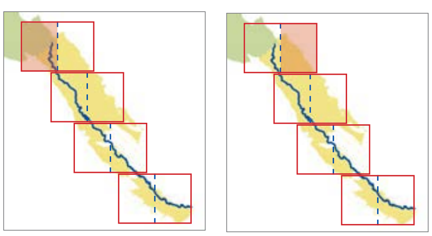
Part III examines conditions prior to Euro-American modification in more detail, focusing on channel morphology, wetland types, plant communities and their controlling physical processes. We also describe the evidence supporting these interpretations.

GEOGRAPHIC DIVISION

To organize the discussion of historical conditions, we divide the valley floor along Coyote Creek into four major sections **(FIGURE III-1)**:

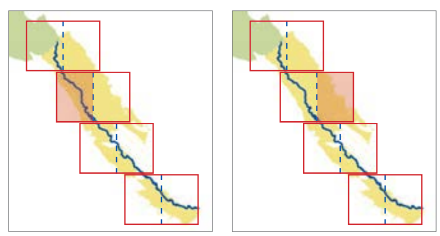
1

Lower Coyote Creek and Adjacent Areas covers the creek from the tidal marshlands, near the confluence with Mud Slough, upstream to the Montague Expressway crossing. It also incorporates the valley floor west and east, including Calera, Berryessa, and Lower/Upper Penitencia Creeks.



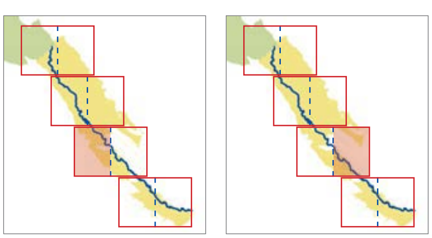
2

Mid-Coyote Creek and Adjacent Areas covers the creek from Montague Expressway to Highway 280 — the Mid-Coyote Flood Protection Project extent. To standardize map scale and area, it also includes a small additional length of creek, to Tully Road. Adjacent areas include the bottomlands east of downtown San Jose and distributary creeks such as Silver, Thompson, and Norwood.



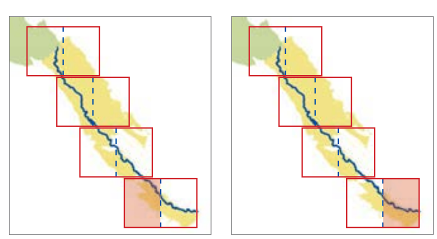
3

Coyote Creek/South San Jose covers the creek from Tully Road to Coyote Narrows and the relatively narrow adjacent valley lands.



4

Coyote Creek/Coyote Valley covers the creek from the Narrows to Anderson Dam, and the adjacent Coyote Valley.



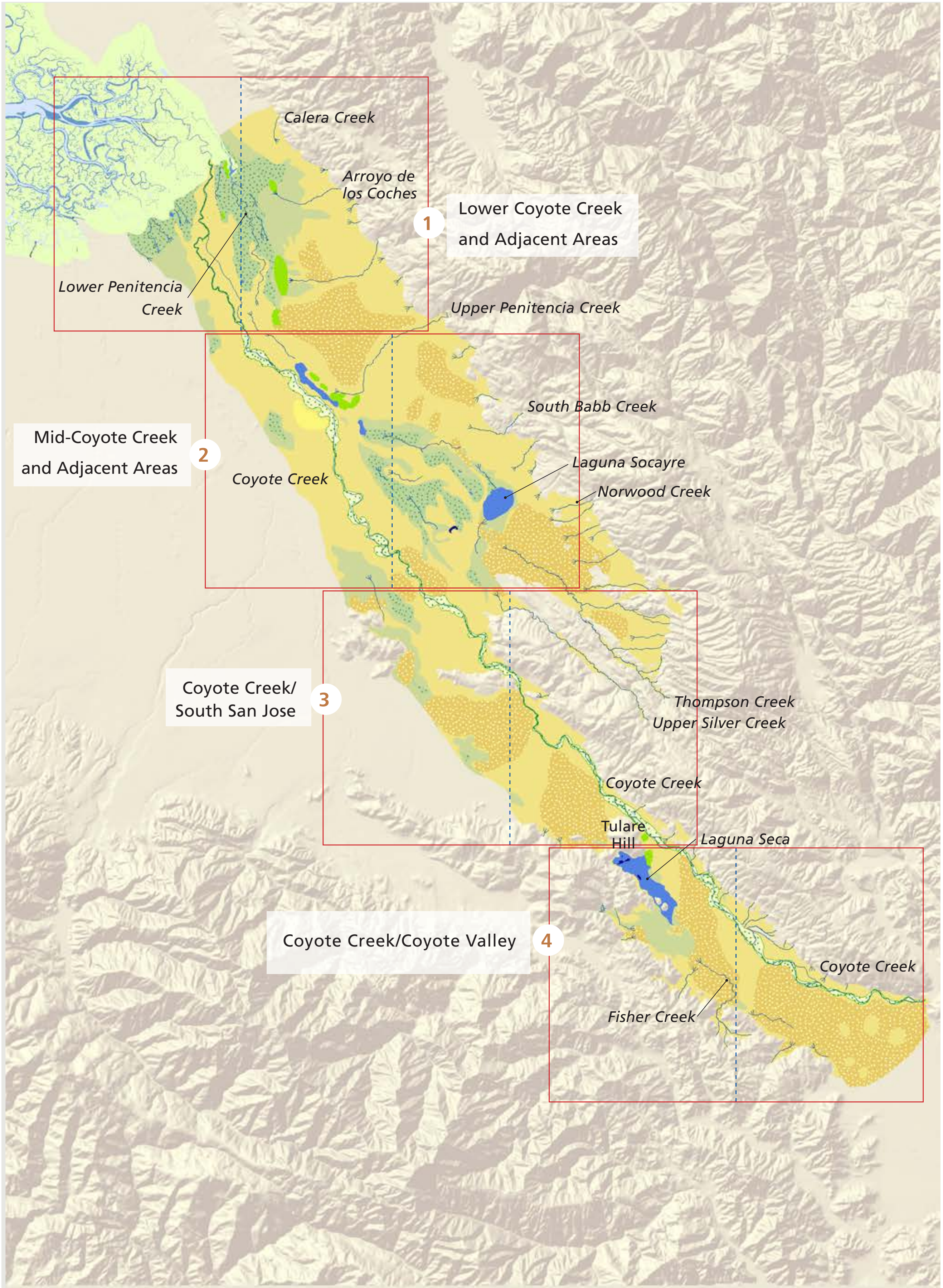


FIGURE III-1. REFERENCE MAP DIVIDING COYOTE CREEK AND ITS ATTENDING VALLEY FLOOR INTO FOUR MAJOR SECTIONS. See inside front cover for legend.

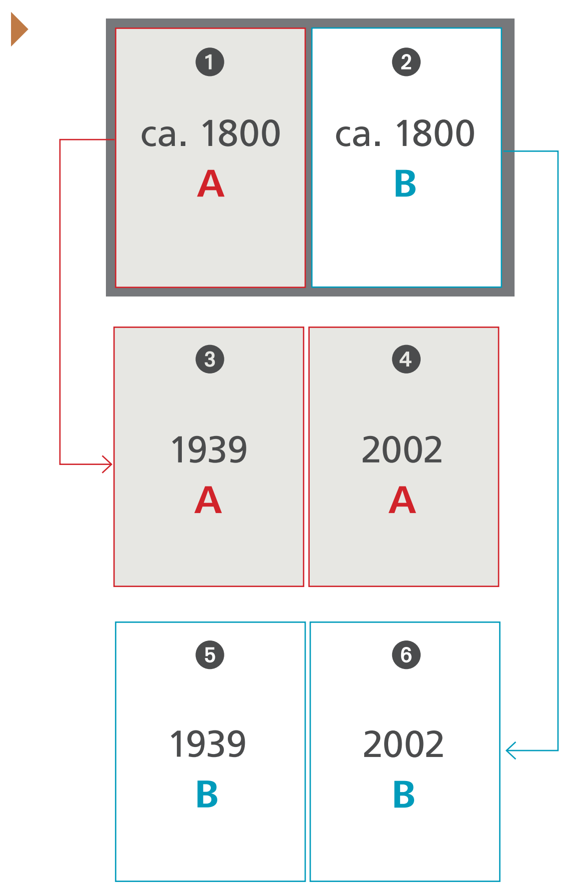
MAP GRAPHICS

To coordinate the presentation of information at different scales, we use **three** standard map scales. All standard maps are oriented with North at the top of the page.

- The overview maps showing the full Coyote Creek Valley floor area are made at 1:200,000 scale, or 1 inch equals approximately 3 miles.

- Each section in Part III begins with a 6-page 1:40,000 (1″= 3333′) reference map series showing the area circa 1800 (using the project GIS), in 1939 (using the georectified aerial photomosaic), and in 2002 (using a true color photomosaic by AirPhotoUSA). Past and present place names are shown here.

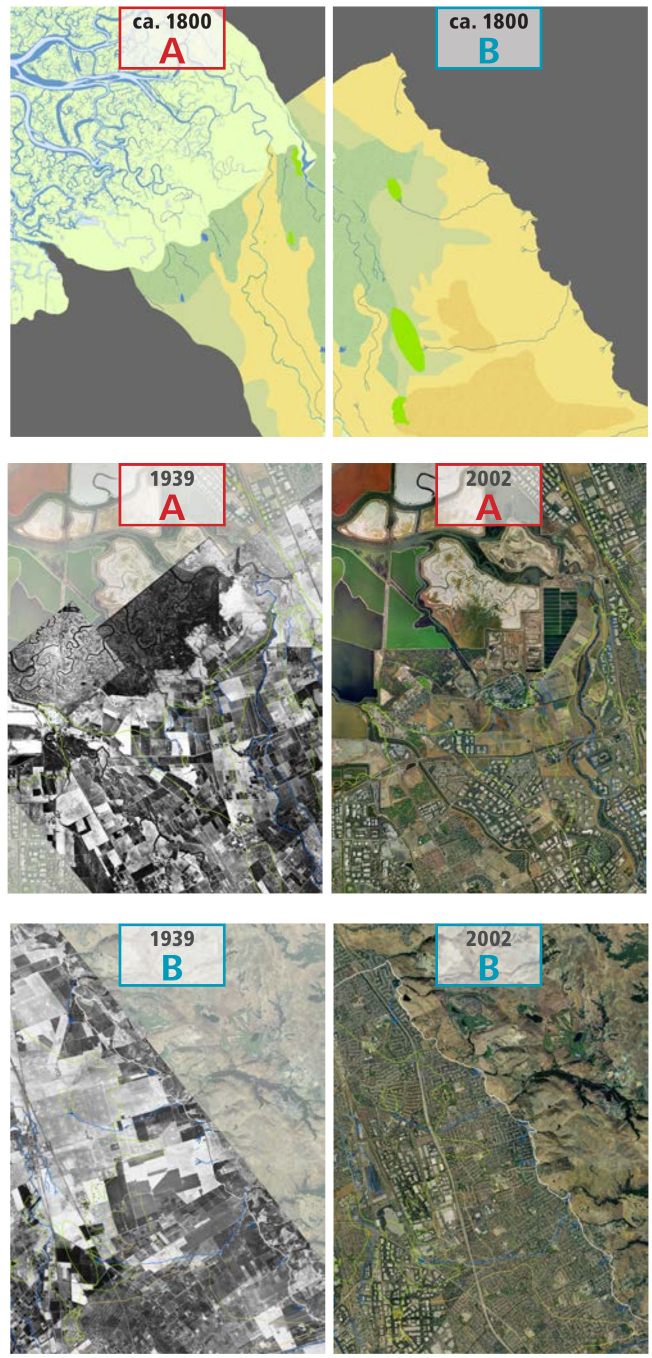
- About 20 “zoom-ins” distributed throughout the text focus on half-mile squares at 1:10,000 (1″= 833′). Features are thus enlarged fivefold and fourfold, sequentially.

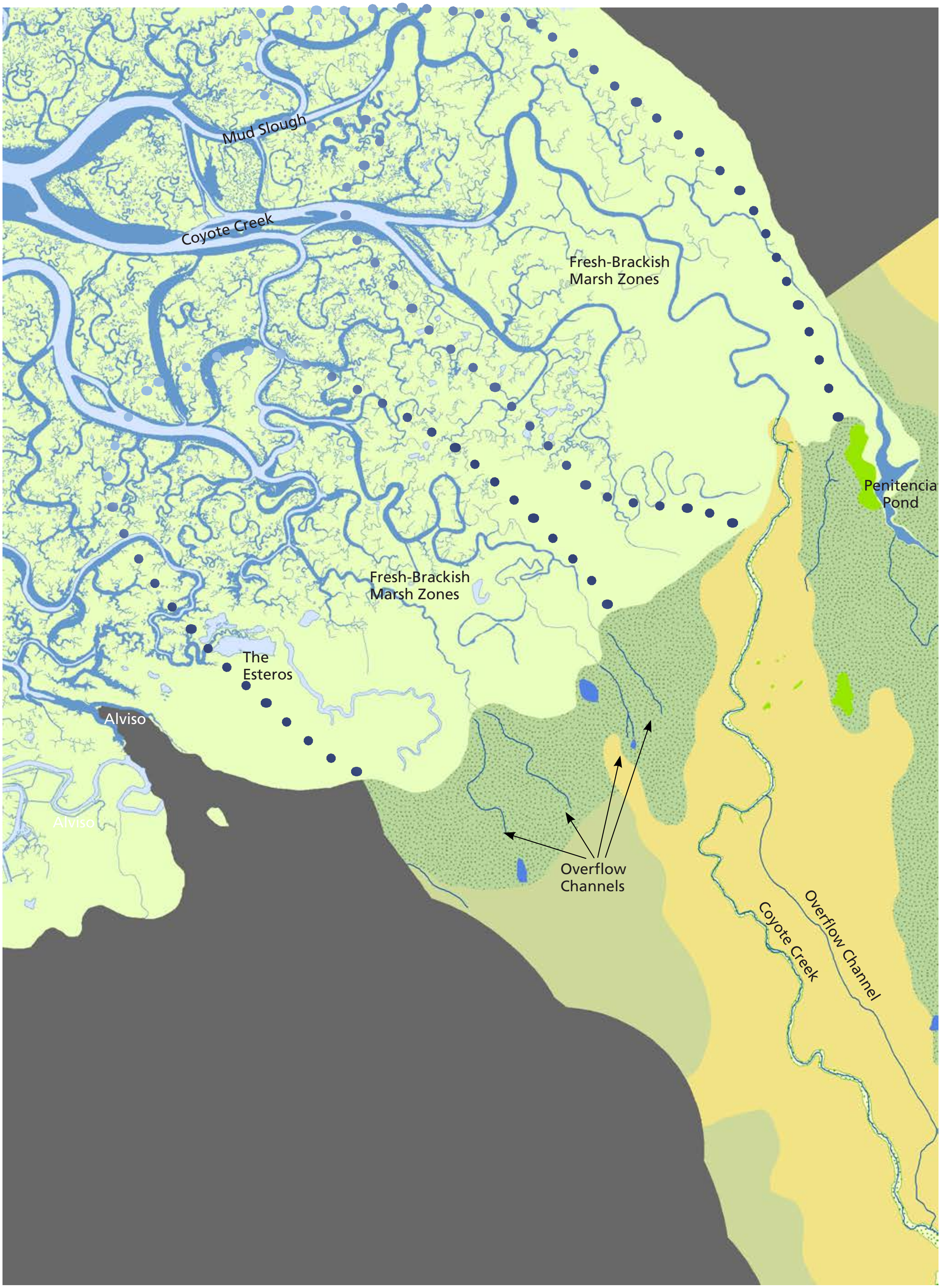


1

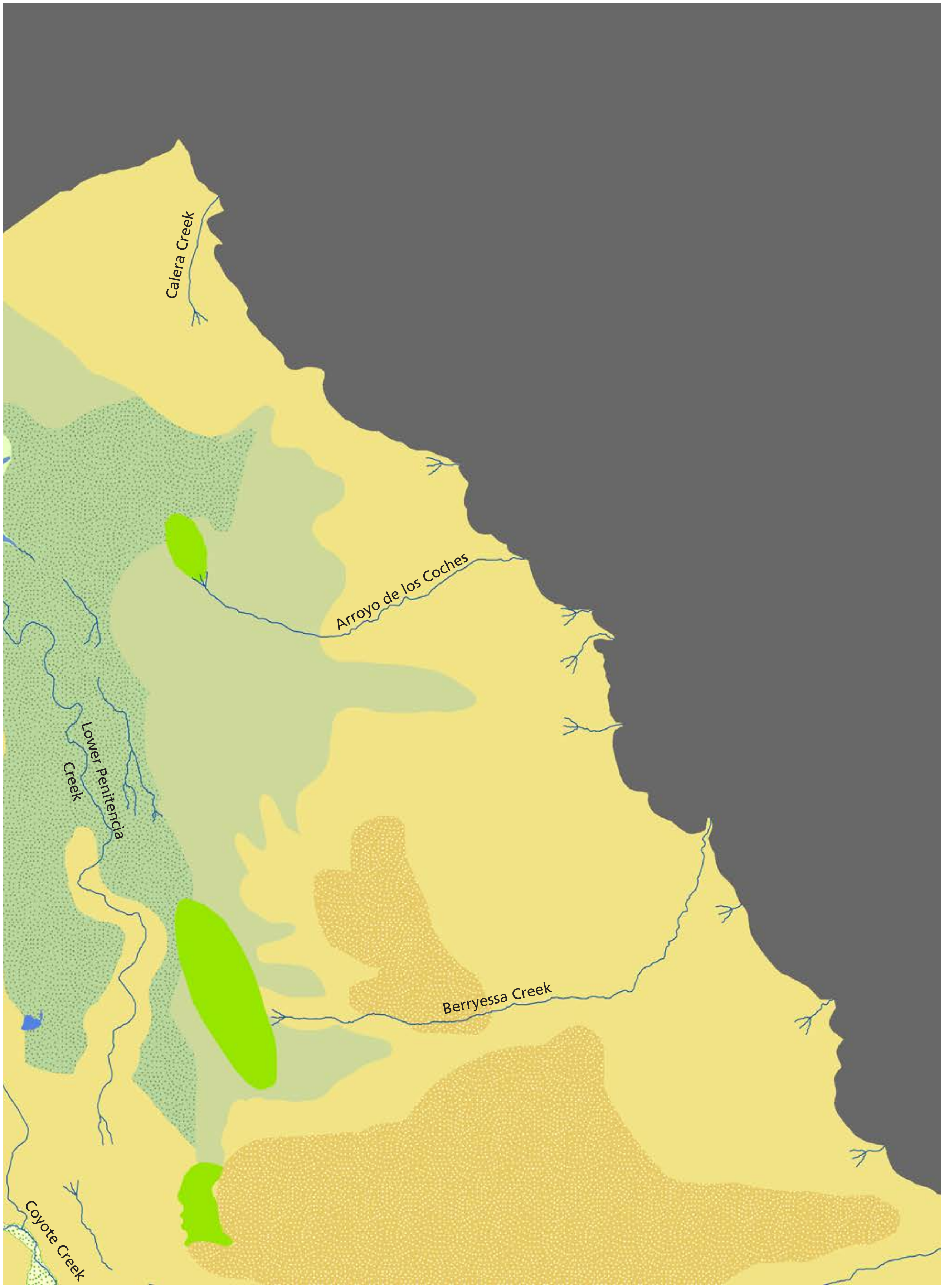
LOWER COYOTE CREEK AND ADJACENT AREAS

This section covers Coyote Creek from the tidal marshlands, near the confluence with Mud Slough, upstream to the Montague Expressway crossing. It also incorporates the valley floor west and east, including Calera, Berryessa, and Lower Penitencia Creeks.

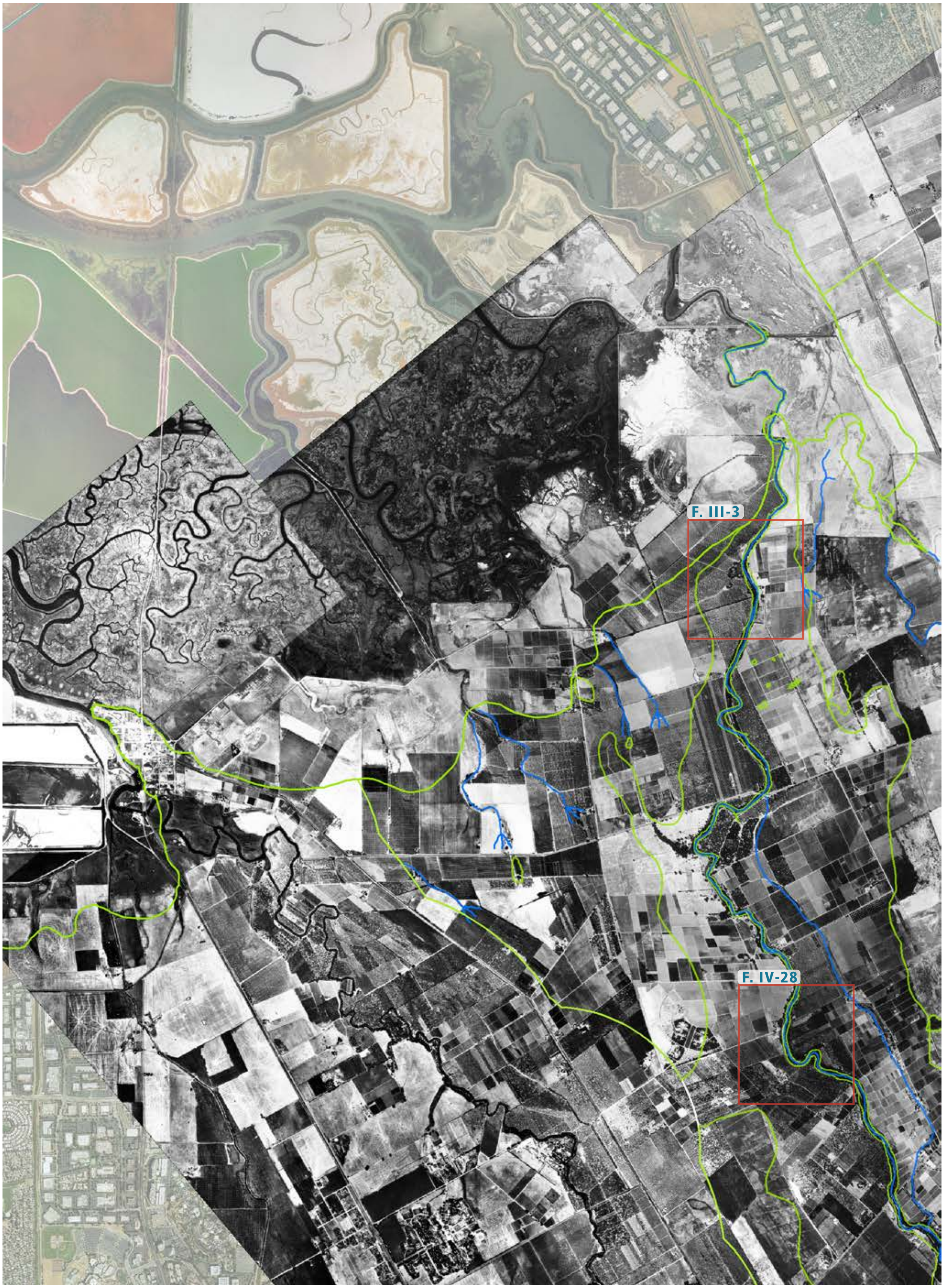




MAP 1A-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.

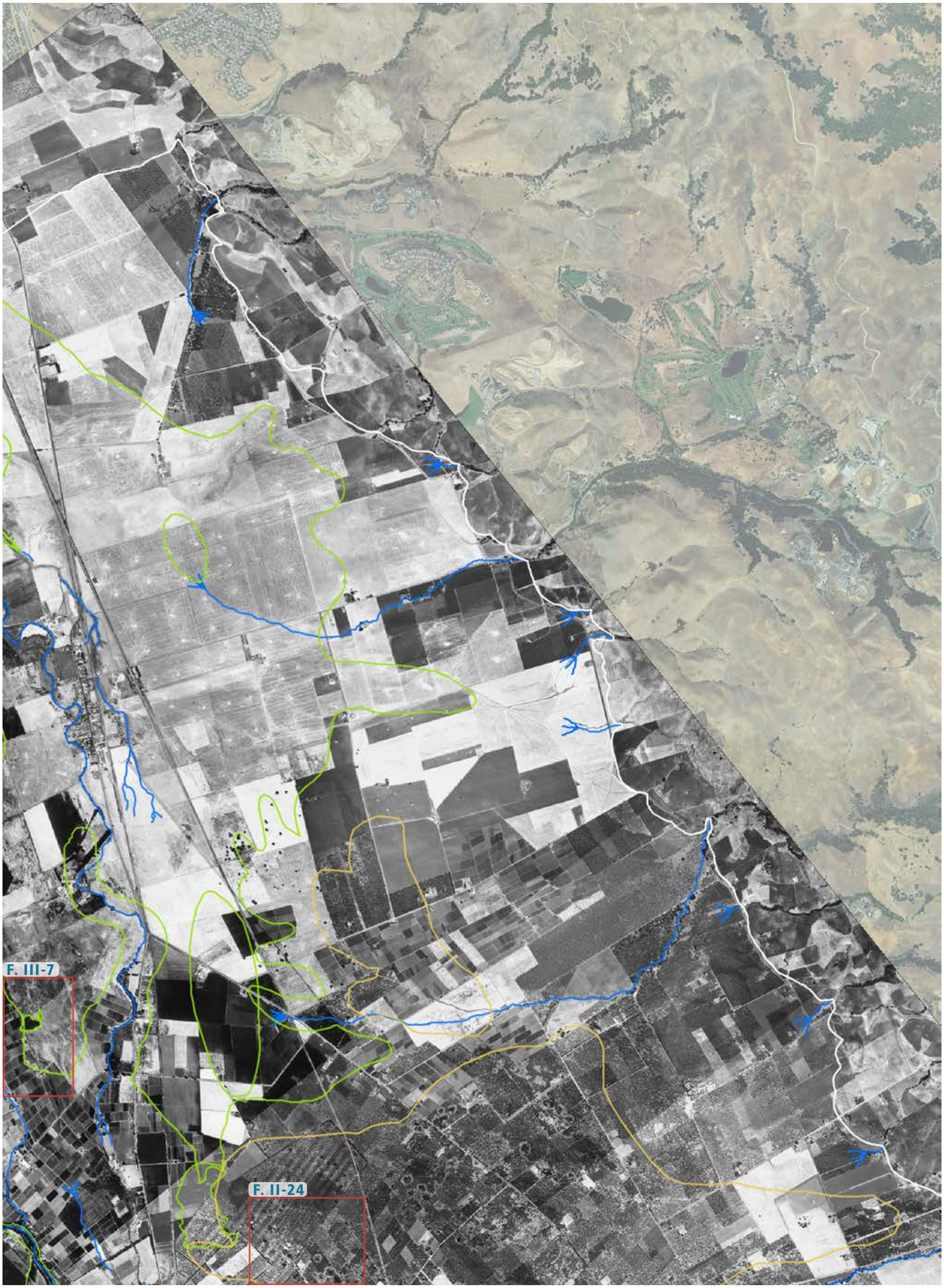


MAP 1B-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.



MAP 1A-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).

MAP 1A-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1″~3300′; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).



MAP 1B-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).

MAP 1B-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

In the Lower Coyote Creek Area, Coyote Creek's natural levee extends across the lower valley floor and into the Baylands. Prominent natural levees follow the creek's present and former routes. The smaller, steeper alluvial fans of Calera Creek, Arroyo de los Coches, Berryessa Creek, and Upper Penitencia Creek descend from the east side. In between the alluvial fans of the eastside creeks and Coyote, there was a large bottomlands area through which Lower Penitencia Creek meandered.

Willow groves, freshwater marshes, wet meadows, and salt grass-alkali meadows occupied the bottomlands areas. The smaller creeks dissipated on the alluvial plain near their canyon mouths, but the larger creeks —Arroyo de los Coches and Berryessa Creek — maintained defined channels into the bottomlands, where they ended in giant willow thickets. Trees were found along creeks, but outside of the riparian corridors and *sausals*, most of the area was a treeless plain. Wallace describes Rincon de los Esteros: "the land is perfectly level and destitute of timber except on the banks of the creeks" (Wallace 1858: 197). Numerous overflow or secondary channels carried flood flows from Coyote Creek and Lower Penitencia Creek. At the southeastern edge of the area, valley oak savanna appears on the Berryessa and Upper Penitencia Creek fans.

Fluvial sediment primarily entered the Baylands where Lower Penitencia Creek and Coyote Creek joined tidal sloughs. West of Coyote Creek, the overflow channels were apparently supplied by artesian water, creating additional points of freshwater influence into the Baylands. During floods, overland flow ran across the entire Baylands-Bottomlands interface, creating large areas of temporary ponding (**FIGURE III-2**).

Gradients of fresh to brackish to saline tidal marsh extended a substantial distance from the points of freshwater influence into the Baylands, creating tule-lined channels. Extreme high tides spread beyond the limits of the tidal marsh, well into the *salitroso* lands — the saltgrass-alkali meadows adjacent to the tidal marsh.

LOWER COYOTE CREEK

Lower Coyote Creek was one of the relatively few Bay Area streams to maintain a continuous, well-defined channel across the entire valley floor and directly join a tidal slough. The channel supported a narrow but continuous, dense riparian forest along this reach, as shown

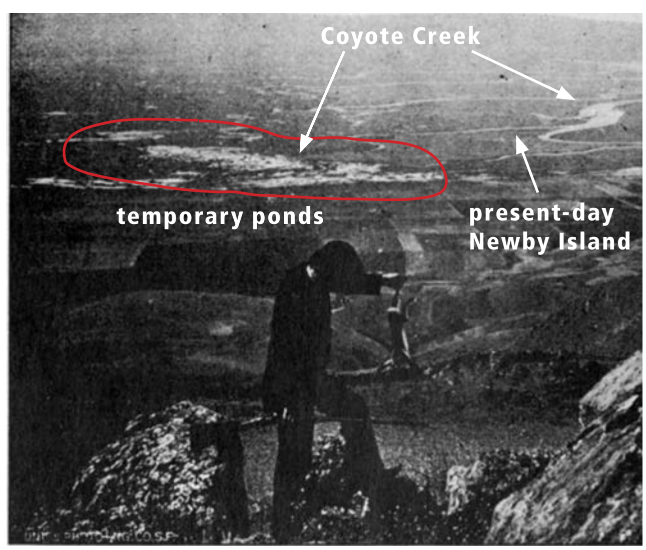


FIGURE III-2. SEASONAL PONDING IN THE BOTTOMLANDS ALONG LOWER COYOTE CREEK, 1896. This view looks east across the South Bay Baylands at the fluvial-tidal interface on Coyote Creek (Shortridge 1896, courtesy History San José).

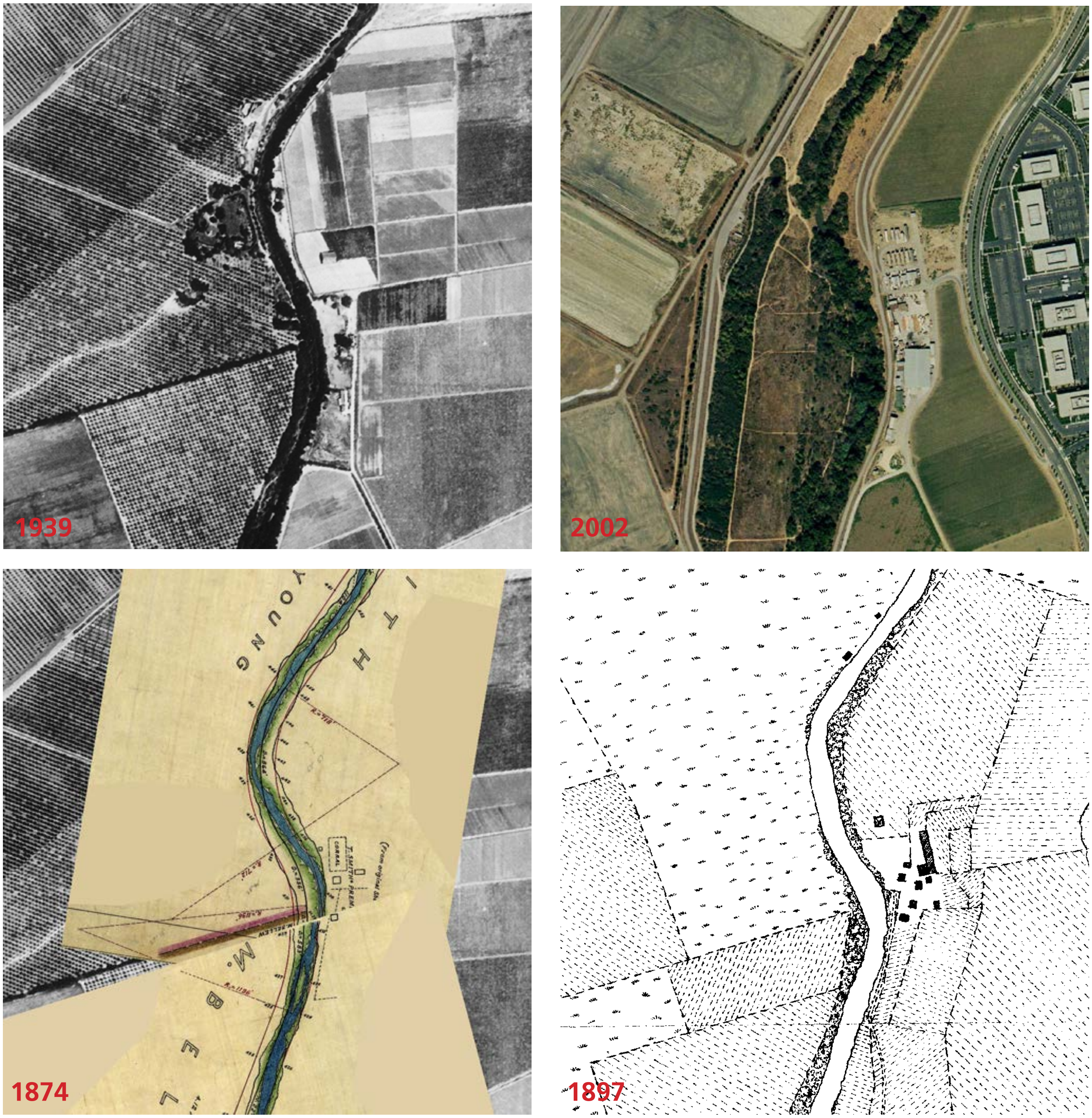


FIGURE III-3. **SEQUENTIAL IMAGES OF LOWER COYOTE CREEK ADJACENT TO THE PRESENT-DAY SAN JOSE-SANTA CLARA WATER POLLUTION CONTROL PLANT.** These data illustrate conditions in 1874 (lower left, Herrmann 1874, courtesy Santa Clara County Surveyors Office), 1897 (lower right, Westdahl & Morse 1896-97, courtesy National Ocean Service), 1939 (upper left; AAA 1939), and 2002 (upper right; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved). These views indicate a nearly continuous, narrow riparian corridor that has persisted through time, with some expansion in recent decades. This reach is also the likely location for the following landscape photographs by Hare circa 1905 (**FIGURE III-4**).

by Herrmann (1874c), Westdahl & Morse (1896-97), and early aerial photography (**FIGURE III-3**).

Brown (2005: 16-18) speculates, based upon limited evidence and inference, that there may have been several "natural sinks" associated with large sycamore groves between present-day Highway 101 and Highway 237. While the downstream disappearance of many other Santa Clara Valley streams into sinks, seasonal wetlands, and willow groves is well-documented by many sources, there is little evidence for this pattern on Coyote Creek. A number of sources not cited by Brown contradict the

FIGURE III-4. LOWER COYOTE CREEK CIRCA 1905. These images were titled “A winding stream near Milpitas Cal.” and “Coyote Creek near San Jose” but examination of the trees at left indicates that they were taken from the same location at different times. Broken branches indicate that the image on the left was taken later (Hare ca. 1905a&b, courtesy The Bancroft Library, UC Berkeley).

interpretation of the Coyote Creek channel as discontinuous (e.g. Pueblo lands survey [US District Court [184-?]a, White 1850, Herrmann 1874; as well as its sinuous plan form, not consistent with ditching).

A range of evidence indicates that Lower Coyote Creek was naturally less deep than Mid-Coyote Creek (or Lower Guadalupe River). Herrmann (1874c) carried out a longitudinal profile immediately downstream of Highway 237 after the sedimentation and “backing up” of the channel. His notes indicate that the bed was only several feet deep, and the target depth of the proposed excavated channel is only 4-6 feet.

A pair of photographs taken by the noted artist Alice Iola Hare illustrates these general conditions on Coyote Creek at the turn of the 20th century (**FIGURE III-4**). While levees had been constructed along the creek upstream of Highway 237 by this time (Westdahl & Morse 1896-97), these photographs appear to have been taken downstream of Highway 237 (accordingly, one of the captions specifies “near Milpitas”). Taken at two different times of year, the photographs show shallow, sinuous channel with slow-moving water. Riparian vegetation is dense but young, suggesting frequent overflow and disturbance by flood.

Present-day riparian vegetation is robust along Lower Coyote Creek (**FIGURE III-5**, see also **FIGURE III-3**). It appears from comparison of historical maps and photographs that riparian forest has extended slightly farther downstream during the past 130 years. This may be due to reduced tidal prism resulting from diking. It is notable that the downstream extent of the riparian forest has persisted (or increased) despite the dramatic decreases in local groundwater levels during the mid-20th-century. This may reflect the reliability of groundwater emergence into the lower reaches of the channel.

Riparian vegetation also appears taller presently than in the photographs by Hare a century earlier. This change would be a predicted result of decreased high flows and reduced flooding. This new hydrologic regime could lead to a lack of disturbance-associated vegetation types.

OVERFLOW CHANNELS

During high flow events, Coyote Creek overflowed into a number of adjacent overflow channels with freshwater vegetation. Some of these may have been former routes of the main Coyote channel. They represent a significant component of the riparian and palustrine habitat of the lower valley floor and a site for backwater or “off-channel” features with fish habitat value. The overflow channels between Coyote Creek and Guadalupe River, which joined tidal sloughs, were described by Burnett (1860;

FIGURE III-5. LOWER COYOTE CREEK 2005. These photographs likely approximate the location of Alice Iola Hare's photographs 100 years earlier (facing page).

"these sloughs were apparently formed by the overflow from the Coyote, the Tidewater runs in some of them"), and Houghton (1860), who notes that they are "mere gullies caused by the waters of the Coyote overflowing [,] there being a depression in the land about where these sloughs are located." Healy (1860b) clarifies that these channels have tidal flow to a variable point upstream but that the channels themselves "extend into good arable or grass lands upwards of a mile." Remnants of several of these apparently artesian, tidally-influenced features can still be seen in the present-day landscape (**FIGURE III-6**).

The hydrology of the overflow channel paralleling Coyote Creek for about a mile upstream of Highway 237 was described by Day (1852): "Water Course during freshets." The feature was labeled as a "slough" by Lewis (1853), suggesting that it may have held water through much of the year, and matching the depiction by Westdahl & Morse (1896-97), which shows remnant riparian trees and freshwater marsh following some draining efforts.

FRESH-BRACKISH TIDAL MARSH ZONES

While most of the South Bay Baylands were characterized by salt marsh, there were distinct areas of fresh and brackish tidal marsh associated with points of freshwater influence from adjacent creeks. Evidence for these fresh-brackish "intrusions" into the salt marsh matrix comes from a variety of sources, and is described in detail by SFEI (1999). The pattern observed in the vicinity of Coyote Creek conforms to regional findings (Grossinger 1995).

Collections of brackish marsh plants by academic botanists during the early part of the 20th century provide general evidence for freshwater effects in the marshlands near Guadalupe, Coyote, and San Francisquito creeks prior to diking. For example, in the vicinity of Palo Alto, C.F. Baker noted *Cordylanthus maritimus* as "common in the salt marshes" (1903), *Senecio hydrophilus* ("small colonies in the marshes"; 1902a), and *Triglochin maritima* ("tufts common in salt marshes"; 1902b), while other researchers have reported *Glaux maritima* (Halsey 1908, in Baye 1999) and *Juncus xiphoides* (Thomas 1961 *in* Baye 1999) in the same area. These plants suggest a picture of localized but distinct brackish marsh conditions.

FIGURE III-6. RESIDUAL "SPRING RUN" MORPHOLOGY. A distinct swale indicates a former spring-fed, tidally-influenced channel in the vicinity of the San Jose-Santa Clara Water Pollution Control Plant.

More spatially specific evidence comes from a series of 19th-century descriptions. William Thomes reports having been "surrounded by high tullies [sic]" on a boat trip to Mission San Jose (Thomes 1840: 199 *in* Friedly 2000). A careful reconstruction of the route places the observation near the mouth of Warm Springs Slough on Mud Slough, on the north side of present-day Pond A19. The boaters were rescued by "a ranchero, [who] mounted on a splendid-looking horse galloped up, looked over the rushes, and said that he would tow us to the landing if we desired." The perspective of the rider looking down over the tules suggests they are quite tall, and his galloping arrival suggests a marsh plain with low vegetation behind the channel-side vegetation.

Wilkes (1856) noted "grass and rushes on each side" of Guadalupe Slough. Photographs of marshes adjacent to the Alviso Boat Landing in the late 1890s also show low vegetation, suggestive of *Schoenoplectus maritimus* (formerly *Scirpus maritimus*). C.F. Baker also reports "small colonies [of *S. maritimus*] occasional in the marshes" at Alviso (1902b). Photographs at Drawbridge (Dewey 1989) and a specimen collected by R.C. Wilson in the same vicinity (1938) suggest a transition to *S. maritimus*.

These descriptions indicate a pattern of locally specific intrusions of fresh-to-brackish tidal marsh vegetation. One of these freshwater zones, at the fluvial/tidal interface where a spring run (later connected to Saratoga Creek) entered the Baylands west of Alviso, was a landmark for the boundary of the land grant Refugio. Sunol (1853:7-8), describing conditions 10-20 years earlier, describes "an arm of the Estuary there overgrown with rushes (*tulare*)."

Surveyor Reed (1863) also describes the overflow channels between Coyote and Guadalupe River as tidal sloughs with freshwater marsh vegetation: "The width of these sloughs vary I think from 20 to 60 feet or thereabouts, the banks of them are sloping, soft and covered with tule." Reed's corresponding survey (1862) indicates that he is referring to sloughs crossing approximately the present-day location of Los Esteros Road in the vicinity of the San Jose-Santa Clara Water Pollution Control Plant.

The extension of freshwater down Coyote Creek may explain the early attempts to dike the marshland for hay and grain between Coyote Creek and Mud Slough (Westdahl 1897b; now Newby's Island), the only area within the body of the marsh which was reclaimed by this time. Slough water was allowed into the island for irrigation and leaching of salts, as along Napa Creek marshes during the same era (Stanly 1885).

TIDAL MARSHLAND

Fresh and brackish vegetation was probably limited to a narrow zone along the channels carrying freshwater inputs from perennial streams and spring seasonal flows. Away from these influences, saline tidal marsh dominated, with an array of associated habitats. Hundreds of small pannes ranging from a fraction of an acre to several acres in size were scattered across the marsh surface between branching networks of sinuous sloughs. A complex of unusually large marsh pannes formed a key landmark in the Rincon de Los Esteros land case. "*The Esteros*", located at the edge of present-day New Chicago Marsh at Alviso, were "large ponds" (White 1860, Burnet 1860) filled by extreme high tides: "the spring tides come up into them" (Burnett 1860).

TIDAL REACH OF PENITENCIA CREEK AND PENITENCIA POND

Because of the Coyote Creek fan, tidal marshland did not extend as far south at Coyote Creek, except along the Penitencia Creek slough — where the tides reached surprisingly far inland. Twitchell's General Land Office survey of the Rancho Los Tularcitos (1859) shows the "Arroyo de la Penitencia" widening from a relatively narrow fluvial creek into a broad tidal slough not far downstream from the town of Milpitas. His field notes correspondingly put the "mouth of creek and head of the main slough" near the present-day confluence with Calera Creek (1859b: 160-61). Tidal marsh appears to have been limited, however, to the immediate surroundings of the slough, as shown by a later compilation of GLO surveys. The narrow southward extension of tidal marsh along the Penitencia Slough was ratified by the Land Commission, establishing the angular grant boundary still visible on contemporary USGS quadrangles.

The extension of tidal influence farther into the Valley along Penitencia Creek indicates that the Valley is relatively lower here than it is along Coyote Creek. This difference is reasonable given that the dominant sediment load would have been delivered along Coyote, producing the protrusion of coarse grained sediment into the wet meadows evident in soil maps (Gardner et al. 1958). As Brown (2005) has pointed out, Penitencia Creek may in fact have been the dominant outlet for Coyote Creek at some point in recent Holocene times. This would explain the unusually wide slough, now abandoned and transgressed by the rising seas, as well as the wide riparian forest present along the reaches of the creek immediately upstream, shown by Westdahl and Morse (1896-97). It should also be noted that, in addition to natural fluvial, fan-building dynamics, seismic activity may well affect the repositioning of creek routes in this area.

Another consideration is the documentation of historical flood deposits uncovered by Elise Brewster as part of SFEI research into the Rincon de los Esteros land case testimony. Using some of these data, Brown (2005) infers that tidal marsh extended substantially farther inland; we use the *salitroso* classification to describe these zones of subtle, landward tidal effects. Farmers did, in fact, report that recent fluvial deposits of 4-10 inches (Parker 1863: 213) and 18-20 inches (Bloomfield 1863: 219) have permitted the "reclamation" of marshland for hay and grain farming. However, the area of these deposits appears to be limited; one witness estimates about 400 acres in the entire area north of the Milpitas-Alviso Road by 1863 (Bloomfield 1863: 220). The stability of the upper limit of tidal marsh during the subsequent period between 1858 (Wallace) and 1897

(Westdahl and Morse 1896-97), during which time even greater mass wasting of hillsides is documented due to agriculture (Gardner et al. 1958), also seems to make a rapid change from tidal marsh to arable land during the previous two or three decades less likely. Farmers described having to plow these fresh deposits into the "natural soils" (Parker 1863: 212-213) to improve fertility, a scenario more likely to have been successful in the transitional *salitroso* lands rather than Bay-mud based tidal marsh.

THE TIDAL MARSH-ALKALI MEADOW ECOTONE

Saltgrass (*Distichlis spp.*) dominated alkali meadows at the landward edge of the tidal marsh and extended well beyond regular tidal influence, creating a broad ecotone. Defining the boundary between tidal marsh and terrestrial habitats here is challenging because of the gradual transition along this very flat topographic gradient and the absence of 1850s-era US Coast Survey data. However, a number of indicators are available, including remnant sloughs visible in Westdahl and Morse (1896-97)and aerial photography (1939). Other historical map information is available as well; for example, Herrmann (1874c) notes "SWAMP LAND" beginning along Coyote Creek at the boundary we show.

Day (1854:490-491) describes alkali meadows several times in his survey in the vicinity of Milpitas, reporting clay soils "rather wet in winter with some alkali" and "strongly tinctured with alkali." The alkali meadows were characterized by native grasses, wetland plants, and an array of presently rare plants associated with vernal pools and alkali flats (see description in **PART II**). Soil conditions precluded agriculture quite dramatically, forming distinct land use boundaries (**FIGURE III-7**).

PENITENCIA POND

The mysterious Penitencia Pond was also located in this vicinity, two miles downstream from Milpitas and near where "the Penitencia and Coyote join" (Fernandez 1860: 150, Gallagher 1860). Both witnesses locate the "lake (*laguna*)" (Fernandez 1860: 150) near the downstream *sausal*. The feature appears to have been a muted tidal lagoon. A landmark in the Rincon de los Esteros grant testimony, it also happened to be intersected by the Mt. Diablo Meridian and a Township boundary between Five and Six South.

Day (1854: 490) notes that the "tide slough [is] now dry, but often wet." This feature was surprisingly wide: Day (1854: 490-491) requires five chains (330 feet) to cross the "dry bed of salt slough" near the present-day Calera confluence. He and other surveyors are able to cross the slough except when it is flooded, indicating relatively solid substrate and less frequent tidal inundation. In 1866, Thompson approaches the Penitencia Laguna along the Township line from the West and describes entering and leaving the willows and the "Tuley [sic] swamp." The *sausal* is five chains wide (330 feet) and the presence of willows and tule suggests brackish tidal influence.

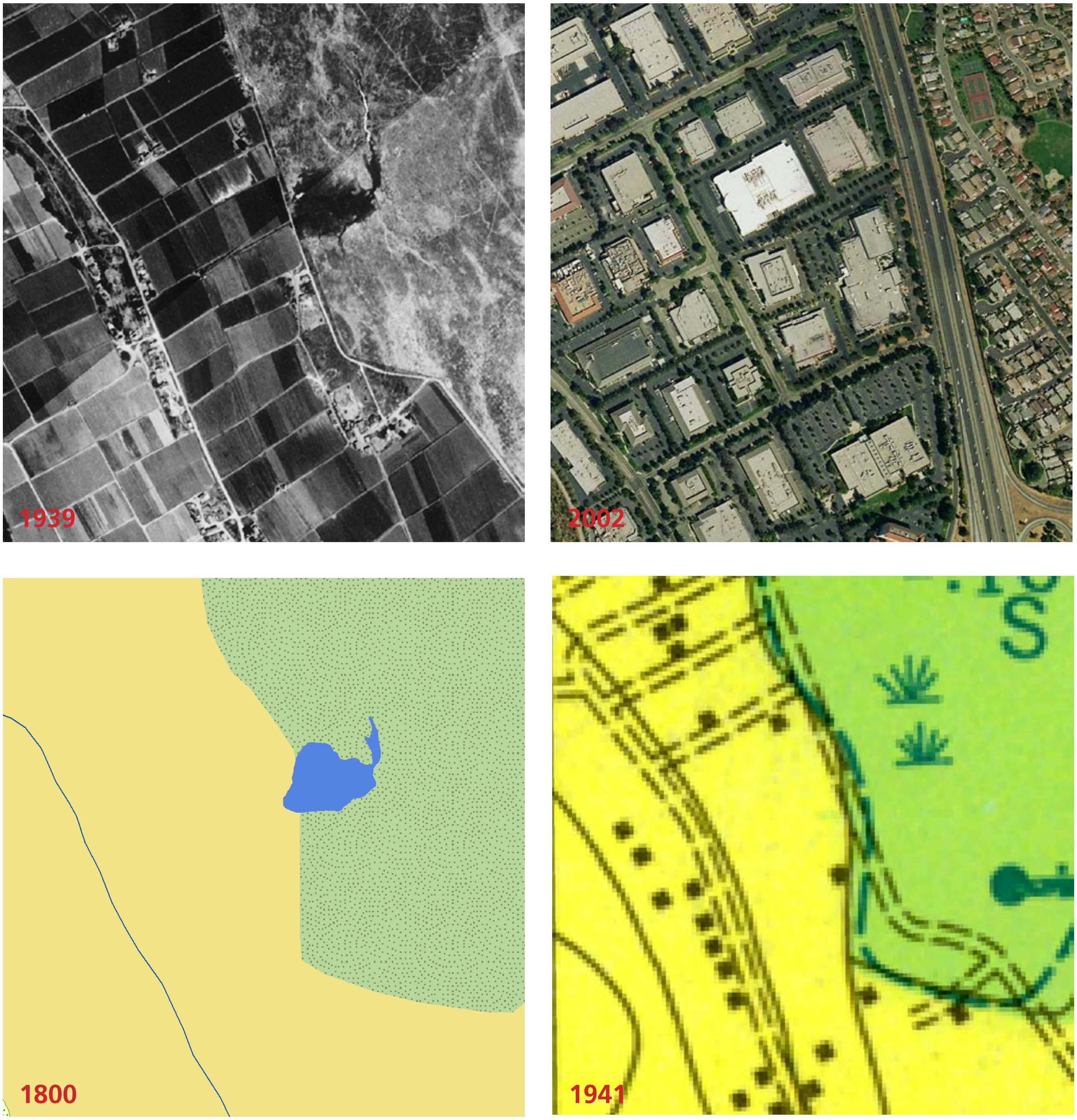


FIGURE III-7. BOTTOMLAND BOUNDARY IN MILPITAS. The 1800 view (lower left) shows dry grassland occupying Coyote Creek's broad natural levee on the left and alkali meadow, with a perennial freshwater marsh, in the bottomlands to the right. These boundaries are based upon the 1940-41 soil survey (Gardner et al. 1958; lower right), which also generally indicates the small marsh with two wetland symbols. Farmers have developed the well-drained, coarse alluvial deposits in 1939 (upper left; AAA 1939), but poor drainage and salt effects in the bottomland soils have precluded agriculture, forming a distinct land use boundary. The shape of the freshwater marsh is indicated by darker, saturated soils. Highway 880 and the Montague Expressway offramp can be seen presently (2002; upper right; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

LOWER PENITENCIA CREEK

US Deputy Surveyor Edward Twitchell (1859: 160-161) explicitly describes the transition from fluvial to tidal feature as he surveys north along the Penitencia Creek boundary of the Rancho los Tularcitos, encountering "the mouth of the Creek and head of the main slough." [U]pstream of this point, Penitencia Creek flowed in a highly sinuous, thickly wooded channel, presumably perennial because of the interception of the high groundwater table. Thompson's 1857 summary of Rancho Milpitas describes thick riparian forest along the creek (Calaveras Boulevard to Rock Avenue): "on the Arroyo de la Penitencia a good growth of oak timber of an inferior quality fit only for fuel" (Thompson 1857: 53).

DISTRIBUTARY CREEKS AND SAUSALS

As the Northern boundary of Rancho Tularcitos, Calera Creek was surveyed by US Deputy Surveyor Edward Twitchell in 1859. His survey explicitly indicates that the stream "sinks" not long after entering the alluvial plain, just below present-day Highway 680, at about 100 foot elevation (**FIGURE III-8**). He set his course to "the lowest sycamore" on the creek.

The historical route and natural termination of the stream can still be seen on the modern USGS quadrangle, in which the grant boundary follows the curves of the creek with short line segments and then, in the absence of a creek to follow, establishes two long straight lengths to close the rancho boundary at Penitencia Creek. In a reversal of sorts, the creek then was extended downslope as a ditch, along the abstract property line. There is no evidence of a *sausal*, probably because the termination of the stream was so high in the alluvial plain, removed from clay soils and groundwater emergence.

Compared to Calera Creek, Arroyo de los Coches maintained a continuous channel across more of the alluvial plain and did spread directly into a large willow grove. The coincidence of distributary and *sausal* is well-docu-

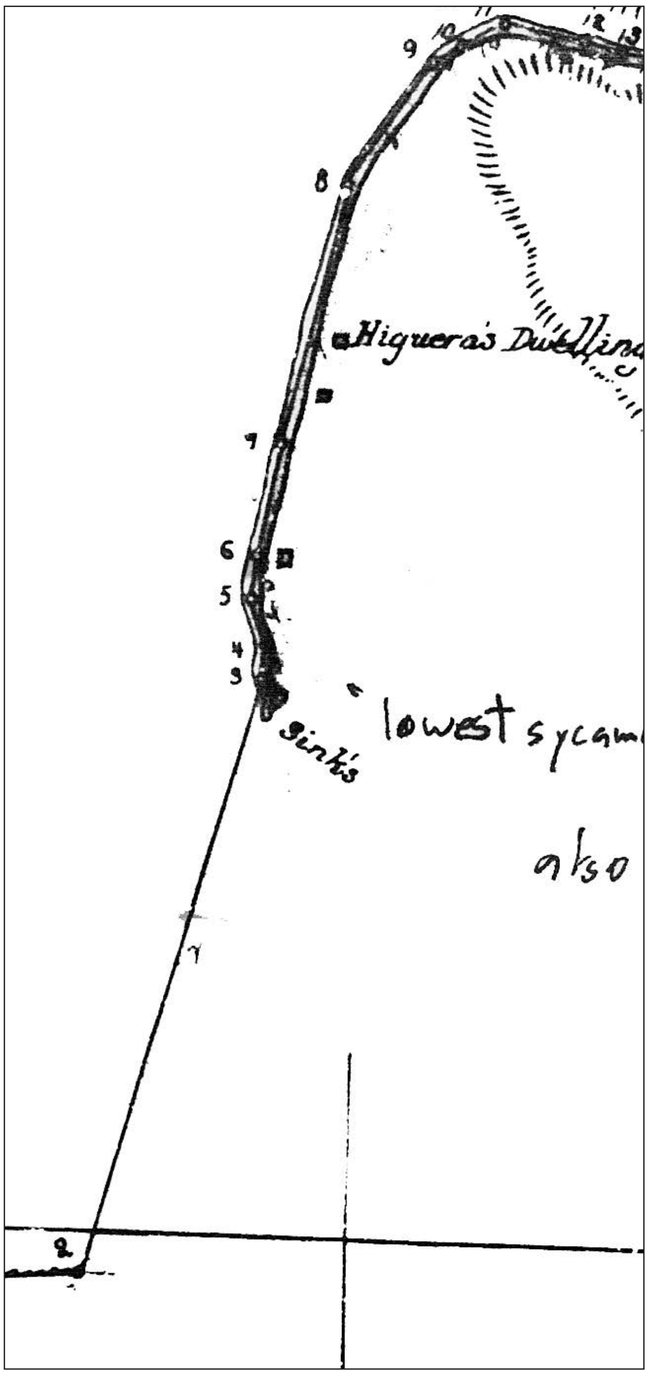


FIGURE III-8. CALERA CREEK SINK, 1859. Calera Creek maintained a channel from the hills to just below present-day Highway 680. At this point, surveyor Twitchell, following the creek as the general boundary between adjacent land grants here, found no further channel to follow and set a straight-line course downslope (Twitchell 1859).

mented here by both Higuera's *diseño* for Rancho los Tularcitos (U.S. District Court, Northern District, 1870 [Land Case Map D-494]) and Day's attractive survey (1851). Although the exact size and location are uncertain, the stream appears to have extended into the wet meadows to approximately 40-50 feet in elevation. Willows here are colonizing slightly coarser materials at the stream mouth, while intercepting subsurface dry season flows.

Higher on the alluvial plain, after exiting the canyon mouth, Arroyo de los Coches crisscrosses the Tularcitos/Milpitas Rancho boundary, including several crossings of the grant line on the Valley floor, now Calaveras Boulevard. Just downstream from the canyon mouth, near Alviso house and present-day Evans Road, Calaveras Boulevard originally jogged to the north to accommodate the creek, but the stream and road were straightened by 1895 (USGS San Jose [1895]1899). The earliest available survey of the line (Day 1851) clearly shows Arroyo de los Coches crossing the line again farther downstream, heading northwest in the vicinity of the present-day Highway 680 crossing. Subsequent surveys by Twitchell (1859) and Stratton (1862a,b) make no mention of this crossing and the route does not show up clearly in 1939 aerial photography. However, the area is described in some detail by Day, including Alviso's gardens and the downstream willow grove. Day was a professional surveyor who became the U.S. Surveyor General for California, so it is not unlikely that the map is accurate and that the shallow channel filled with sediment subsequent to Day's survey.

Berryessa/Milpitas Creek also terminated in a willow grove at a similar position on the valley floor to Arroyo de los Coches (outer edge of wet meadows, 40-50 feet in elevation). The location is well recorded and illustrated by a number of documents, including Stratton (1862), who illustrates the distributary and willow grove with the annotation "*Sausal* at sink of Milpitas Creek" (**FIGURE III-9**); Healy (1863), who draws only the distributary; the Pueblo San Jose map circa 1840 ("*sausales*"); the Tularcitos *diseño* (U.S. District Court, 1870 [Land Case Map D-494]); and Day (1851), who shows the feature as a very large marsh. While the size of the willow grove is somewhat uncertain, the location can be pinpointed using the illustration by several maps of the features intersecting or lying just below an old road (now Capitol Avenue), and the bearing and distance reported by Stratton as he passed to the south along the Tularcitos boundary: "*Sausal* at the sink of the Milpitas Creek bears North 20 East distant 57 chains" (Stratton 1862a: 159). These independent data correspond precisely.

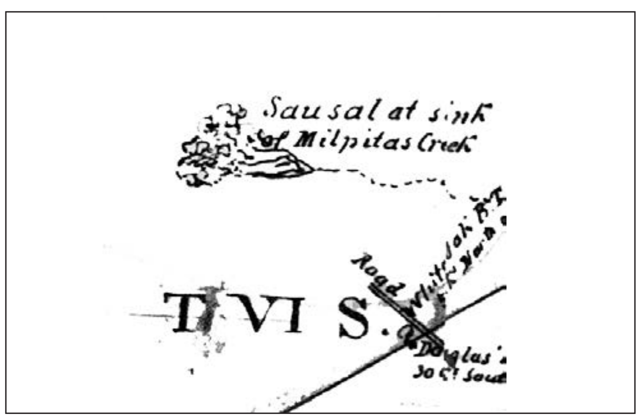


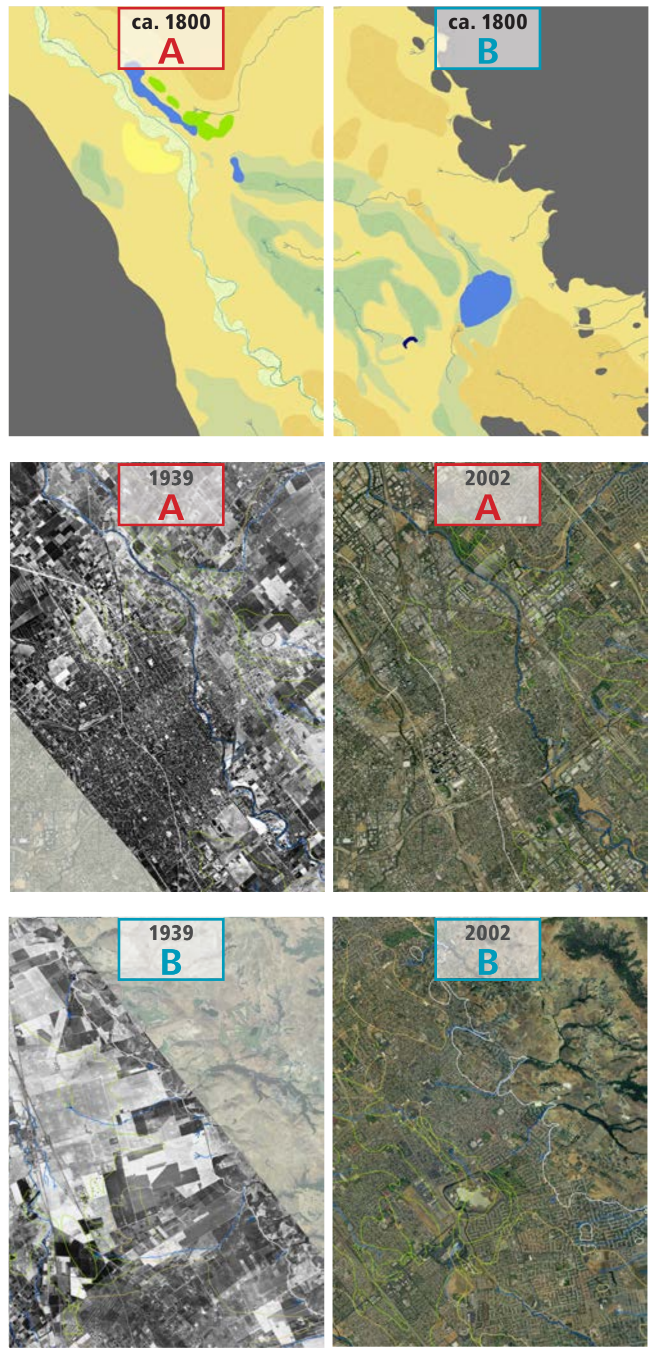
FIGURE III-9. "SAUSAL AT SINK OF MILPITAS CREEK." Berryessa Creek (formerly Milpitas Creek) ended in a willow grove just below today's Capitol Ave. ("Road", Stratton 1862b, courtesy The Bancroft Library, UC Berkeley).

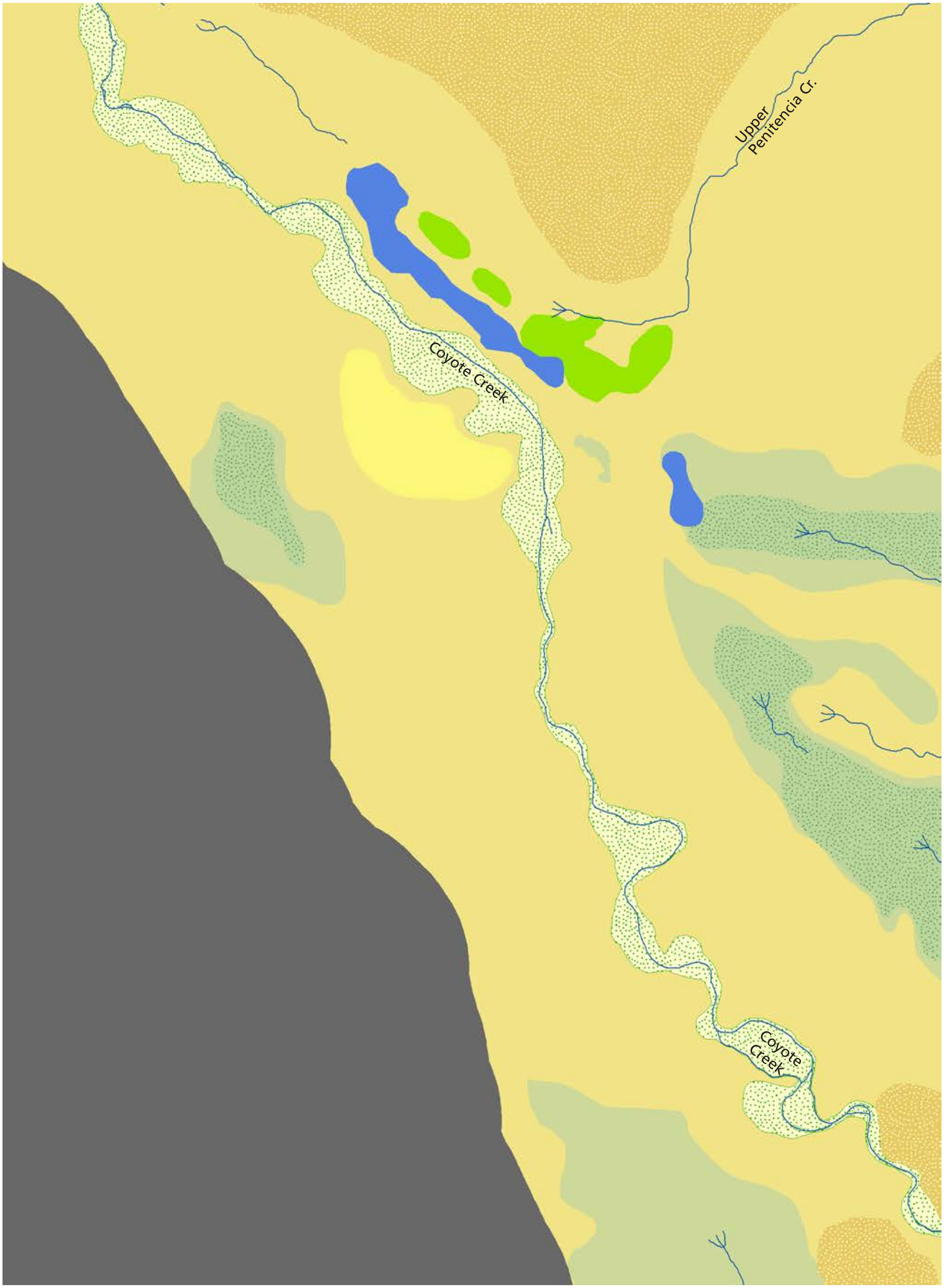
Upper and Lower Penitencia Creeks, now completely independent systems, have a particularly complicated hydrological history. During the Mexican land grant era, these reaches were discontinuous enough to be considered separate creeks. At this time, the creek running parallel to Coyote Creek, in the general location of the contemporary constructed channel we call Lower Penitencia Creek, was simply called Penitencia Creek (for its use as a meeting point for the priests of Mission San Jose and Mission Santa Clara to exchange confessions). Present-day Upper Penitencia Creek was referred to as Arroyo Aguaje (e.g. US District Court, Northern District [184-?]a, [Land Case Map E-900], Thompson and Herman 1879), the name now used, with slightly different spelling (Aguague), for a tributary in the upper watershed. The streams were only indirectly hydrologically connected through a series of discontinuous channels and freshwater wetlands. While Arroyo Aguaje/Upper Penitencia Creek was diverted directly into Coyote Creek as early as 1852 (see Land Use Chronology in **PART IV**), subsequent maps suggest that the diversion was not completely effective and that flow continued to the north with an increasingly continuous channel into "Lower" Penitencia Creek (e.g. Hare 1872, Hoffman 1873). Presumably this temporary connection resulted in the extension of the name to the entire system, before their full disconnection during the later 19th century.

2

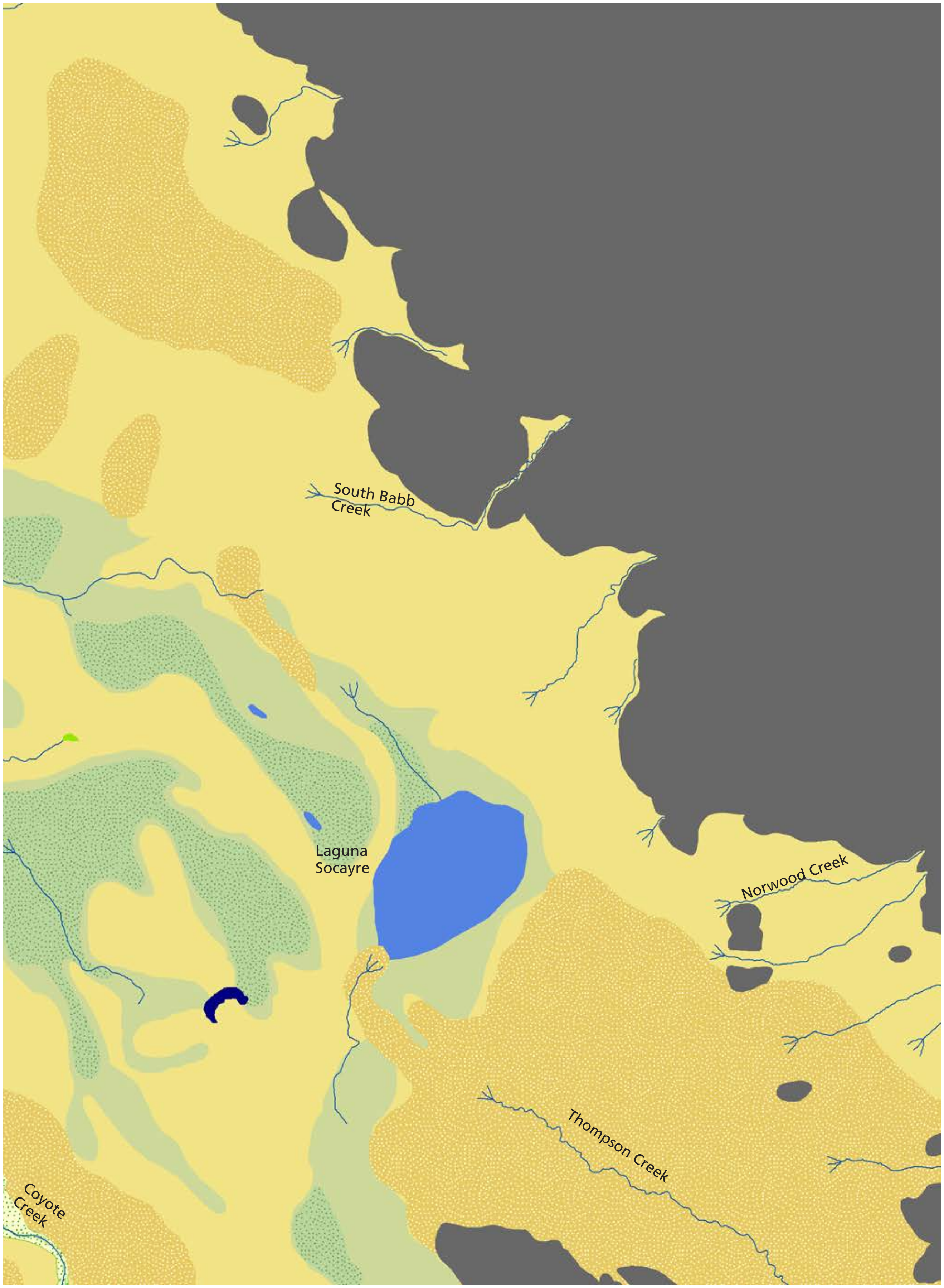
MID-COYOTE CREEK AND ADJACENT AREAS

This section follows Coyote Creek from Montague Expressway to Highway 280 – the Mid-Coyote Flood Protection Project extent. To standardize map scale and area, it also includes a small additional length of creek, to Tully Road. Adjacent areas include the bottomlands of East San Jose and distributary creeks such as South and North Babb, Norwood, Quimby, and Thompson.

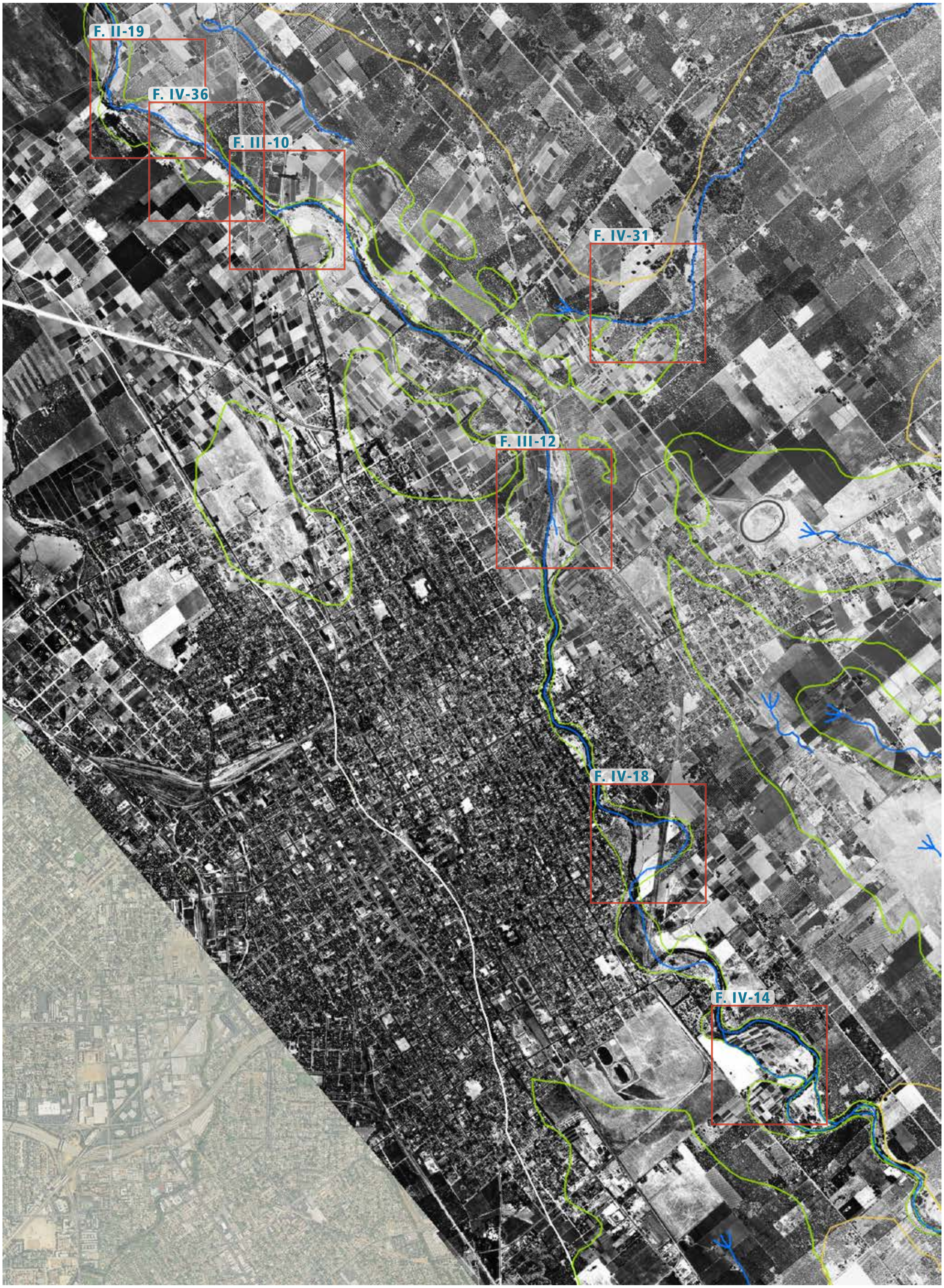




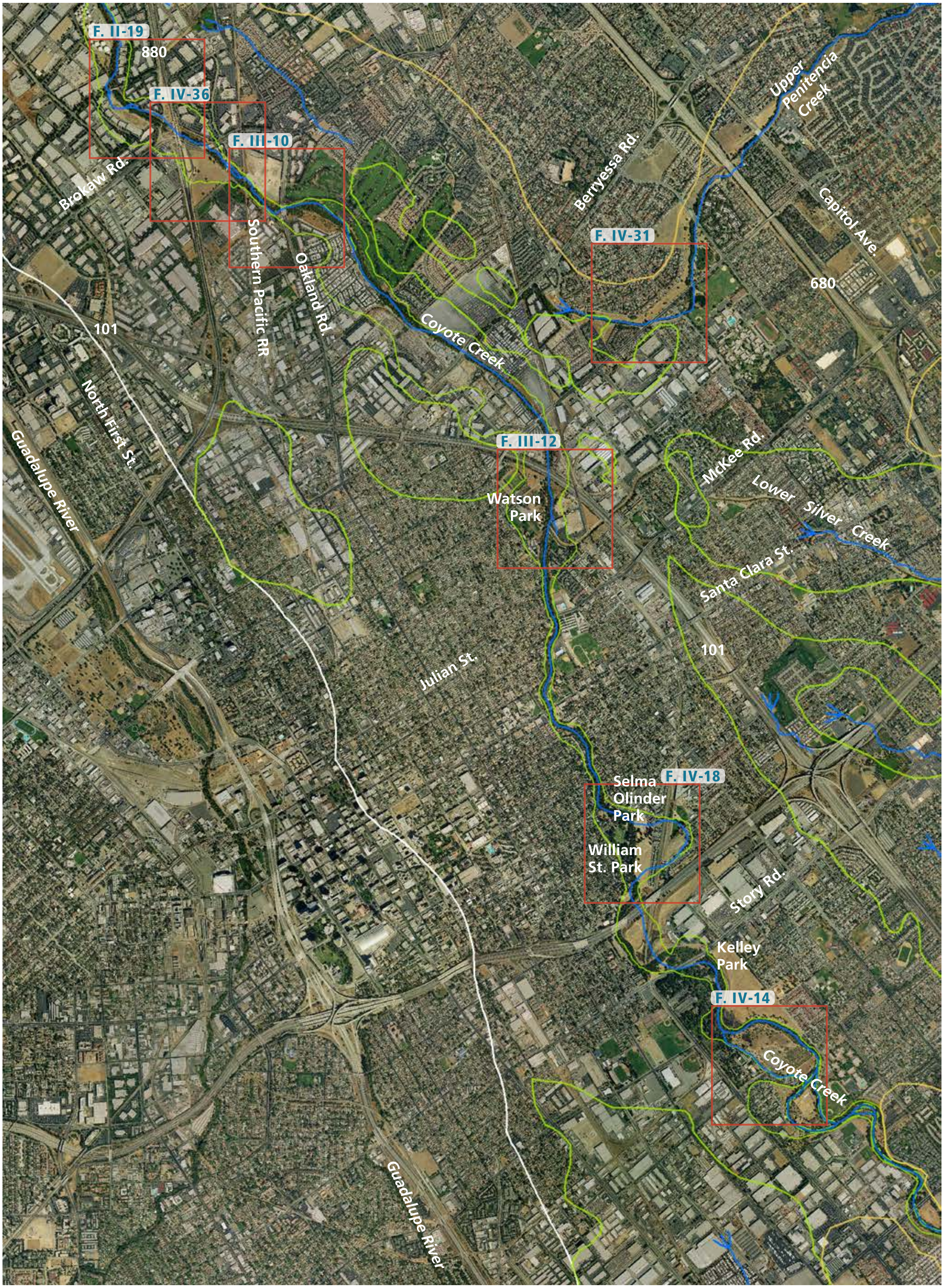
MAP 2A-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300). See inside front cover for map legend.



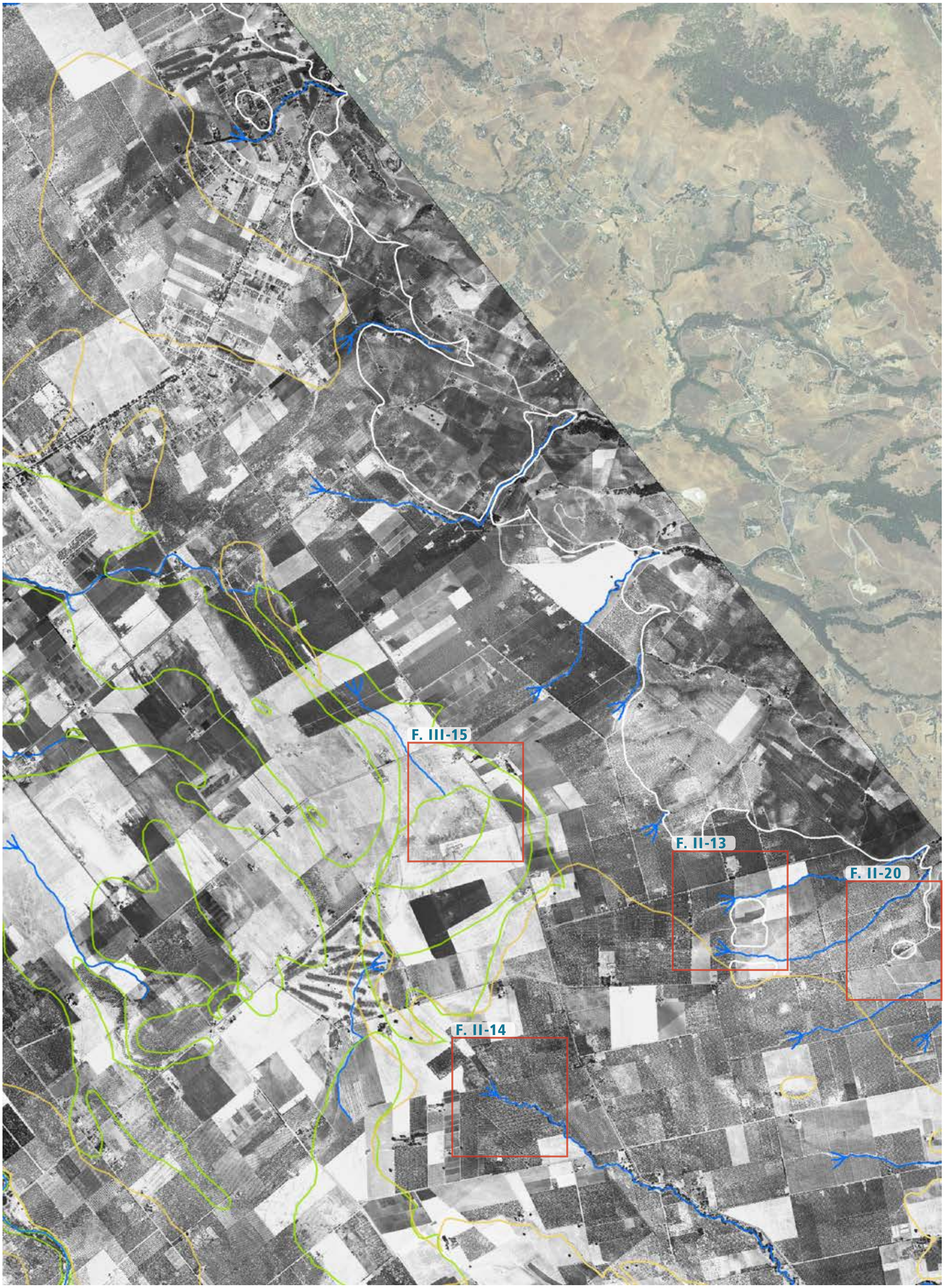
MAP 2B-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.



MAP 2A-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1″~3300′; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).



MAP 2A-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).



MAP 2B-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).

MAP 2B-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

FIGURE III-10. COYOTE CREEK AT OAKLAND ROAD IN 1939 (LEFT) AND 2002 (RIGHT). Long-standing crossings such as Oakland Road (center, running north-south in each image) and the Southern Pacific Railroad (left side) were established at this short, naturally narrow reach. On the right side of the 1939 image (AAA 1939), a broad active channel area can be seen in the form of scour patterns and unvegetated areas excluding agriculture. These stream benches are now occupied primarily by the South Bay Mobile Home Park, which has been subject to flooding, the San Jose Golf Course, and the North Coyote Park (brown area at middle right, 2002 Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved), which provides some undeveloped floodplain capacity.

In the Mid-Coyote reach, Coyote Creek shifted to a mostly wide, entrenched system with broad flood-prone benches. Wide reaches were interspersed with narrow reaches (**FIGURE III-10**). This pattern of constriction and expansion significantly shaped transportation patterns on the east side of San Jose, with important crossings associated with the narrow reaches between the S. Pacific Railroad and Oakland Road (**FIGURE III-11**). and between Julian Street and San Antonio Street. Agriculture and garbage dumps encroached upon the stream benches, then commercial development and other uses – but little housing. Many former dumps are now city parks (**FIGURE III-12**).

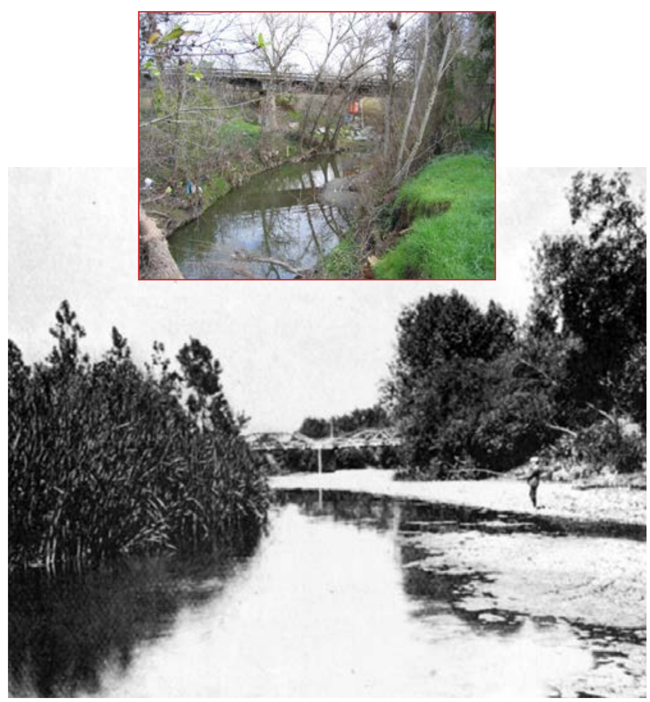


FIGURE III-11. PHOTOGRAPHS OF COYOTE CREEK BETWEEN THE OAKLAND ROAD AND SOUTHERN PACIFIC RAILROAD CROSSINGS, 1896. This pair of photographs shows the dense and tall riparian forest canopy along this relatively narrow channel reach. Even the narrow reaches had significant unvegetated gravel bars and pools. Such a clear view is no longer possible as vegetation has now encroached substantially into the former channel, with some apparent incision (see inset) (Shortridge 1896: 20,174, courtesy History San José).

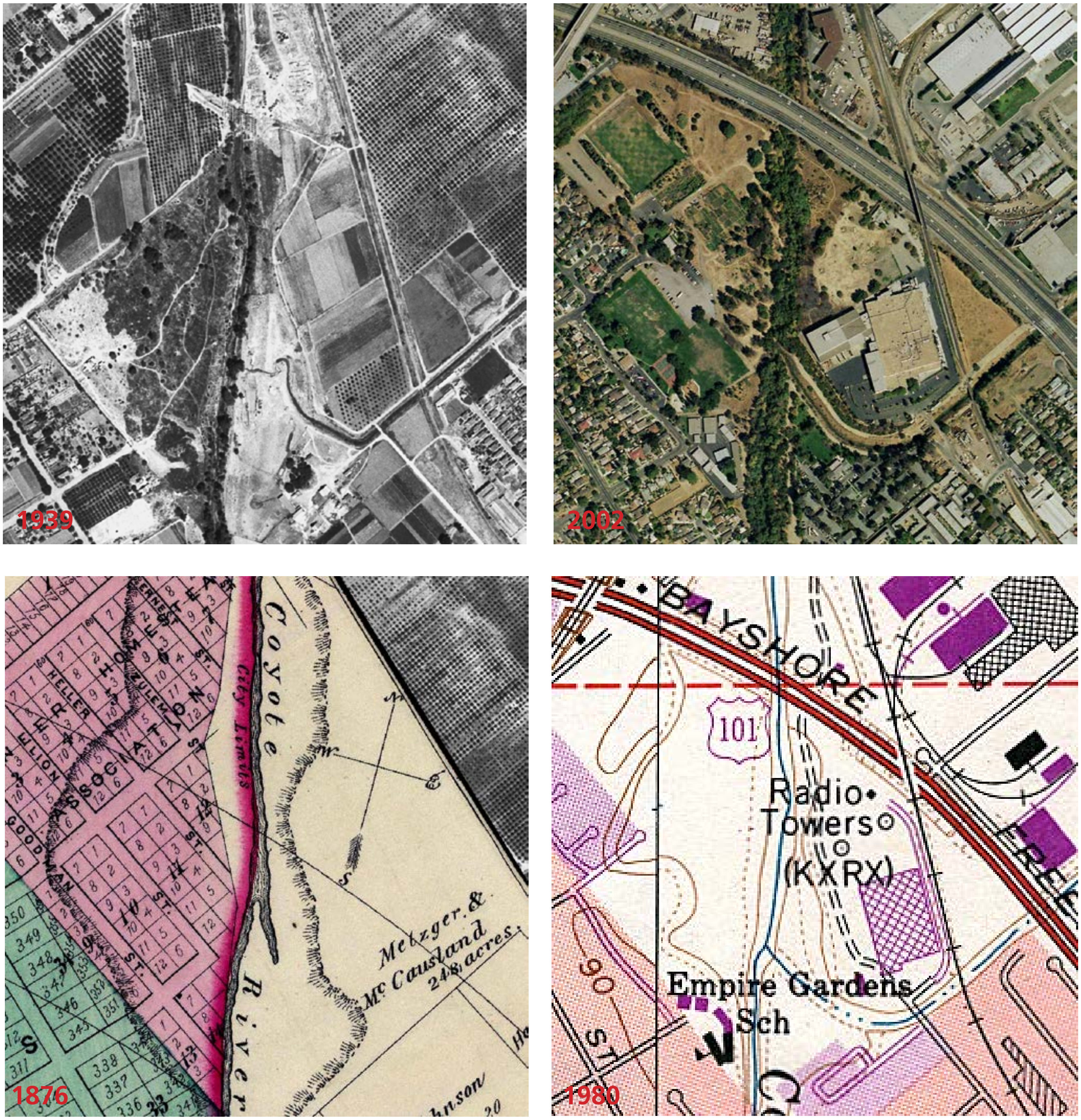


FIGURE III-12. STREAM BENCHES BECOME PARKS. In the contemporary image (upper right; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved), Watson Park is located immediately left of the Coyote Creek riparian forest. Highway 101 crosses diagonally. Each park occupies large lateral stream benches still subject to flooding. In 1939 (upper left; AAA 1939), agriculture and landfill operations take place in the future location of Watson Park. The location of the outer channel banks/valley floor is evident as hatch marks in the 1876 map (lower left; Thompson and West 1876, courtesy David Rumsey, Cartography Associates), breaks in land use in the 1939 image, and contours in the USGS (San Jose East & West 7.5 min 1980) quadrangle (lower right).

To the east, several thousand acres of bottomlands lay at the foot of alluvial fans and the broad alluvial levee of Coyote Creek. Wet meadows with saltgrass and alkali patterns captured water and fine sediment. Laguna Socayre, one of the great *lagunas* of the Santa Clara Valley, lay at eastern edge of the valley floor, at the base of the Thompson Creek fan. The bottomlands were broken up by slightly higher, grass-covered rises deposited by earlier courses of Coyote Creek. Many discontinuous streams flowed from springs, willow groves, and the Laguna. These probably had few or no riparian trees, except in some cases sycamores at their

FIGURE III-13. RESIDUAL ELEMENTS OF THE FORMER LOWER PENITENCIA CREEK CHANNEL. Low area through center of photograph indicates historical channel location. A large, historic sycamore has resprouted.

downstream ends (Brown 2005). The discontinuous channel between Upper and Lower Penitencia Creek can be seen in the map series, with a remnant swale and a stump-sprouting, historic sycamore still visible at the former downstream distributary, located at the present-day Orchard Elementary School (**FIGURE III-13**; see also Sowers and Thompson 2005).

Trees were rare in this landscape, outside of the localized areas of valley oak savanna and a few, albeit large, groves of willows or sycamores. In the vicinity of today's Highway 101 crossing, Day (1854) reported limited trees: "timber sycamores on the Coyote and willows N. of line, in swamp."

WETLANDS AT THE BASE OF THE PENITENCIA CREEK FAN

A significant wetland complex formed at the base of the Upper Penitencia Creek alluvial fan, behind Coyote Creek's natural levee, near today's San Jose Golf Course to Mabury Road. One of the willow groves, the "*Montecito*" ("little thicket," despite covering as much as 50 acres) served as an important landmark in the vicinity of present-day Ringwood Ave. and Concourse Drive. Stratton carefully centers his survey on the "Center of the *Monticito* [sic]" that set the southern boundary of Rancho Milpitas, and reports 16 chains (1,056 feet) between entering and leaving it (Stratton 1862: 159). It took Thompson (1857: 51) 10.5 chains to cross the same "willow thicket" from a slightly different angle while establishing the sectional boundary.

The freshwater marshes here apparently had significant perennial surface water, as Sherman Day (1854) described "water knee deep" when crossing them in July 1854. The *sausal* at the former downstream end of Upper Penitencia Creek is also noted by Day. On his survey along the Section line to the south, Day (1854: 507) noted the "willows N. of line, in swamp," locating the feature within the square mile of Section 33, which includes the area where the Upper Penitencia Creek appears likely to have ended. These wetlands may have even extended more continuously into the willow groves at the downstream terminus of Berryessa Creek, as suggested by Brown (2005).

LAGUNA SOCAYRE

Laguna Socayre was an array of freshwater wetlands located above and below present-day Capitol Expressway between Story Road and Tully Road. These included a series of ponds mapped by Healy with the annotation "water" and the distinctive, crescent-shaped feature shown by Healy (1861) and Thompson and West (1876; **FIGURE III-14**). The heart of Laguna Socayre was a large freshwater marsh partly coinciding with present-day Lake Cunningham. Drainage was blocked by an old natural levee of Coyote Creek (Sowers and Pearce 2003).

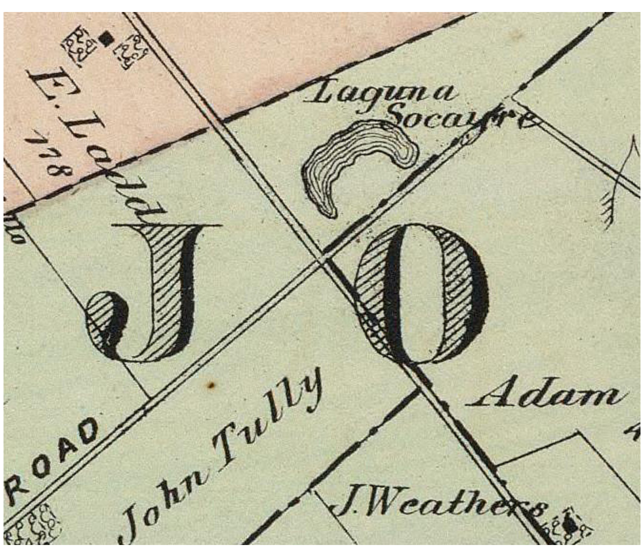


FIGURE III-14. SMALL PERENNIAL POND OF THE LAGUNA SOCAYRE COMPLEX, 1876. The larger marshland area was located immediately to the northwest (Thompson and West 1876, courtesy David Rumsey, Cartography Associates).

Stanford ornithologist John Schneider celebrated the Laguna in an 1893 article about cinnamon teal nesting (Schneider 1893). He describes vegetation, hydrology, and use by water birds:

> "The swamp is covered with a variety of vegetation. In the center and deepest part tall tules rise many feet above one's head, and in these numbers of Tule Wrens build their deceptive nests. A great many Coots breed here, and I am told our Bitterns also nest in the dense tules. Last year I found a Marsh Hawk's nest in the same place.
>
> Where the water is quite shallow rushes grow luxuriantly and in the dead bunches Soras and California Clapper Rails, Gallinules, Coots and others nest, but very rarely the Cinnamon Teal.
>
> Along the shore in many places, where the water is very shallow or the ground merely damp, coarse marsh grass grows and along the edges of this thick clusters of clover thrive, which offer favorable sites for Ducks' nests... The ground here is covered with water about an inch deep."

Day describes parts of this wetland complex in summer 1854, crossing the meadows and marshes: "grassy and boggy land," "bulrushes and weeds," and the "dry bed of an alkaline dragoon."

FIGURE III-15. LOCATION OF LAGUNA SOCAYRE AND LAKE CUNNINGHAM IN 1939 (LEFT) AND 2002 (RIGHT). Cow paths mark the unfarmed area of the historical Laguna Socayre in 1939 (AAA 1939). Part of the area has now been excavated to create Lake Cunningham, a storm-water detention basin. Some elements of alkali meadow persist in the fields along the north edge of the lake. A blue circle indicates the location of **FIGURE III-16** and red circles locate the images in **FIGURE III-17** (2002 Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

These conditions limited agricultural development such that grazing, not orchards, was dominant in the 1930s (**FIGURE III-15**). As a result, a number of large, institutional land uses currently predominate here, including Reid Hillview Airport, Lake Cunningham, and Pleasant Hills Golf Course — and some wetland features are still apparent. Low areas of the golf course, coinciding with the historical Laguna boundary, form ponds in the winter (**FIGURE III-16**). Saltgrass meadows with seasonal ponds coexist with grassy fields on the north edge of Lake Cunningham at the exact site of Day's alkaline description 150 years earlier (**FIGURE III-17**).

SYCAMORE GROVE

A large, well-documented sycamore grove occupied the valley floor terrace along the west side of Coyote Creek between the Oakland Road and Highway 101 crossings. Hutton's (1847) notoriously inaccurate map (Arbuckle 1986: 55-56) subdividing the Pueblo lands shows the feature following the creek across parts of three properties, but a General Land Office survey also recorded the grove, in the same location. Day (1854: 505-506), establishing the southern boundary of Township 6 South, Range 1 East, placed the quarter section stake in the grove, noting that the "line passes through the S. edge of a grove of large sycamores." The trees were indeed giant — he records two bearing trees ten feet in diameter and one five feet across — and were widely spaced in an open savanna pattern. (The distances to these bearing trees, a standard indicator of historical stand density, are 37, 141, and 308 feet.) These "few large sycamores" are reported the only timber in the area.

Along Oakland Road, within the estimated boundary of the sycamore grove (Medium Location Certainty, 150 m), an unusual row of California Sycamore trees may be descendent of the original grove (**FIGURE III-18**).

FIGURE III-16. TEMPORARY PONDING AT HISTORICAL LAGUNA SOCAYRE. Surface water and wetland vegetation can be identified in scattered places, corresponding to the former wetland area.

FIGURE III-17. SALTGRASS-ALKALI MEADOW AT LAKE CUNNINGHAM REGIONAL PARK. Reddish-brown areas are predominantly *Distichlis* patches. Scattered ponds form during rainfall events. The lower image shows a well-defined panne with mud bottom and forage for dabbling ducks; other ponds are more temporary.

DISTRIBUTARY CREEKS

Immediately upon entering the Valley, streams were well-defined, in gullies or gulches. Channel dimensions are often recorded by early GLO surveys; however, we have not catalogued all of these at this time. For example, Day crossed South Babb Creek in July, 1854 at the base of the foothills just above Clayton Road, reporting: "deep gully (8 feet deep) 50 links wide to SW, with water running" (1854: 509). This small creek had substantial flow at the base of the hills in July. Depth and width can be compared to present-day channel geometry. Notably, he calibrates the term "deep," indicating that eight feet is relatively deep. We can infer that streams of this general size in the area are typically shallower, or not much deeper, than this.

Norwood Creek, like other neighboring creeks, did not extend far from the canyon mouth, but "the little stream called Arroyo de los Alisos" (for its sycamores farther up in the canyon (Soto 1853: 7, Healy 1861) was still the distinguishing feature for the boundary between the Pala and Yerba Buena grants (Noriega 1854: 8; Pico 1854: 10). Noriega (1854: 9) provides an explicit description of Norwood Creek as discontinuous: "the arroyo spreads out on the plain and does not run into any other stream."

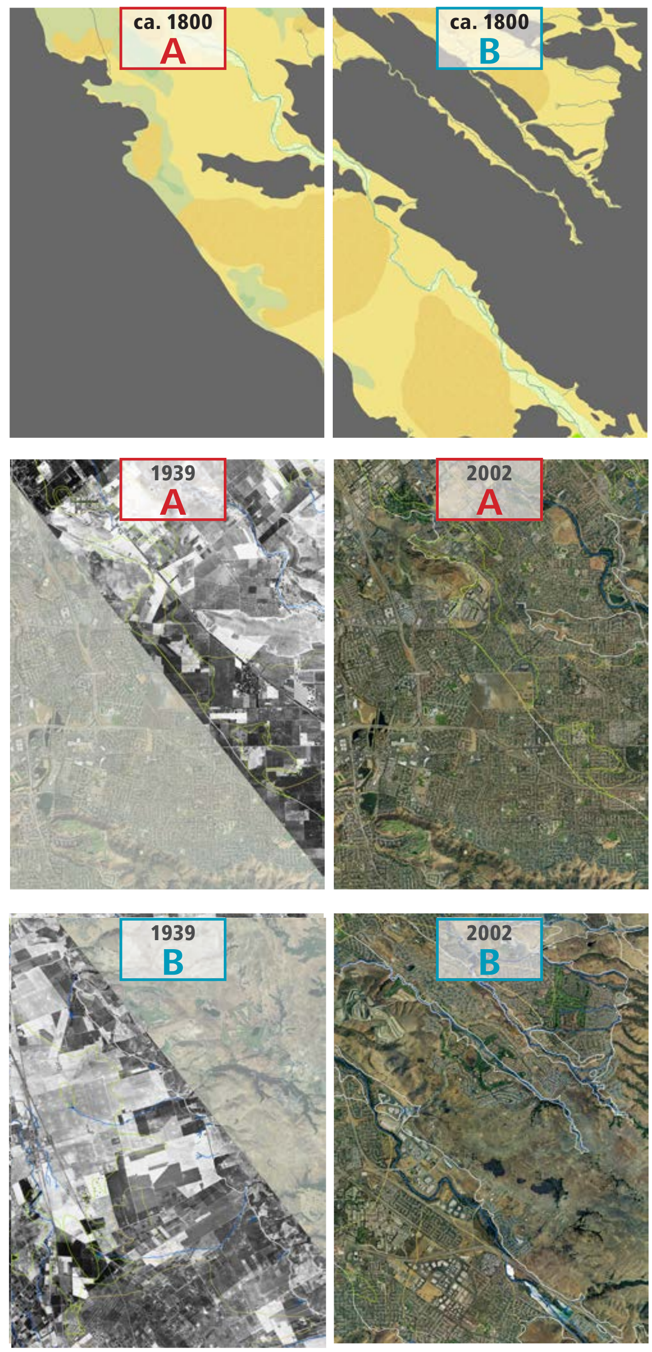
The streams between Norwood Creek and Thompson Creek were recognized as smaller — called *aguaje* rather than *arroyo* (U.S. District Court 1833) — and terminating at the *roblars* of the valley floor. The seasonality of Thompson Creek is confirmed by its historical name in the American era "Dry Creek" (USGS Palo Alto 1899, Hoffman 1873) and was also apparently referred to as *Arroyo del Yedral* earlier. Silver Creek had Spanish names of *Arroyo de Socayre* (Soto 1853: 7) and "*Arroyo Seco*" (466).

FIGURE III-18. CALIFORNIA SYCAMORES ALONG OAKLAND ROAD. Recurved branching pattern and distinctive leaves indicate that these street trees are the native *Platanus racemosa*, rather than the more common Western Planetree. There appear to be other California sycamores in the neighborhood, potentially descending from the historical grove.

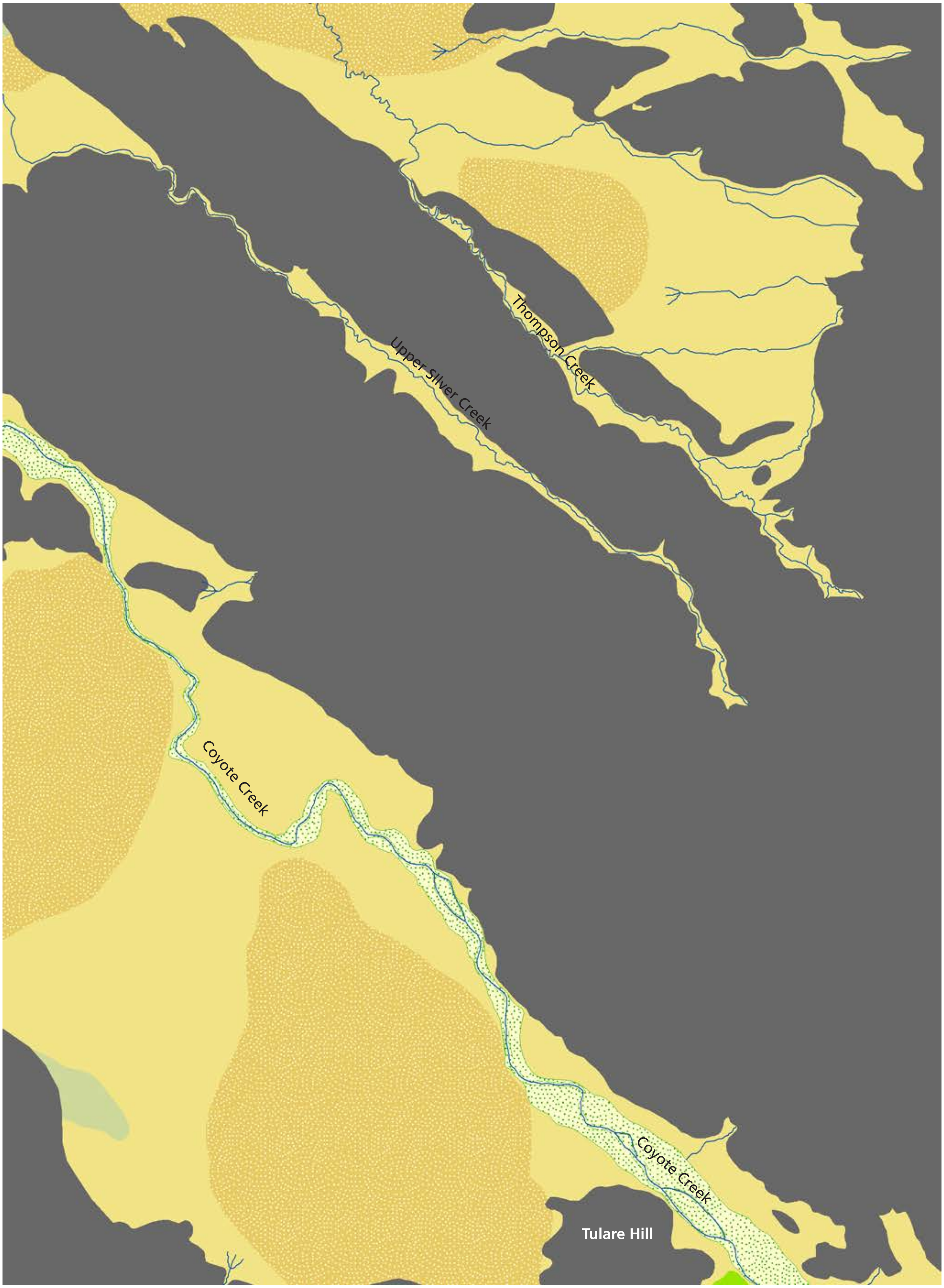
3

COYOTE CREEK/SOUTH SAN JOSE

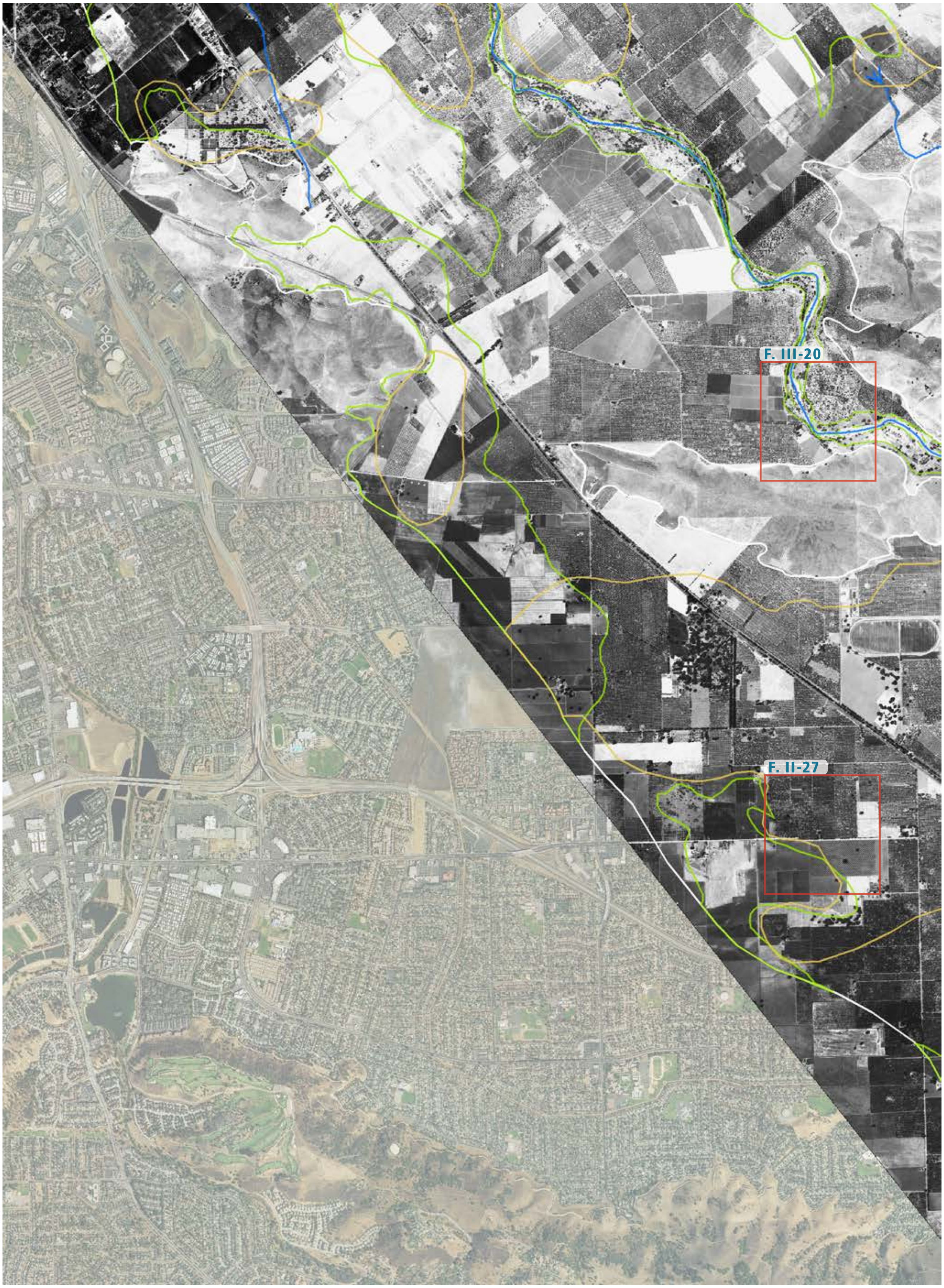
This section covers Coyote Creek from Tully Road to Coyote Narrows, and the adjacent valley lands.



MAP 3A-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.

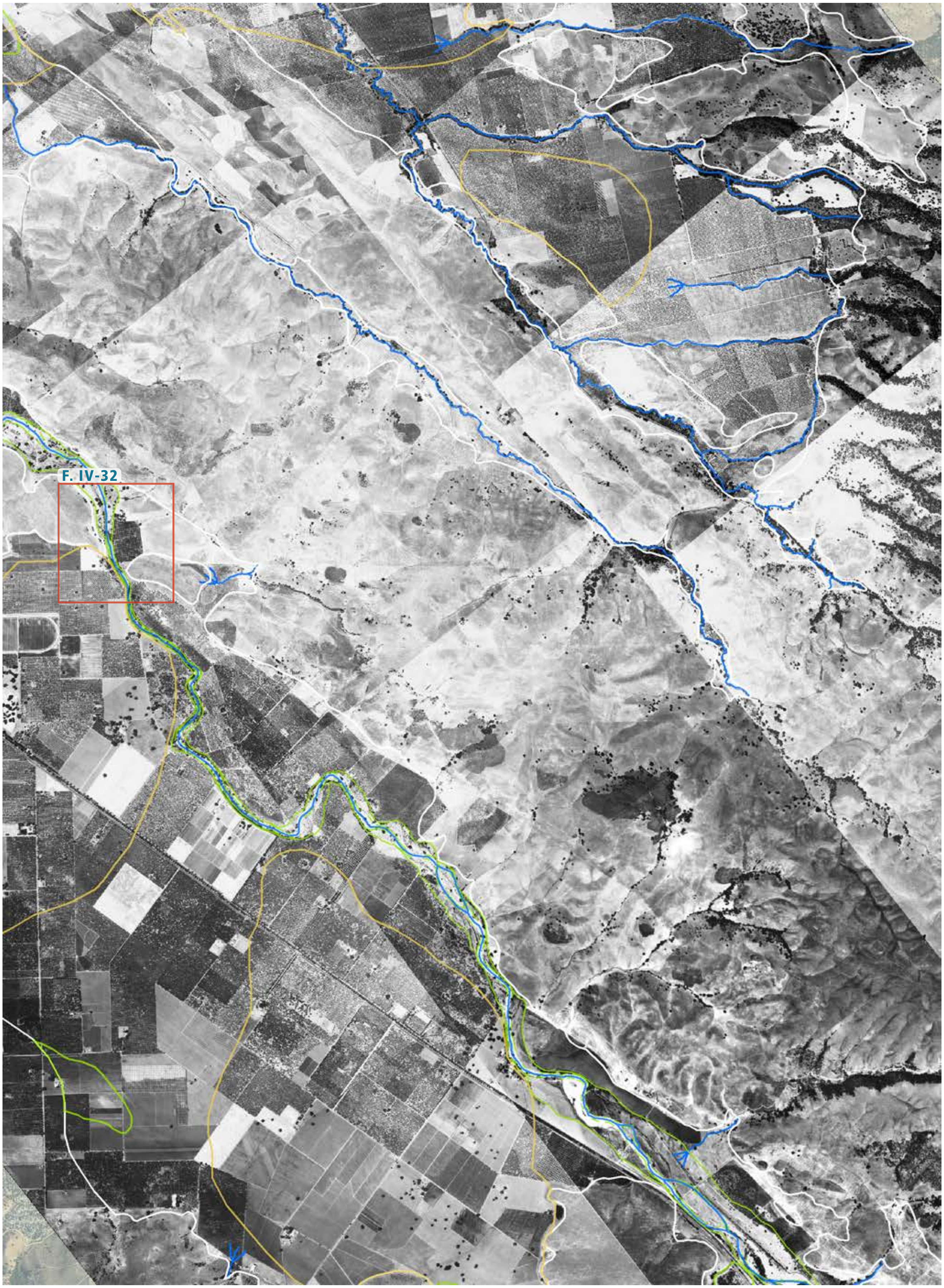


MAP 3B-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.

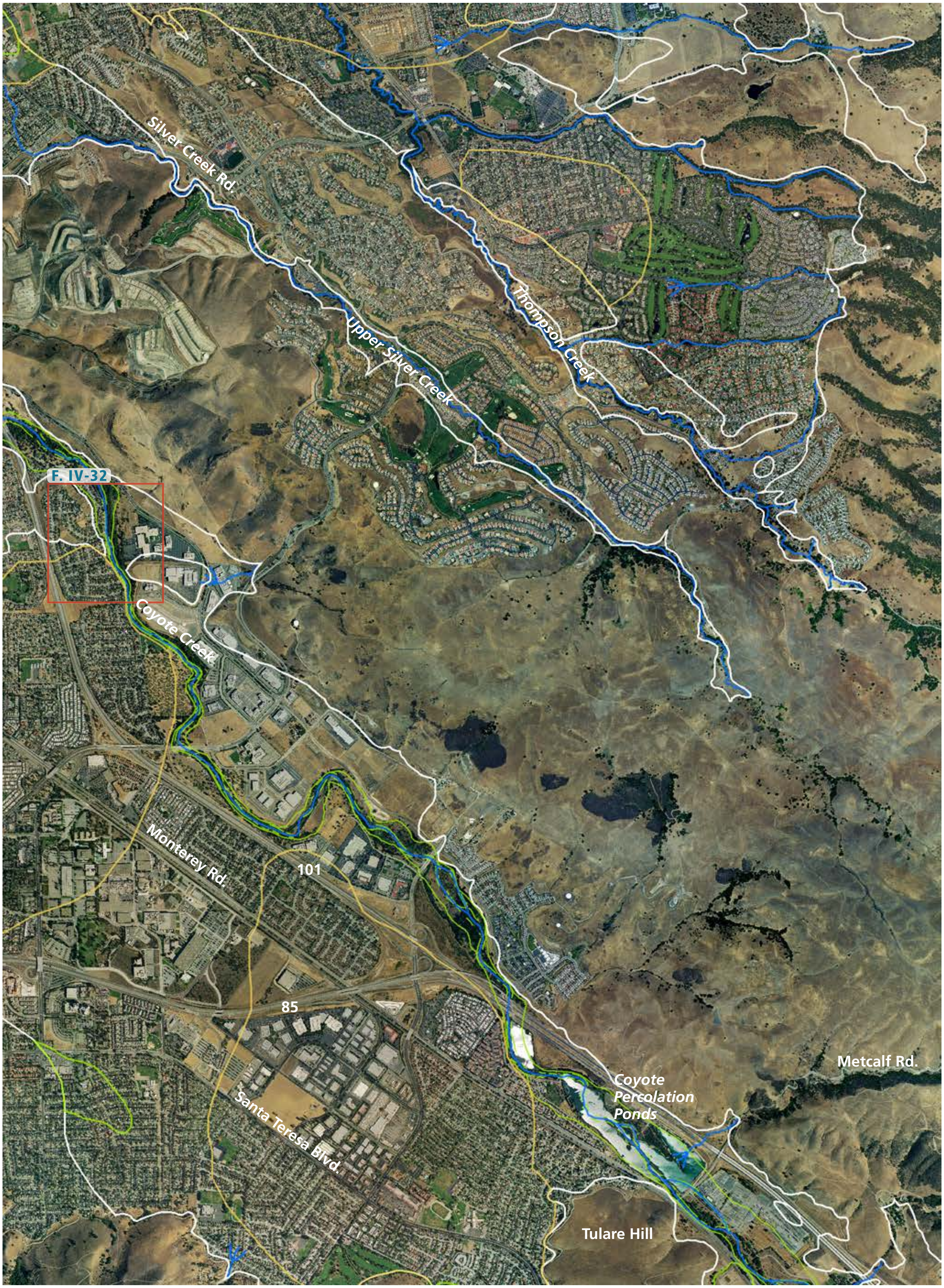


MAP 3A-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).

MAP 3A-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).



MAP 3B-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).



MAP 3B-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

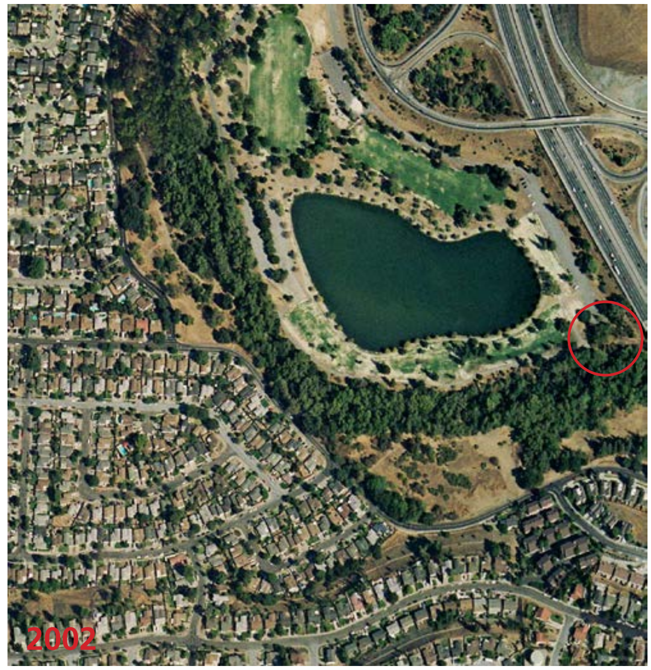


FIGURE III-20. COYOTE CREEK AT COTTONWOOD LAKE IN 1939 (LEFT) AND 2002 (RIGHT). In the earlier image, we can see a wide main channel with little vegetation except for patches of riparian scrub. Larger trees are located on the adjacent stream benches and, in places, there are linear strands of riparian forest along the outer banks of the channel area. The contemporary image shows a more dense and continuous riparian forest. The sycamore shown in **FIGURE III-21** is indicated by a red circle in both images (AAA 1939; 2002 Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

FIGURE III-19. VALLEY OAK ALONG COYOTE ROAD.

While each of the other three sections of Coyote Creek's valley floor had large areas of bottomlands and wetland complexes, this section was quite well-drained. Oak savanna covered large areas — remnant trees of the savanna are evident in historical aerial photography and scattered within the present-day landscape (**FIGURE III-19**, see also **FIGURES III-27** and **III-28**).

Coyote Creek displayed a braided channel pattern throughout this reach. Scattered sycamore trees occupied islands, bars, and benches in the broad channel reaches. Linear strands of riparian forest were occasional on the outer banks of the channel area. **FIGURE III-20** shows this riparian pattern along present-day Cottonwood Lake, where surveyors Wallace and Healy reiterated the wide spacing of sycamore trees in the mid-19th century (see **PART II**, Riparian Habitat), and a few remnant trees can be found presently (**FIGURE III-21**). Riparian habitat has shifted to a dense forest dominated by cottonwoods.

While extensive evidence agrees that Coyote Creek was seasonally dry in this reach, there is reason to believe that pools persisted through the summer in places, probably associated with the reaches with riparian overstory and scoured outside bends. For example, Day (1854: 514) describes "water in holes" in the vicinity of present-day Cottonwood Lake in mid-July. In February 1905, Hermann (1905) maps a series of large pools (80-120 feet long) along the outer edge of the Coyote Creek channel as it bends to the north at the downstream side of present-day Shady Oaks Park — a densely forested ripar-

FIGURE III-21. SYCAMORE CIRCLE AT COTTONWOOD LAKE. These trees are sprouts from a giant stump in the center, potentially one of the "large sycamores" reported by Wallace and Healy in 1858-1863 (see page II-42).

ian segment reach. These pools would have provided important summer refugia for native stream fish.

The GLO field surveys conducted during the 1850s documented a broad, active channel area recording, for example, that the creek between Tenant Avenue and Coyote Narrows ranges from three to eight chains wide (198-528 feet), corresponding closely with our mapped channel area. Photographs taken in the early 1930s as part of a study of Lesser Nighthawks show channel morphology and vegetation immediately downstream of Coyote Narrows at the present-day location of the Coyote Percolation Ponds (**FIGURE III-22**). Close-ups of nighthawk nests show a wide range of poorly sorted sediment sizes, indicative of braided channel character (**FIGURE III-23**). Conversion here has been dramatic, with the creek now flowing through a large, impounded water body.

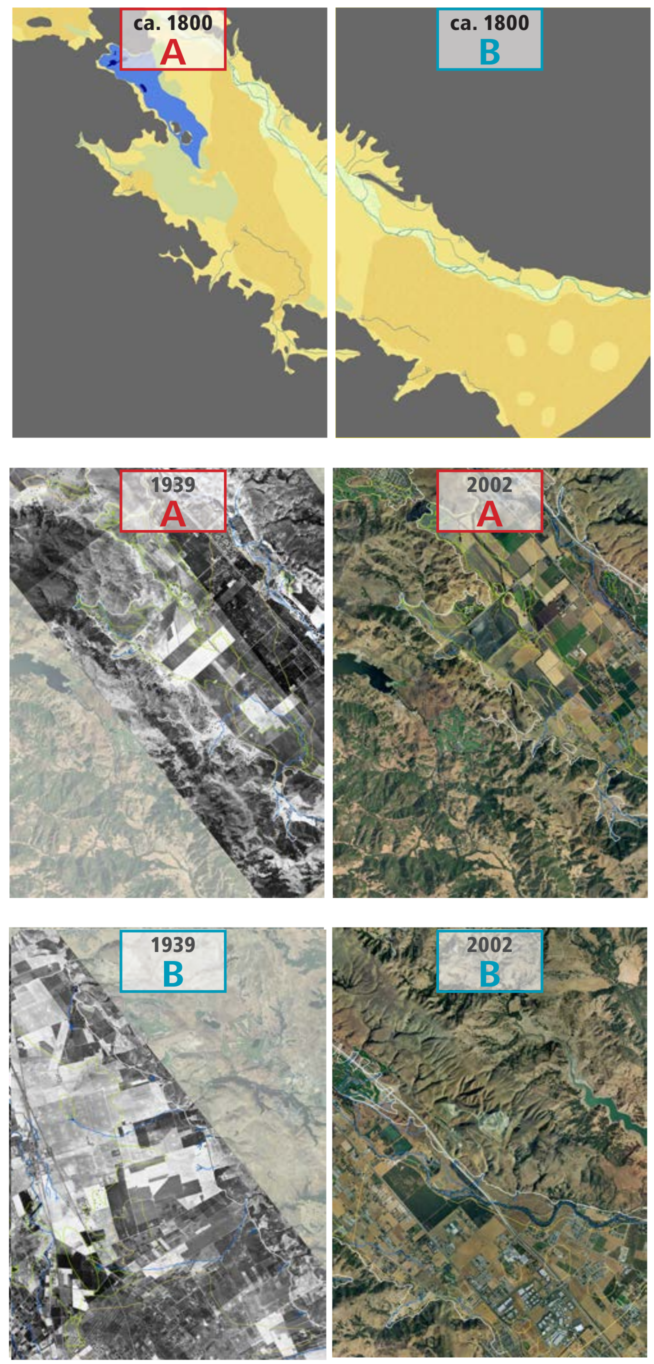
FIGURE III-22. BROAD, GRAVELLY COYOTE CREEK BED IMMEDIATELY DOWNSTREAM OF COYOTE NARROWS, CIRCA 1930. Vegetation is described in **TABLE II-2** (Pickwell and Smith 1938, courtesy Cooper Ornithological Society).

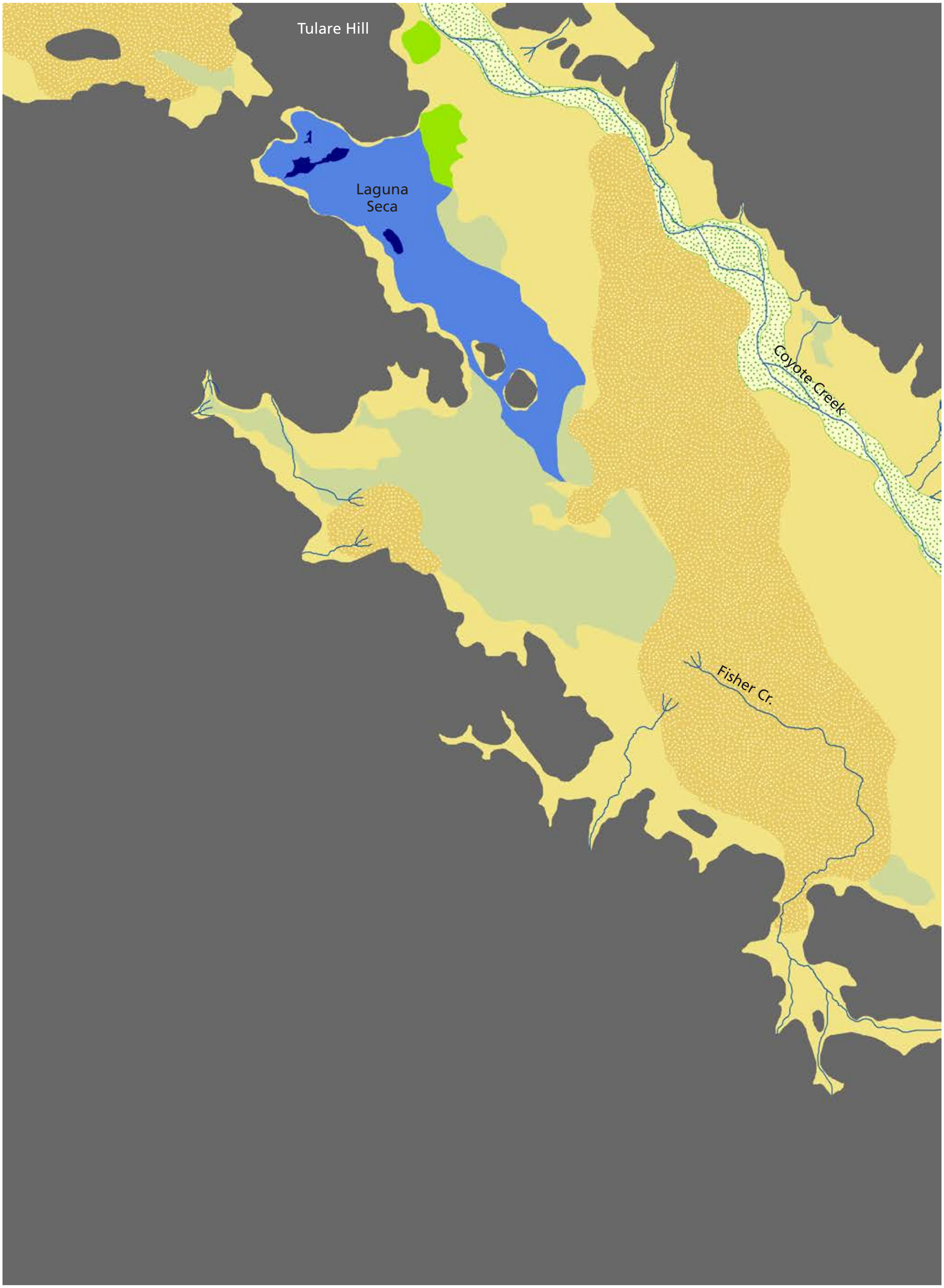
FIGURE III-23. THE SUBTLE NEST MADE BY A LESSER NIGHTHAWK IN THE DRY GRAVELLY BED OF COYOTE CREEK (Pickwell and Smith 1938, courtesy Cooper Ornithological Society).

4

COYOTE CREEK/COYOTE VALLEY

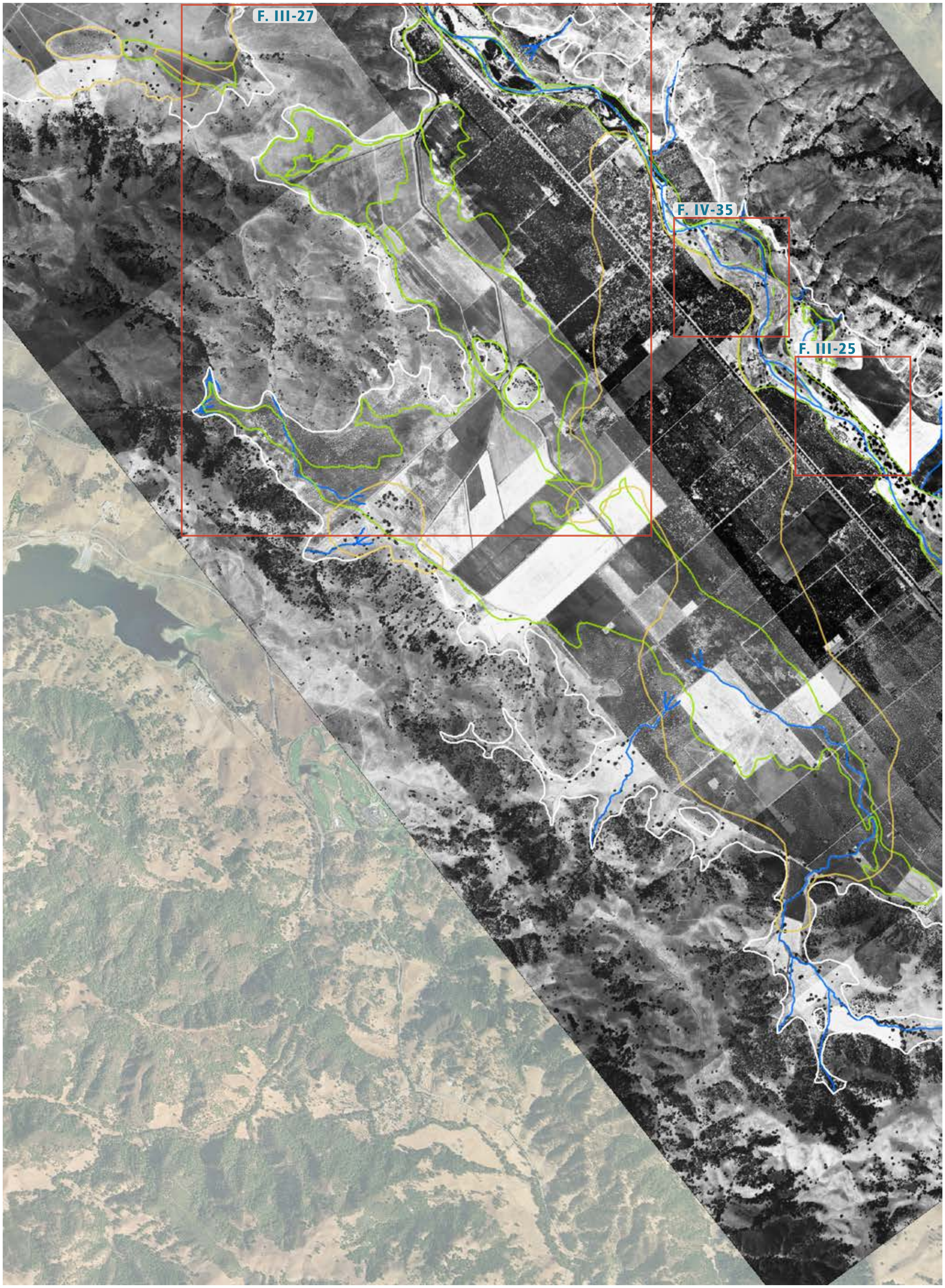
This section covers Coyote Creek from the Narrows to Anderson Dam, and the adjacent Coyote Valley.



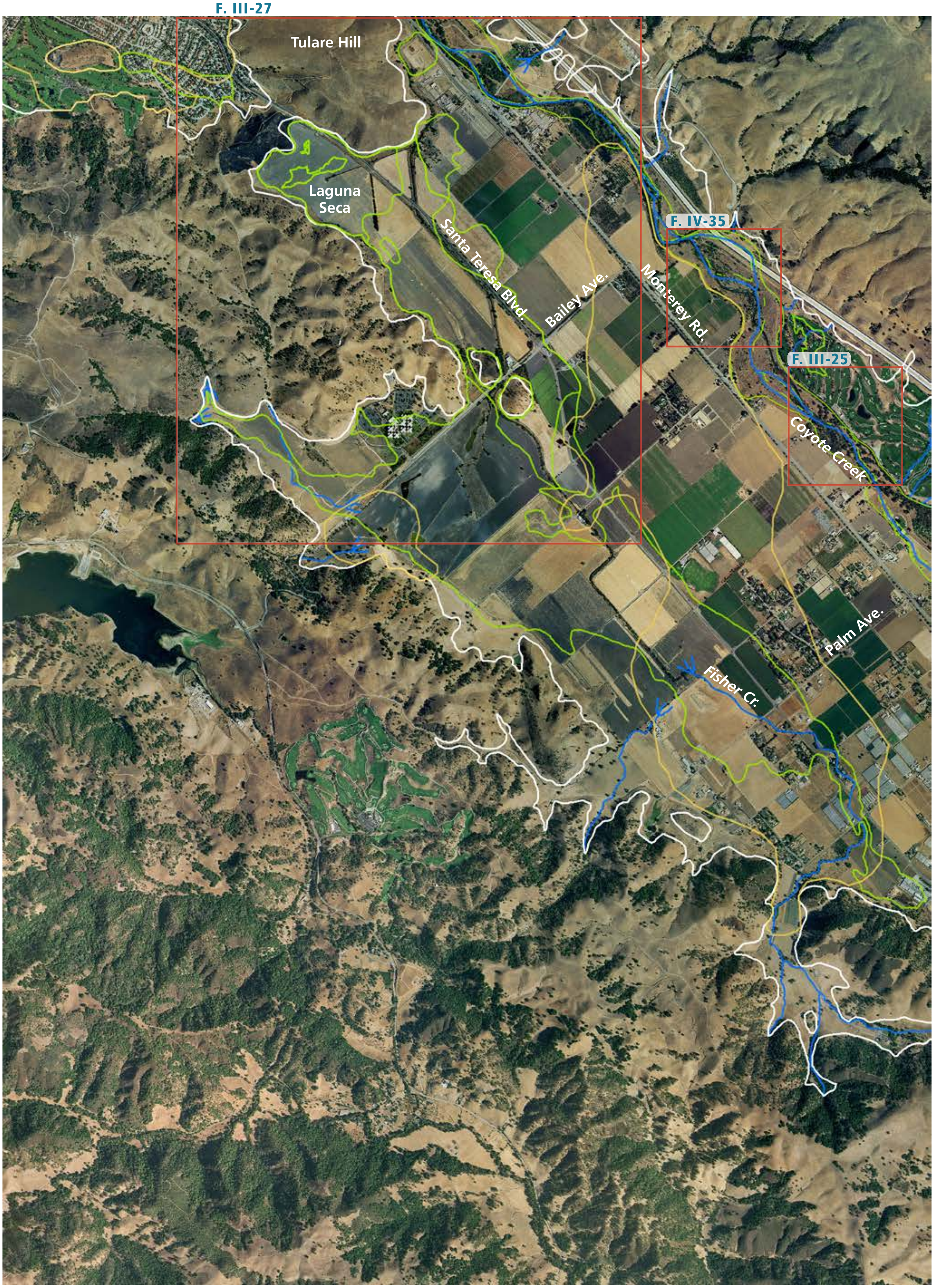


MAP 4A-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.

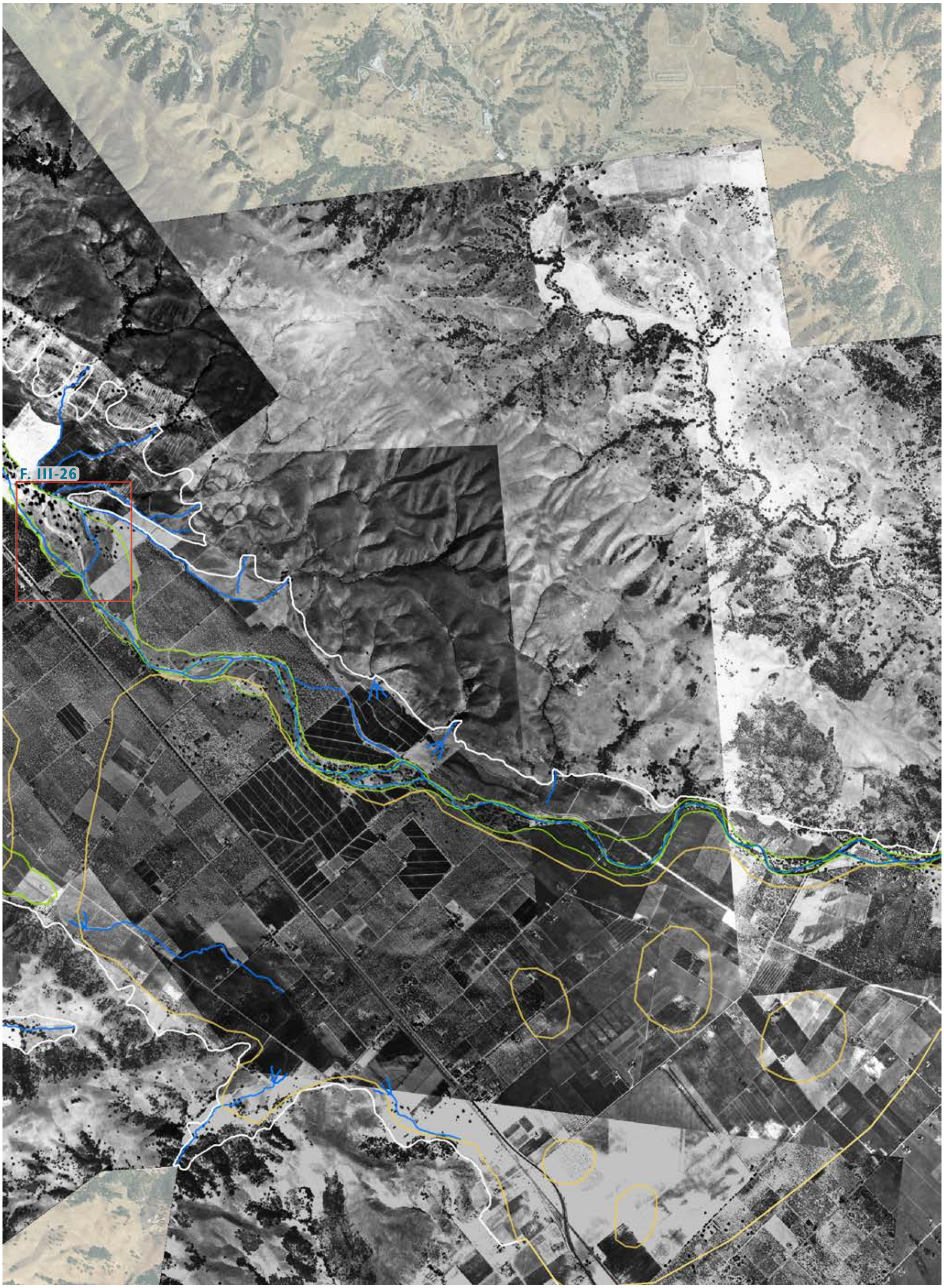
MAP 4B-CA.1800. LANDSCAPE FEATURES DURING INITIAL EURO-AMERICAN SETTLEMENT, CIRCA 1769-1850. Certainty level varies among features; valley oak savanna is a preliminary estimate. More information is available in the project GIS (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres). See inside front cover for map legend.



MAP 4A-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).



MAP 4A-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).



MAP 4B-1939. PHOTOMOSAIC OF EARLY AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300'; 1 square inch ~250 acres; original photographs courtesy SCVWD, USGS Menlo Park, and UC Santa Cruz, UC Santa Barbara, and UC Berkeley).

MAP 4B-2002. MODERN AERIAL IMAGERY, WITH HISTORICAL LANDSCAPE FEATURES OVERLAY. Historical fluvial features in blue; other features, green; project boundary, white (scale 1:40,000; 1"~3300' ; 1 square inch ~250 acres; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

Coyote Valley is shaped by the cone of alluvial sediment spreading downward from the canyon mouth, at the present-day site of Anderson Dam. Currently, Coyote Creek flows to the north, but in previous ages it has flowed south to Monterey Bay. The subtle watershed divide here, crossed in the vicinity of Morgan Hill, is formed purely by the alluvial topography.

A vast valley oak savanna occupied much of Coyote Valley, with small and large "oak openings" (**FIGURE III-24**). Coyote Creek maintained a "wide, gravelly bed" that excluded agriculture from a broad zone (Broek 1932). Steep creeks approached the creek from the hills immediately east of the channel, likely contributing to a high sediment load. On the west side of the Valley, the streams, including Fisher Creek, were discontinuous.

FIGURE III-24. PART OF THE GREAT VALLEY OAK SAVANNA SOUTH OF LAGUNA SECA, CIRCA 1896 (Shortridge 1896, courtesy History San José).

In this reach, Coyote Creek presently exhibits some of its most un-modified morphology and riparian habitat. Examples of sycamore alluvial woodland and open riparian scrub can be found upstream and downstream of Ogier Ponds, representing significant residual habitats (**FIGURES III-25** and **III-26**, see also **FIGURE IV-35**).

At the northern end of the Valley, the adjacent ranges converge into the Coyote Narrows. Laguna Seca, one the most significant freshwater, non-tidal wetland complexes in the region, was located here.

BRAIDED CHANNEL

There is some evidence indicating that Coyote Creek's banks were quite dynamic in this reach, as the main channel moved within the broader channel area. Howe's 1851 (p. 89) survey describes the kinds of dynamic conditions we would expect to observe on braided channels, when he crosses the creek channel between today's Coyote Creek Golf Club and Ogier Ponds:

> 30.30 W. bank of a large creek in wet weather, now entirely dry, bears N. 46 W.
>
> 33.00 E. bank of creek, channel has washed off of one side, and added to the other, so that the channel has been changed for many rods. Width indefinite, say in wet weather 1.50 chains.

Howe's 1851 main channel was about 700 feet to the west of the present-day channel, along the far west bank of the active channel area we have mapped. Prosser (1903) shows

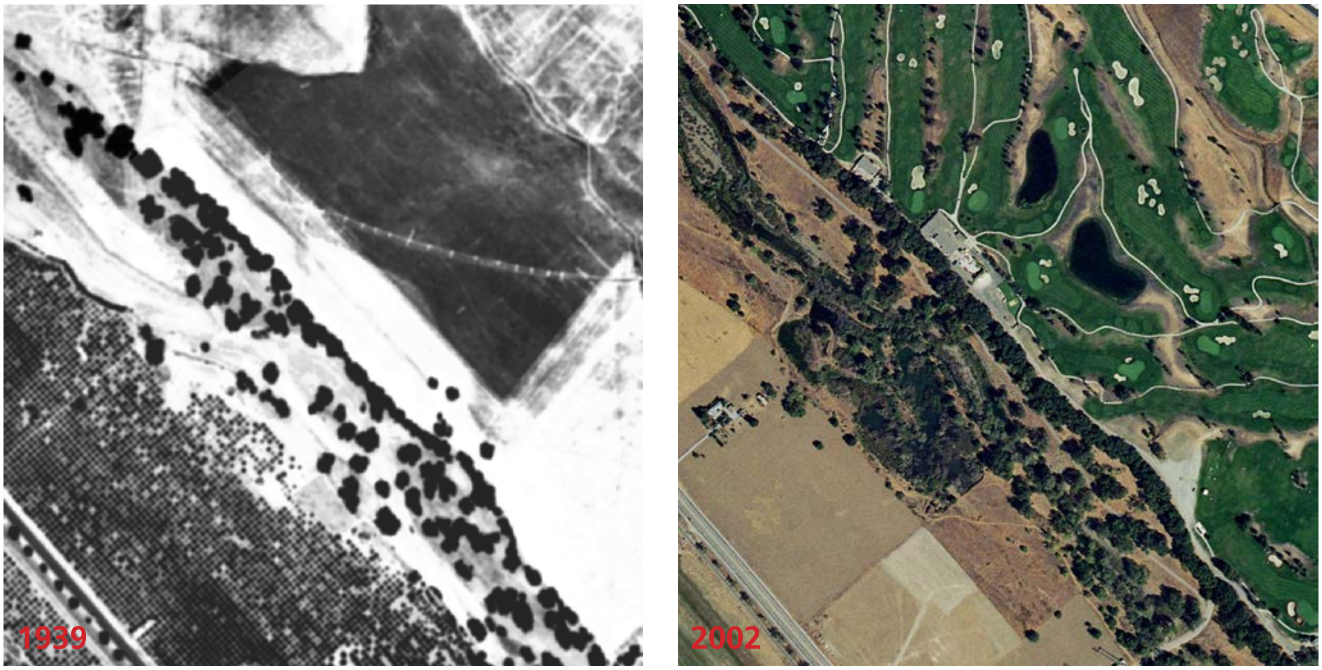


FIGURE III-25. **COYOTE CREEK AT THE COYOTE CREEK GOLF CLUB IN 1939 (LEFT) AND 2002 (RIGHT).** The 1939 (AAA 1939) image shows several of the common characteristics of the braided Coyote Creek channel historically found from approximately Tully Road to Ogier Ponds/Highway 101 crossing. These include riparian woodland composed of large widely spaced trees; substantial unvegetated, scoured areas; and strands of mixed riparian forest following one of the outer banks. These elements are relatively intact presently, as can be seen in the contemporary image (2002 Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

that the subsequent eastward migration of the main channel took place prior to 1903; the main channel has stayed in position during the 20th century, with the current position closely matching that visible in 1939.

The current channel has perhaps downsized slightly since the 1850s, with a present-day maximum width of 80-90 feet compared to Howe's wet weather estimate of 99 feet (1.5 chains) and a bank-to-bank distance of 178 feet. He also reports crossing a "bayou of creek," corresponding to one of the secondary channels visible in the 1939 aerial image.

LAGUNA SECA

The historical Laguna Seca wetland complex, covering over 1000 acres, was formed by the emergence of Coyote Valley groundwater alongside the Santa Teresa Hills (Clark 1924). Drainage at this northern end of the Coyote Valley was blocked both by the bedrock wall of the Santa Teresa Hills and the natural levee of Coyote Creek — together creating a low spot. Wet meadows, perennial freshwater tule marshes, willow groves, and open water ponds received water from both groundwater discharge and the distributary creeks that are now connected across the valley floor as part of the Fisher Creek watershed.

Crossing the wet meadows at the southern end of the Laguna, near present-day Bailey Ave., Howe (1851: 88) used unusually colorful language for a formal survey, recording "a beautiful valley." He described the wet meadows as "a rich prairie, peculiar to the growth of wild clover" but with "wild geese so numerous that the noise is quite annoying."

The perennial wetlands of Laguna Seca are well-documented in the historical record, particularly by a series of landscape photographs preserved in the Santa Clara Valley Water District vault and taken during its reclamation, in the winter of 1916-1917. Despite earlier irrigation and drainage efforts, the spatial extent of perennial wetland and seasonally flooded area remained consistent between 1847 and 1915-1916 (**FIGURE III-27**).

FIGURE III-26. COYOTE CREEK IMMEDIATELY DOWNSTREAM OF OGIER PONDS IN 1939 (LEFT) AND 2002 (RIGHT). The open riparian and channel pattern visible in 1939 (AAA 1939), which closely matched that described by Howe in 1851, has filled in substantially, probably as a result of decreased winter flows and increased summer flows (2002 Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved).

FIGURE III-28 is a panorama taken from the north end of the Laguna, showing a tule marsh with ponds of open water, one of them called "Mallard Pond." Another photograph looks across one pond to the hill on the left, appropriately named Tulare Hill (**FIGURE III-29**). These pictures and the associated captions (see also **FIGURES II-10** and **II-11**) confirm tule vegetation greater than 10 feet tall and water depths of 4-5 feet.

Despite the construction of an extensive drainage system, groundwater seepage still supports surface water during summer months at the northern end of the historical Laguna (**FIGURE III-30**). The natural hydrology of the laguna appears substantially intact, despite historical modifications. The site has changed relatively little during the past 85 years (**FIGURE III-27**, **FIGURE IV-34**) and would appear to have unusual potential for restoration of a natural wetland mosaic in northern Santa Clara County.

ALVIREZ CANAL

Laguna Seca provided an important natural water source for waterfowl, amphibians, and local human culture. Since Coyote Creek was seasonally dry along most of its length, there were few sources of water for summer irrigation upstream of San Jose. Laguna Seca thus provided a rare source of summer water. Accordingly, it was tapped for agriculture unusually early, by the 1830s. Gravity fed irrigation from the Laguna led to an odd scenario.

It appears that the prevailing topography (sloping towards the Laguna) caused Alvirez, the recipient of the Laguna Seca land grant, to construct an irrigation system carrying water around Tulare Hill and north through Coyote Narrows (and alongside Coyote Creek) to the lower lying lands to the north. Unfortunately this crossed what became the traditional boundary between the Laguna Seca and the Santa Teresa land grants, as well as the natural boundary between Coyote and Santa Clara Valley

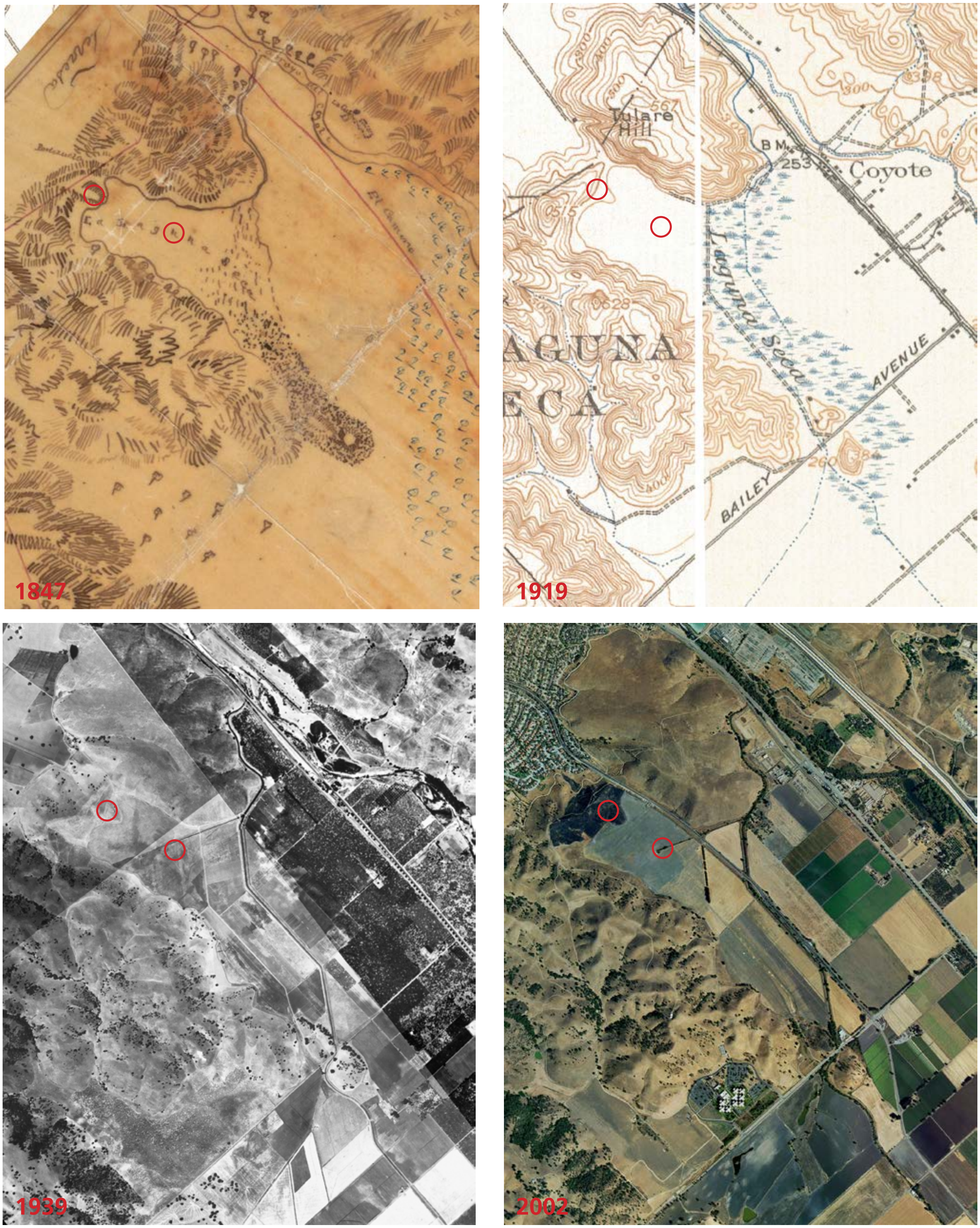


FIGURE III-27. LAGUNA SECA IN 1847, 1915-16, 1939, AND 2002. The 1847 Rancho Laguna Seca *diseño*, by the well-respected surveyor Chester Smith Lyman (e.g. Arbuckle 1986:56), shows perennial wetlands and an open water area, with valley oaks located some distance to the east and south. The outlet channel, probably an extension of Alvirez's canal, has not changed shape much over time, but has received an increasingly greater drainage network. Mottled soil patterns (1939, lower left; AAA 1939) and less agricultural diversification (2002, lower right; Imagery Copyright 2005 AirPhotoUSA, LLC, All Rights Reserved) mark the Laguna site after the 1916-17 reclamation. Approximate locations of the following panoramas are indicated with red circles. Lyman 1847, courtesy The Bancroft Library, UC Berkeley; USGS 1919 and 1940 courtesy Santa Clara Valley Water District.

groundwater basins. This early interbasin water transfer led to understandable conflict, which was recorded by the Mexican courts in the 1830s and recapitulated during the land case trials of the 1850s.

The American records document that Alvirez argued in 1834 that he had already occupied the land for over a decade, and was dependent upon the irrigated fields which Bernal now claimed as part of Rancho Santa Teresa:

> "The citizen...now seeks in property the place Santa Teresa whose map comprehends my fields of tillage and canals of water in which I have made my sustenance. Sir this individual who intends to dispoil me of a right which I have acquired in force of sacrifices costly... I swear what is necessary. Monterey, June 5, 1834" (Alvirez 1834).

FIGURE III-28. LAGUNA SECA PANORAMA, DECEMBER 28, 1916. This view from the north end of the Laguna shows wetland vegetation and perennial ponds immediately before draining for agriculture. See **FIGURE III-27** for location. SCVWD Vault 1916: 64-65, courtesy the Santa Clara Valley Water District.

In the 1834 dispute, Alvirez described the significance of the canal "which in fact has produced much benefit, for in the rest of the land solicited there is no irrigated land." At the same time he described the "*ascequia* (canal) of water which I have lately made (leading) from the said *Laguna* (lake) for my cultivations. I petition of you to grant me as far as said *ascequia* extends..." [spelling and parenthetical phrases from the original text].

Because of this construction, his claim was successful. The resulting Rancho shape has been carried through American land tenure and can still be seen on USGS maps as the grant boundary. Apparently the irrigation ditch was later diverted directly into Coyote Creek to help drain Laguna Seca. This early irrigation project appears to be the origin of the present-day reach of Fisher Creek between the Laguna and Coyote Creek.

FIGURE III-29. LAGUNA SECA PANORAMA ACROSS A TULE POND, DECEMBER 20, 1916. "View looking westward from Lagoon showing open water (about 4 1⁄2 ft. deep) with clam-shell working on Ditch advancing through tulles (Sta. D' 22+50) to drain lands." [Original caption text]. See **FIGURE III-27** for location. SCVWD Vault 1916: 58-59, courtesy the Santa Clara Valley Water District.

CONNECTION TO COYOTE CREEK

There is no mention made of an outlet to Coyote Creek during the extensive discussion of Alvirez's canal from the Laguna through the Narrows, which would have come very close to Coyote Creek. The presence of an adjacent natural channel draining to Coyote Creek would have made a diversion alongside the creek particularly difficult. Yet by 1847, Lyman's map does show a connection from Laguna Seca to Coyote Creek. It seems most likely that this was an extension of the early ditch — as a way to begin draining the Laguna. This inferred history would explain why this channel follows the edge of the hill — to maintain elevation — and how it would have been able to cut through the substantial natural levee sloping alongside Coyote here. The expansion of the ditch into the Outlet Canal (now called Fisher Creek), following the edge of the hills, is illustrated in **FIGURE III-31**.

SAUSAL

There also appears to have been a willow grove or thicket at the Narrows, commented on by travelers and perhaps the reason for the splitting of El Camino Real there. Palou (1774 *in* Bolton 1933) encountered a "thick grove" at the Coyote Narrows. This feature may have been part of the *sausal* at the Laguna Seca wetland complex, whose clearing is recorded in the Laguna Seca Reclamation photographs (**FIGURE III-32**; SCVWD Vault 1916-17: 116, 130, 132, 137). The Laguna Seca *sausal* can be generally located based upon the photographs and USGS Morgan Hill Quadrangle (1917).

FIGURE III-30. GROUNDWATER SEEPAGE AT NORTH END OF FORMER LAGUNA SECA.

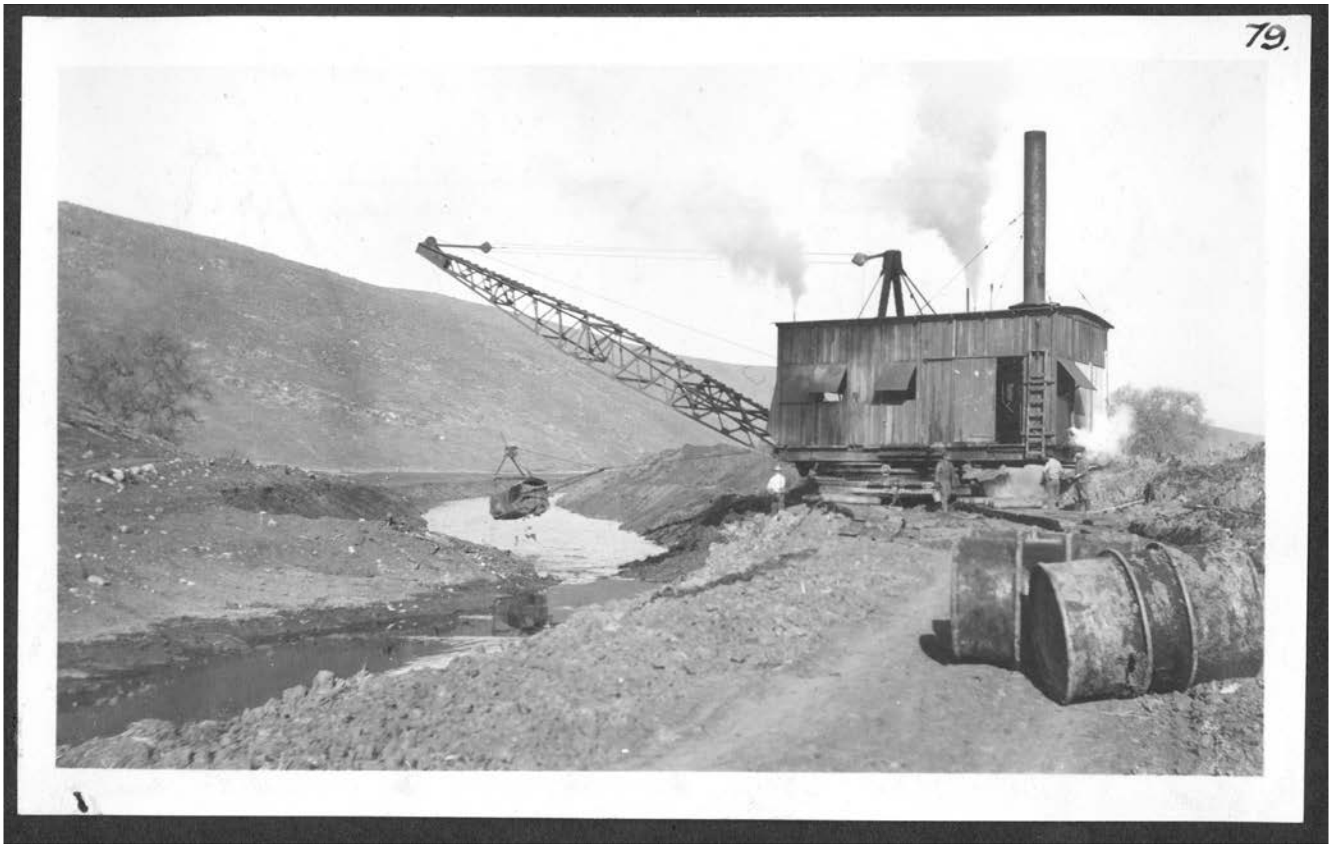


FIGURE III-31. CONSTRUCTION OF THE LAGUNA SECA OUTLET CANAL, FEBRUARY 2, 1917. SCVWD Vault 1917: 79, courtesy the Santa Clara Valley Water District.

FIGURE III-32. LAGUNA SECA WILLOW GROVE, 1917. This image provides a rare photograph of a Santa Clara Valley *sausal*, or willow grove. SCVWD Vault 1917: 115, courtesy the Santa Clara Valley Water District.