DETAILED FIELD STUDY REPORT

PAJARO RIVER HABITAT MANAGEMENT STUDY

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Pajaro River & Tributaries

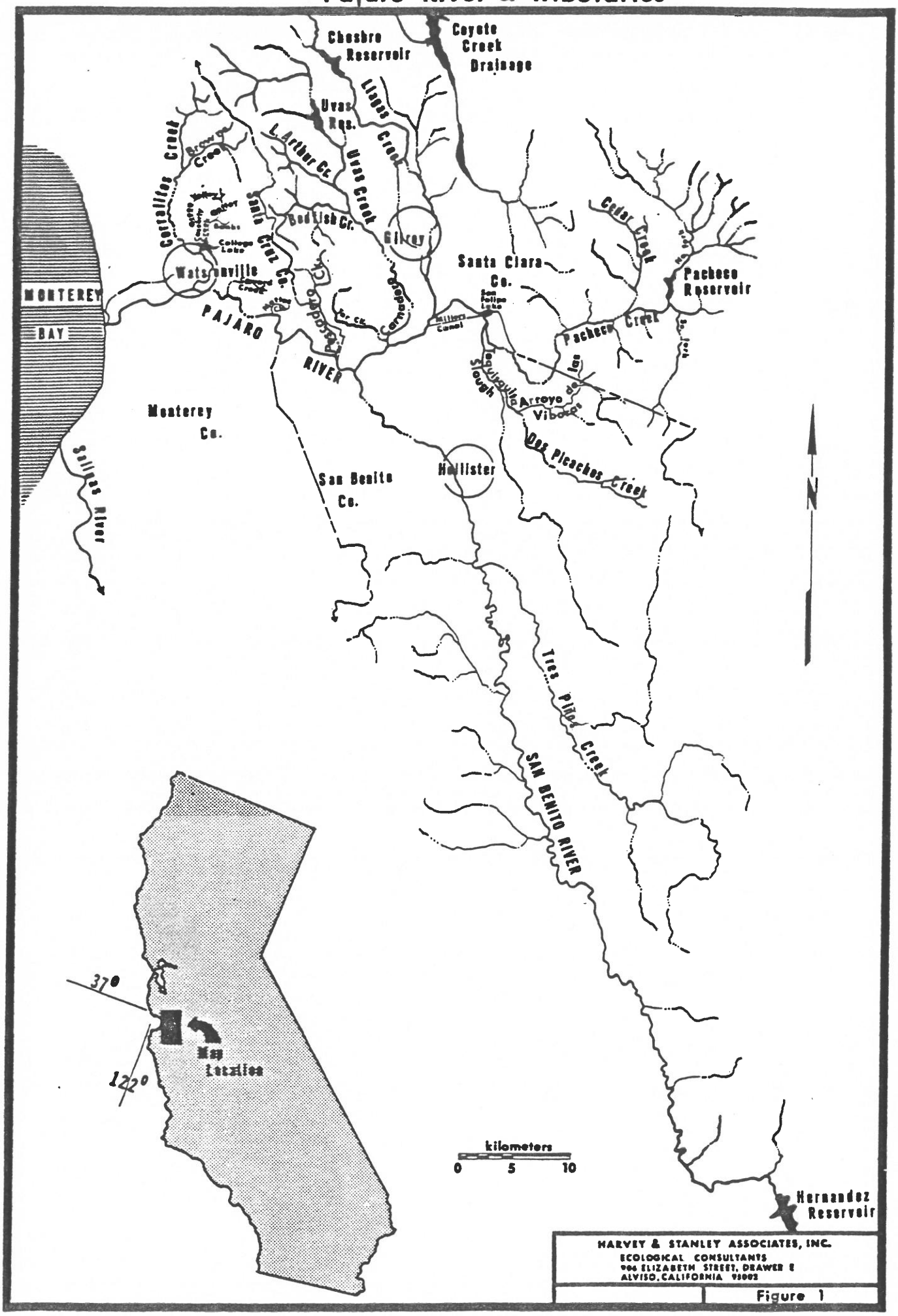

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Figure 1

GENERAL DESCRIPTION OF VEGETATION AND WILDLIFE ALONG THE PAJARO RIVER AND ITS TRIBUTARIES

The following description of vegetation and wildlife is based exclusively upon investigations made in the field by the principal investigator, field biologist or fisheries assistant from August 1981 through January 1982.

Definitions

There are three principal types of riparian plant communities in the Pajaro River Watershed, each very distinct from the others although there are intermediate stages.

1. "Sonoran" type-Typical of floodplains of intermittent or perennial streams in relatively dry interior locations (inland of outer coast ranges). Streambeds are broad, shallow and rocky. Commonest trees are red and arroyo willows, valley oak, and either sycamore or Fremont cottonwood. Trees are widely spaced, absent in some sections, and rarely forming a continuous canopy. Dominant cover is mulefat, sometimes with sandbar willow as co-dominant. Understory vegetation is richer (more diverse) than in the other types of riparian communities, and includes a large number of "locally-unique" species. The principal groundcover is grass (either saltgrass or non-native annuals), with native perennial and annual herbs and sub shrubs in varying densities.

Sonoran type floodplains are typically very rich in birds and other wildlife, and support a number of semi-desert species which are absent or very rare nearer the coast (roadrunner, prairie falcon, ferruginous hawk, lesser nighthawk, raven, yellow-billed magpie, Lewis' woodpecker, canyon wren, horned lark, phainopepla, blue grosbeak, lark sparrow, Lawrence's goldfinch, etc.). The predominant land use is grazing (plus a few walnut orchards, etc.), and so far impacts have been relatively slight.

2. "Valley" type-Occurs in lowlands nearer the coast, in rich alluvial valleys. Stream channels are variable in width, usually relatively narrow, with rocky base but often considerably silted. Tree cover along both sides of the channel is continuous and dense, with black cottonwood, red and arroyo willows, boxelder, sycamore, and sometimes valley and coast live oaks. Understory is California blackberry, often with few or no other native plants except for a few species of aquatics and other herbs along the stream channel (where blackberry is not able to grow).

Sections of stream which are rocky and dry in summer (i.e. those sections most resembling "sonoran-type" floodplains) are the richest in native flora. Unlike the other two types, the valley riparian community has been severely reduced in extent by channelization and clearing for agriculture, which has confined the riparian woodland zone to a narrow fringe of trees bordering the channel (along some stretches, trees have been removed altogether and not al-

lowed to re-establish).

The valley riparian community supports higher breeding densities of valuable songbirds than any other vegetation type in the region, and is the preferred or exclusive habitat of several rare or "locally-unique" species (California yellow-billed cuckoo, Bell's vireo, long-tailed chat, yellow warbler, etc.). In many areas the belt of valley riparian woodland, however constricted, comprises the only significant tree cover in the vicinity - a feature not common to the other riparian communities.

3. "Canyon" type-Characteristic of perennial streams in moist, forested canyons of the coastal hills. Stream channels are rocky and usually clean, narrow, relatively steep-sided, with no appreciable floodplain.

Redwood, bigleaf maple, white alder, tanoak, etc. form a solid dense canopy shading the channel all year. Shrub understory is sparse, leaving room for a well-developed, diverse fern and herb flora including a number of rare and "locally-unique" species. Land uses are relatively low-intensity, with some grazing and occasional small orchards and houses along some stretches. There has been relatively little reduction of this riparian community. Canyon riparian habitats are relatively rich in fish and amphibians but poor in other vertebrates (although there are at least two "locally-unique" bird species - dipper and woodduck).

Pajaro River

REACH: 1 MOUTH TO WATSONVILLE SEWAGE PLANT

Valley riparian* woodland extends from below Thurwatcher Road to upper end of reach, but is sparse and has apparently been much reduced in extent and density. The leveed banks of the river have been planted to Kikuyu grass (Pennisetum clandestinum) which has formed a dense cover preventing re-establishment of native vegetation. Plant diversity is low (25+ native species). Black cottonwood is the dominant tree species, along with red and arroyo willows and a few boxelders. The channel is fairly broad, muddy, and subject to tidal action. There is a fairly extensive pickleweed marsh at the first bend in the river, and additional salt marsh habitat along the lower stretch of Watsonville slough which empties into the estuary.

Reach #1 of the Pajaro River (including the estuary etc.) is a very important wildlife area, particularly for migratory water birds. More bird species have been recorded here than in any other portion of the Pajaro system. Three species of ducks, (potentially) 3 species of terns, and 4 or 5 species of shore-birds nest in this section as well as many landbirds (including a bank swallow colony), but the greatest numbers of birds use the area during winter and migration. Many rare migrants have been recorded from the estuary and also from the vicinity of the sewage plant.

* see definition

If the coastal dunes and salt marsh habitats in the vicinity of the Pajaro estuary are considered as part of Reach #1, the diversity of native vegetation is greatly increased (by at least 60 species including 4 or 5 rare/endangered). Dune and salt marsh communities have been severely reduced and degraded by agriculture, housing developments and invasive non-native plants, but there are still significant remnants of native dune communities at Sunset Beach S.P. and limited salt marsh areas along lower Watsonville Slough and Pajaro estuary.

REACH: 2 SEWAGE PLANT TO BELOW MURPHY CROSSING

Entire reach of river is bordered by a narrow (confined by levees) but relatively dense and continuous belt of valley riparian woodland, dominated by black cottonwood, boxelder, and red and arroyo willow. Understory is mostly California blackberry and non-native German ivy (Senecio mikanioides); diversity of native vegetation is probably fairly low (40 species?). Channel becomes weedy (and marshy in places) during summer. The channel is periodically cleared of vegetation, but presently, in places, has a good border of red and arroyo willow along the low flow channel. This border helps pool development and provides cover and shade for native warm-water fsh.

Riparian woodland in Reach #2 provides valuable habitat for nesting and migrant land birds.

Reaches #1 and #2 both run through valley agricultural (row crop) land.

REACH: 3 BELOW MURPHY CROSSING TO AROMAS

Except near the upper end of the reach, the channel is

broad, gravelly and dry in summer, providing habitat for a number of native plant species not recorded elsewhere in Santa Cruz County (Atriplex breweri, Petunia parviflora, Blepharizonia plumosa and several others). The zone of riparian woodland bordering the channel is much the same as in Reach #2, with the addition of a few sycamores and without much Senecio or other invasive species. Because of specialized habitat conditions in Reach #3, native plant diversity is greater (70+ species) than in most valley-type riparian communities. Wildlife values are about the same as in Reach #2 (or probably higher in the case of mammals, due to accessibility from adjacent chaparral-covered hillsides). Freshwater clams appear to be abundant. Level land outside the leveed riparian zone is mostly in apple orchards.

REACH: 4 AROMAS TO HIGHWAY 25

The floodplain is relatively narrow as the river winds through Chittenden Pass and the Sargent Hills, until the upper portion of the reach where it widens into the southern Santa Clara Valley. As in lower reaches, the riparian woodland belt is dominated by black cottonwood (absent in a few stretches), red and arroyo willow, boxelder, etc., and is confined to a generally narrow zone either by hills or (in valley areas) by agriculture and levees. The riparian forest is particularly extensive near the mouth of the San Benito River, where the corridors of the Pajaro and San Benito Rivers and San Juan Creek converge. Level floodplain land in the hill sections is in orchards and hay-fields, and valley portions are used for row crops. Diversity of native vegetation is probably comparable to Reach #2 (ca. 40

species?). Understory is mostly dense, with California blackberry, coyote brush, elderberry, etc. A grove of redwoods across the river from Soda Lake is the only known native stand of redwood in San Benito County. From Highway 101 upstream to Carnadero Creek, all riparian vegetation on the Santa Clara County side of the river was removed in 1982. Wildlife habitat value of valley section is higher than Reach #3. Raptor abundance is very high in the Santa Clara County portion of the reach.

Soda Lake, in Chittenden Pass, is of particular interest for its "locally-unique" native plants and wildlife (q.v.) and because it is the only alkaline lake in the Santa Cruz Mtn. region (and the Pajaro watershed?); it also has a "tar pit" comparable to the one at Tar Creek. The lake has been filled with slurry from the quarry across the river, destroying much of its biological value.

REACH: 5 HIGHWAY 25 TO SAN FELIPE LAKE

The stream is lined with red willows and a few arroyo willows and cottonwoods upstream to the mouth of Llagas Creek. Upstream of the confluence with Llagas Creek the leveed channel is mostly devoid of any riparian trees. Sparse coyote brush and annual weeds provide limited cover for wildlife.

Salsipuedes/Corralitos Creek

REACH: 1 MOUTH TO HIGHWAY 152

The entire reach is leveed and, except at the lower and upper ends, devoid of trees. The lower 1/4 mile of the reach has mature valley riparian woodland exactly like Reach #2 of the

Pajaro River with which it connects, and the upper portion has the same, plus a few sycamores and white alders. Native plant diversity is low (15+ species); wildlife value of treeless portion is very low. Wooded portions are more or less comparable to Reach #2 of Pajaro River.

Reach #1 of Salsipuedes Creek mostly runs through agricultural valley land, but toward the upper end it is bordered by housing tracts.

The floodplain of the upper end of Reach #1 includes Drew and Kelley Lakes, both of which (particularly Kelly Lake) are important stop over and feeding areas for migratory waterbirds. Kelly Lake supports up to 1000 wintering double-crested cormorants along with many other water and land birds. Both lakes are developed nearly to their banks and have only a narrow fringe of native vegetation (mostly willows and tules).

REACH: 2 HIGHWAY 152 TO DIVERSION DAM

The riparian zone is narrow but mostly unbroken, with mature valley riparian vegetation dominated by black cottonwood (forming a more or less solid canopy) with a mixture of other trees (red, arroyo, and yellow willow, sycamore, bigleaf maple and white alder) and dense, simple understory of California blackberry, creek dogwood, etc. Diversity is predictably low (26+ native species). Portions of the riparian zone suffered severe bank erosion and vegetation destruction during the January 1982 storm.

Wildlife habitat is similar in character to Reach #2 of the Pajaro River but less extensive.

Most of the Corralitos Creek floodplain has been in apple

orchards for many years, and there are also some houses along the creek, mostly toward the upper end of Reach #2.

Many troublesome non-native plants have invaded the riparian zone, particularly eucalyptus, acacia, and to some extent german ivy and periwinkle (Vinca major).

REACH: 3 ABOVE DIVERSION DAM

Typical "canyon riparian" habitat, with perennial flow, relatively clean sandstone channel (except downstream of Rider Creek), and riparian zone limited by slope rather than clearing. Slopes are covered by second growth redwood/tanoak forest (douglas fir and madrone are common further upslope), and riparian vegetation is limited to a narrow strip of white alder and bigleaf maple (with some willow and sycamore and a few black cottonwoods) along creek; understory is relatively open, with ferns and other forest herbs (i.e. canyon type flora) rather than the dense brushy understory of valley type riparian communities. Native plant diversity is fairly high (77+ species). In headwater areas and tributaries (upper Corralitos Creek, Diablo, Shingle Mill, and Rattlesnake gulches) the riparian zone often gives way to tanoak and redwood. Dogwood is locally abundant. The lower portion of Reach #3 is badly infested with periwinkle, but there are few other problems with invasive plants.

Houses are scattered along most of Reach #3.

Browns Creek

REACH: 1 MOUTH TO DIVERSION DAM

Strip of valley riparian woodland runs through narrow valley with apple orchards and some houses. Canopy is more or less continuous, with mixture of bigleaf maple, black cottonwood, sycamore, white alder, red and arroyo willow and a few coast live oak and redwood. Understory is tangled, low-quality, mostly blackberry with patches of creek dogwood, periwinkle and german ivy etc. Diversity is fairly low (33+ native species). Channel is silt and sandstone.

The riparian woodland is valuable wildlife habitat for nesting and migrant land birds.

REACH: 2 ABOVE DIVERSION DAM

Perennial stream with clean sandstone channel, canyon riparian plant community with bigleaf maple and scattered white alder (some red alder) along stream and second growth redwood/tanoak forest on slopes. Understory is not as diverse as some canyon riparian habitats (total 69+ native plant species). In Ramsey Gulch and Gamecock Canyons the riparian border gives way to the redwood/tanoak forest except for localized openings; maple and dogwood, and even some black cottonwoods (Gamecock Canyon) are present in these openings. Many of the lower sections are infested with periwinkle. Houses are scattered along lower portion of reach (up to Redwood Canyon)

College Lake

REACH: 1 CORRALITOS CREEK TO INLETS

The lake was drained many years ago and is used for growing crops during the summer, however it partially fills with water most winters and becomes an attractive wintering area for ducks and other waterbirds. Most of the original native vegetation has disappeared except for a few remnants (28+ species) around the edges of the lake, mainly red and arroyo willows, coast live oaks, blackberry, coyote brush and smartweed. A huge and old valley oak at the north end of the lake, and 2 smaller trees nearby, may be the only valley oaks remaining in the Pajaro Valley area. There is a colony of endangered Santa Cruz tarweed (Holocarpha macradenia) in a cultivated field on the east side of the lake. No plants were in evidence during 1981 field surveys as the field had just been plowed.

Casserly Creek

REACH: 1 COLLEGE LAKE TO GAFFEY ROAD

The lower two thirds of reach #1 is a narrow, but dense zone of valley riparian woodland (mature black cottonwood, red, yellow, and arroyo willow, white alder, coast live oak, and sycamore with understory of blackberry etc.) running through strawberry fields and apple orchards. Channel is narrow, silted and trashy. The upper third, in the hills along Mt. Madonna Rd. is a transition to canyon riparian, with some redwoods, bigleaf maple, more oaks and fewer willow etc. This section is a low density residential area, and houses, clearings and exotic plan-

tings along the creek tend to break the continuity of the native riparian vegetation; only the upper end of the reach is still more or less intact, although even this small area is threatened by a large encroaching eucalyptus grove. Native plant density is low (29+ species).

Wildlife habitat value is high for nesting and migrating landbirds.

Gaffey and Banks Canyon Creeks

REACH: 1 ABOVE GAFFEY ROAD

The channel of Gaffey Creek is narrow, mostly silted (on sandstone base), with steep banks, cutting through a mixture of oak woodland, redwood forest, scrub, and small apple orchards. Riparian vegetation is canyon-type, with closed canopy of bigleaf maple, live oak, and redwood (willow thickets in open areas) and some sycamores, etc. Understory is mostly blackberry, but there is often also a middle story of creek dogwood, hazel, etc. Ferns and other forest herbs are fairly common along banks. Native plant diversity is slightly lower (54+ species) than typical for canyon riparian communities. The lower portion of Banks Canyon Creek is similar, but climbs into a heavily forested canyon of tanoak, redwood and laurel. Bigleaf maple does provide a sparse, narrow riparian border.

Green Valley Creek

REACH: 1 COLLEGE LAKE TO 4TH GREEN VALLEY ROAD CROSSING

Channel is narrow and silted. The upper half of the reach is dry in most summers. This reach of Green Valley Creek cuts through agricultural land (mostly apple orchards), except for a short residential section along Casserly Road. Riparian vegetation is of valley type (with solid canopy of tall black cottonwood etc.), gradually changing toward canyon type upstream (scattered white alders and sycamores, then redwood and many live oaks; willows are common throughout). Slopes in upper portions of the reach tend to be very brushy, with poison oak, creek dogwood, blackberry, elderberry etc. Native vegetation is (predictably) somewhat more diverse than in purely valley-type habitats (42+ species). Valuable habitat is provided for nesting and migratory land birds. The zone also provides good habitat for small mammals and some larger species (grey fox, raccoons, etc.) in an otherwise "developed" area.

REACH: 2 UPSTREAM FROM 4TH CROSSING

Channel is narrow, rocky (sandstone), probably silted in some places. Riparian vegetation is of canyon type, mostly intact and undisturbed except in lower portions of the reach where there are scattered houses and apple orchards near the creek. Slopes are predominantly redwood/tanoak forest, with a narrow fringe of bigleaf maple and other riparian trees (willow, alder, sycamore) along creek, and relatively well-developed understory of ferns and other forest herbs along banks. Diversity is typical for the habitat (71+ native species). The upper

portion of the reach is the least disturbed and also the richest botanically, with at least two "locally-unique" plant species. A rare vertebrate (spotted owl) has also been reported from this section; wildlife habitat value is otherwise comparable to most canyon riparian communities.

Simas Lake is surrounded by willow thickets and grazed annual grassland with marshy edges grown to bog rush and common rush. Portions of the willow thickets were removed in 1892. Slopes to the east are covered with oaks, scrub and pasture; redwood to the west. Tules are common on the lake itself. Simas Lake has value as wildlife habitat, however it appears to be used by few waterbirds relative to other ponds in the region.

Coward Creek

REACH: 1 ENTIRE LENGTH

Perennial flow in upper portion (from below fern canyon). Coward Creek is leveed and treeless from confluence up to junction of Coward Road and Carlton Road. From there up to the bend the creek flows through agricultural land and is covered by dense valley riparian woodland (tall sycamore, black cottonwood, bigleaf maple, live oak etc.) with degraded understory of german ivy. Canyon riparian vegetation (redwood, laurel, live oak, maple) begins at the bend and continues to head of creek, except for a long open section in the rift valley where the creek is bordered only by willows. Understory is dense with blackberry and poison oak except where kept down by cattle (the whole upper section is grazed) or in deep shade of redwoods etc.

Adjacent south-facing slopes are annual grassland with scattered live oaks; north-facing slopes are more or less solid live oak and redwood.

Native plant diversity is high (105+ species) because both valley and canyon riparian communities are well represented. Wildife is (apparently) correspondingly diverse.

Interesting plants include two isolated colonies of tanoak (the southernmost in the Santa Cruz Mountains), and an albino redwood near the head of the creek.

Mattos Gulch

REACH: 1 ENTIRE LENGTH

Channel is silt and sandstone above bend, with perennial flow; below bend, channel is mudstone. Lower section of Mattos Gulch borders level agricultural land and is dominated by sycamore, some black cottonwood, and live oak, with tangled shrub/-vine understory. In the upper section (beginning at bend) canyon riparian vegetation takes over, with redwood, maple, live oak and laurel dominant and understory of ferns and low herbs. This is interrupted by a long stretch of open grassland and scattered willows in the rift zone.

Slopes are covered by oak, scrub, and grassland; the whole area is grazed. Native plant diversity is fairy high (79+ species), typical of canyon riparian floras. There is a large colony of endangered shield fern (*Polystichum dudleyi*) also several old-growth redwoods and a population of an undescribed *Sanicula* sp.

Wildlife habitat value is comparable to Coward Creek.

Pescadero Creek

REACH: 1 MOUTH TO COUNTY LINE

Channel is gravelly, clean, and dry in the lower portion in dry years. Except near confluence, the entire reach is grazed, but otherwise virtually undisturbed. Even though Pescadero Creek is not an entirely typical example of a valley riparian stream (there is no significant floodplain), it is the only valley-type riparian community in the Santa Cruz County portion of the Pajaro River system which has not been artificially constricted by agricultural or other clearing. In a few locations the riparian woodland broadens into attractive park-like groves and grades naturally into adjacent grassland and oak woodland slopes. Dominant riparian trees are red and arroyo willow, black cottonwood, boxelder, live oak, with smaller numbers of sycamore, white alder, buckeye, laurel etc. Understory is a diverse but not dense assortment of shrubs, with grass as ground cover. Some of the willows, elderberry bushes, etc. are extremely large. Native plant diversity is considerably greater (57+ species) than in more constricted valley riparian communities. In the upper portion of the reach, the canyon narrows and white alder becomes the dominant riparian tree of the canyon-type riparian habitat. Although most species from the lower portion are still present in small numbers there is much more oak, laurel, redwood and bigleaf maple.

Birds and other wildlife are abundant.

REACH: 2 COUNTY LINE UPSTREAM

The lower portion of reach 2 is a continuation of the canyon riparian habitat. Upstream from Hatfield Canyon the canyon again opens up (valley riparian) and willows, bigleaf maple, and sycamores replace the alders in dominance. Laurel, redwood, oaks and cottonwoods are also present. Further upstream the canyon again narrows with redwood, liveoak, alder, and maple common.

Wildlife value is highest in the valley riparian section.

Tar (La Brea) Creek

REACH: 1 MOUTH TO HIGHWAY 101

This portion of Tar Creek has been reduced to a treeless ditch through valley croplands.

REACH: 2 HIGHWAY 101 UPSTREAM

As at Pescadero Creek, the entire reach is grazed, and there has been little or no reduction of the riparian zone., Stream channel is gravelly, relatively clean, with perennial flow in many sections. The lower section is valley riparian, with closed to open canopy of red and arroyo willow, sycamore, boxelder, black cottonwood, live and valley oaks etc., and relatively open shrubby understory, surrounded by annual grassland with scattered large valley oaks and a few live oaks. Most of Reach #2 runs through steeper, more densely wooded canyons and has a solid canopy of canyon type riparian woodland dominated by white alder, oaks, laurel, etc., although the other species are still present in small numbers and in openings. There appear to be some areas of native herb habitat on steep south-facing slopes. Since both

valley and canyon riparian habitats are well represented, native herb diversity is high (75+ species). "Locally-unique" plants include colonies of smooth dogwood (Cornus glabrata) and western chokecherry (Prunus demissa), and a huge specimen of blue elderberry.

Wildlife is abundant in the lowland section; it is much less evident in the canyon section. At the upper end of the lowland section is a series of "tar" flows and pools which have trapped many small birds, at least 10 larger birds (great blue heron, turkey vultures, barn owls) and a few mammals.

Carnadero/Uvas Creek

REACH: 1 MOUTH TO MILLER ROAD

Reach #1 is leveed, running through level agricultural land in southern Santa Clara Valley, with continuous canopy of mature valley riparian woodland consisting of a relatively even mix of red and arroyo willow, sycamore, Oregon ash, live and valley oak, black cottonwood, with typical shrub/vine understory of California blackberry, elderberry, snowberry, California rose etc. Native plant diversity is slightly better than average for the habitat (30+ species). Two "locally-unique" plant species are indian hemp (Apocynum) near upper end of reach, and Oregon ash (Fraxinus) along most of reach.

REACH: 2 MILLER ROAD TO WATSONVILLE ROAD

Channel is broad, gravelly, with perennial flow for most of length. Riparian vegetation is basically "sonoran" type but would probably regress to a less diverse "valley" type if chan-

nelized. The lower half of this reach (below Hecker Pass Highway) has very few mature trees and has been badly degraded by recent quarrying, grading, ORV use, etc.; the dominant cover is shrubby thickets of sandbar willow and mulefat. The upper half of the reach (above Hecker Pass Highway) has been quarried and graded to some extent in the past, but is in excellent condition by comparison, with a rich and diverse native flora (76+ species).

A broad belt of floodplain land along the creek has been left in a more or less natural condition (there was extensive bank erosion near Highway 152 in 1982), providing habitat for annual and perennial herbs and allowing riparian trees and shrubs to spread out into open stands rather than concentrate along the creek banks. At present there are few large mature trees except for sycamore and some valley and live oaks, but riparian trees of several other species are becoming established (red and arroyo willow, black and Fremont cottonwood, Oregon ash, etc.) and sandbar willow and mulefat are common, along with many other species of native shrubs. There is one "rare" species (Malacothamnus) and several "locally-unique" (Brickellia, Oregon ash, etc.).

The scattered groves of huge old sycamores are very picturesque as well as important to wildlife. One non-native plant, giant reed (Arundo donax) has become abundant enough in the floodplain to threaten native vegetation; there are a number of other potentially invasive species, but none have caused significant problems so far.

The upper half of Reach #2 is very rich in wildlife because of habitat diversity and optimal balance between open areas and cover. The lower half is much poorer habitat at present but would probably rehabilitate itself rapidly if allowed to. A number of "locally-unique" bird species occur in this section including wood ducks near upper end of reach. Red shouldered hawks are occasionally present.

REACH: 3 WATSONVILLE ROAD TO UVAS DAM

Reach #3 is a relatively unbroken stretch of mature valley riparian woodland with some canyon riparian elements (abundant white alders etc.). It forms dense solid canopy of black cottonwood, alder, sycamore, red willow, live and valley oak.

Wildlife habitat appears to be excellent.

Bodfish Creek

REACH: 1 MOUTH TO NEAR WHITEHURST ROAD

Mature valley riparian woodland with sycamore, willows, maple, alder, and oaks. Some walnuts are also present. The lower half of the reach lacks surface flows in most years. Excellent wildlife habitat.

REACH: 2 WHITEHURST ROAD TO SPRIG LAKE, UPPER BODFISH CREEK, AND BLACKHAWK CANYON

Canyon riparian woodland, including redwood, bigleaf maple, and white alders upstream of Sprig Lake, with forest herb understory. Further upstream on Bodfish (and on Blackhawk Canyon), redwood, tanoak and maple dominate.

Tree cover downstream of Sprig Lake is more diverse, with

white alders, laurels, and live oaks. Willows and black cottonwoods are present upstream of the Whitehurst Road bridge. Deciduous (valley and blue) and evergreen oaks are on the slopes. Redlegged frogs are present.

Little Arthur Creek

REACH: 1 MOUTH TO END OF PAVED ROAD

The canyon riparian of this reach varies in degree of canopy cover because portions of the stream run beside the road and because there are numerous homesites in the upper section above Old Watsonville Road. Sycamores are present throughout. White alders and red (and some arroyo) willows alternate dominance, depending upon surface flow and bank steepness and type. Bigleaf maples are common in the upper half of the reach. Adjoining slopes are of oaks, tan oak and madrone with vineyard and pasture in the developed portions.

Wildlife values are slightly less than most canyon riparian because of the degree of homesite development, especially in the upper half of the reach. Wood ducks are often present at Pickel's pond. Pygmy owls and black salamanders have also been reported in the reach (see plate LA-2).

REACH: 2 END OF PAVED ROAD UPSTREAM

The redwood, laurel and tan oak of the surrounding forest replace the canyon riparian border at the end of the paved road. Understory vegetation is very sparse.

Wildlife habitat for birds and mammals is very poor as might be expected with the dense forest and lack of understory. The

black salamander has been reported from this reach (and downstream) and red-legged frogs are also present.

Llagas Creek

REACH: 1 MOUTH TO SEWAGE PLANT

This portion of Llagas Creek has been reduced to a leveed channel through agricultural land, with no trees other than patches of red and arroyo willows. Present operations maintain a low flow channel but remainder of channel is marshy, with an abundant growth of cattails and other herbaceous vegetation (15+ native species). River otter have reportedly been observed in the marsh at the mouth of Llagas Creek (Stiles, pers. com.). Muskrats are common.

REACH: 2 SEWAGE PLANT TO MONTEREY HIGHWAY

Llagas Creek upstream of the Sewage Treatment Plant is usually dry in summer upstream to Highway 101. Valley oaks and sparse sycamores are present along the upper banks. Some red and arroyo willows are present in the downstream portion of the section, primarily where the channel is narrow and the banks steep. Since the trees are sparse and shrubs are also sparse and limited to coyote brush and toyon, wildlife values are low compared to most valley riparian. However, the riparian zone is important as the only habitat within the intensive agricultural zone.

From Highway 101 to Monterey Highway riparian vegetation increases with the increased frequency of summer flows. Sycamores are common and arroyo and red willows increase upstream.

Wildlife values likewise increase upstream.

REACH: 3 MONTEREY HIGHWAY TO CHESBRO DAM

Upstream from Monterey Highway, surface flows are present in most years and riparian vegetation width and density increase, especially above Santa Teresa Blvd. The dense riparian vegetation consists primarily of arroyo and red willows with maples, white alders and sycamores less abundant. Regulation of flood flows by Chesbro dam has allowed the trees to increase in density and to encroach into the old stream bed. Understory tends to be dominated by blackberry. Homesites are increasing in the Paradise Valley area, but there has been little intrusion into the riparian zone. However, extensive riparian cutting and understory removal occurred in portions of the reach in 1982 (Santa Clara Valley Water District).

The uncut portions of the riparian zone provide quality habitat for migrating and nesting land birds and excellent habitat for small mammals. There is a great blue heron nesting colony in the lower portion of the reach. Wood ducks and red shouldered hawks are occasionally present.

Miller's Canal

REACH: 1 PAJARO RIVER TO SAN FELIPE LAKE

The leveed channel is surrounded by agricultural land and is devoid of riparian trees and shrubs. The canal is dry in most summers, but the weedy border does provide limited cover for wildlife.

San Felipe Lake

REACH: 1 ENTIRE LAKE AREA

The lake is encircled by relatively open groves of mature red and arroyo willows, surrounded by grazed annual grassland. Apart from the willows, there are only vestiges of native vegetation around the edges of the lake (12+ species), however the lake is still attractive to numerous waterbirds (gulls, cormorants, herons, egrets, ducks, etc.). An adult bald eagle was seen during the field check in 1981, and may be a regular winter visitor at the lake.

Pacheco Creek

REACH: 1 MOUTH TO CASA DE FRUTA

Narrow strip of valley riparian woodland running through level agricultural land. Most of the gravelly channel is dry during summer months; section downstream of highway 156 has been graded to below Lover's Lane. Mature red and arroyo willows, boxelders, sycamores, and valley oaks form a solid canopy along both banks, with understory of blackberry, elderberry, etc. Trees are absent in section near San Felipe Lake. Section in vicinity of Lover's Lane is invaded by English elm. An extremely large valley oak and a "locally-unique" plant (Stachys albens) are at Casa de Fruta. Native plant diversity is typical for the habitat (about 25+ species); wildlife habitat likewise.

REACH: 2 CASA DE FRUTA TO SOUTH FORK

The entire reach, particularly the first several miles above Casa de Fruta, is a high-quality sonoran-type riparian community

with a broad natural floodplain, undisturbed except by grazing and not channelized or otherwise constricted (with the exception of Casa de Fruta). The floodplain is dominated by magnificent old sycamores and valley oaks. This is the largest and best preserved of the few sycamore/valley oak parkland habitats remaining in the Pajaro River system. Mulefat is the dominant vegetation along the broad, dry, gravelly channel(s) of the creek, and there is a thin scattering of red and arroyo willows, coast live oak, and various other trees and shrubs. A number of native herbs grow along the channels, and more in the grassy upland portions of the floodplain. Diversity is high (99+ species). There is a colony of one "rare" species (Malacothamnus) and populations of several "locally-unique" plants (Petunia, Astragelus, Marsilea, etc.). Above Bell Station the floodplain (and therefore the riparian zone) becomes considerably narrower and tree cover denser.

Wildlife habitat value of Reach #2 is high, particularly during the summer and fall when the riparian woodland provides an oasis in an otherwise dry landscape. During the field check Nov. 11, 1981, a group of 17 American mergansers and at least 12 great blue herons were seen feeding on fish stranded in a single small pool left by the creek.

REACH: 3 SOUTH FORK TO PACHECO PASS

Narrow, mostly dry channel running through a steep canyon, with oaks and scattered clumps of willows. Willows and sycamores are present in the perennial stretch of stream from above the South Fork upstream to the narrowing and steepening of the canyon

(below the roadside pullout); this is the most valuable portion for wildlife.

North Fork Pacheco Creek

REACH: 1 MOUTH TO NORTH FORK DAM

Short (1/2 mile) section of stream with broad, nearly continuous canopy of mature sycamores, willows, and valley oaks. Understory is grazed. Excellent wildlife habitat.

South Fork Pacheco Creek

REACH: 1 ENTIRE LENGTH

In the first mile and a half, riparian vegetation consists of sparse red and arroyo willows and occassional sycamores, giving way primarily to California bays and oaks as the canyon narrows. The stream is intermittent.

Cedar Creek

REACH: 1 MOUTH TO HAGERMAN CANYON

Sonoran-type riparian similar to Pacheco Creek, with sycamores and some valley oaks. California bay and a few red and arroyo willows are also present.

REACH: 2 HAGERMAN CANYON UPSTREAM

Upstream of Hagerman Canyon the floodplan generally narrows and relative abundance of Sycamores decreases to approximately equal to the oaks and California bays. The stream is generally intermittent except over bedrock outcrops.

Tequisquita Slough

REACH: 1 SAN FELIPE LAKE TO ARROYO DOS PICACHOS/ARROYO VIBORAS

Tequisquita Slough flows through grazing and cropland, all level. The channel is narrow, gravelly, often disturbed, bordered mostly by non-native grasses and weeds. There is a section above Lake Road with more or less continuous tree canopy, but for the most part tree cover is limited to scattered low patches of arroyo and red willow, with elderberry and a few other shrub species. There are also marshy sections with cattails etc. at Shore Road and San Felipe Road. Diversity of native vegetation is low (25+ species).

Tracts of grazed land along the slough often appear to be somewhat alkaline (dominant cover is usually saltgrass). These areas provide good habitat for small mammals and ground-dwelling birds, and good hunting areas for raptors.

Arroyo Dos Picachos

REACH: 1 MOUTH TO LONE TREE ROAD (MOUTH OF CANYON)

Section from mouth to Fairview Road is agricultural, with no significant tree cover; above Fairview Road the narrow sandstone and gravel channel cuts through grazed grassland and is borderd by sparse to fairly continuous stands of mature sycamores and valley oak, with very little understory other than grass. At the upper end of Reach #1 (near the base of the hills) the sycamores and oaks spread out to form a beautiful parkland similar to but smaller and denser than, the one at Pacheco Creek, and providing

excellent wildlife habitat. The stream is perennial at this point.

REACH: 2 LONE TREE ROAD (AT MOUTH OF CANYON) UPSTREAM

Stream flows through a fairly steep canyon, densely wooded with oaks etc. on north-facing slope and more open (grassland) on south slopes. The channel is shaded by a solid canopy of sycamore, live oak (fewer valley oaks) and a few willows and black cottonwoods and other trees and shrubs. Slopes in many sections probably support a rich native herb flora. Reach #2 is undisturbed except for grazing, and appears to be excellent wildlife habitat.

Arroyo De Los Viboras

REACH: 1 MOUTH TO BEGINNING OF PERENNIAL FLOW

Lower portion of reach (mouth to above Fairview Road) flows through a residential area and is in a degraded condition, with only a scattering of native trees and shrubs (13+ species). The channel is narrow, gravelly, disturbed. Condition of riparian zone appears to be much better upstream, with numerous sycamore etc.

REACH: 2 ENTIRE LENGTH OF PERENNIAL FLOW PORTION

Stream flows through grazed hills with from zero to nearly 100% tree cover (live oak and valley oak primarily). Sycamores, valley oaks, live oaks, and a few red and arroyo willows, form a solid to fairly open canopy along the creek, with sparse shrub understory. This type of cover extends from above the Garcia Ranch to a mile or more below the Comstock Ranch. Vegetation is

undisturbed except for grazing, and wildlife habitat appears excellent. Native annual herbs are probably abundant on many slopes.

San Benito River

REACH: 2 MOUTH TO NEAR PRESCOTT ROAD (NORTH OF SAN JUAN BAUTISTA)

Reach #1 is a stretch of valley riparian community similar to adjacent portions of the Pajaro River, with dense, continuous tree and shrub canopy along both banks of the channel, and bordered by agricultural fields. Channel is gravelly or silted, broadest in the upper half, and usually dry for most of the way. The channel and floodplain in the upper half of the reach have been subject to recent grading, leveling (and quarrying?) on a massive scale.

Dominant trees are black cottonwood (giving way to Fremont cottonwood at upper end of reach), red and arroyo willow, box-elder and coast live oak. Understory is dense and tangled, with California blackberry and several shrub species.

Wildlife habitat is comparable to upper reaches of the Pajaro River.

REACH: 2 NORTH OF SAN JUAN BAUTISTA TO HOLLISTER

This reach is the beginning of the sonoran-type riparian community which continues throughout most of the San Benito River system. The floodplain is bordered on the north by grassy hills and on the south by the San Juan Valley (mostly agricultural land, with orchards, vineyards, turf, and row crops). The im-

mediate floodplain is very broad, particularly in the upper half of the reach, and has been relatively little encroached on by agriculture. One large tract (from Bixby Road to the Hollister sewage ponds) is grazed. Stream channels are shallow, gravelly, and dry in most years upstream to near Hollister. Although the natural breadth of the floodplain has been little reduced, several sections of channel have been disturbed on a large scale by grading, quarrying, etc. including all of the lower section from Lucy Brown Road downstream.

The best developed and apparently least disturbed riparian vegetation is the upper half of the reach. Large trees (primarily Fremont cottonwood, red and arroyo willow) are very widely spaced, and the dominant woody cover is mulefat, with sandbar willow and other shrubs conspicuous but less abundant. Non-native annual grasses form the principal groundcover throughout the floodplain. Unlike further upstream, saltgrass occurs only in a few patches. Native plant diversity is comparable to other sonoran riparian areas in the Pajaro system. One "rare" species was found (Grindelia camporum paruflora) and several "locally-unique" species.

Birds (and apparently other wildlife) are very abundant, especially in the upper half of the reach, where diversity of vegetation and proportion of cover to open land are ideal for many species. Two possible nesting colonies of bank swallows were located.

REACH: 3 HOLLISTER TO HERNANDEZ RESERVOIR

Floodplain winds through low hills which are covered with blue oak/digger pine savannah (dense to sparse), sage/buckwheat chaparral, annual grassland, and native herb communities.

Channel is shallow, gravelly, with perennial flow in many or most sections; upstream of Highway 25 perennial flows are present in some sections even during droughts. Width of natural floodplain vegetation has been reduced in some areas by walnut orchards and other types of agriculture, but most of the reach is grazed (particularly upstream from highway 25), which reduces the density of the native riparian vegetation somewhat but does not reduce the extent or (probably) the diversity.

Vegetation is of sonoran type, with trees usually quite widely spaced (although sometimes forming a solid canopy in places where floodplain is narrow). Principal trees in the floodplain are Fremont cottonwood, red and arroyo willow, valley oak (some coast live oak) and digger pine.

Shrub cover in the floodplain varies from fairly dense to sparse or absent. The dominant species is mulefat, sometimes along with sandbar willow (tamarix is also common in some places). Groundcover throughout most of the floodplain is grass (frequently saltgrass), usually interspersed with various low shrubs and perennials. Native plant diversity is predictably high (99+ species). Two "rare" plants were found (Malacothamnus aboriginum and Eriogonum argillosum) and a number of "locally-unique" species.

Wildlife habitat is excellent nearly throughout the reach. There is a large cattail marsh below San Benito Junction which provides potential habitat for various aquatic and marsh birds.

Tres Pinos Creek

REACH: 1 COTTONWOOD ROAD TO PANOCHE PASS

A sonoran riparian community, comparable in most ways to upper San Benito River. Channel is shallow, gravelly, with perennial flow throughout most of length, winding through grazed hills covered with mosaic of blue oak/ digger pine woodland, chaparral, grassland, etc. North-facing slopes in particular appear to be rich in native herbs (wildflowers). Most of the Tres Pinos Creek floodplain is grazed (at least above Cottonwood Road) so the extent of riparian vegetation has been little reduced so far. Trees in the floodplain are mostly valley oaks and digger pines, with widely spaced red and arroyo willow and fewer Fremont cottonwoods, continuing upstream as far as fire station near Panoche Pass. An exception is a narrow section of floodplain near Highway 25 (including USGS gage) with a dense solid canopy of willow and cottonwood and perennial flows, even during droughts. The dominant woody vegetation is mulefat, with grass/subshrub groundcover. Native vegetation is diverse (102+ species), including the same "rare" and "locally-unique" species as in Reach #3 of San Benito River.

Wildlife values are also comparable to upper San Benito River. Red-legged frogs are still present in perennial sections.

FISH RESOURCES OF THE PAJARO RIVER SYSTEM

Native Fishes

Although steelhead are the primary concern in this investigation, the Pajaro River system also has fairly full complement of other native fishes. Originally it was one of the most diverse coastal river systems. The native fish can be divided into five fish associations or communities (shown in figure 2):

The trout association is found in small headwaters and usually above barriers to steelhead migrations (for example, upper Ramsey Gulch or Bodfish Creek). Where steelhead have regular access few resident fish occur. The only other species often present in this association is the riffle sculpin.

Where pools are deeper and the water warmer a trout/sucker association develops (for example, Little Arthur Creek above the dam or Arroyo dos Picachos). Sacramento suckers and California roach join trout (and riffle sculpins) in this association.

In warm, usually intermittent tributaries (for example, Tres Pinos Creek and portions of the San Benito River) California roach dominate. Speckled dace may be present in riffles within this zone. Adult suckers are in deeper pools, and juvenile suckers are usually common throughout. Sticklebacks may also be present.

In large, warm tributaries a sucker/minnow association develops (this association in the Pajaro River system is primarily below the reservoirs on Pacheco, Uvas and Llagas Creeks and in portions of the San Benito River). Hitch and often Sacramento

squawfish join the roach, suckers and sticklebacks of the small tributary associations. Juvenile steelhead can be abundant in riffles if flows are good and summer temperatures are not too high.

In slow, warm streams with large and/or deep pools, a blackfish association is found (for example, the Pajaro River and lower Llagas Creek). Sacramento blackfish are found almost exclusively in this "floodproof" association. Other fishes usually present include hitch, suckers, prickly sculpin and sticklebacks. The water is usually too warm for riffle sculpins and trout. Roach are not present, apparently due to replacement by hitch. Sacramento squawfish are present where rocky spawning substrate, aquatic insects and clear water are available (lower Salsipuedes Creek, unchannelized portions of the Pajaro River upstream to the Highway 129 crossing); squawfish are a good "indicator" of habitat which might be suitable for steelhead if water temperatures were lowered and flows increased.

Prior to a 1968 pesticide kill, tule perch and Sacramento perch were present in the Pajaro River within this zone. An attempt to re-establish tule perch in 1976 failed due to the drought.

Steelhead

Three basic parameters affect steelhead success in the Pajaro River system: migration passage, spawning, and rearing habitat. The accompanying chart rates the quality of these parameters for the Pajaro River and its tributaries using results

for the years 1973 through 1981 and using 1981 as a "minimum" condition due to the low flows. Criteria and considerations in assigning the ratings include:

MIGRATION

Two kinds of migration problems occur for Pajaro River steelhead. The first is the problem of access upstream to spawning areas. Bridge abuttments, diversion dams, log jams and boulder falls present barriers at certain flows (or may act as absolute barriers). In addition, many portions of the river system are dry during much of the year. For example, access to Pacheco Creek is available only after: 1) the lower portion of Pacheco Creek resumes surface flow, and 2) San Felipe Lake fills sufficiently to overflow into Miller Canal. Reservoirs may alter flood flows and prevent or reduce access to some streams until spilling occurs. Llagas Creek and Uvas Creek upstream from Little Arthur Creek often experience this problem. Because adults can wait and make a quick upstream migration on peak flows, with the exception of absolute barriers, upstream migration is probably less of a problem than downstream migration.

The major migration problem for much of the Pajaro may be the downstream migration of smolts in spring. Normally this migration occurs in March and April, at a time when flows are rapidly receeding and some channels may even already be unpassable. For example, a smolt in Bodfish Creek must out-migrate before the mouth of that creek goes dry <u>and</u> before the mouth of Uvas Creek goes dry <u>and</u> before portions of the Pajaro River go

dry or become too shallow for passage. Failure of any of these areas to be open would doom the smolt. The potential problem appears to be even worse for tributaries east of Uvas Creek (Llagas and Pacheco Creeks, Arroyo de los Viboras, etc). In all probability there has been genetic selection in the Pajaro system for young steelhead which "get out quick" in spring. Strains of fish from other streams (such as the Mad River), not subject to such perils, are poorly adapted to them. "Restoring" runs with poorly adapted fish has little probability of working in much of the Pajaro system.

Migration ratings are as follows:

Excellent - no migration problems, even in dry years (no Pajaro stream section fits this criterion!).

Good - access is good except in extremely dry years; most adults and smolts are able to migrate without difficulty. Even in dry years significant migration is possible.

Fair - access is possible in most years, but timing is important, keeping some adults out or trapping smolts. In dry years migration is quite restricted.

Poor - timing is crucial; upstream migration possible only on peak flows; no access possible in dry years. Stream sections dry early and trapping of smolts is the typical situation.

SPAWNING

Although good spawning substrate is rare in much of the Pajaro River system this apparently rarely restricts steelhead production; in most sections it appears sufficient to seed the

rearing habitat available. Part of the reason for this may be that small adults, capable of using smaller, shallower gravels, are common in the Pajaro. Our spawning ratings are referenced to the available rearing habitat:

Excellent - flows, water temperatures and substrate are sufficient to produce many fry. Spawning success is far in excess of rearing capacity and the section could contribute large numbers of fish to other portions of the stream by migration or artificial translocation.

Good - spawning success able to saturate stream with fry, with excess in most years. Can contribute fry to other portions of the stream.

Fair - flows, temperatures or substrate limited but spawning is sufficient to seed stream section adequately; rearing habitat is still the limiting factor. Seldom an excess of fry to contribute to other portions of the stream.

Poor - insufficient to saturate fair or better rearing habitat; may be the limiting factor except where rearing habitat is marginal.

REARING

Rearing habitat is limiting for much of the Pajaro River system. The specific factors include: 1) adequate flows for pool development and to provide feeding stations for fish; 2) hiding cover, as undercut banks, surface turbulence, "unembedded" (not burried in sand) cobble and boulders, and submerged or

overhanging vegetation or debris; 3) aquatic and terrestrial insect food; and 4) suitable summer water temperatures.

In all cases the rearing criteria for smolt-sized fish (greater than 3 1/2" in total length) are stricter than for smaller fish. So in evaluating rearing habitat we are concerned almost entirely with larger fish. For example, portions of Browns Creek without deep pools and with poorer cover still had as many fish as sections with good cover and pool development. However, since the proportion of large fish is much less the habitat has a much lower rearing "value". In addition, since the probability that a smolt will return as an adult increases exponentially with size of the fish, size differences in the smolt-sized fish are very important in evaluating the productivity of rearing habitat.

For the small tributaries which make up most of the steelhead rearing habitat in the river system, smolt-sized fish are yearling or older. The low summer flows in these streams do not appear to directly limit density of smolt-sized fish. Density does not change much from spring through fall or from a wet year to a drier year. What appears crucial to density is adequate cover (pool development, undercut banks, and especially unembedded cobble) for the fish to "hide out the summer" in. Growth of these yearling fish is rather small (they may even lose weight) in summer and fall. The importance of stream flow appears to be in spring when these fish show a large jump in size. More flow, due to wetter years or reduced diversions, lengthens this favorable growth period and increases this very valuable

growth increment.

In Uvas, Llagas and Pacheco Creeks large summer releases, if not too warm, provide valuable rearing habitat for steelhead. Although the fish are restricted to riffles and heads of pools where fast-water feeding stations and overhead turbulent cover are available, densities can be quite high in wet years. In addition, the fish in these streams grow continuously throughout the summer, reaching smolt size in their first year. Even when total density is low the ability to smolt in one year, plus the often large size (young-of-the-year fish in Pacheco Creek were longer than 7 1/2 inches in October of 1973!), make the contribution of these habitats very large.

For establishing ratings of rearing habitat we constructed two sampling summaries. Figure 3 shows the density results we found for smolt-sized fish in streams of the Pajaro River system and for other coastal streams in Santa Cruz County in 1981. Based upon these results we rated rearing habitat as follows (appropriate for 1981 comparisons only since densities at most sites would increase in wetter years):

Very Poor - less than 2 smolt-sized fish per 100 feet of stream.

Poor - from 2 to 4 " " "

Below Average - 4 to 8 " " "

Fair - 8 to 16 " " "

Good - 16 to 32 " " "

Very Good - 32 to 64 " " "

Excellent - 64 or more " " "

We also plotted mean size of smolt-sized fish for the same streams (Figure 4) and assigned poor through excellent values based upon size (these categories are appropriate for 1981 comparisons only, since sizes at most sites would increase in wetter years). Sites with fish sizes rated as only poor (3 to 3.5 inches standard length) had their rearing rating (based upon density) drop one level. Sites with size ratings of good (4 to 4.5 inches) to very good (4.5 to 5 inches) usually had their overall rating raised 1 to 2 levels. The combination rating gives a good approximation of the relative contribution of the stream section to the adult steelhead run. The lowest rating indicated in the table is the relative quality in a low flow year (like 1981); where a range is given, the higher rating is the probable relative quality in years of higher flow.

TABLE 1

FISHERIES HABITAT QUALITY OF THE PAJARO RIVER SYSTEM

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
Pajaro River							
1. Mouth to sewage plant			Good	Good	None	None	Temperature
2. Sewage plant to summer flow limit below Murphy Crossing		Fair Blackfish	Good	Good	None	* None	Temperature/Flow
3. Below Murphy Crossing to below Aromas			Good	Fair to Good	None to Poor	None	Usually Dry in Summer
4. Below Aromas to Hwy. 25	A. Below Aromas to USGS gage (Hwy. 129)	Good Blackfish	Good	Fair to Good	Poor to Fair	* None to below Average	Temperature/Flow
	B. USGS gage to Hwy. 25	Fair to Good Blackfish	Good	Fair to Good	None	* None	Temperature/Flow/ Water Quality: Turbidity, Oxygen
5. Hwy. 25 to San Felipe Lake	A. Hwy. 25 to mouth of Llagas Creek		Good	Fair to Good	None	* None	Temperature/Flow/ Water Quality: Turbidity, Oxygen
	B. Mouth of Llagas Creek to San Felipe Lake		None to Poor	None	None	* None	Flow: Drainage Channel Only

(Parentheses) indicate potential situation if area were utilized, such as by removal of barriers.

*Asterisk on Rearing Quality designation indicates that rating is based upon actual sampling in 1973-1982 period.

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
Salsipuedes/ Corralitos							
1. Mouth to Hwy. 152	A. Mouth to Hwy. 129	Fair Blackfish	Good	Good	Poor to Fair	* None to very Poor	Temperature/Flow
	B. Hwy. 129 to Hwy. 152		Good	Good	Poor	None	Temperature/Flow
2.Hwy. 152 to Diversion Dam	A. Hwy. 152 to 1 mile above Green Valley Road		Good	Good	Poor to Fair	* None to Poor	Flow/Temperature/ Substrate
	B. 1 mile above Green Valley Road to mouth of Browns Creek		Fair to Good	Good	Fair	None to Poor	Usually Dry (Flow/ Temperature/Sub-strate)
	C. Mouth of Browns Creek to Diversion Dam		Fair to Good	Good	Fair	* Poor to below Average	Flow/Substrate
3. Above Diversion Dam	A. Diversion Dam to Rider Creek		Fair to Good	Good	None to Poor	* Below Average	Substrate: Cover/Depth/ Food
	B. Rider Creek to Clipper Gulch		Fair	Good	Fair	* Fair to very Good	Cover/Pool Development
	C. Clipper Gulch to Shingle Mill Gulch		Fair	Good	Good	* Good to very Good	Cover/Pool Development/ Flow
	D. From Shingle Mill Gulch to Diablo Gulch		Poor	Good	Fair	Fair	Pool Develop-ment/Flow
	E. From Diablo Gulch upstream 0.4 miles		Poor	Good	Poor to Fair	Below Average to Fair	Flow/Access
4. Tributaries	A. Rider Creek		None	(Good)	None	None to very Poor	Substrate: Pool Develop-ment/ Food

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	B. Eureka Gulch		None to Poor	Fair	None	(Poor)	Substrate: Pool Development/Food
	C. Shingle Mill Gulch upstream to Rattlesnake Gulch		Poor to Fair	Good	Fair	* Fair	Flow/Food
	D. Rattlesnake Gulch upstream 0.4 miles	Fair Trout	Poor to Fair	Good	Very Poor	Below Average	Pool Development/Flow
	E. Diablo Gulch upstream 0.8 miles		None	(Good)	(Poor)	(Below Average)	(Pool Development/Flow)
Browns Creek							
1. Mouth to Diversion Dam	A. From mouth upstream 0.5 miles		Fair to Good	Good	Poor	None to Fair	Usually Dry
	B. 0.5 miles above mouth up to Diversion Dam		Fair to Good	Good	Poor to Fair	* Good to very Good	Flow
2. Above Diversion Dam	A. Diversion Dam to mouth of Redwood Canyon		Fair to Good	Good	Poor to Fair	* Below Average to Fair	Pool Development/Flow/Food
	B. Mouth of Redwood Canyon to Gamecock Canyon		Fair to Good	Good	Fair	Below Average to Fair	Flow/Pool Development
3. Tributaries	A. Redwood Canyon		None	(Good)	(None)	(Poor)	Substrate: Pool Development
	B. Ramsey Gulch upstream 0.8 miles	Fair Trout	Poor to Fair	Good	Fair	* Below Average to Fair	Pool Development/Flow/Food
	C. Gamecock Canyon upstream 0.9 miles	Fair Trout	Poor to Fair	Good	Fair to Good	* Below Average to Fair	Pool Development/Flow/Food

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
College Lake							
1. Corralitos Creek to inlets			Fair	Fair	None	None	Dry in Summer
Green Valley Creek							
1. College Lake to 4th road crossing upstream on Green Valley Road	A. College Lake to second road crossing upstream on Green Valley Road		Fair	Fair	Very Poor to Fair	* None to below Average	Flow/Temperature
	B. Second crossing upstream to 4th crossing upstream		Poor	Fair	Poor to Fair	None	Dry in Summer
2. Upstream from 4th crossing on Green Valley Road	A. Upstream to 5th road crossing		Poor	Fair	Poor to Fair	None to Poor	Dry or Intermittent in Summer
	B. 5th road crossing to Hazel Dell Road		Poor	Fair	Poor to Fair	* Fair to below Average	Access/Flow
	C. Hazel Dell Road upstream to fork (0.55 miles)		Poor	Fair	Poor	Poor to below Average	Access/Flow/ Pool Development
3. Tributary along Hazel Dell Road			Poor	Fair	Poor to Fair	None to below Average	Flow (Dry in 1981)
Casserly Creek							
1. College Lake to above Gaffey Road	A. College Lake to 0.3 miles below Mt. Madonna Road		Fair to Good	Fair to Good	Poor to Fair	Poor to Fair	Flow/Temperature

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	B. 0.3 miles below Mt. Madonna Road to confluence of Banks and Gaffey Creeks		Fair to Good	Fair to Good	Fair	* Fair to Good	Flow/Pool Development
Banks and Gaffey Creeks							
1. Gaffey Creek	A. Upstream 0.4 miles		Fair	Fair to Good	Fair	Very Poor to Fair	Flow
1. Banks Canyon	A. From mouth upstream 0.4 miles		Fair to Good	Fair to Good	Fair to Good	Fair to Good	Flow/Pool Development
	B. From mile 0.4 to mile 1.3	Fair Trout	None to Poor	Fair	Fair	Fair	Access/Flow/ Pool Development
Coward Creek							
1. Mouth to Thompson Grove region			Poor to Fair	Poor to Fair	Poor	(None to Poor)	Flow (Dry in 1981)/Substrate
2. Thompson Grove region upstream	A. Upstream to mile 2.5		Poor to Fair	Poor to Fair	None to Poor	(Poor)	Substrate/Pool Depth/Access/ Spawning
	B. Above mile 2.5		None	(Poor)	(None to Poor)	(Poor)	(Access/Spawning/ Substrate)
Mattos Creek							
1. Mouth to 1 mile upstream (bend to east)			None to Poor	Fair to Poor	Poor	(None to Poor)	Flow (Dry in 1981)/Substrate

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
2. Bend to abandoned dam 0.4 miles			None to Poor	Fair to Poor	Poor	(Poor)	(Access/Pool Depth/Substrate/ Spawning)
3. Above Dam			None	Fair to Poor	(Poor)	(Poor)	(Pool Depth/ Substrate/ Spawning)
Pescadero Creek							
1. Mouth to County line	A. Mouth to about 1 mile upstream		Good	Fair to Good	Poor to Fair	None to below Average	Flow (Dry in 1981)/Tempera- ture
	B. Mile 1 upstream to 0.5 miles above Hatfield Canyon confluence		Good	Fair to Good	Poor to Fair	* Below Average to Good	Flow/Pool Development
	C. From 0.5 miles above Hatfield Canyon to Ranch Road crossing		Good	Fair to Good	None to Poor	None to below Average	Flow/Tempera- ture (mostly dry in 1981)
	D. From road cros- sing upstream 0.8 miles to east bank peren- nial tributary	Fair Trout	Good	Fair	Fair	* Fair to Good	Flow/Pool Development
	E. Upstream from east bank tributary		Poor	Fair	Poor	None to below Average	Flow/Access (dry in 1979 and 1981)
	F. East bank tributary		None	(Fair)	(Poor)	(Below Average)	Access (Pool Development)
Tar (La Brea) Creek							
1. Mouth to Hwy. 101			Fair to Good	Fair to Good	None to Poor	None to Poor	Temperature/ Flow

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
2. Hwy. 101 upstream	A. Hwy. 101 upstream to Ranch Road bridge crossing (2 miles) (oil fields)		Fair to Good	Fair	Poor	None to Poor	Flow (dry in 1981)
	B. Bridge crossing upstream 1.2 miles		Fair to Good	Fair	Poor	* None to below Average	Flow/Substrate/ Pool Development
	C. 1.2 miles above bridge upstream 0.8 miles to west bank tributary from farm pond		Fair to Good	Fair	Poor to Fair	Below Average	Flow/Substrate/ Pool Development
	D. From west bank tributary upstream to concrete dam (0.65 miles)		Fair to Good	Fair	Poor to Fair	* Below Average to Fair	Pool Development
Carnadero/ Uvas Creek							
1. Mouth to Miller Road	A. Mouth to Thomas Road		Fair to Good	Fair to Good	Fair to Good	* None to Poor	Flow (usually dry)
	B. Thomas Road to Miller Road		Fair to Good	Fair to Good	Poor to Fair	* None to Poor	Temperature/ Flow/Riffles
2. Miller Road to Watsonville Road	A. Miller Road to 0.5 miles above Santa Teresa Blvd. (quarry region)	Fair Sucker/ Minnow	Fair to Good	Fair to Good	Poor to Fair	* None to very Good	Flow/Temperature
	B. 0.5 miles above Santa Teresa Blvd. upstream to 0.65 miles above Hwy. 152	Good Sucker/ Minnow	Fair to Good	Fair to Good	Excel- lent	* Poor to Excellent	Flow/Tempera- ture/Cover

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	C. 0.65 miles above Hwy. 152 to Watsonville Road (mouth of Little Arthur)	Good Sucker/ Minnow	Fair to Good	Fair to Good	Fair to Good	* Fair to Excellent	Flow/Temperature
3. Watsonville Road to Uvas Dam	A. Watsonville Road crossing to west of Day Road	Good Sucker/ Minnow	Fair	Fair to Good	Fair	* Fair to Good	Flow/Food
	B. West of Day Road upstream to Uvas Road crossing	Good Sucker/ Minnow	Fair	Fair to Good	Poor to Fair	* Fair to Good	Flow/Spawning
	C. Uvas Road upstream to Dam	Good Sucker/ Minnow	Fair	Fair to Good	Very Poor to Fair	* Fair	Flow/Riffles/ Spawning
Bodfish Creek							
1. Mouth to Whitehurst Road	A. From mouth upstream about 1.5 miles		Fair to Good	Fair	Fair	* None to Poor	Flow (Dry in most years)
	B. From 1.5 miles above mouth to Whitehurst Road		Fair to Good	Fair	Fair	* Fair to very Good	Flow/Cover
2. Whitehurst Road upstream	A. Whitehurst Road to tributary from Sprig Lake		Fair	Fair	Fair	* Fair to very Good	Flow/Pool Development/ Food
	B. Tributary from Sprig Lake upstream 0.6 miles		Poor to Fair	Fair	Poor to Fair	* Good	Flow/Food
	C. 0.15 mile steep section	Fair Trout	(None)	Fair	None to Poor	*(Good)	(Access/spawning)
	D. Above steep section upstream to where stream turns south from road	Fair Trout	(None)	(Fair)	(Fair to Good)	*(Below Average to Fair)	(Flow/Pool Development)

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	E. Upstream 1 mile from where stream leaves road	Fair Trout	(Poor to Fair)	(Fair)	(Fair)	(Fair)	(Flow/Pool Development)
	F. Upstream to mile 2 above road	Fair Trout	(None)	(Fair)	(Poor to Fair)	(Below Average to Fair)	(Flow/Pool Development)
	G. West bank tributary which parallels Hwy. 152 (upstream 0.3 miles)	Fair Trout	(Poor to Fair)	(Fair)	(Poor) to Fair)	*(Below Average)	(Flow/Pool Development)
3. Sprig Lake			Fair	Fair	Poor to Fair	* Good to Excellent	Flow/Temperature
4. Blackhawk Canyon	A. From Sprig Lake upstream .5 miles		Fair	Fair	Fair	* Below Average to Fair	Pool Development/ Flow/Food
	B. From mile .5 upstream		None to Poor	Fair	Poor to Fair	* None to below Average	Access/Flow
Little Arthur Creek							
1. Mouth to end of paved road	A. Mouth upstream to 0.2 miles below Pickel Dam		Fair to Good	Fair to Good	Good	None to below Average	Flow dry most years
	B. 0.2 miles below Pickel Dam to d m		Fair to Good	Fair to Good	Fair	* Poor to Good	Flow/Temperature
	C. Pickel Dam to second road crossing		None	(Fair)	(Fair)	*(Very poor to Fair)	(Flow-often intermittent)
	D. Second Road crossing to old Watsonville Road crossing	Fair Sucker/ Trout	(Fair) to Good)	(Fair)	(Fair)	*(Below Average to Good)	(Flow/Pool Development)

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	E. Old Watsonville Road to end of paved road	Good Sucker/ Trout	(Fair)	(Fair)	(Fair)	(Very Good)	(Flow/Food)
2. End of paved road upstream 1 mile	A. End of paved road to 1/2 mile upstream	Good Trout	(Poor to Fair)	(Fair)	(Poor to Fair)	*(Good)	(Flow/Spawning/ Food)
	B. Further than 1/2 mile upstream of paved road	Fair Trout	(Poor)	(Fair)	(Poor to Fair)	(Fair)	(Access/Spawning/Food)
Llagas Creek							
1. Mouth to sewage plant		Fair Blackfish	Fair to Good	Fair to Good	None	* None	Water Quality/ Flow/Temperature
2. Sewage plant to Monterey Hwy.			Poor to Fair	Poor to Fair	Fair	* None	Flow/Temperature/ Cover
3. Monterey Hwy. to Chesbro Dam Dam	A. Monterey Hwy. to Santa Teresa Blvd.	Fair (Sucker/ Minnow)	Poor to Fair	Very Poor to Fair	Fair to Good	* None to Fair	Flow/Temperature
	B. Santa Teresa Blvd. to Watsonville Road	Fair (Sucker/ Minnow)	Poor to Fair	Very Poor to Fair	Poor to Fair	* Poor to Good	Flow/Access
	C. Watsonville Road to 0.4 miles above Machado Road	Fair (Sucker/ Minnow)	Poor to Fair	Very Poor to Fair	Poor to Fair	* None to below Average	Flow/Riffles/ Temperature/ Access
	D. 0.4 miles above Machado School upstream to Llagas Avenue	Fair (Sucker/ Minnow)	Poor to Fair	Very Poor to Fair	Poor to Fair	* Poor to Good	Flow/Riffles/ Temperature/ Access
	E. Llagas Avenue to Dam	Fair (Sucker/ Minnow)	Poor to Fair	Very Poor to Fair	Poor	* None to Poor	Spawning/Riffles

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
4. Machado Creek			Poor to Fair	None to Poor	Fair to Good	None	Dry in Summer
Miller Canal							
1. Pajaro River to San Felipe Lake			Fair to Good	Poor to Good	None	None	Usually dry in summer/Water quality
San Felipe Lake			Fair to Good	Poor to Good	None	None	Temperature
Pacheco Creek							
1. San Felipe Lake to Casa de Fruta	A. San Felipe Lake to Hwy. 156		Fair to Good	Poor to Good	Poor to Fair	None to Poor	Usually dry in Summer/Pool Depth
	B. Hwy. 156 to Casa de Fruta		Fair to Good	Poor to Good	Poor to Fair	* None to Fair	Flow/Temperature/Access
2. Casa de Fruta to South Fork	A. Casa de Fruta to ranger station		Fair to Good	Poor to Good	Fair to Good	* None to Good	Flow/Temperature/Access
	B. Ranger Station to Bell Station		Fair to Good	Poor to Good	Fair to Good	Poor to very Good	Flow/Temperature/Access
	C. Bell Station to North Fork	Good Sucker/ Minnow	Fair to Good	Poor to Good	Fair to Good	* Poor to Excellent	Flow/Temperature/Access
	D. North Fork to South Fork		Fair to Good	Poor to Fair	Fair	None to Poor	Flow (usually dry in summer)/ Temperature

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
3. From South Fork to Pacheco Pass	A. From South Fork upstream 0.5 miles		Fair to Good	Poor to Fair	Poor to Fair	* None to Fair	Flow/Access
	B. From 0.5 miles upstream (along Hwy. 152)		None	(Poor to Fair)	(Poor to Fair)	(None to Poor)	Access/(Flow)
North Fork							
1. Mouth to dam		Good Sucker/ Minnow	Fair to Good	Poor to Good	None to Poor	None to Fair	Riffles/Spawning
South Fork							
1. Entire Length	A. Mouth upstream 1.2 Miles		Fair to Good	Poor to Fair	Fair	* Poor to below Average	Flow (dry to Intermittent)
	B. Above 1.2 miles upstream		Prob-ably None	(Poor to Fair)	(Fair)	(Poor to below Average)	(Flow-Inter-mittent to dry)
Cedar Creek							
1. Mouth to Hagerman Canyon			Fair	Poor to Good	Fair to Good	* None to Poor	Dry most years
2. Hagerman Canyon upstream	A. From Hagerman Canyon upstream 0.5 miles		Fair	Poor to Good	Fair to Good	* Poor to Fair	Flow/Access/ Temperature
	B. 0.5 miles above Hagerman Canyon upstream to mile 2.5		Fair	Poor to Good	Good	Poor to Fair	Flow/Access/ Temperature
	C. Mile 2.5 to mile 3.6		None to Poor	Poor to Fair	Fair	Poor to Fair	Access/Flow/ Temperature

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	D. Above mile 3.6	Not surveyed					
Tequisquita Slough							
1. San Felipe Lake to Arroyo dos Picachos and Arroyo de las Viboras			Poor to Fair	None to Fair	None	None	Flow/Temperature
Arroyo dos Picachos							
1. Mouth to 0.2 miles below Lone Tree Road crossing	A. Mouth to Fairview Road		Poor to Fair	Poor to Fair	None	None	Flow-Dry in Summer: Agri-cultural Land
	B. Fairview Road to 0.2 miles below Lone Tree Road Crossing		Poor to Fair	Poor to Fair	Poor to Fair	None	Dry in Summer
2. 0.2 miles below Lone Tree Road upstream	A. 0.2 miles below Lone Tree Road upstream 1 mile	Good Trout/ Sucker	Poor to Fair	Poor to Fair	Fair	* Good to very Good	Access
	B. 1 mile above Lone Tree road upstream to mile 2.5	Good Trout/ Sucker	Poor to Fair	Poor to Fair	Good	Good to very Good	Access
	C. Above mile 2.5		None	Poor to Fair	Fair to Poor	(Fair)	Access
Arroyo de las Viboras							
1. Mouth to mile 4	A. Mouth to 1 mile above Fairview Road		Poor to Fair	Poor to Fair	Fair	None	Dry in Summer/ Access

Stream & Reach	Section	Native Fish Association	Steelhead Migration In	Steelhead Migration Out	Steelhead Spawning	Steelhead Rearing	Limiting Factors
	B. 1 mile above Fairview Road upstream .3 mile (to mile 2)		Poor to Fair	Poor to Fair	Fair	(None to Poor)	Flow (usually dry in summer)/Temperature/Access
	C. Mile 2 to mile 4		None	(Poor)	(Fair)	(Poor)	(Flow/Temperature)
2. Mile 4 upstream		Not surveyed					
San Benito River							
1. Mouth to Prescott Road			(Poor to Fair)	(None to Poor)	(None)	(None)	Dry in Summer
2. Prescott Road to Hollister			(Poor to Fair)	(None to Poor)	(None)	*(None)	Often Dry in Summer/ Temperature
3. Hollister to Hernandez Reservoir	A. Hollister to Hwy. 25 Road crossing		(Poor to Fair)	(None to Poor)	(None)	*(None)	Often Dry in Summer/ Temperature
	B. Hwy. 25 Road crossing to 1 mile below San Benito	Good Roach	(Poor to Fair)	(None to Poor)	(None)	*(None)	(Temperature)
	C. 1 mile below San Benito upstream to Hernandez Reservoir	Fair Minnow/ Sucker	(Poor to Fair)	(None to Fair)	(Poor to Fair)	*(None)	(Temperature)

FISH ASSOCIATIONS OF THE PAJARO RIVER SYSTEM

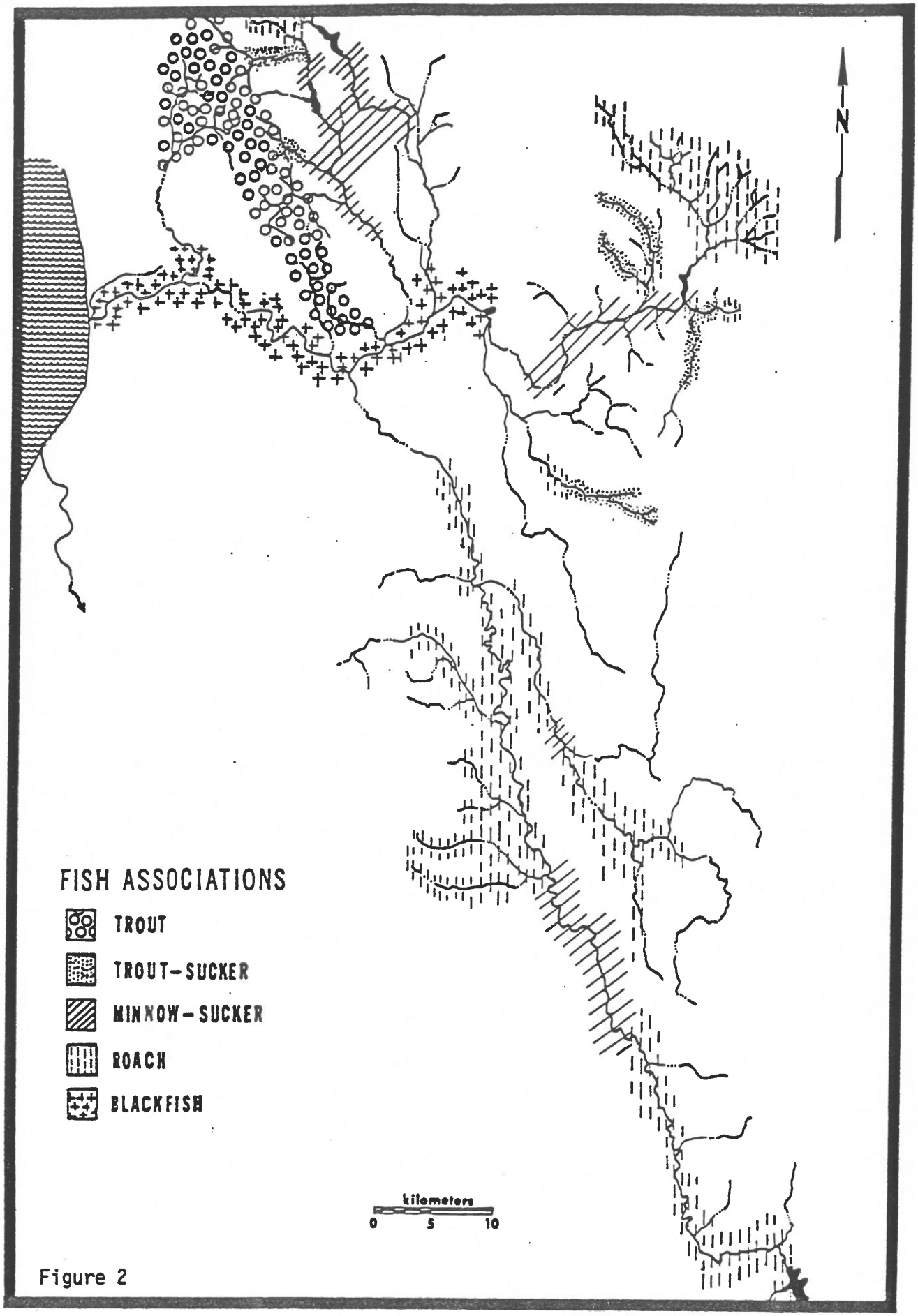


Figure 2

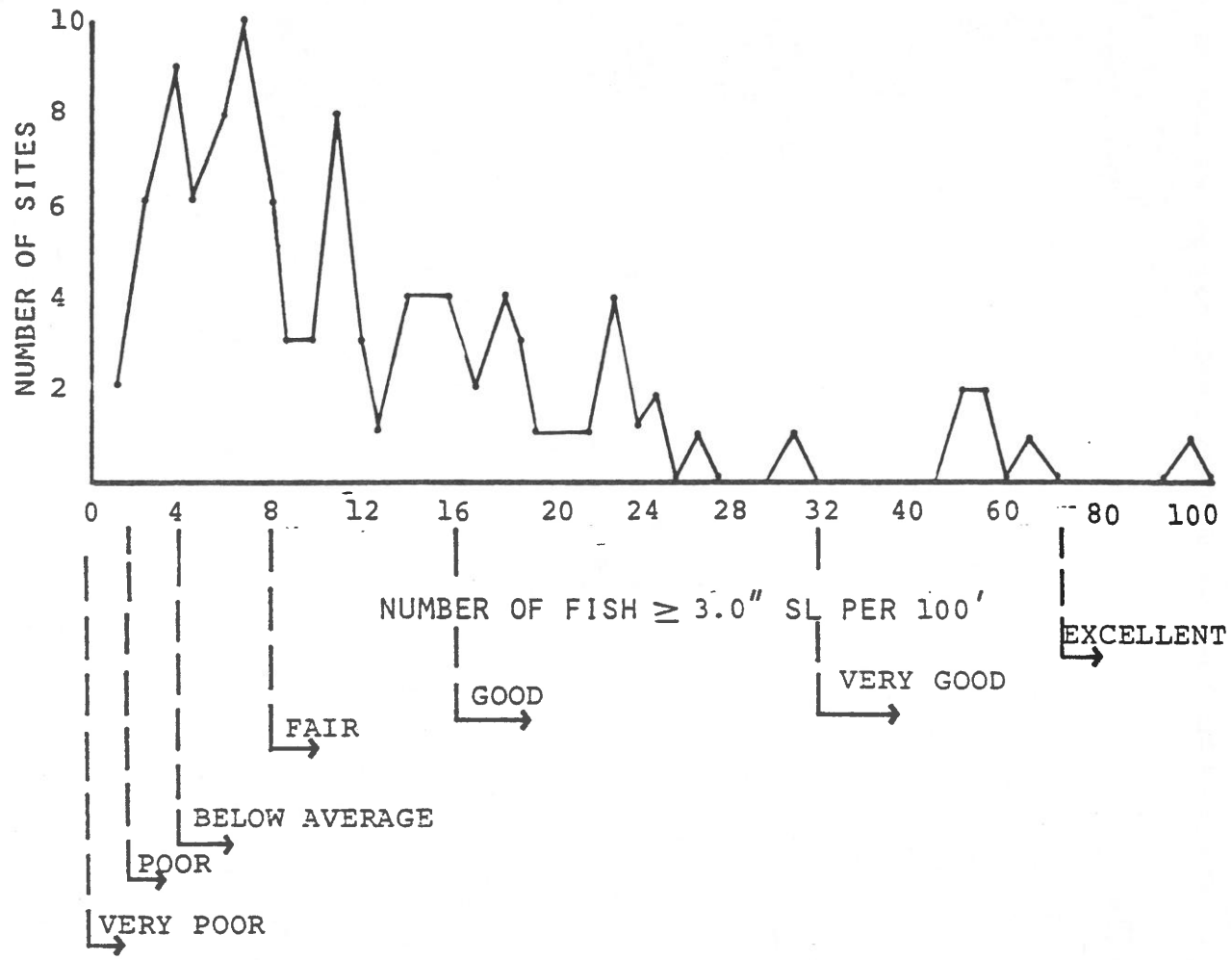


FIGURE 3. DENSITIES OF SMOLT-SIZED FISH AT 106 SITES IN SANTA CRUZ AND SANTA CLARA COUNTIES (1981)

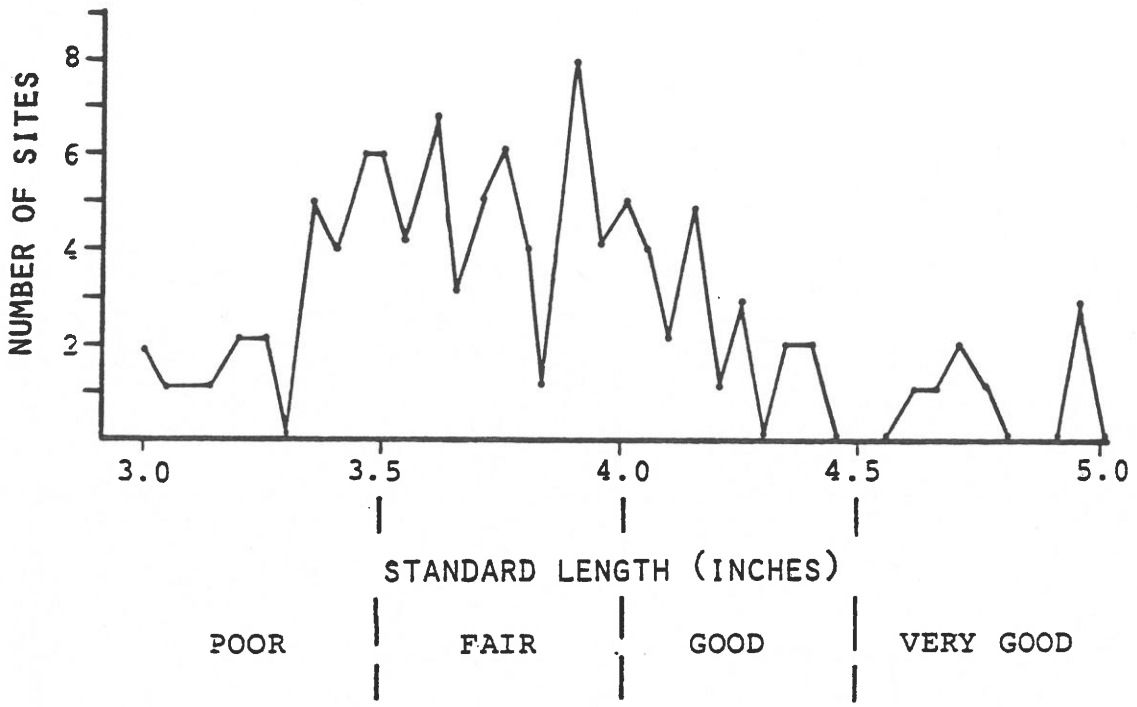


FIGURE 4. MEAN LENGTH OF SMOLT-SIZED FISH AT 102 SITES IN SANTA CRUZ AND SANTA CLARA (1981)

"LOCALLY-UNIQUE" PLANT COMMUNITIES/HABITATS"

1. Serpentine slopes and other native wildflower habitats. One place along Tar Creek (upper reach), probably upper reach of Llagas Creek, one place at second reach of Uvas Creek (and probably more along upper reach), probably Cedar Creek, upper reaches of Pacheco Creek and forks, upper reach of Arroyo dos Picachos, upper reach of Arroyo de las Viboras, and many places along upper reach of San Benito River and Tres Pinos Creek.

2. Shrub plains (small areas in "sonoran" floodplains with exceptionally diverse assortments of native shrubs and perennials.

3. Sycamore/valley oak parklands (broad, parklike stands of large sycamores and some valley oaks in wide grassy floodplains near edge of foothills).
   Found only in 2 areas: in second reach of Pacheco Creek, and upper end of first reach of Arroyo dos Picachos (see plate AP-3). There are small vestiges of this community elsewhere, notably Uvas Creek just above Hecker Pass Highway.

4. Cattail marsh.
   There are small marshy areas many places, but the only large intact cattail marsh is on the San Benito River downstream of San Benito junction (see plate SB-17).

5. Alkaline lake/marsh.

   Soda Lake.

6. Fresh water lake/marsh.

   College Lake, Pinto Lake, Kelly Lake, Drew Lake, Tynan Lake, Simas Lake, San Felipe Lake.

7. Fresh water slough/marsh.

   Struve, Harkins, Galligham, Hansen's and Watsonville Sloughs

8. Pickleweed (tidal) marsh.

9. Beach and tidal mudlfats.

   Pajaro estuary.

ENDANGERED/RARE PLANTS

(From 1980 edition of CNPS Inventory and 1981 Supplement)

Five currently listed species were found during field surveys October 23-December 23, 1981, and 4 or 5 more prior to the Pajaro River study. Additional species and many additional populations could be expected given adequate field time to search potential habitat. (Rare-plant report forms were filled out for each new rare plant population discovered and submitted to California Fish & Game Natural Diversity Data Base).

1. Castilleja latifolia ssp. latifolia (Monterey Paintbrush)
   "Rare but not endangered", REVD code 1-1-1-3.
   Scattered plants persist in remnants of coastal dunes at Pajaro estuary and Sunset Beach, sometimes even growing among iceplant.
2. Cordylanthus rigidus ssp. littoralis (Seaside Bird's-Beak)
   "Rare and endangered", REVD code 3-3-2-3
   Reported for Santa Cruz County in CNPS inventory, and Pajaro estuary would appear to be the most probable location.
3. Eriogonum argillosum (Clay-loving Buckwheat)
   "Rare but not endangered", REVD code 1-1-1-3
   One plant was found at San Benito River above Willow Creek (Melandy Ranch), and 2 colonies were found on road embankments along Tres Pinos Creek (just above 3rd bridge up from Cottonwood Road, and just below 4th bridge).

4. Eolocarpha nacradenia (Santa Cruz Tarweed)

"Rare and endangered", REVD code 3-3-2-3

The colony at College Lake fluctuates markedly according to land use (see plate CL-1). At times there have been hundreds or thousands of plants, but when the site was checked in Dec. 1981, there were none (because the field had recently been plowed). When the site was visited in Dec. 1980, there was only one plant (the field had been mowed). There are other colonies (mostly threatened by development) and still apparently much potential habitat in the vicinity of Watsonville, Struve and Harkin's Sloughs.

5. Grindelia camporum ssp. parviflora (Great Valley Tarweed)

"Rare but not endangered", REVD code 1-1-1-3

A small colony of a few plants was found in the floodplain of the San Benito River near the end of Lucy Brown Road east of San Juan Bautista (see plate SB-3).

6. Grindelia latifolia ssp. latifolia (Coastal Gumplant)

"Rare but not endangered", REVD code 1-1-1-3

It is arguable whether the plants at the Pajaro estuary belong to the ssp. latifolia or ssp. platyphylla, but they (or at least some) have been reported as latifolia (Munz, 1959).

7. Malacothamnus aboriginum (Indian Valley Malacothamnus)

"Rare but not endangered", REVD code 1-1-1-3

Three small colonies were found along Tres Pinos Creek, from about 3 miles above Las Aquilas Creek to several miles above Cottonwod Rd. One plant was seen near upper San Benito River

(Old Hernandez Road, above San Benito junction). There appears to be habitat for many more colonies in the San Benito County portion of the Pajaro Watershed.

8. Malocothamnus arcuatus (Arcuate Malacothamnus)

"Rare but not endangered", REVD code 1-1-1-3

A single, out-of-habitat plant was found in the Uvas Creek floodplain (see plate CV-5), and a small colony was found at a gravelly outcrop in the grazed floodplain of Pacheco Creek above Casa de Fruta (see plate PA-4).

9. Polystichum dudleyi (Dudley's Shield Fern)

"Rare and endangered", REVD code 2-2-2-3

A large population was discovered in Mattos Gulch (see plate MG-1).

"LOCALLY-UNIQUE" PLANTS

The following list probably represents less than half of the "locally-unique" native plant species occurring in the Pajaro system. Many species are difficult or impossible to detect in late fall (when the field work was done), and time was sufficient only to cover a very small percentage of the habitat. Locations of most "locally-unique" plants have been mapped.

1. Alisma plantago-aquatica (Water-plantain)
   Colony at "fish pond" on second reach of Pacheco Creek (see plate PA-4).
2. Alnus oregona (Red Alder)
   An out-of-habitat tree growing among white alder at diversion on Brown's Creek (see plate BR-2). This tree was also unusual in having exceptionally large leaves (several other tree species were found in the study area with leaves exceeding published maximum size: black cottonwood, red willow, bigleaf maple, sandbar willow, Fremont cottonwood, sycamore, and valley oak).
3. Apocynum cannabinum (Indian Hemp)
   Upstream from Thomas Road on Uvas Creek (see plate CU-3).
4. Arctostaphylos pungens "benitoensis" (Mexican Manzanita)
   Single small colony at San Benito River below Highway 25 crossing (see plate SB-13).

5. Astragalus sp. (annual) (Milkvetch)

   Small population in floodplain of San Benito River opposite San Juan Bautista (see plate SB-2).

6. Astragalus sp. (perennial) (Milkvetch)

   Single plant in floodplain of Pacheco Creek beyond Casa de Fruta (see plate PA-5).

7. Brickellia californica (Brickellbush)

   Population at Uvas Creek between Hecker Pass highway and Watsonville Road; a few plants in second reach of Pacheco Creek; a few at the two shrub plains on Tres Pinos Creek; upper San Benito River.

8. Chrysothamnus nauseosus ssp. mojavensis (Rabbit Brush)

   A few along the San Benito River between San Benito Junction and Hernandez Reservoir.

9. Cornus glabrata (Smooth Dogwood)

   A few along Tar Creek (see plate TC-2).

10. Datura meteloides (Toloache)

    Colony at Pajaro River below Aromas (see plate PR-6) is the only known occurrence of the species in Santa Cruz County.

11. Eriodictyon tomentosum (Woolly Yerba Santa)

    Patch near San Benito River downstream from San Juan Bautista is the northernmost location known (see plate SB-1).

12. Eriogonum elongatum

    Scattered colonies along upper San Benito River and Tres Pinos Creek (see plate SB-15).

13. Eriogonum wrightii?

    Colonies along Tres Pinos Creek above fire station.

14. Fraxinus latifolia (Oregon ash)

    Fairly common along first and second reaches of Uvas Creek, but rare in region and known from no locations further south.

15. Gutierrezia bracteata

    Two Small colonies at shrub plains on San Benito River (just above highway 25 bridge, and further downstream).

16. Haplopappus linearifolius? (Golden-Fleece)

    Scattered along upper part of Tres Pinos Creek and probably upper part of San Benito River.

17. Haplopappus venetus vernonioides (Coastal Isocoma)

    Along Tres Pinos Creek and third reach of San Benito River.

18. Juniperus californica (California Juniper)

    Upper parts of Tres Pinos Creek and San Benito River.

19. Lepidospartum squamatum

    Scattered colonies in second and third reaches of San Benito River.

20. Marsilea vestita (Clover Fern)

    Colony in a vernal pond in Pacheco Creek floodplain near Malacothamnus (see plate PA-4).

21. Montia sibirica (Candy Flower)

    Two colonies along upper reach of Green Valley Creek (see plate GV-4), also reported from Browns Creek.

22. Muehlenbergia asperifolia (Scratchgrass)

    Two small colonies in third reach of San Benito River (see plates SB-11 and SB-13).

23. Parkinsonia (Palo Verde)

    Near creekbed tributary to Arroyo dos Picachos at Fallon Road east of Fairview Road (see plate AP-2).

24. Petunia parviflora (Wild Petunia)

    Occasional in reach #3 of Pajaro River (see plate PR-5) and second reach of Pacheco Creek (see plate PA-4).

25. Pinus sabiniana (Digger Pine)

    Common along San Benito River and Tres Pinos Creek, but one at Tres Pinos Creek near fire station is exceptionally large (55 inch dbh) and is used as an acorn-storage tree by acorn woodpeckers. Another digger pine was of interest because of its isolation (far from any other populations) - a single tree in the floodplain of Pacheco Creek above Casa de Fruta.

26. Prunus demissa (Western Choke Cherry)

    Single thicket at Tar Creek (see plate TC-2).

27. Puccinellia airoides (Alkali Grass)

    Population at Soda Lake (extirpated).

28. Quercus lobata (Valley Oak)

    One huge tree near College Lake (55 inch dbh even though half of trunk is split off) and two smaller trees nearby are the only valley oaks (at least the only ones remaining) in the Pajaro Valley (see plate CL-1). There is another extremely large tree (61 inch dbh) on the bank of Pacheco Creek at Casa de Fruta (see plate PA-4).

29. Ribes quercetorum

    Small population at Tres Pinos Creek above fire station.

30. Ribes menziesii, var. senile (Canyon Gooseberry)

Few in Mattos Gulch, Green Valley (see plate GV-4), and Coward Creek.

31. Rosa californica (California Rose)

Common, but several colonies at Uvas Creek (between Hecker Pass Highway and Watsonville Road) have exceptionally large and abundant variable fruit.

32. Sambucus mexicana (Blue Elderberry)

Common, but one at Tar Creek (see plate TC-1) is the largest among many extraordinarily large tree-like plants in the study area (33 inch dbh). Pescadero Creek also has many extremely large plants.

33. Salix laevigata (Red Willow)

Common, but there are some gigantic specimens. Two at Pescadero Creek have tall trunk 37 inch dbh, and one has a short trunk 49 inches dbh. Tall, massive trees.

34. Sanicula sp. (new species related to Gambleweed, Sanicula crassicaulis)

Large population in Mattos Gulch (see plate MG-1).

35. Sequoia sempervirens (Coast Redwood)

Common in canyons of Santa Cruz County etc., but a large grove along the Pajaro River opposite Soda Lake (see plate PR-6), plus a single clump at San Benito River near mouth (see plate SB-1) are the only native redwoods known to exist in San Benito County. Also of interest are several large old-growth redwoods in Mattos Gulch (see plate MG-1).

36. Stachys albens (Hedge-Nettle)

Single colony at edge of Pacheco Creek at Casa de Fruta (see plate PA-4).

VERTEBRATE SPECIES: ENDANGERED, RARE AND OF SPECIAL CONCERN

California Fish & Game "endangered", "rare", and "species of special concern" lists.

Endangered:

1. California Brown Pelican (Pelecanus occidentalis californicus)

   May not be applicable to Pajaro study. Occurs commonly along coast but does not utilize the Pajaro estuary to any extent, either for feeding or roosting.

2. California Condor (Gymnogyps californianus)

   Formerly foraged throughout the Pajaro watershed and undoubtedly nested there as well. A communual roost was reported during the late 1800's in the hills near Sargent (Santa Clara County), and there are several 1903 records from the hills east of Watsonville (Hunter) and two 1973 records for the Pajaro watershed (Elliott et al.). Since the more productive coastal hunting areas have been pre-empted by people, the few remaining condors now depend on large unbroken tracts of foothill rangeland (such as still exist within the Pajaro watershed in San Benito and eastern Santa Clara Counties).

3. American Peregrine Falcon (Falco peregrinus anatum)

   Now mostly a migrant and winter visitor along the coast and around wetlands. There are sightings every year from coastal wetlands etc. throughout the Monterey Bay area, including a

few recent records from the Pajaro estuary and slough area. Marshes and estuaries with large concentrations of water birds are a magnet. As long as prey populations remain healthy and DDT levels low, local populations of peregrine falcon have a good chance of recovering.

4. Southern Bald Eagle (Haliaeetus leucocephalus leucocephalus)
   Probably resident in Pajaro watershed at one time, now a rare winter visitor at lakes, reservoirs, and along the coast. There are recent records for Soda Lake, Struve Slough, and San Felipe Lake. An adult bird was seen at San Felipe Lake during field check on December 12, 1981. This may be a regular wintering area, depending on availability of fish and freedom from disturbance.
5. California Least Tern (Sterna albifrons browni)
   Formerly nested at Moss Landing and Pajaro estuary. Now only occurs as a rare migrant (about 1 or 2 sightings at Pajaro Dunes per year) although there is some suspicion of nesting again near Moss Landing. It is possible that habitat could be improved so as to encourage breeding at Pajaro estuary.
6. California Clapper Rail (Rallus longirostris obsoletus)
   Probably not applicable to the Pajaro study. There is a small resident population at Elkhorn Slough, but the pickleweed marsh at Pajaro estuary is probably too small to support Clapper Rails.
7. Santa Cruz Long-Toed Salamander (Ambystoma macrodactylum croceum)
   Not known to occur in the Pajaro watershed, however there are

populations a short distance to the north and south of the lower Pajaro River system.

Rare:

1. California Black Rail (Laterallus jamaicensis caturniculus)
   May occur as rare visitor in salt marshes of Pajaro estuary, but there are not records yet.
2. California Yellow-billed Cuckoo (Coccyzus americanus occidentalis)
   Probably nested in dense riparian woodlands (of "Valley" type) throughout the Pajaro system (Silliman, 1894 Hunter, 1903). In recent years there have been two sightings, both at the Pajaro River near the Watsonville sewage treatment plant.

Special Concern:

(Highest priority)

1. Fulvous Whistling Duck (Dendrocygna bicolor)
   No records to date, but the large cattail marsh below San c Benito Junction appears to be suitable nesting habitat and is within the historical breeding range of the species.
2. Barrow's Goldeneye (Bucephala islandica)
   There are one or two winter records for the Pajaro estuary, but the Pajaro area is outside the normal range of the species.
3. Swainson's Hawk (Buteo swainsoni)
   Formerly nested in riparian habitats (mostly "Sonoran" type)

in open rangeland areas as far north as the Salinas and Santa Clara Valleys, and probably also in the dry inland valleys of the Pajaro watershed.

4. Least Bell's Vireo (Vireo belli pusillus)

   Now nearly extinct; formerly nested in riparian habitats in coast range valleys north to Santa Clara County (and further north in the Central Valley). There is at least one old record from the Pajaro River, in southern Santa Clara County.

(2nd priority)

5. Double-Crested Cormorant (Phalacrocorax auritus)

   A large wintering population of up to 1000 birds feeds each day at Kelly Lake (and to 50 at Pinto Lake, plus a few at other lakes etc. in the Pajaro system). Some of these (several hundred?) have begun to roost at Kelly Lake in recent years, but most still commute from roosts at Santa Cruz and Davenport.

6. Cooper's Hawk (Accipiter cooperi)

   Still relatively common during migration, but local breeding populations are apparently declining. To be expected in riparian habitats etc. throughout most of Pajaro watershed.

7. Northern Harrier (Marsh Hawk) (Circus cyaneus)

   Relatively common during winter and migration, but now rare as a breeding species in central California. There is one old nesting record for the Pajaro system, at a marsh near Watsonville Slough.

8. Osprey (Pandion haliaeetus)

Reported most years from Pajaro estuary, Pinto Lake, etc.; probably visits most lakes, reservoirs, and large streams of Pajaro system, particularly during migration. Formerly nested almost throughout the state, but there are no recent records for the Pajaro watershed.

9. Prairie Falcon (Falco mexicanus)

Resident in dry rangelands throughout the interior portion of the Pajaro watershed, but apparently declining.

10. Snowy Plover (Charadrius alexandrinus)

The Pajaro estuary supports an important breeding population of snowy plover which has been the subject of intensive study (under auspices of Pt. Reyes Bird Observatory) over the past five or six years.

11. Burrowing Owl (Athene cunicularia)

Resident (more common in winter) in lowland areas, living in ground squirrel burrows. Populations have dramatically declined due to conversion of rangelands to agriculture and poisoning of ground squirrels. Two were seen during field surveys.

12. Long-Eared Owl (Asio otus)

To be expected in riparian habitats etc. throughout Pajaro system. Very uncommon.

13. Short-Eared Owl (Asio flammeus)

Resident or winter visitor in open marshy lowlands. There are recent winter records for Struve/Hansen Slough area (probably also many interior locations) and breeding records not

far south of the Pajaro estuary (Salinas estuary and Moss landing?).

14. Spotted Owl (Strix occidentalis)

    Expected as rare resident in heavily forested canyons tributary to Pajaro River (mostly in Santa Cruz County). There is one recent report for upper reach of Green Valley Creek.

15. Willow Flycatcher (Empidonax traillii)

    May have nested formerly (still?) in valley riparian habitats of Pajaro system.

16. Yellow Warbler (Dendroica petechia)

    Summer resident (nesting) along Pajaro River and probably most "valley-type" cottonwood/willow riparian habitats throughout the Pajaro system.

(lowest priority)

17. Common Yellowthroat (Geothlypis trichas)

    Wintering in fairly small numbers in marshes probably throughout the Pajaro system, and expected to be resident and breeding in at least a few permanent marshes (Pinto Lake? Kelly Lake? Tynan?).

18. Golden Eagle (Aquila chrysaetos)

    Resident in small numbers throughout Pajaro watershed. Prefers open rangelands for hunting.

19. Elegant Tern (Sterna elegans)

    Large numbers congregate each summer at Pajaro estuary.

20. Black Skimmer (Rhynchops nigra)

There is one recent record for the Pajaro estuary, but this is not within the normal range of the species.

21. Bank Swallow (Riparia riparia)

Now rare in the central coast region. The Pajaro River appears to have the only nesting colonies betwen Ano Nuevo Pt. and the Salinas River. There is one colony at the Pajaro River near the estuary, and apparently two more along the lower San Benito River (see plate SB-2).

22. Purple Martin (Progne subis)

Has become rare in the region, but still to be expected as summer resident (nesting) almost anywhere in watershed.

ADDITIONAL SPECIAL-INTEREST OR "LOCALLY-UNIQUE" WILDLIFE VALUES

Heron or egret roosts or nesting colonies

Black-crowned Night Heron-large roost at Kelly Lake, smaller roost at Pinto Lake, pond west of Struve Slough.

Great Blue Heron nesting colonies-rookeries at Chesbro and Uvas Reservoirs, Uvas Creek (south of Hecker pass Hwy.), Llagas Creek (east of Watsonville Road).

Egret roosts-Kelley Lake, pond west of Struve Slough, Pajaro River below highway 1.

Green Heron-nesting in valley riparian woodland (Pajaro River, etc.).

American Bittern-possibly nesting in upper Watsonville Slough system, also Pinto Lake?

Waterfowl concentration areas*

There are no major waterfowl areas in the Pajaro watershed, but the best are Watsonville Lakes (College, Pinto, Kelly, Drew, Tynan); Watsonville Slough system; Pajaro estuary; large reservoirs (Uvas, Chesbro, Pacheco, Hernandez); small reservoirs and farm ponds; sewage ponds (Hollister, Watsonville, etc.).

Wood Duck-apparently a resident population is established along Uvas Creek.

Gadwall-a few nest every year (?) at Pajaro estuary. Rare locally.

* Including duck nesting areas (other than mallard)

Cinnamon Teal-small populations nest at Pajaro estuary, slough area, Soda Lake (?) etc. Relatively rare locally as a breeding species.

American Merganser-possibly resident along perennial tributaries inland. Rare locally: a group of 17 (all young?) was seen at fish pond on Pacheco Creek (see plate PA-4).

Shorebirds*

Lower reach of Pajaro River (including estuary and sewage ponds) is an important feeding and stopover area for migratory shorebirds.

American Avocet-Pajaro estuary has the only breeding records of avocet for the Pajaro River system and Santa Cruz County.

Black-necked Stilt-Pajaro estuary has the only breeding records of black-necked stilt for the Pajaro River system and Santa Cruz County.

Spotted Sandpiper-there is evidence of nesting along Pajaro River in vicinity of sewage plant (and to be expected elsewhere).

Gulls, Terns

Pajaro estuary is an important resting area for many species of gulls and terns, particularly during migration. A number of rare species have been recorded as well.

* Except killdeer, greater yellowlegs, common snipe

Caspian Tern-reported to have nested formerly at Pajaro estuary, but there are no recent records, although the species is common during migration.

Forster's Tern-reported to have nested formerly at Pajaro estuary, but there are no recent records, although the species is common during migration.

Raptors

Large concentrations of raptors have been reported from Watsonville/Struve Slough area, along the Pajaro River from Pescadero Creek to Llagas Creek, from Bloomfield Ave. near Llagas Creek, and are to be expected in other grazed or marshy lowland areas subject to Microtus outbreaks.

Red-shouldered Hawk-nests in valley riparian woodland (Pajaro River, etc.). Also observed along Uvas and Llagas Creeks.

Ferruginous Hawk-migrant and winter visitor to rangelands in dry interior valleys.

White-tailed Kite-became very rare during 1930's but has made a dramtic comeback. Now relatively common in marshy lowlands of the Pajaro watershed, nesting in the Harkins Slough area and probably other locations. An unheard of concentration of 200 kites was reported September 5, 1980 at Pajaro River near Highway 25 (Smith & Anderson, DFG).

Passerines

The lower 2 reaches of the Pajaro River have become well known to birders as a "vagrant trap", i.e. a concentration point for

"lost" migrants, particularly eastern species. Many extraordinary bird records have come from this stretch of riparian woodland.

Dipper-there is a recent nesting record for Eureka Canyon. Other forested tributaries may harbor small populations of this locally rare bird.

Yellow-breasted Chat-formerly common in riparian woodlands, now aparently rare in this region. There are a few recent records for Pajaro System.

Lesser Nighthawk-locally rare summer resident along dry gravelly streambeds inland. Recorded from Uvas Creek, and to be expected at Pacheco Creek, San Benito River, Tres Pinos Creek, etc.

Blue Grosbeak-locally rare summer resident in "sonoran-type" riparian habitats, expected along San Benito River, Tres Pinos Creek, etc.

Canyon Wren-locally rare resident in rocky inland canyons with perennial water. One was seen during field survey at Tres Pinos Creek.

Lazuli Bunting-uncommon and local, but to be expected at many inland locations in Pajaro watershed. An unusually large nesting population was observed one spring around Soda Lake, in tall mustard.

Grasshopper Sparrow-uncommon and local, but colonies can be expected many places in grassland. There is a large breeding population in the hills around Soda Lake.

Amphibians

Red Legged Frog (Rana aurora)-Mostly replaced by bullfrog in the Pajaro Basin. Still present on Bodfish Creek, upper Little Arthur Creek, Tres Pinos Creek and probably other undisturbed tributaries.

Invertebrates

Freshwater clams are abundant (at time of field surveys) along Pajaro River above Murphy Crossing, and at Pacheco Creek near Lover's Leap.

Two species of aquatic snails at Pacheco Creek "fish pond" (see plate PA-4).

RECEIVED
AUG 29

SENSITIVE HABITATS MAPS

LEGEND

Study corridor boundary.

(20) Length from mouth (outlet) in miles.

(4) Reach by numerical order from mouth (arrow points in direction of reach interval; dotted line ...., indicates limit of reach).

Location of biotic resource of particular significance.

FISH UTILIZATION

Native Fish

- T - trout
- T/S - trout-sucker
- M/S - minnow-sucker
- R - roach
- B - blackfish

Steelhead Migration

Steelhead Spawning

Steelhead Rearing

Pajaro River

MOSS LANDING QUADRANGLE

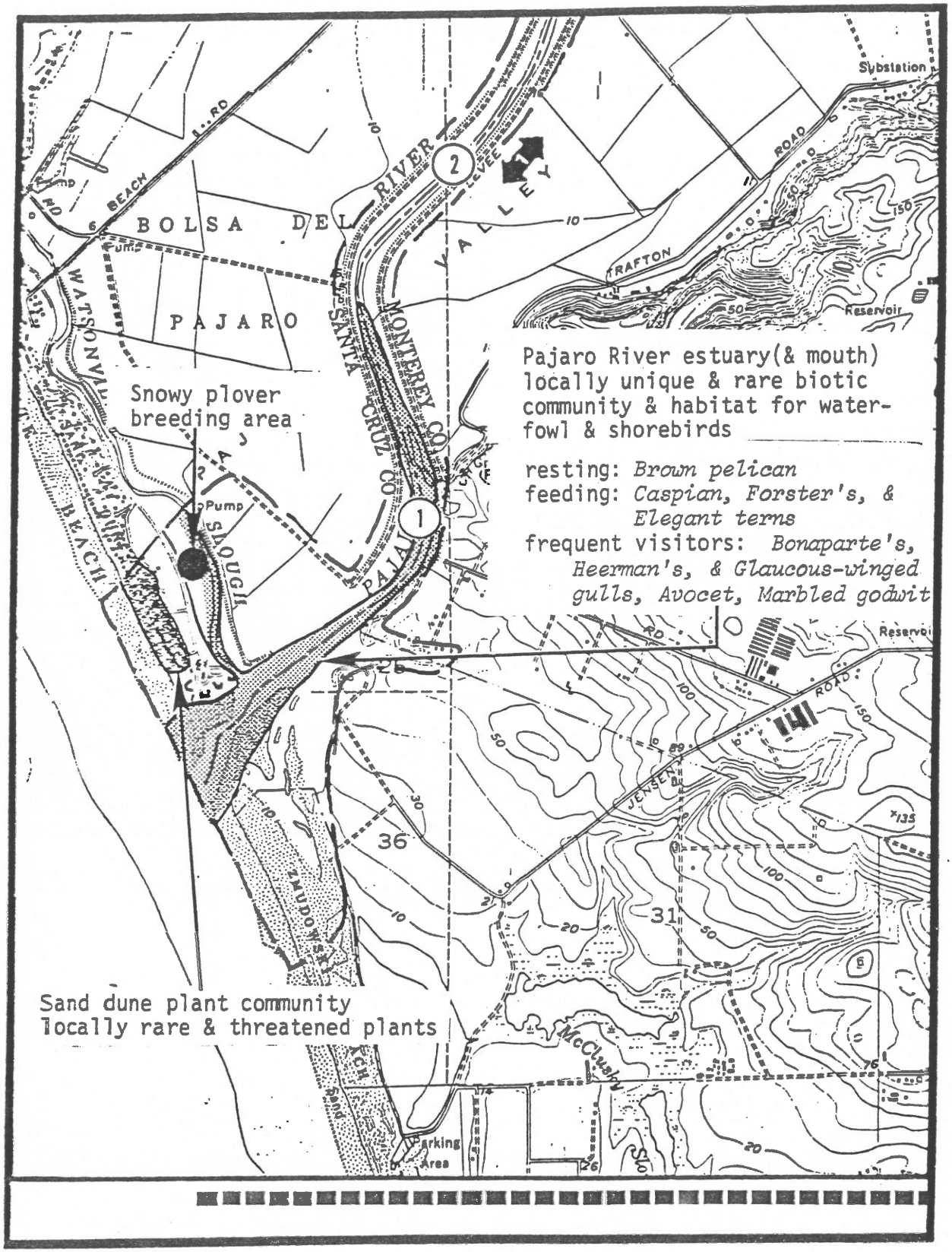


PLATE PR-1

Pajaro River

WATSONVILLE WEST QUADRANGLE

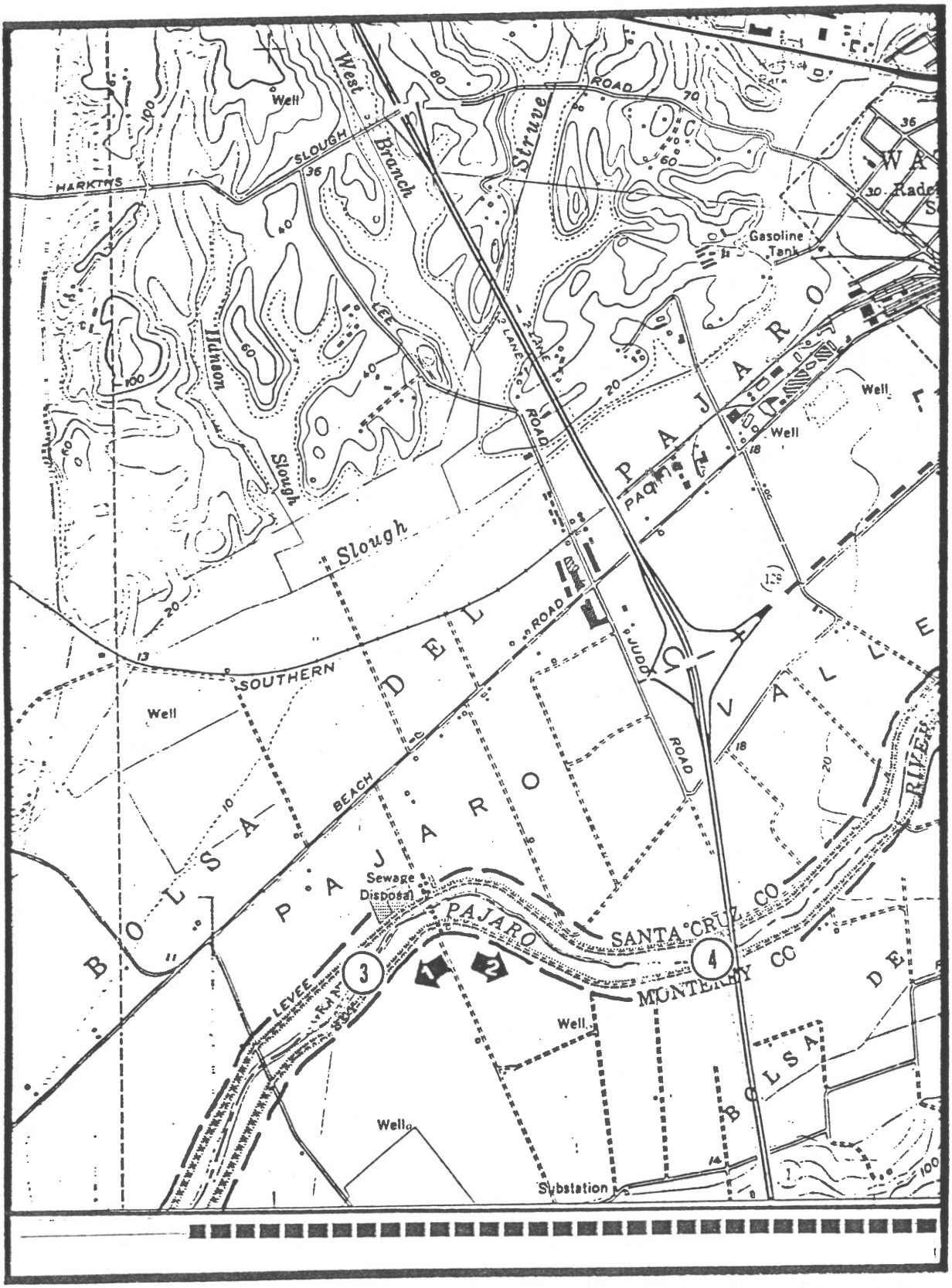


PLATE PR-2

Pajaro River

WATSONVILLE EAST QUADRANGLE

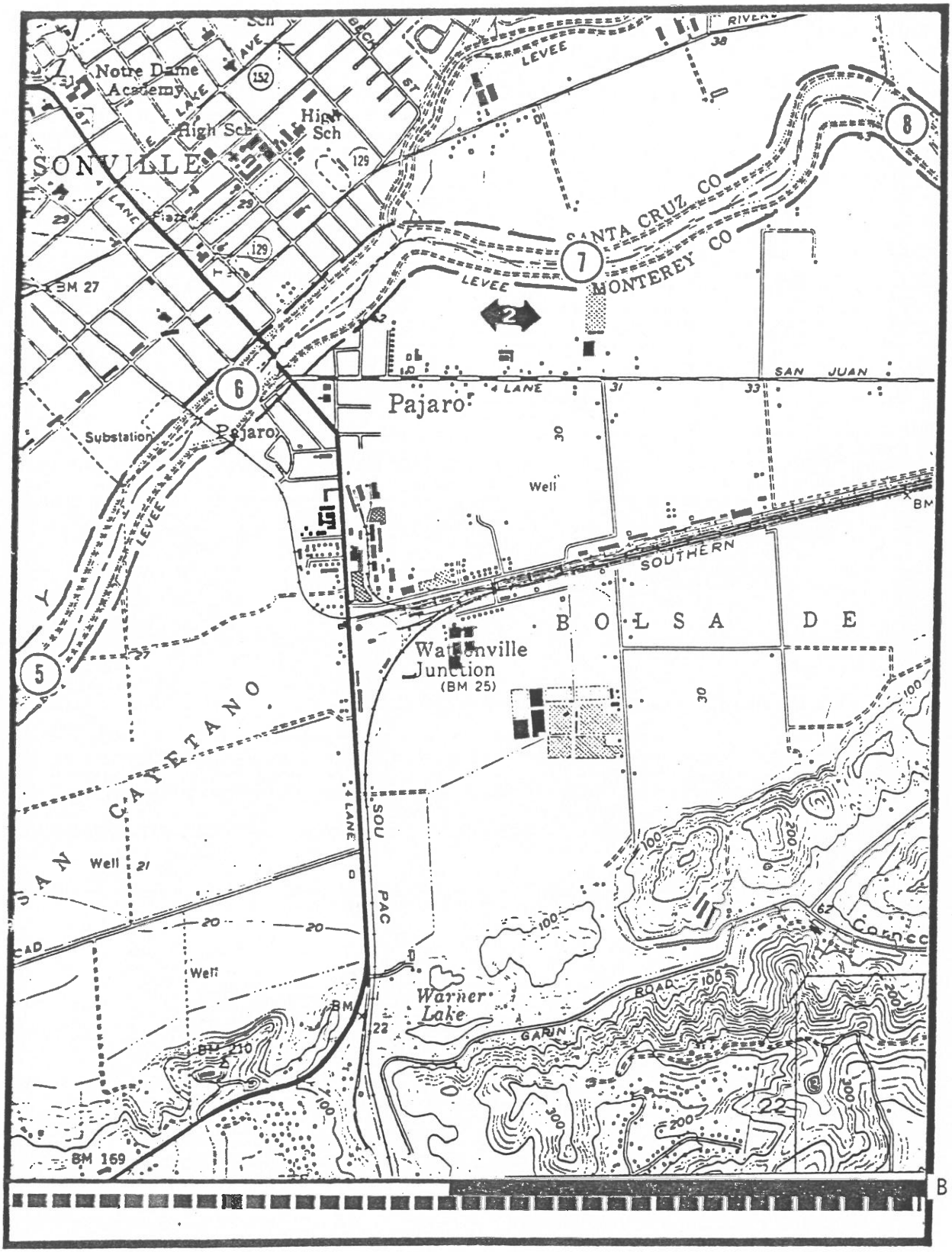


PLATE PR-3

Pajaro River

WATSONVILLE EAST QUADRANGLE

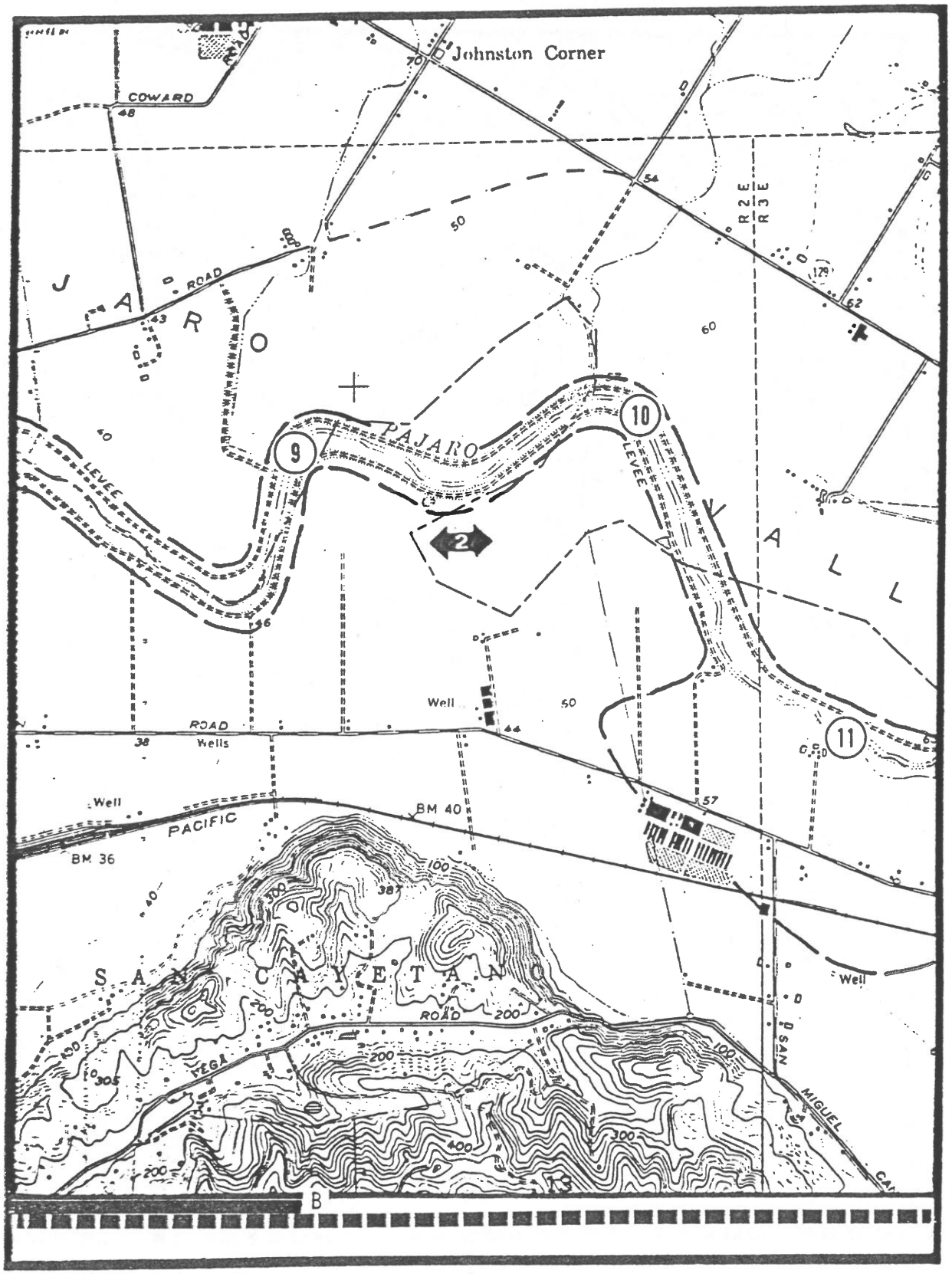


PLATE PR-4

Pajaro River

WATSONVILLE EAST QUADRANGLE

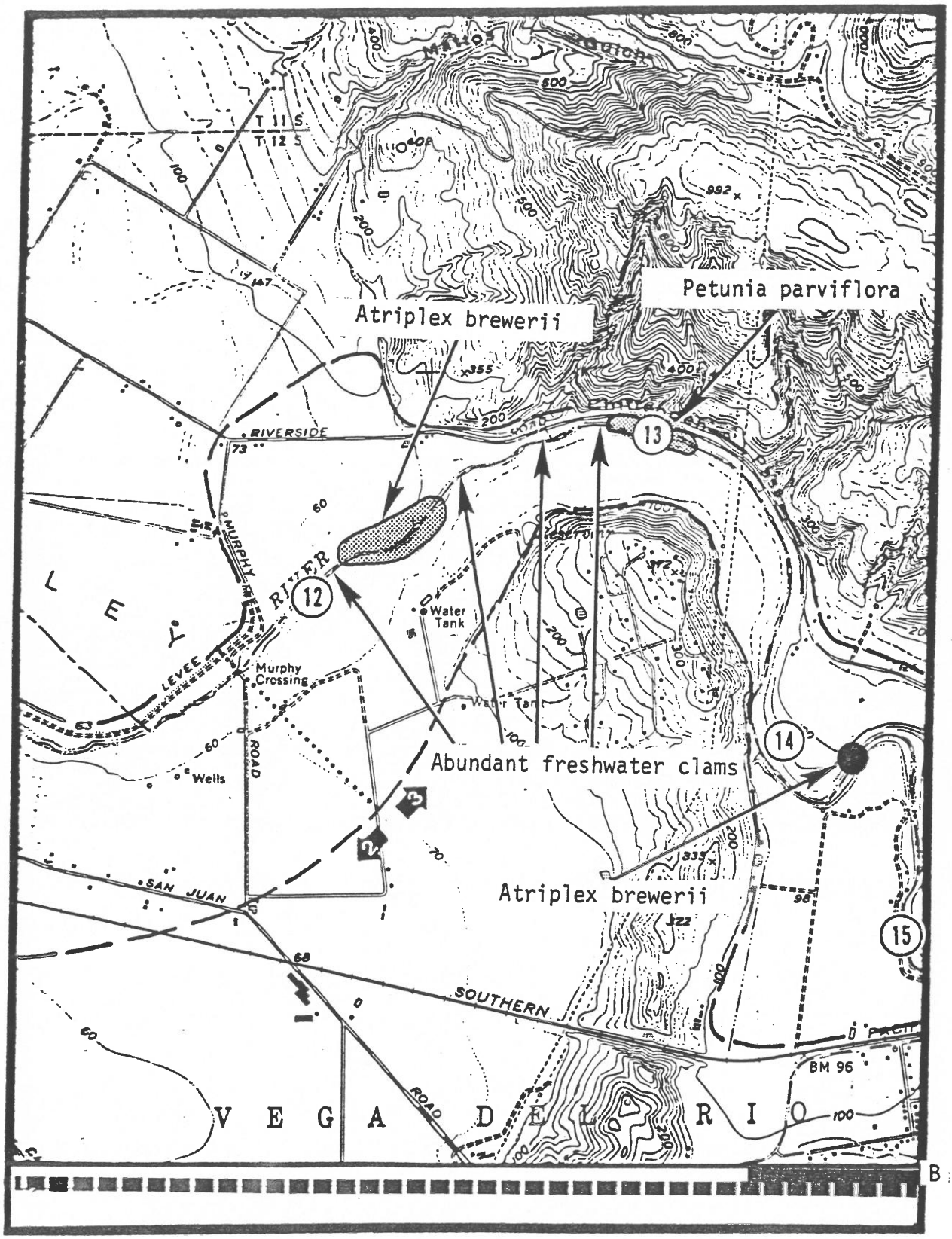


PLATE PR-5

Pajaro River

CHITTENDEN QUADRANGLE

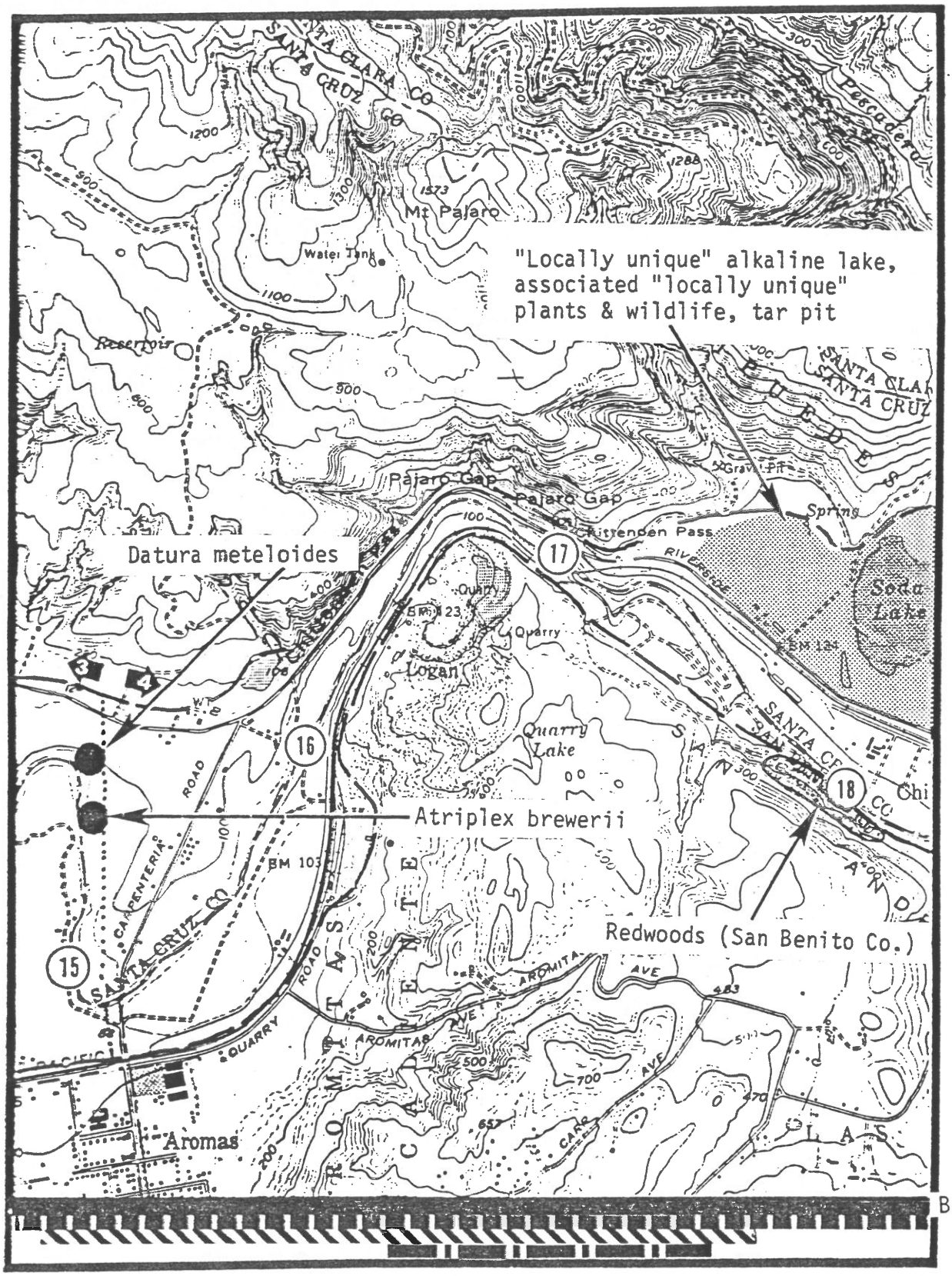


PLATE PR-6

Pajaro River

CHITTENDEN QUADRANGLE

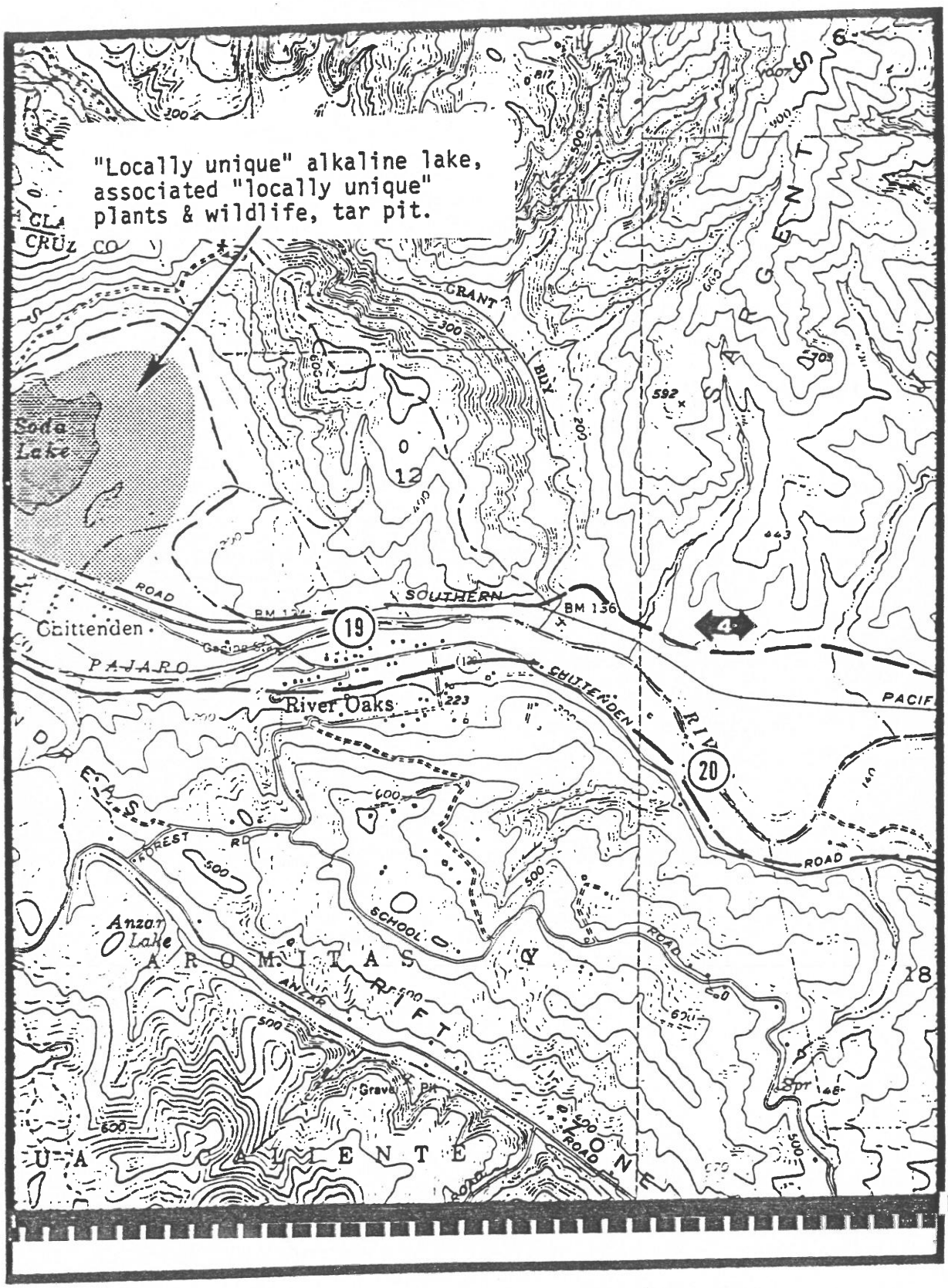


PLATE PR-7

Pajaro River

CHITTENDEN QUADRANGLE

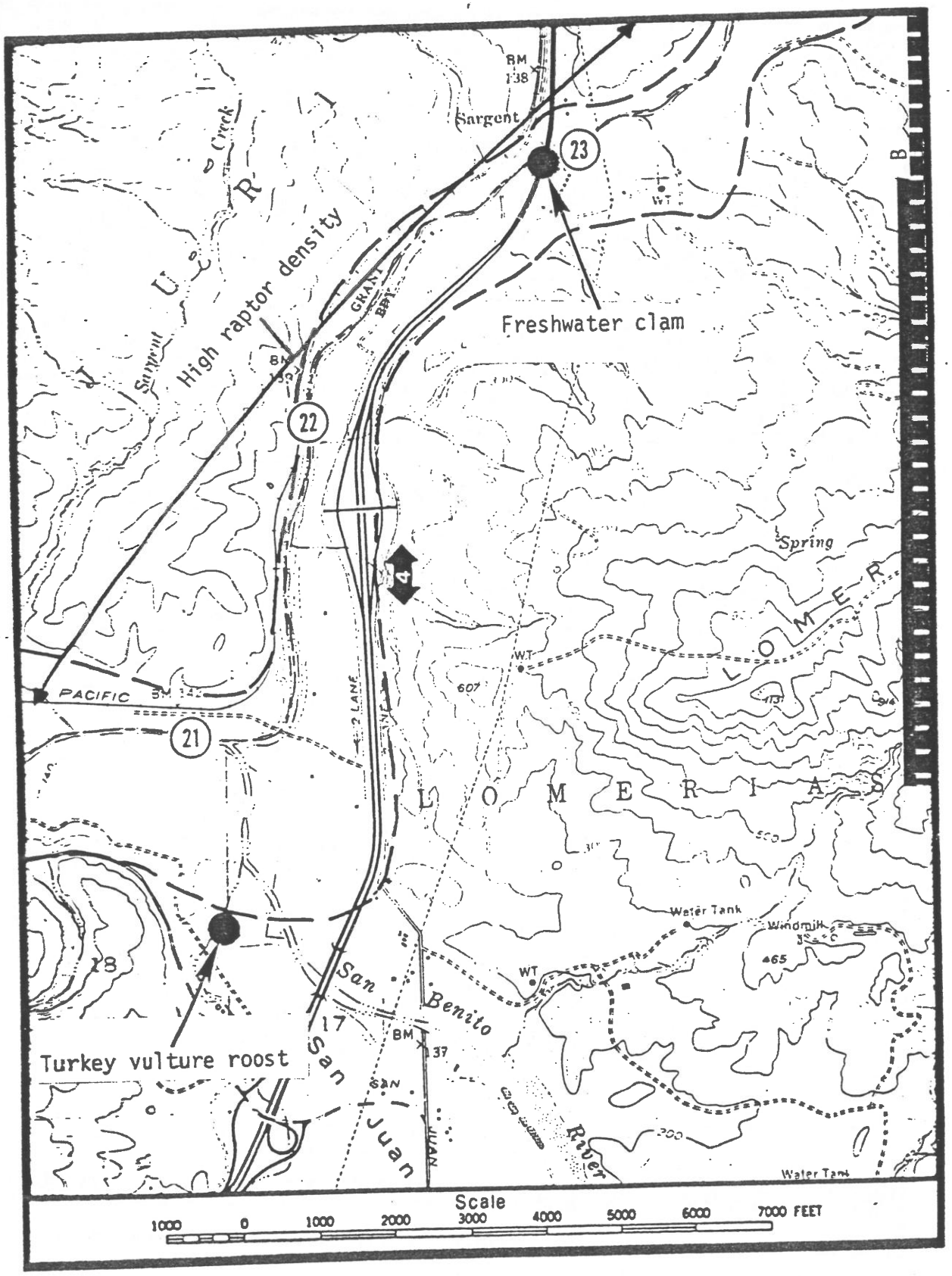


PLATE PR-8

Pajaro River

CHITTENDEN QUADRANGLE

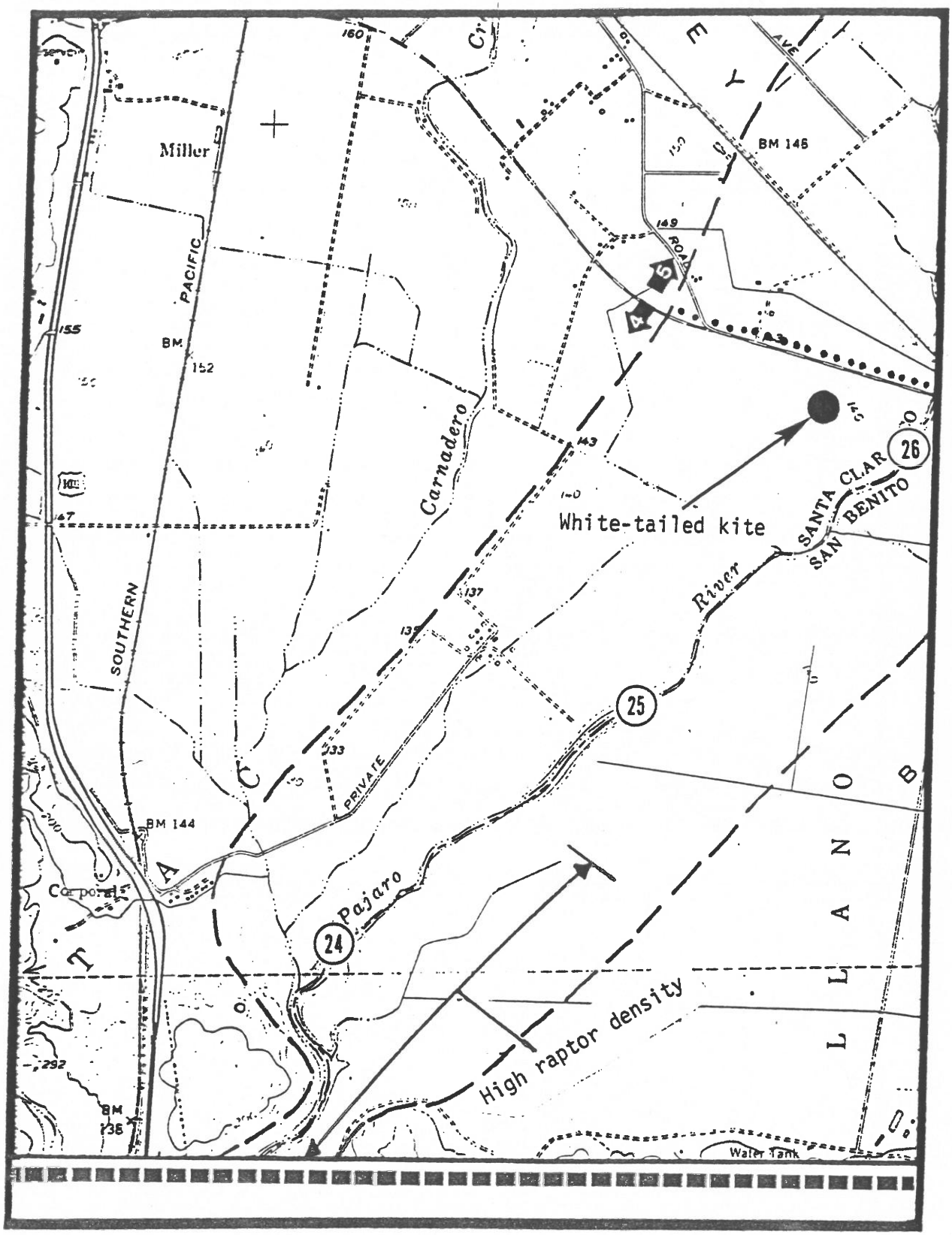


PLATE PR-9

Pajaro River

SAN FELIPE QUADRANGLE

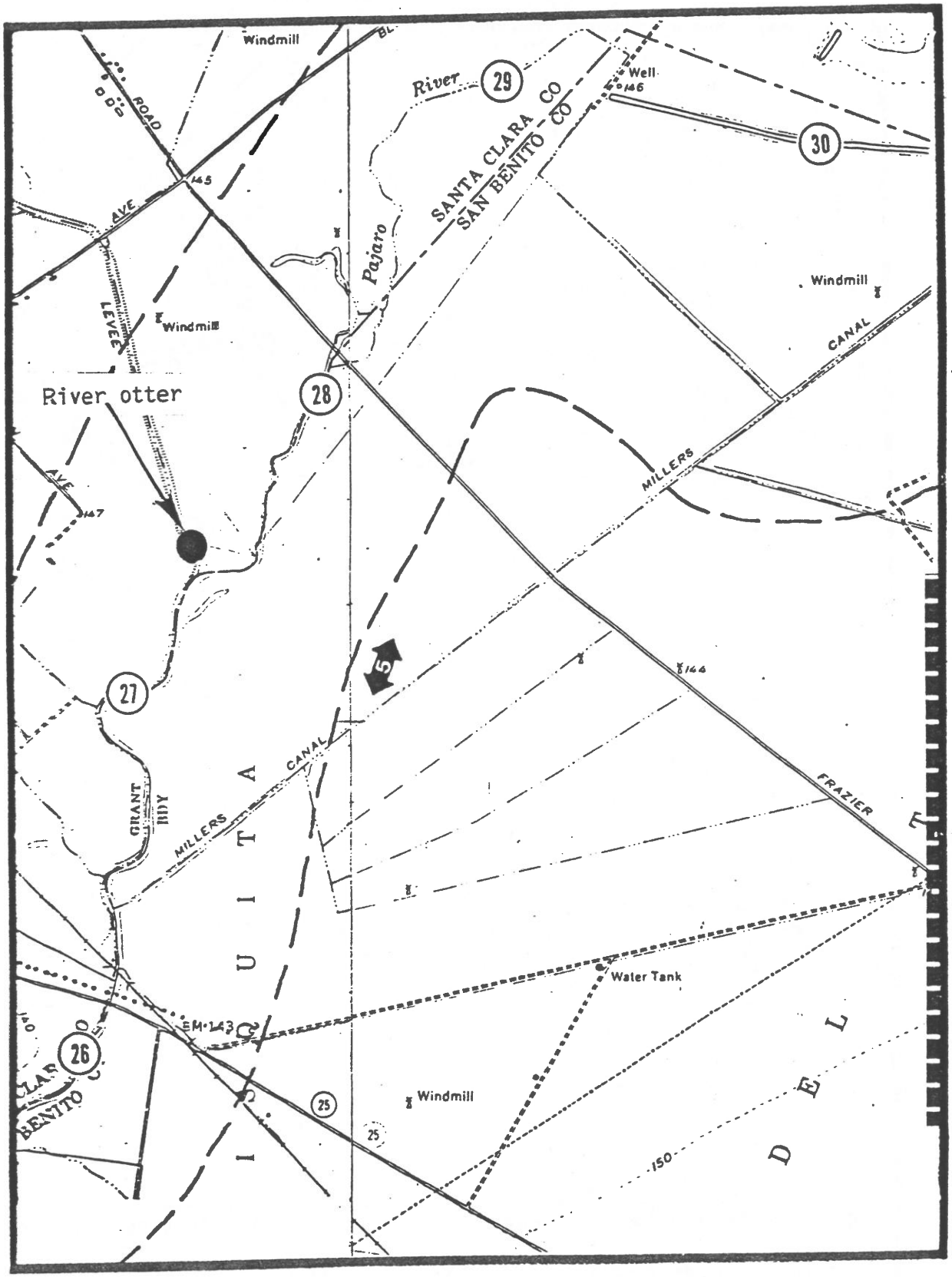


PLATE PR-10

Pajaro River

San Felipe Quadrangle

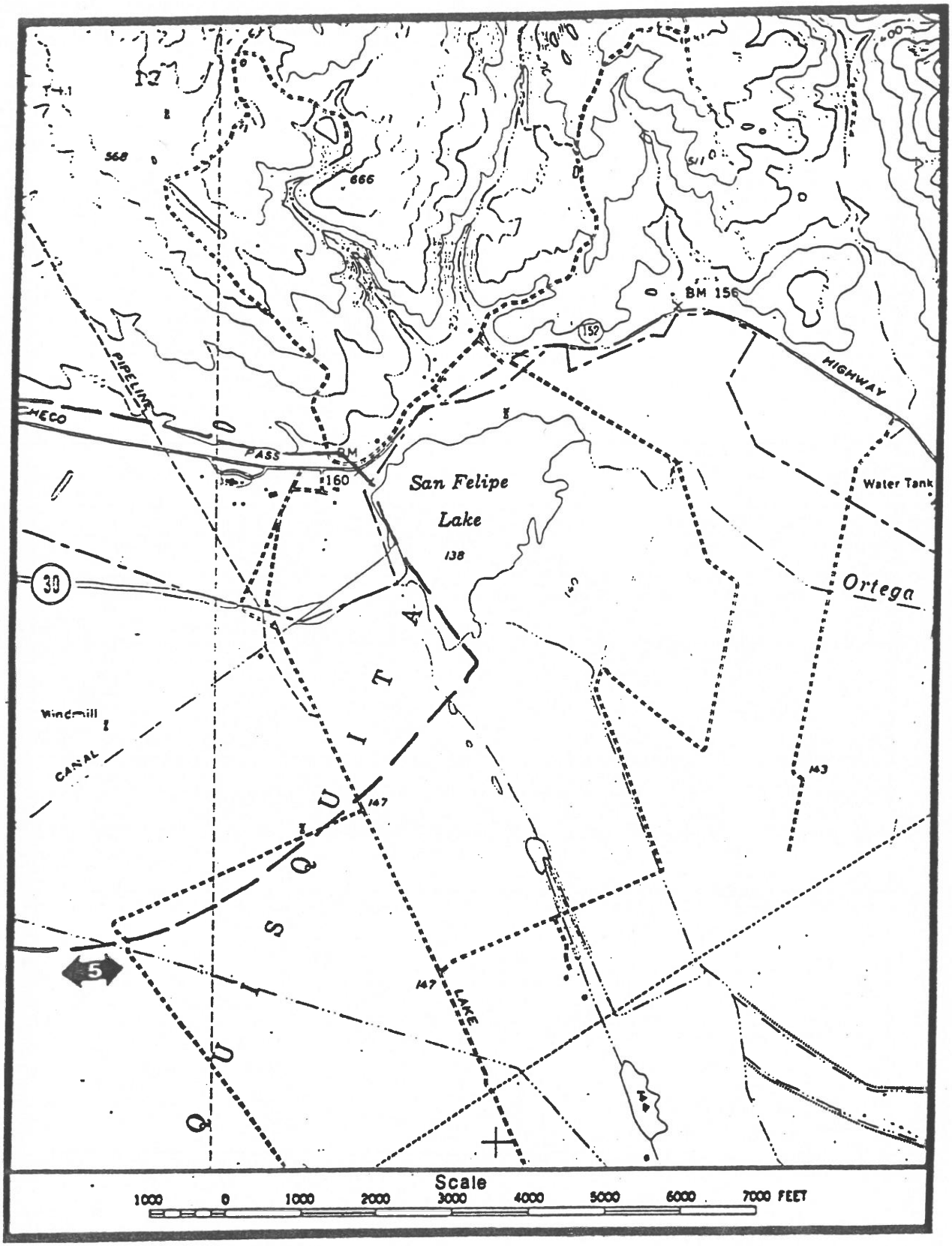


Plate PR-11

Salsipuedes / Corralitos Creek

WATSONVILLE EAST / WEST QUADRANGLE

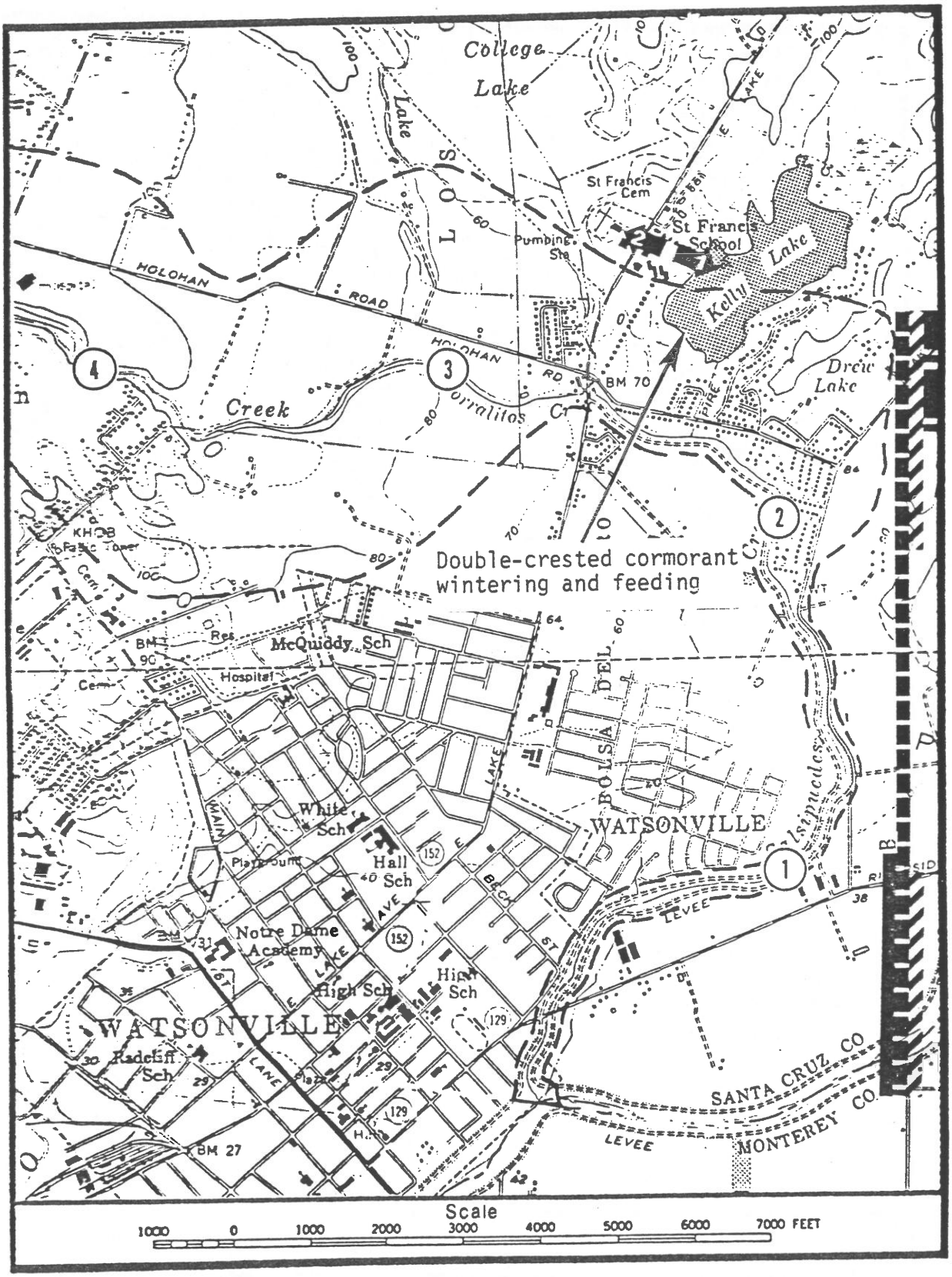


PLATE SC-1

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

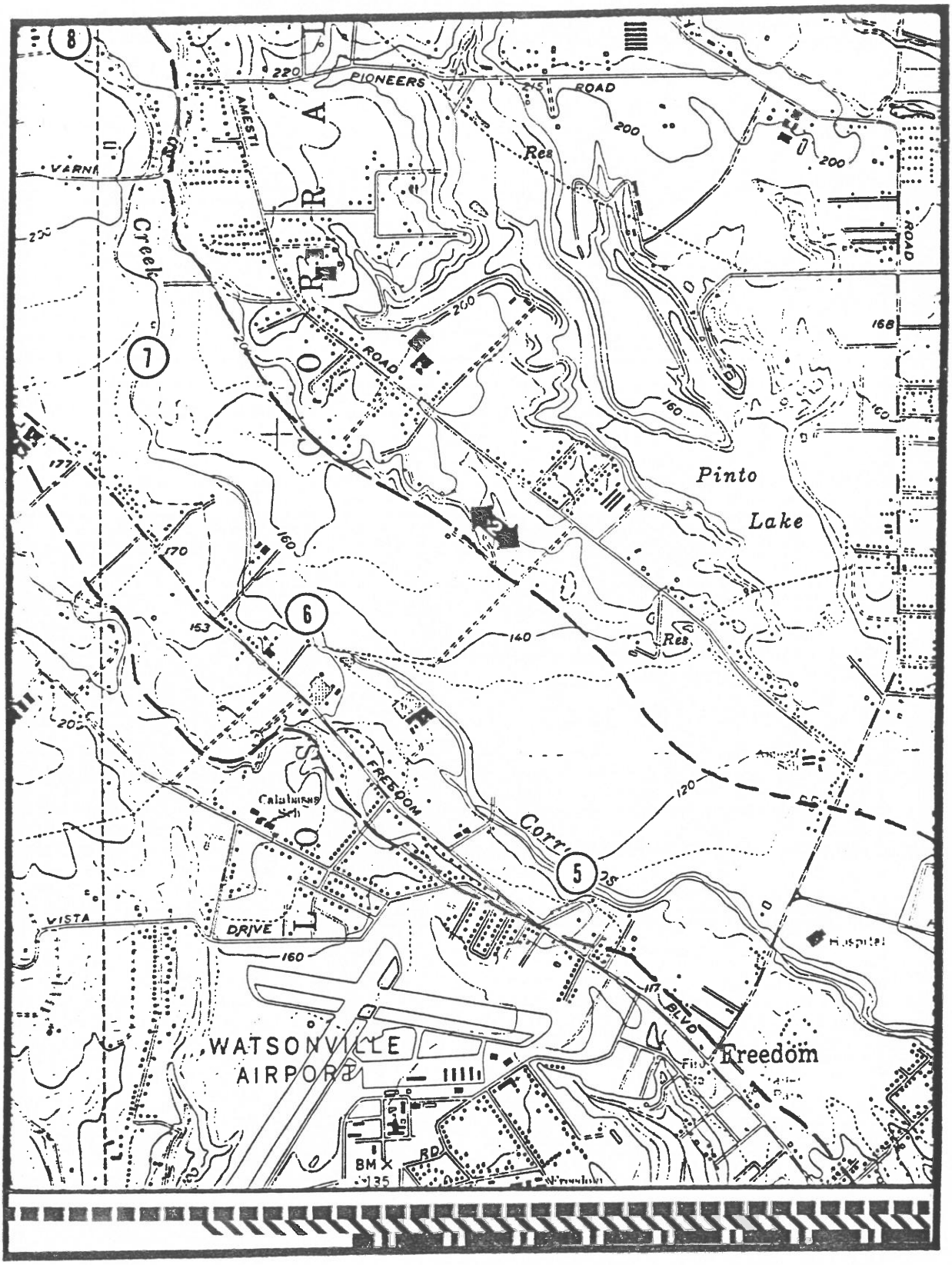


PLATE SC-2

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

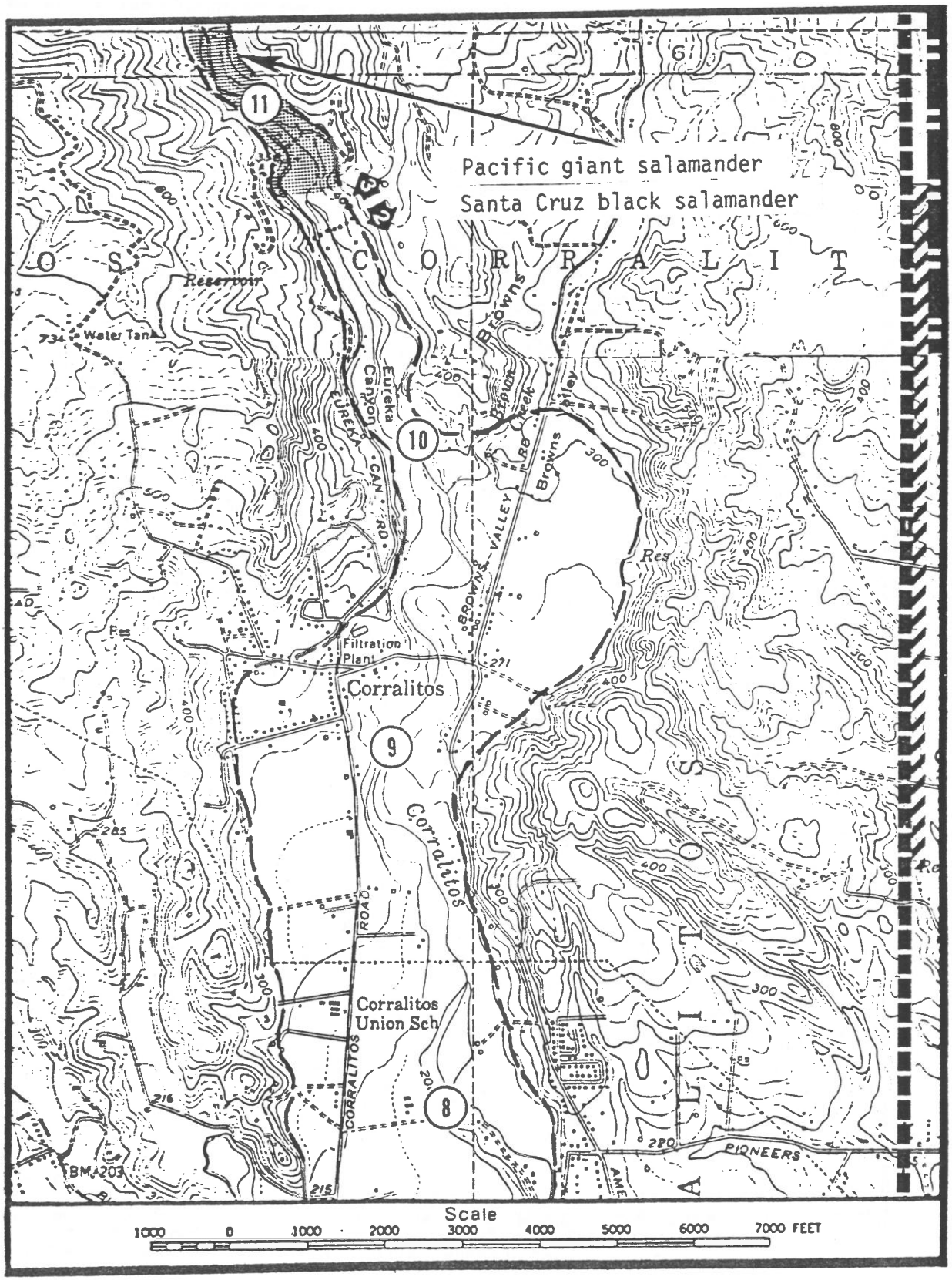


PLATE SC-3

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

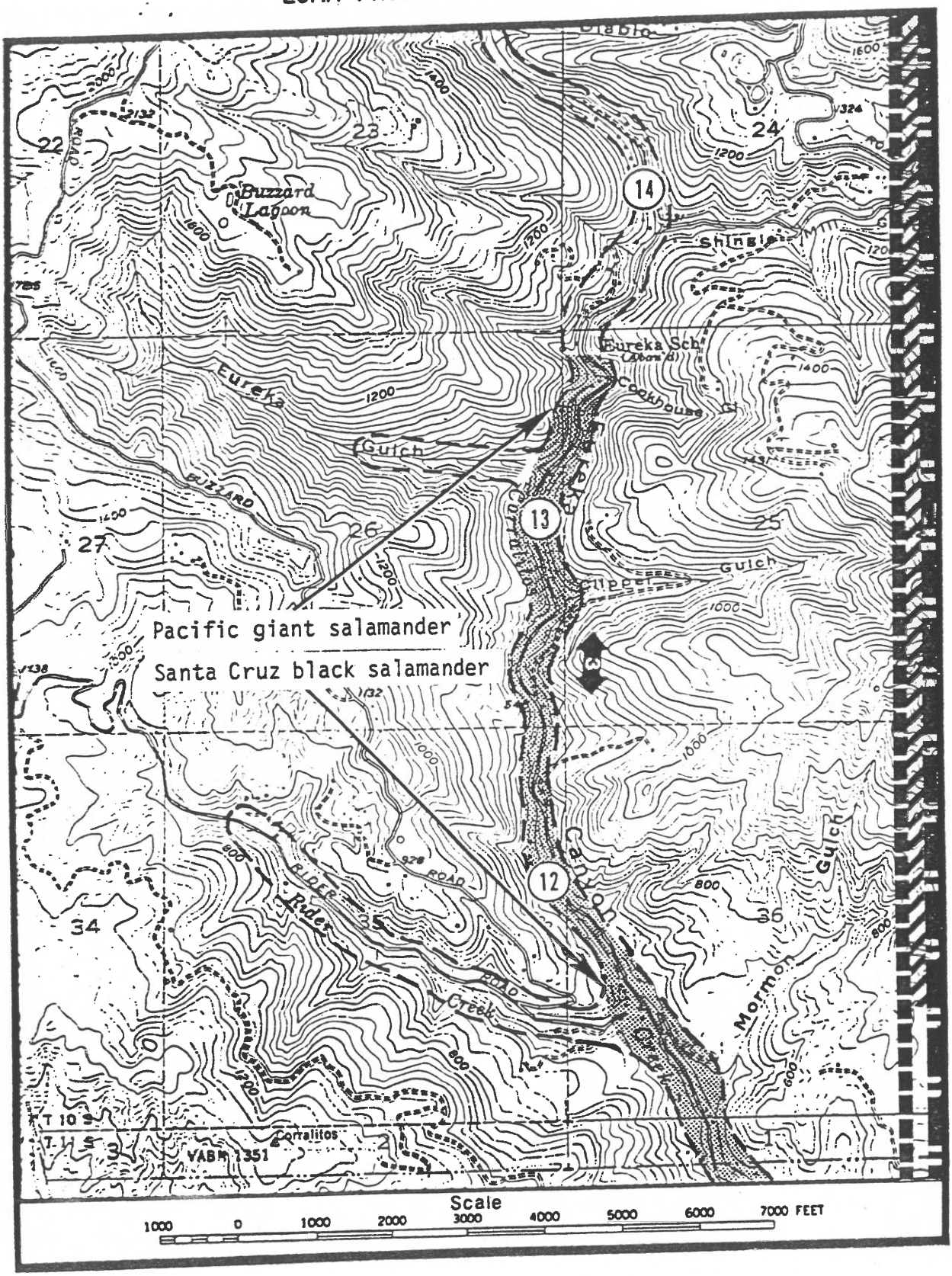


Plate SC-4

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

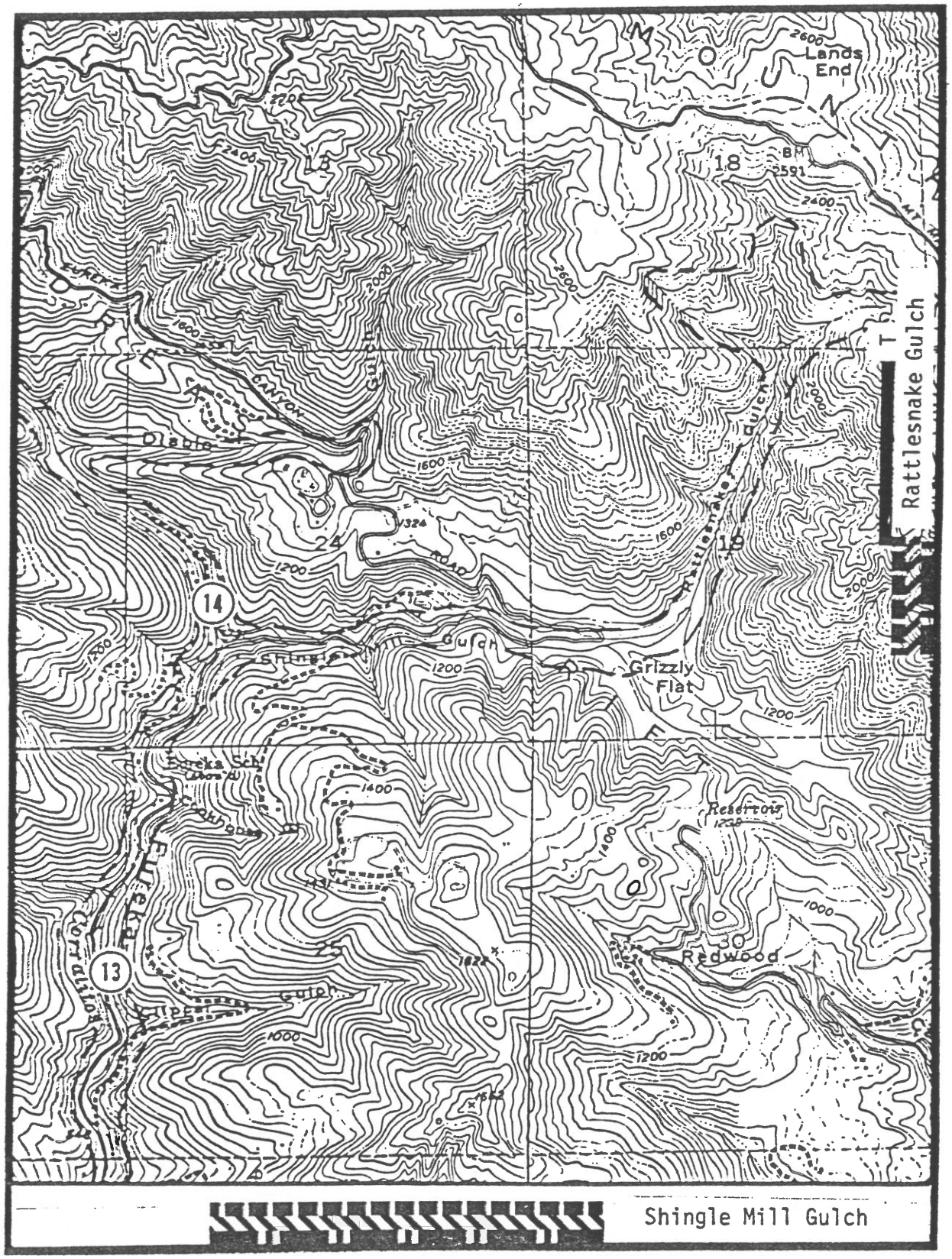


Plate SC-5

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

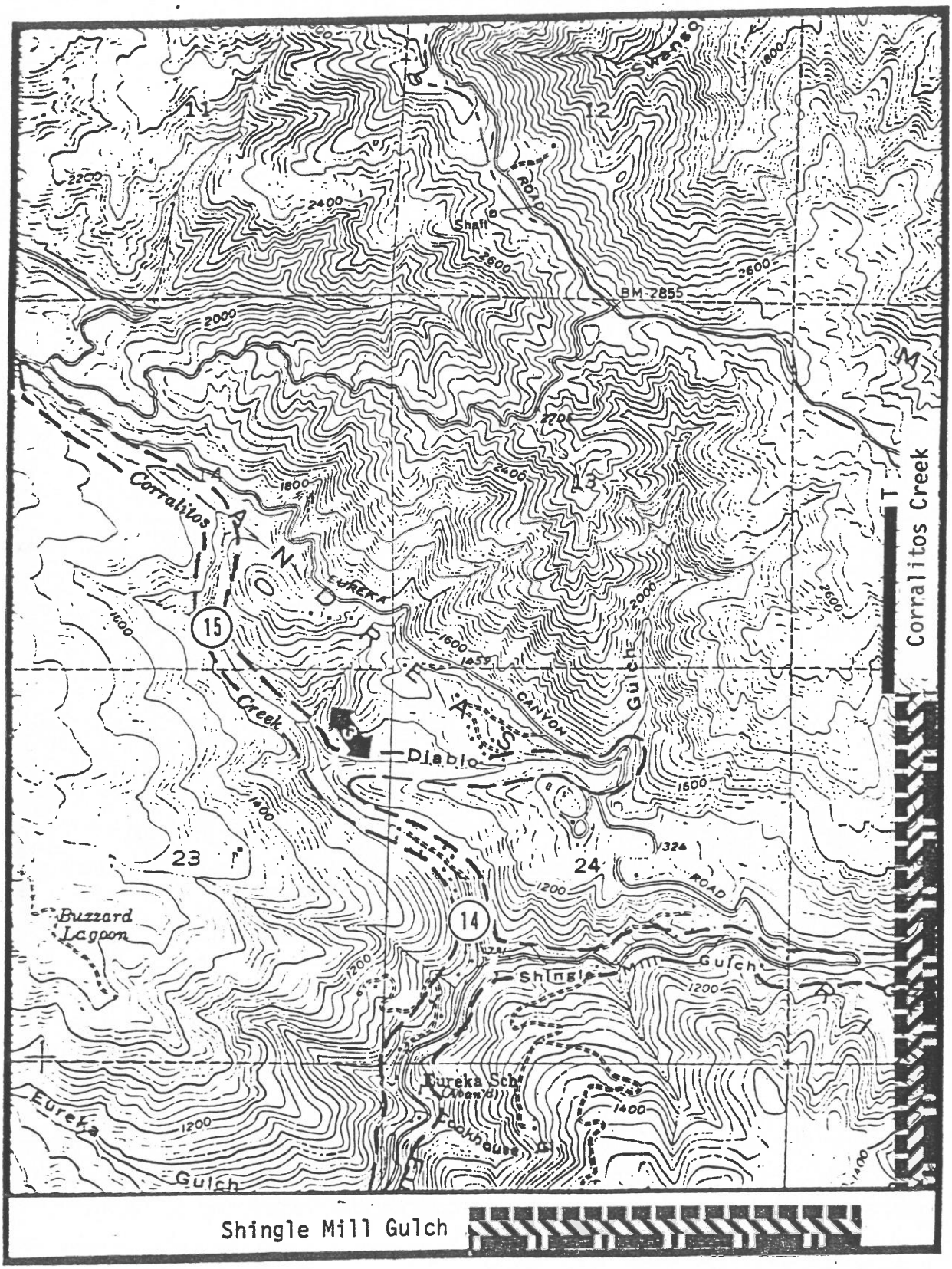


Plate SC-6

Browns Creek

WATSONVILLE WEST QUADRANGLE

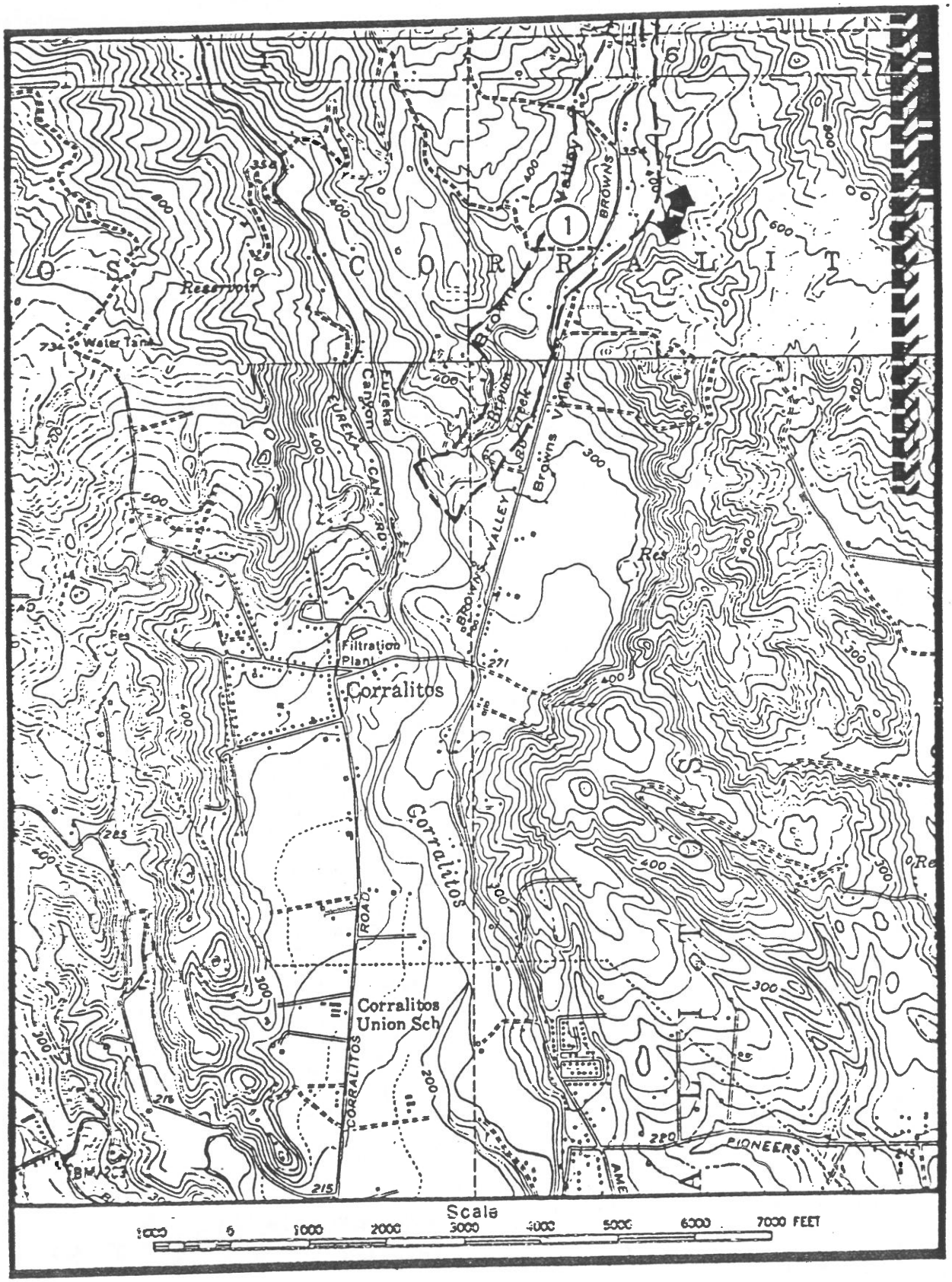


PLATE BR-1

Browns Creek

Loma Prieta Quadrangle

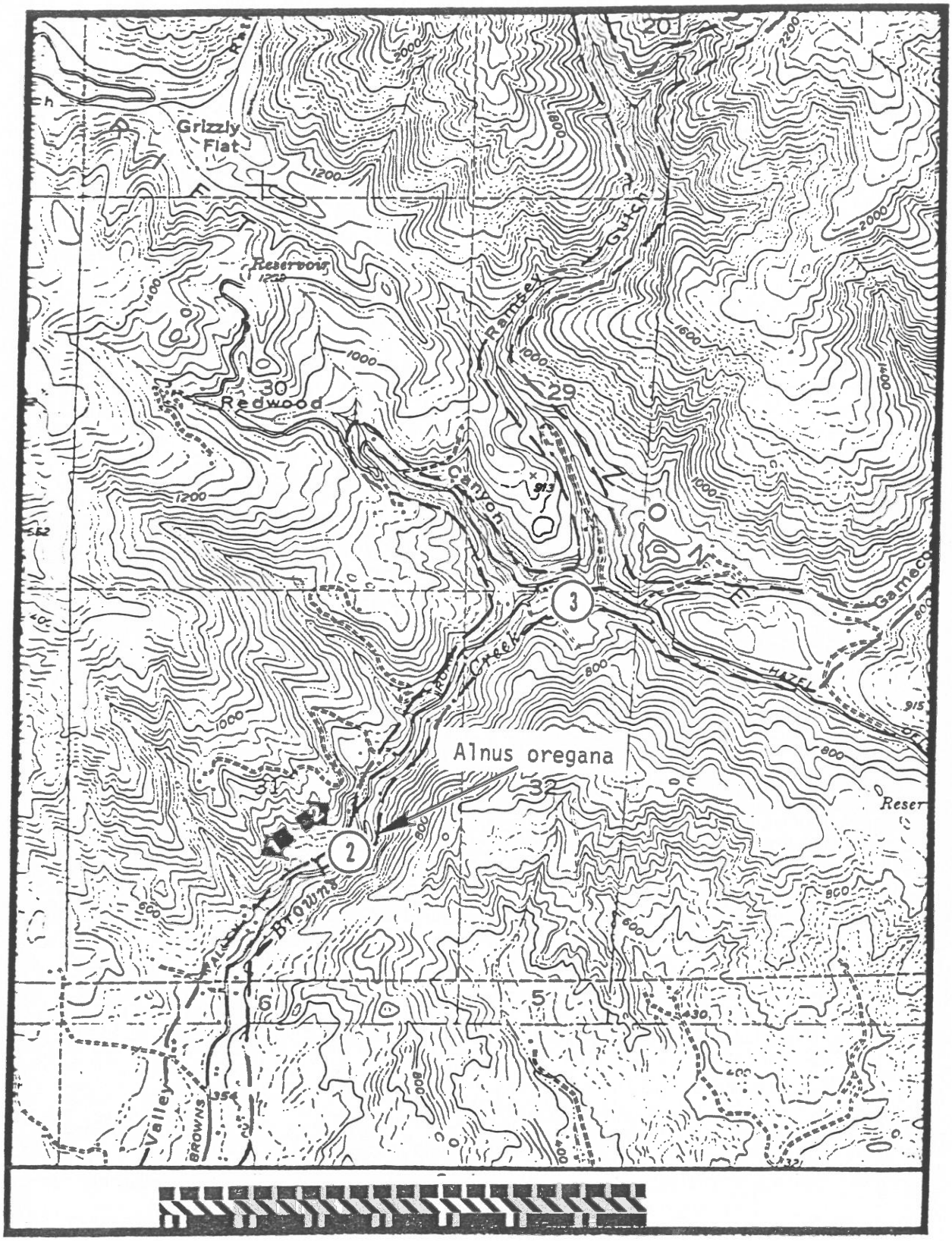


Plate BR-2

Browns Creek

Loma Prieta Quadrangle

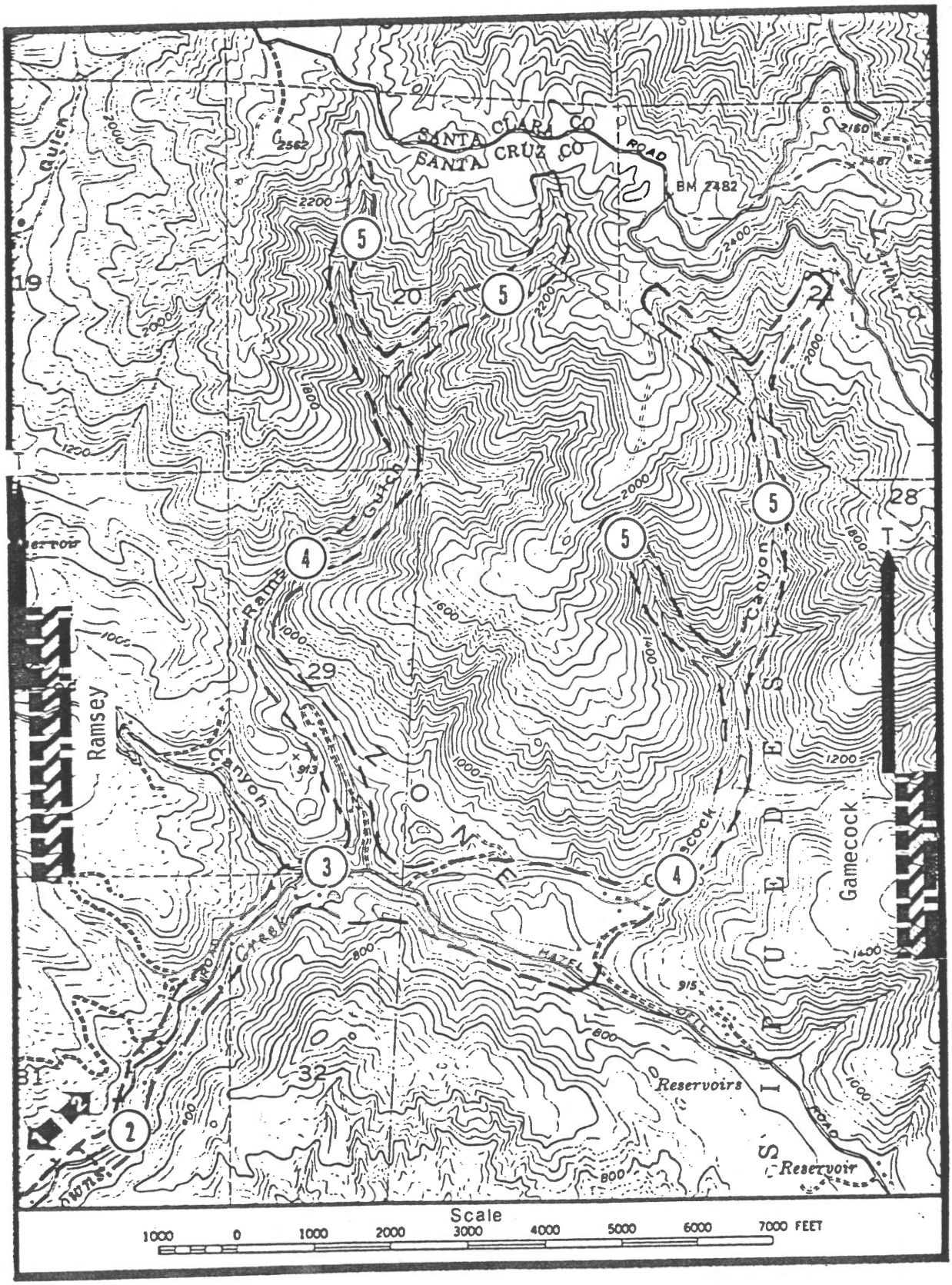


Plate BR-3

College Lake

WATSONVILLE WEST QUADRANGLE

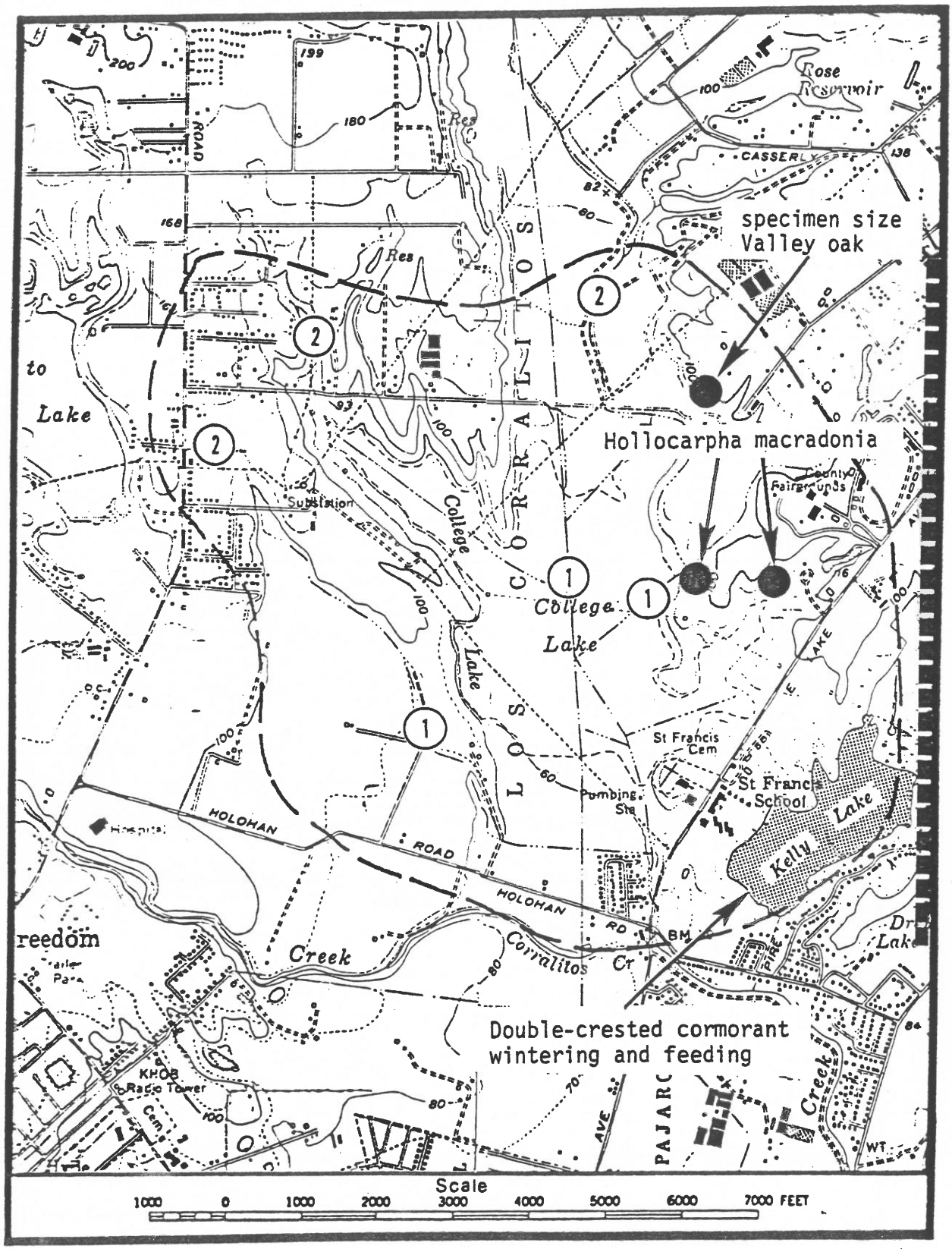


PLATE CL-1

Casserly Creek

WATSONVILLE EAST QUADRANGLE

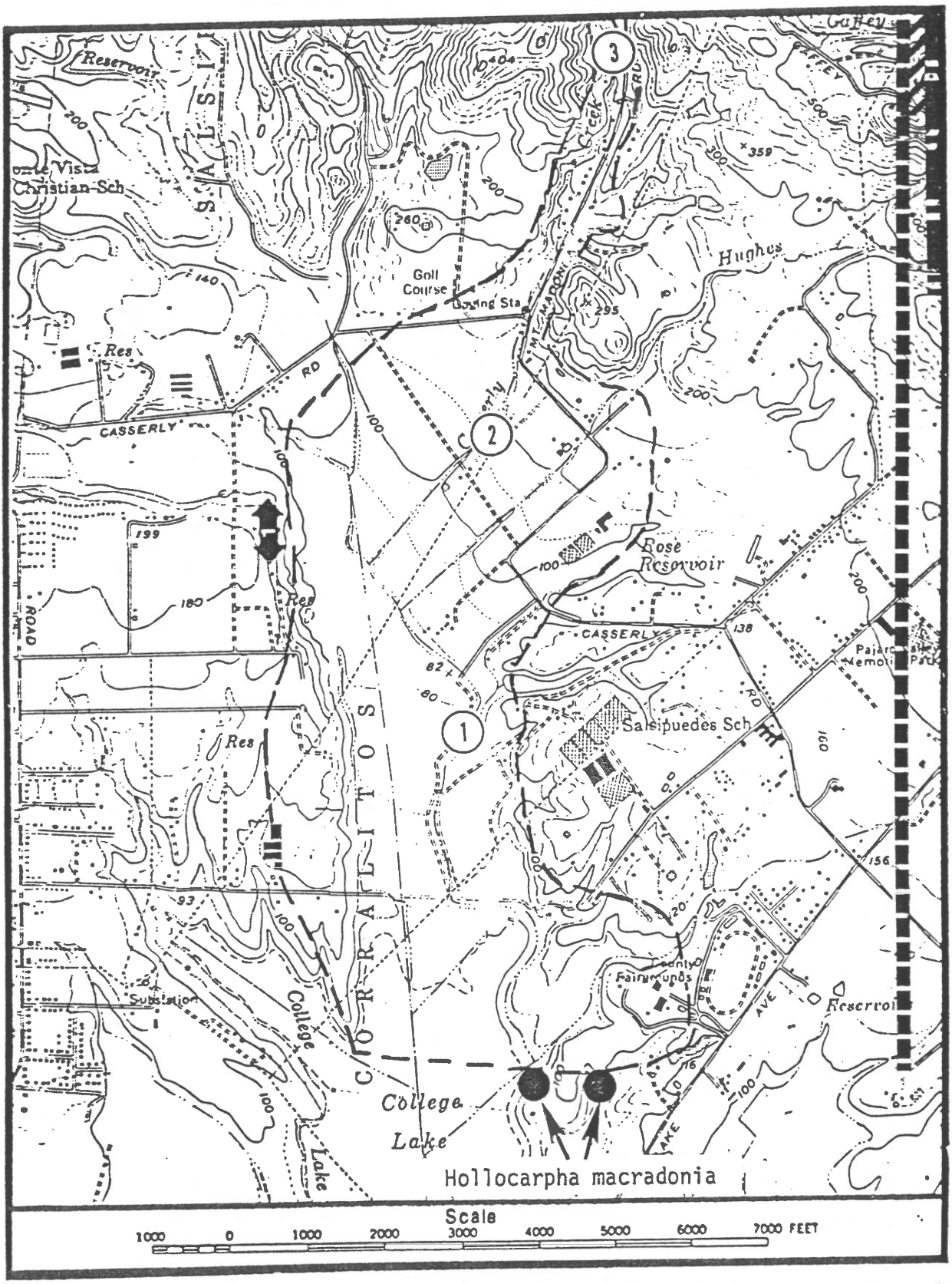


PLATE CC-1

Casserly Creek

WATSONVILLE EAST QUADRANGLE

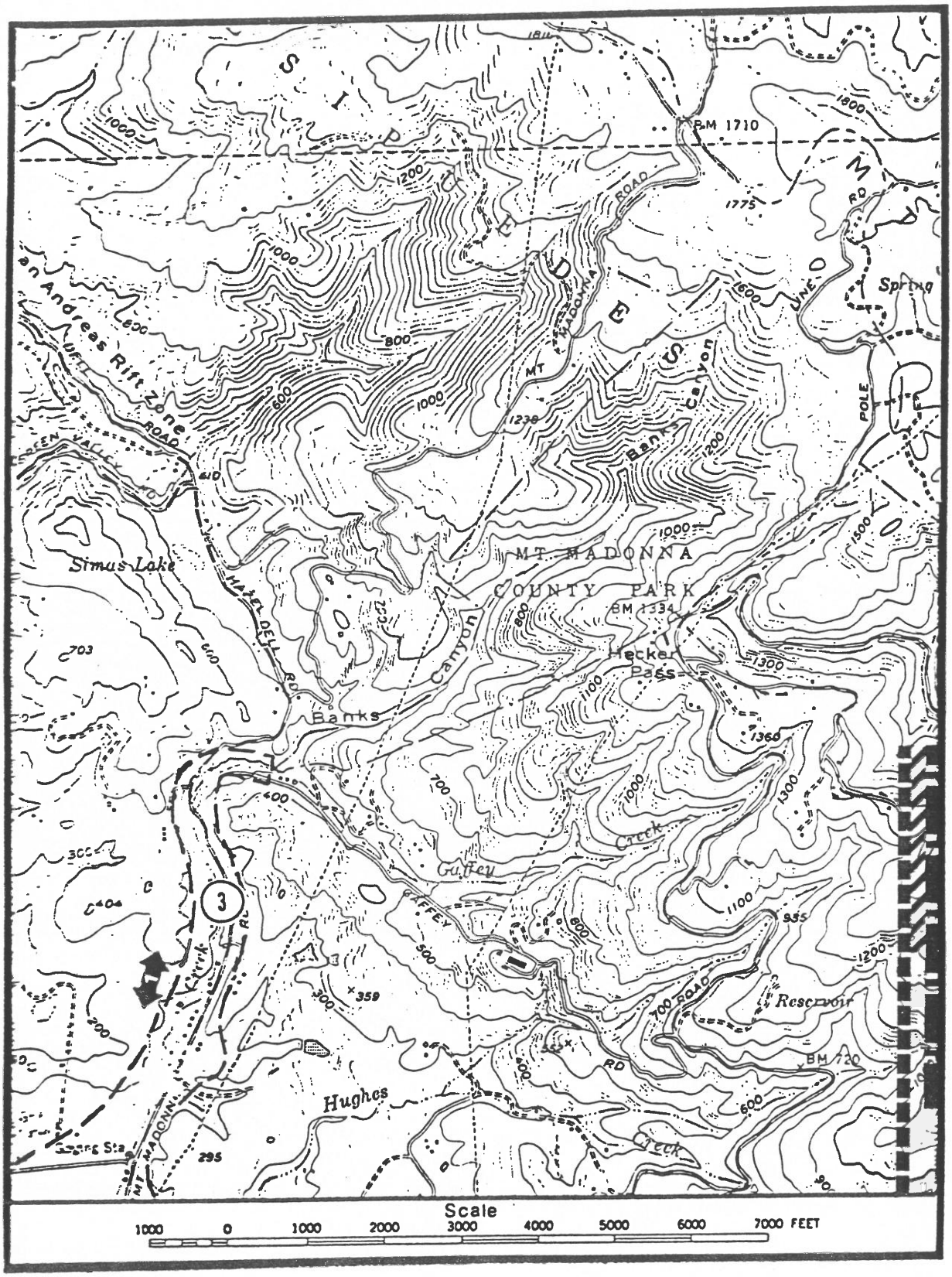


PLATE CC-2

Gaffey & Banks Canyon Creeks

WATSONVILLE EAST QUADRANGLE

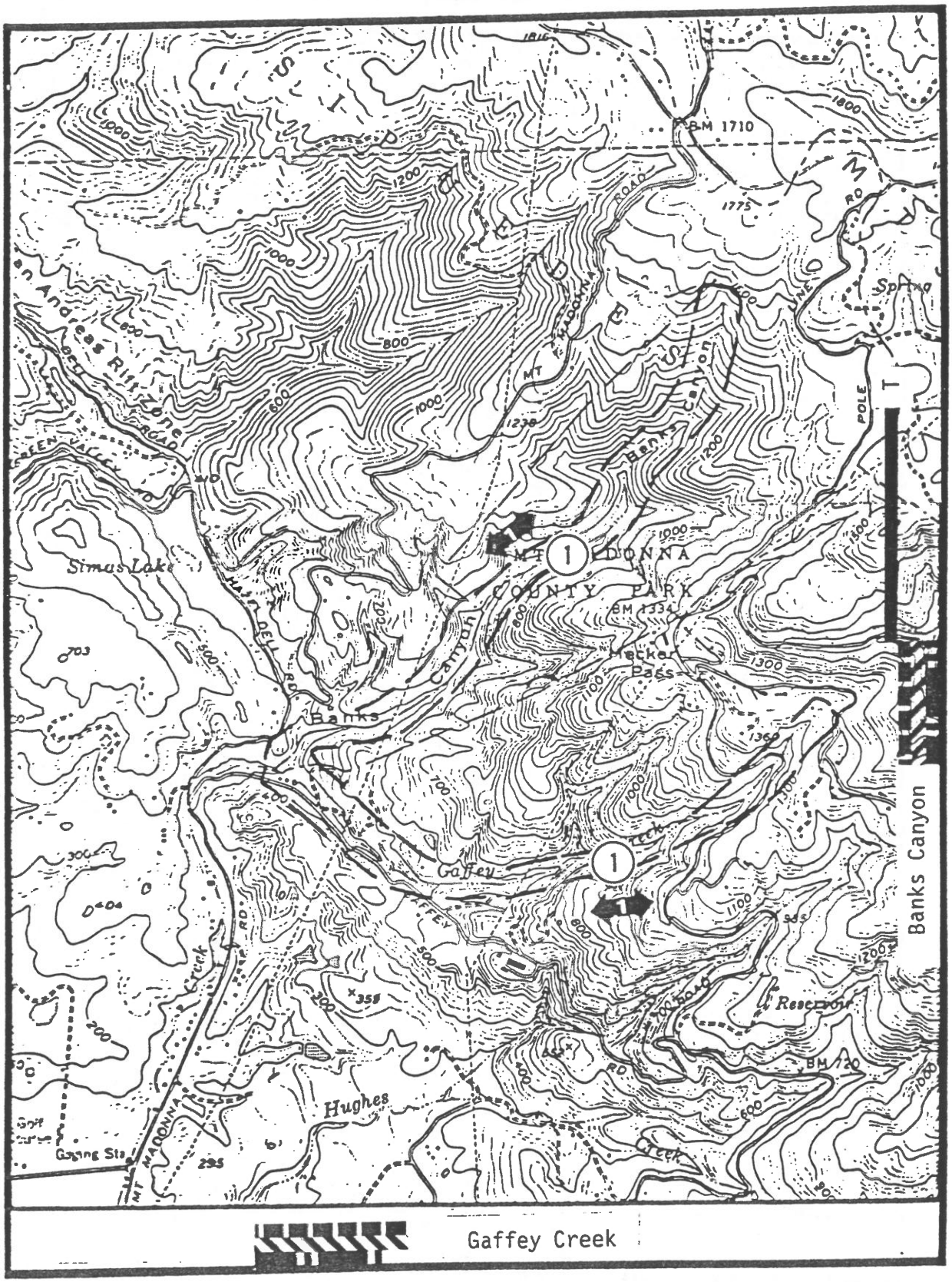


PLATE GB-1

Green Valley Creek

WATSONVILLE EAST QUADRANGLE

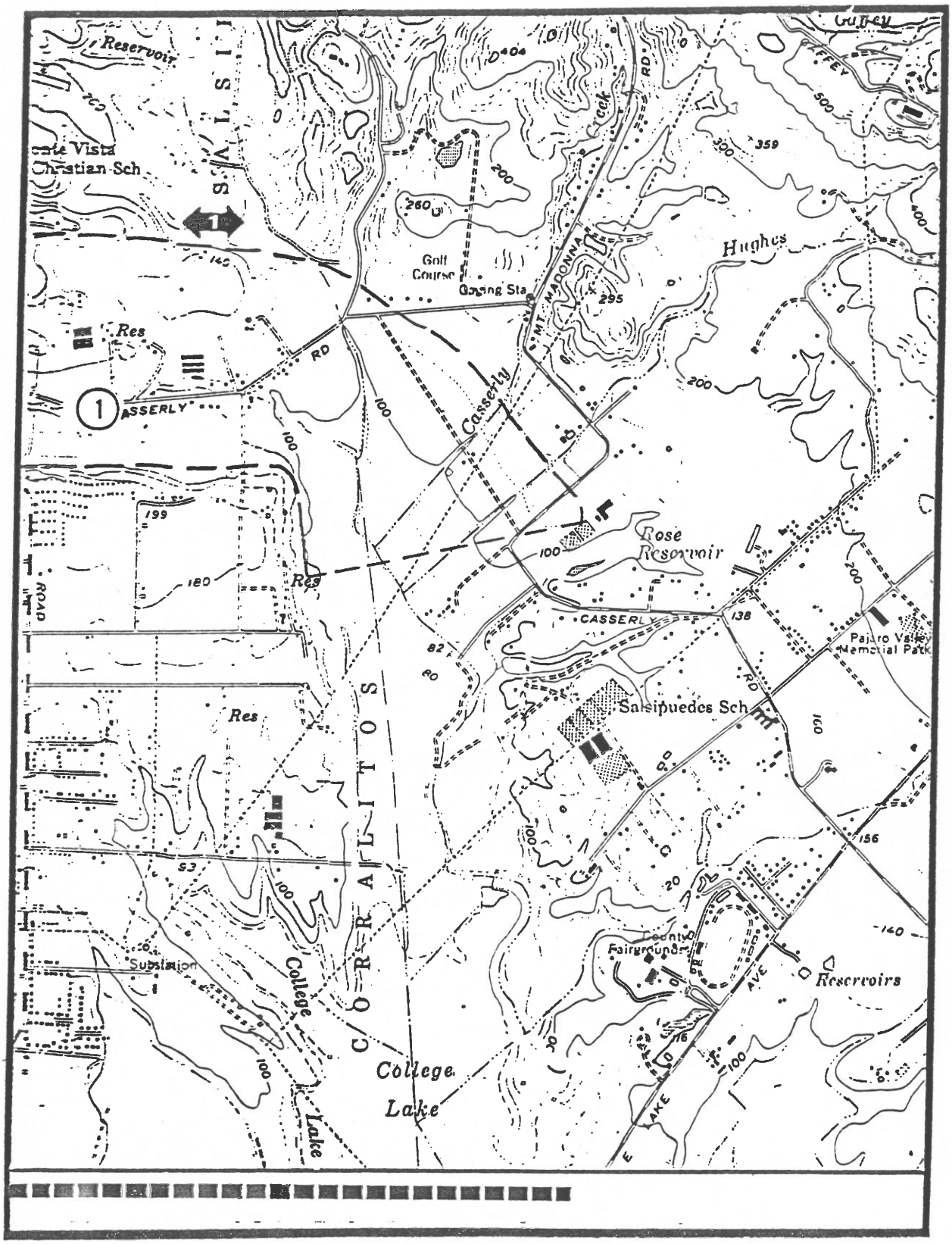


PLATE GV-1

Green Valley Creek

WATSONVILLE WEST QUADRANGLE

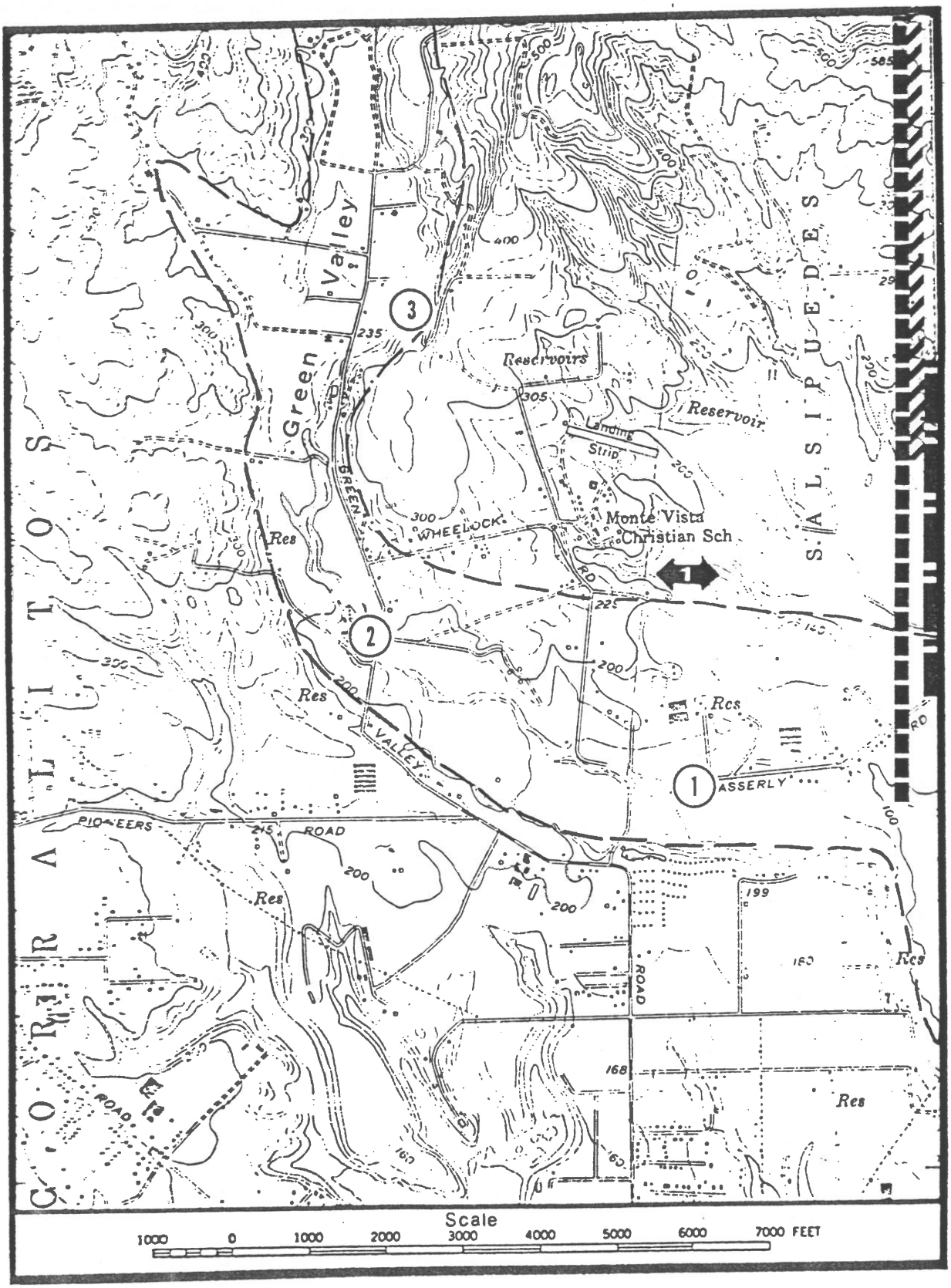


PLATE GV-2

Green Valley Creek

LOMA PRIETA QUADRANGLE

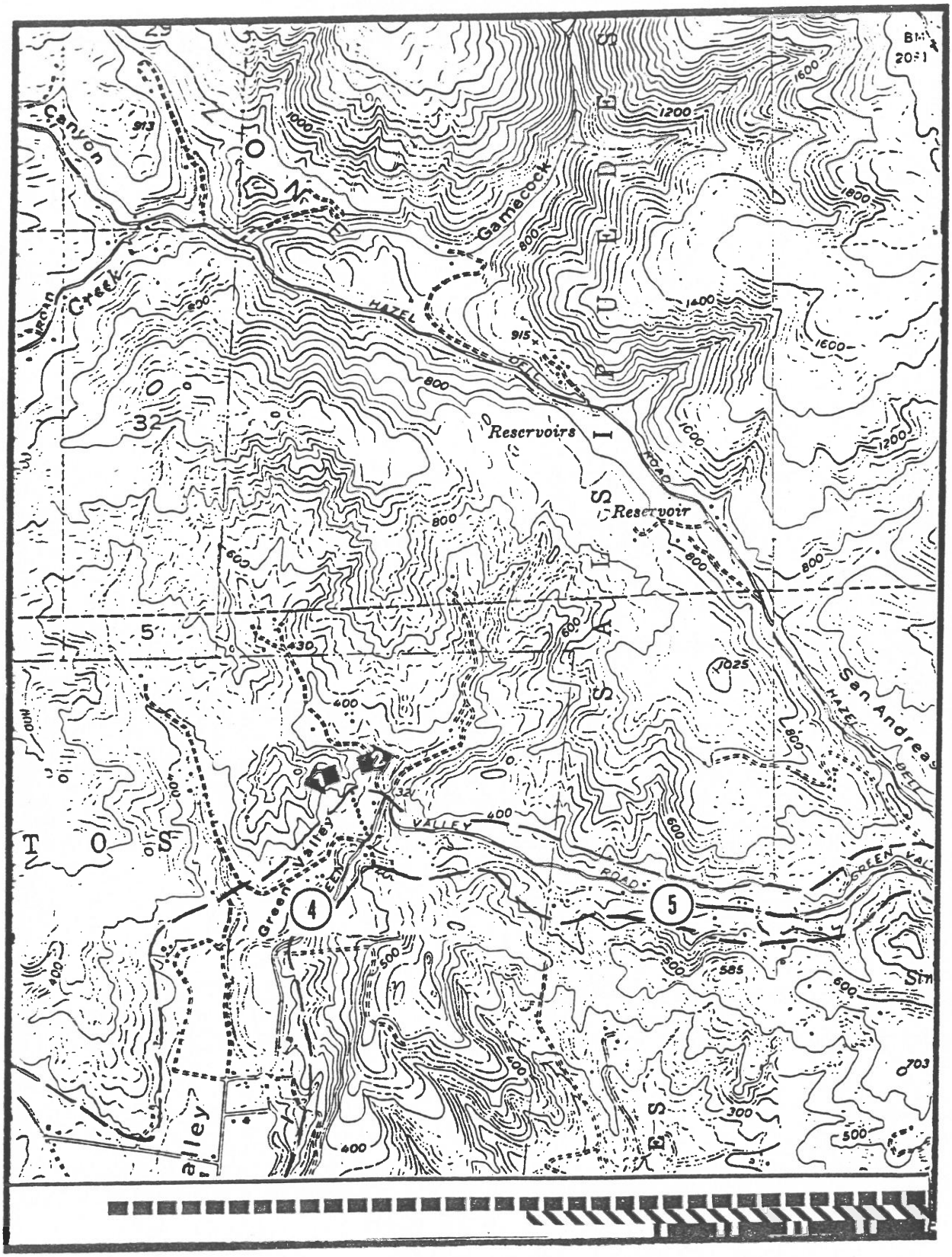


PLATE GV-3

Green Valley Creek

Mount Madonna Quadrangle

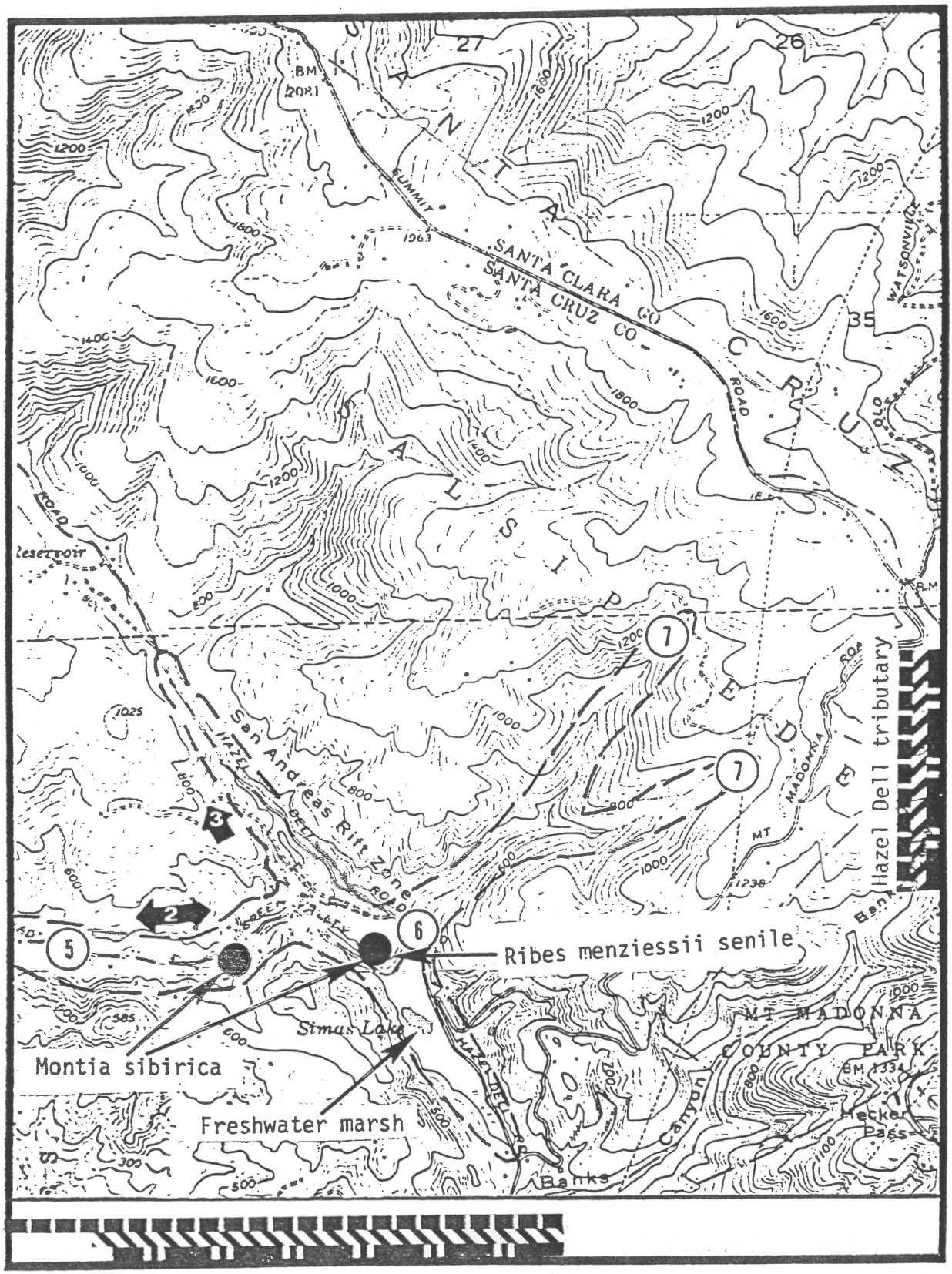


PLATE GV-4

Coward Creek

WATSONVILLE EAST QUADRANGLE

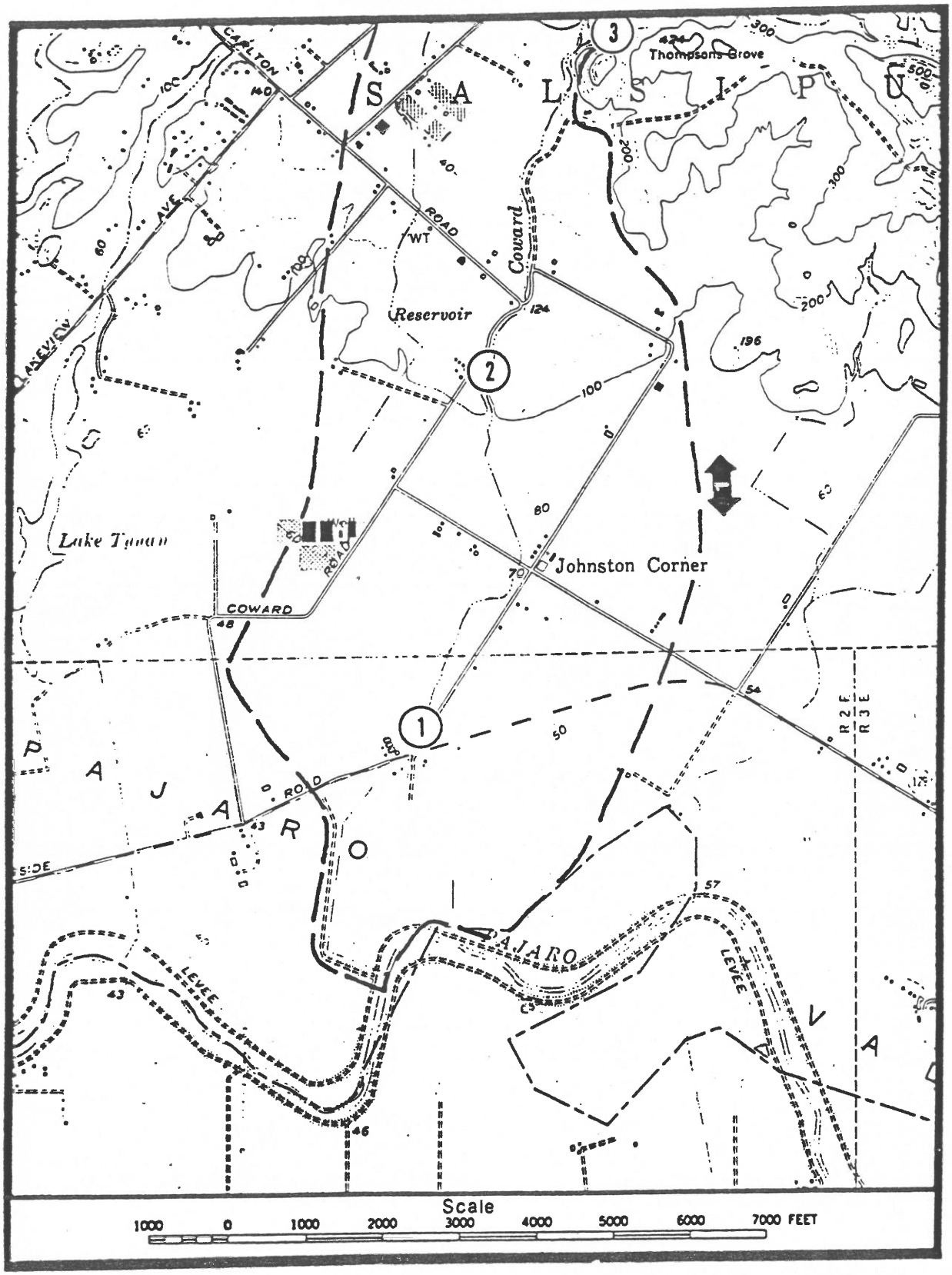


PLATE CW-1

Coward Creek

WATSONVILLE EAST QUADRANGLE

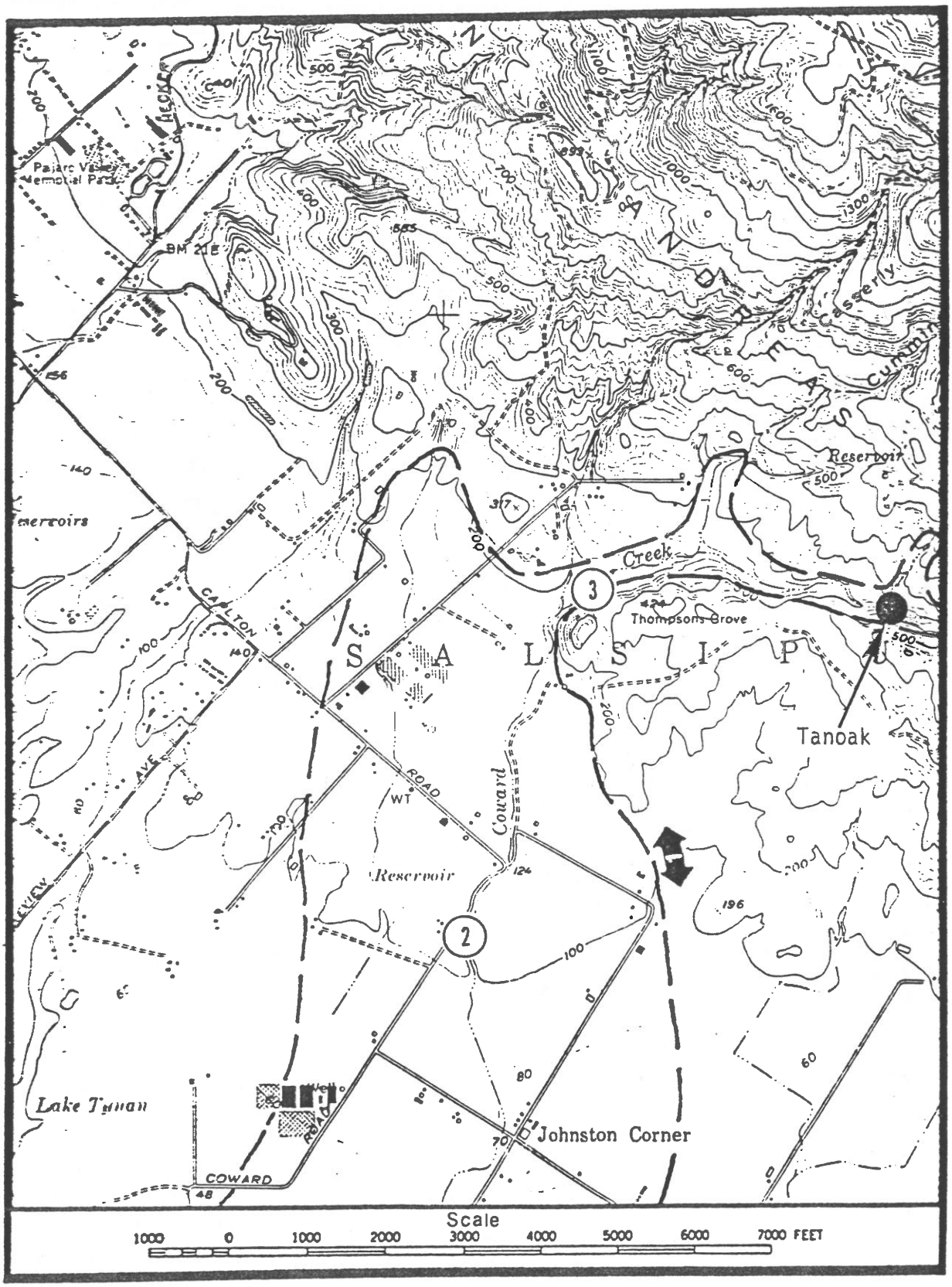


PLATE CW-2

Coward Creek

WATSONVILLE EAST QUADRANGLE

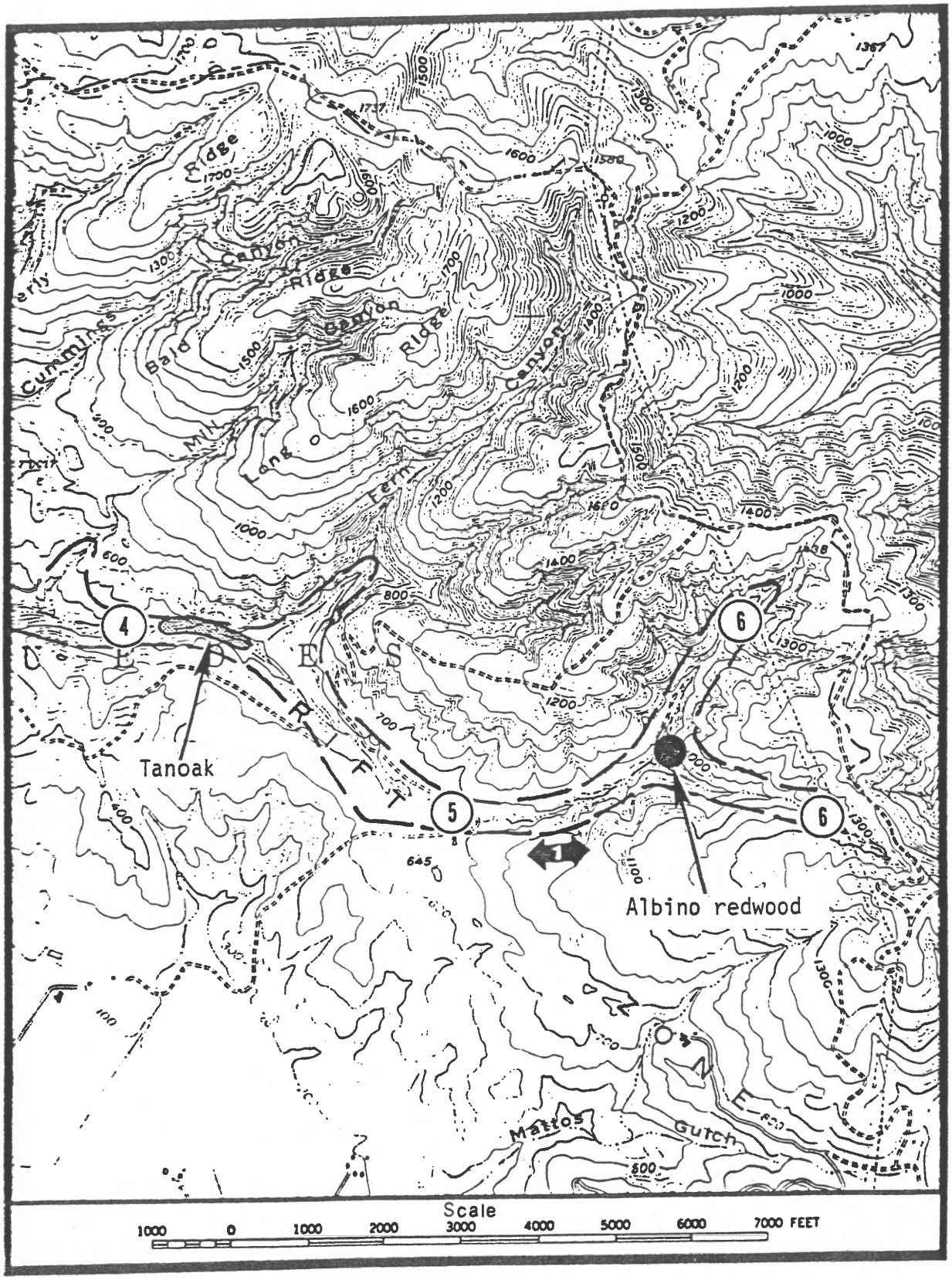


PLATE CW-3

Mattos Creek

WATSONVILLE EAST QUADRANGLE

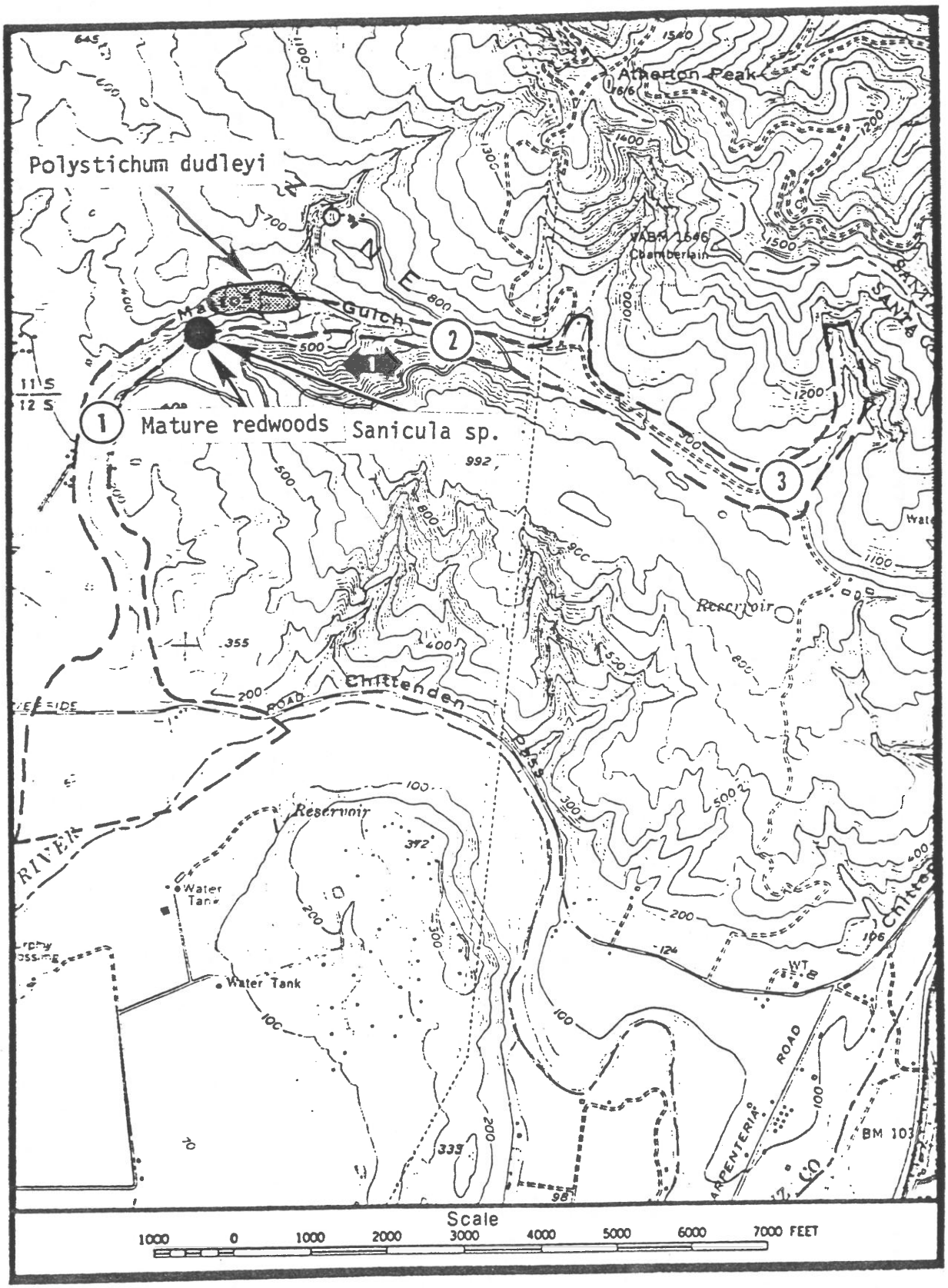


PLATE MG-1

Pescadero Creek

CHITTENDEN QUADRANGLE

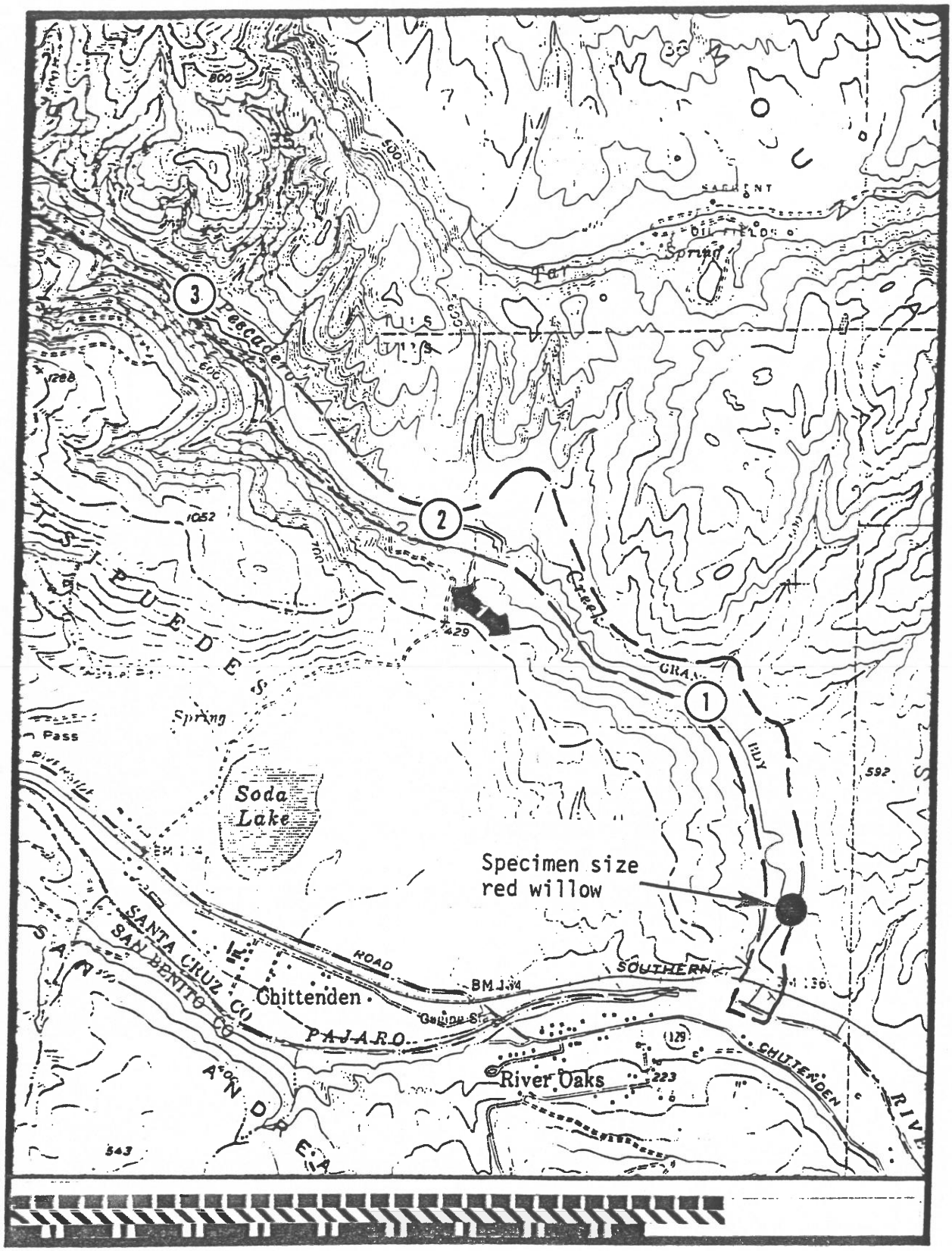


PLATE PE-1

Pescadero Creek

WATSONVILLE EAST QUADRANGLE

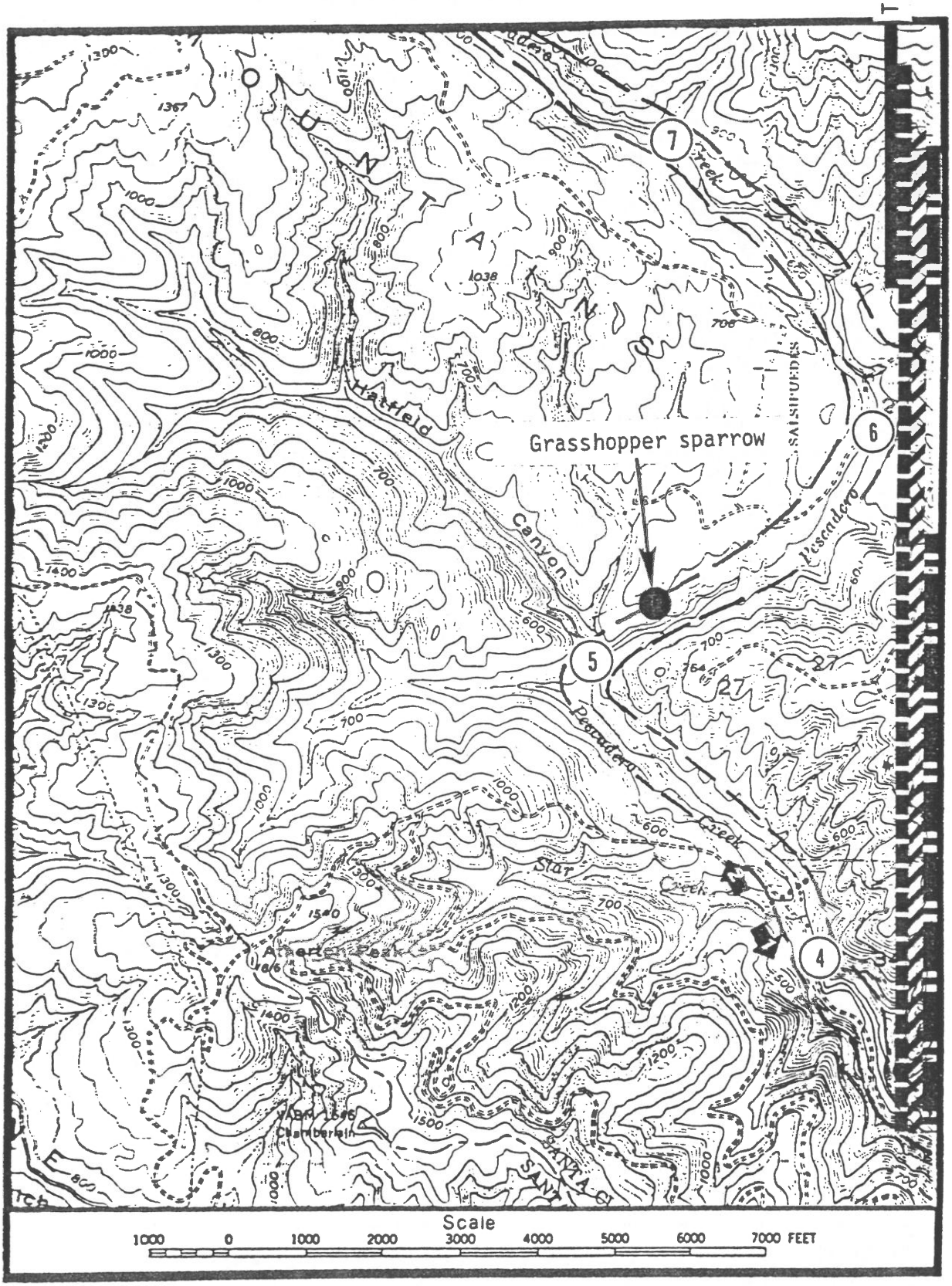


PLATE PE-2

Pescadero Creek

WATSONVILLE EAST QUADRANGLE

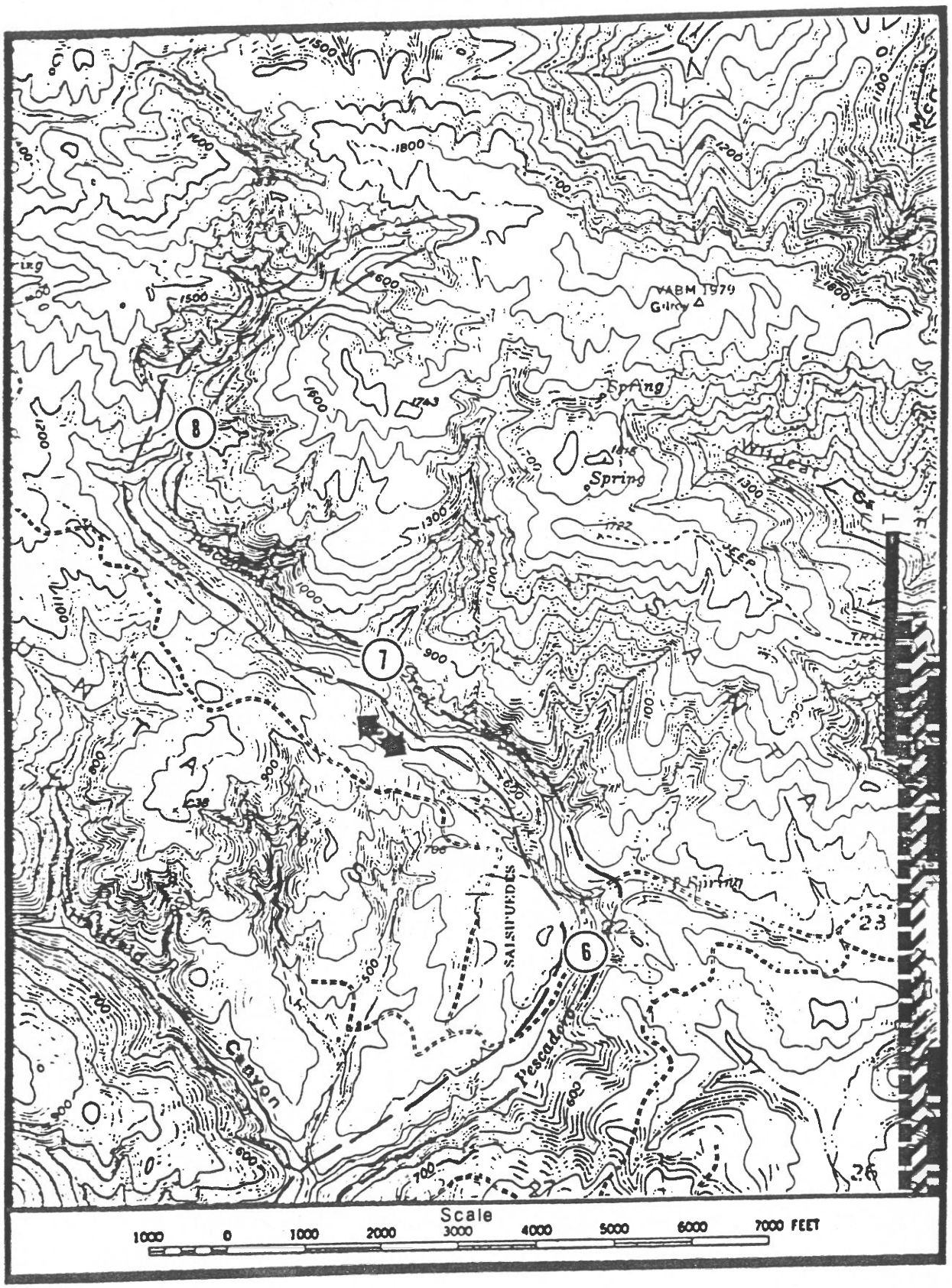


PLATE PE-3

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

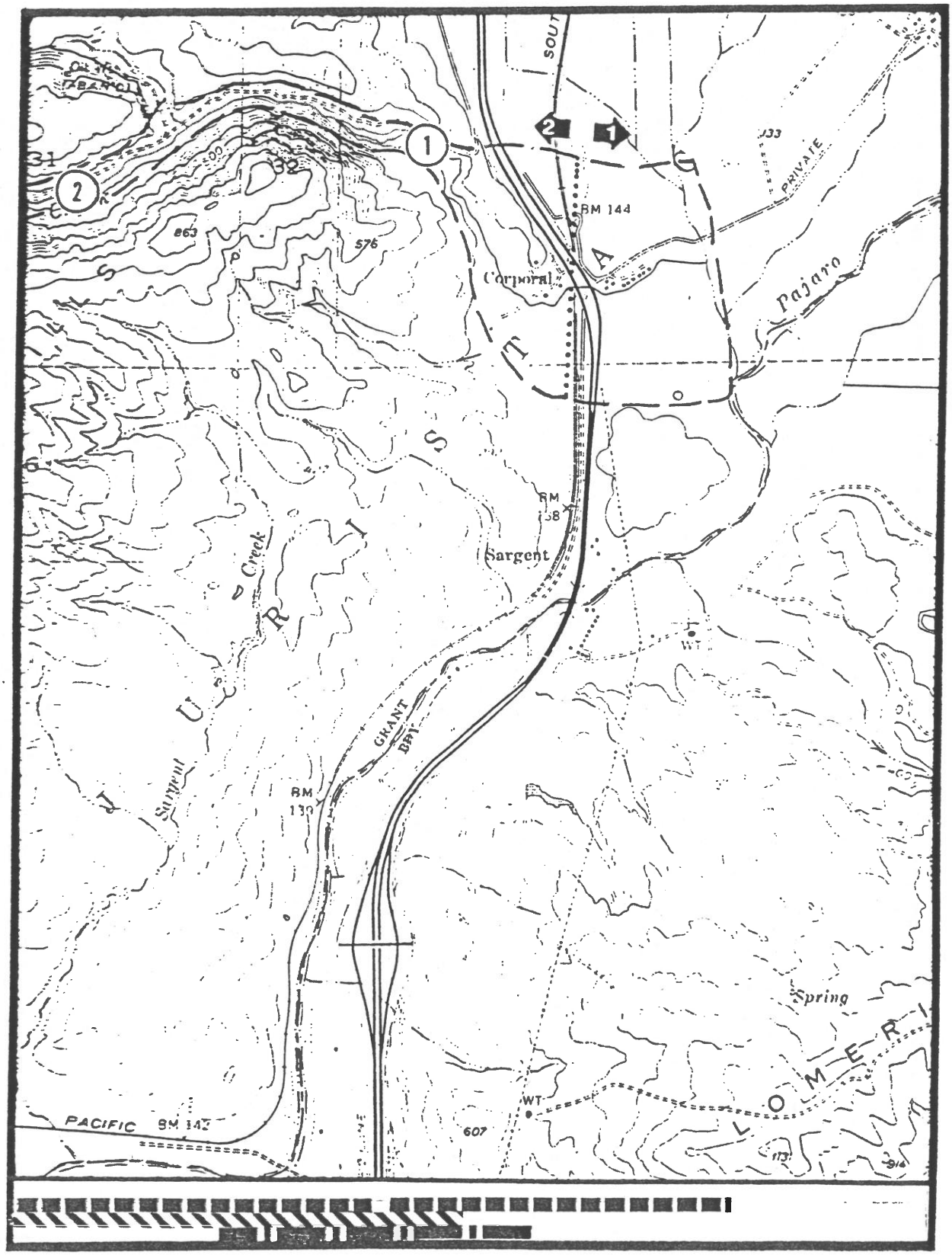


PLATE TC-1

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

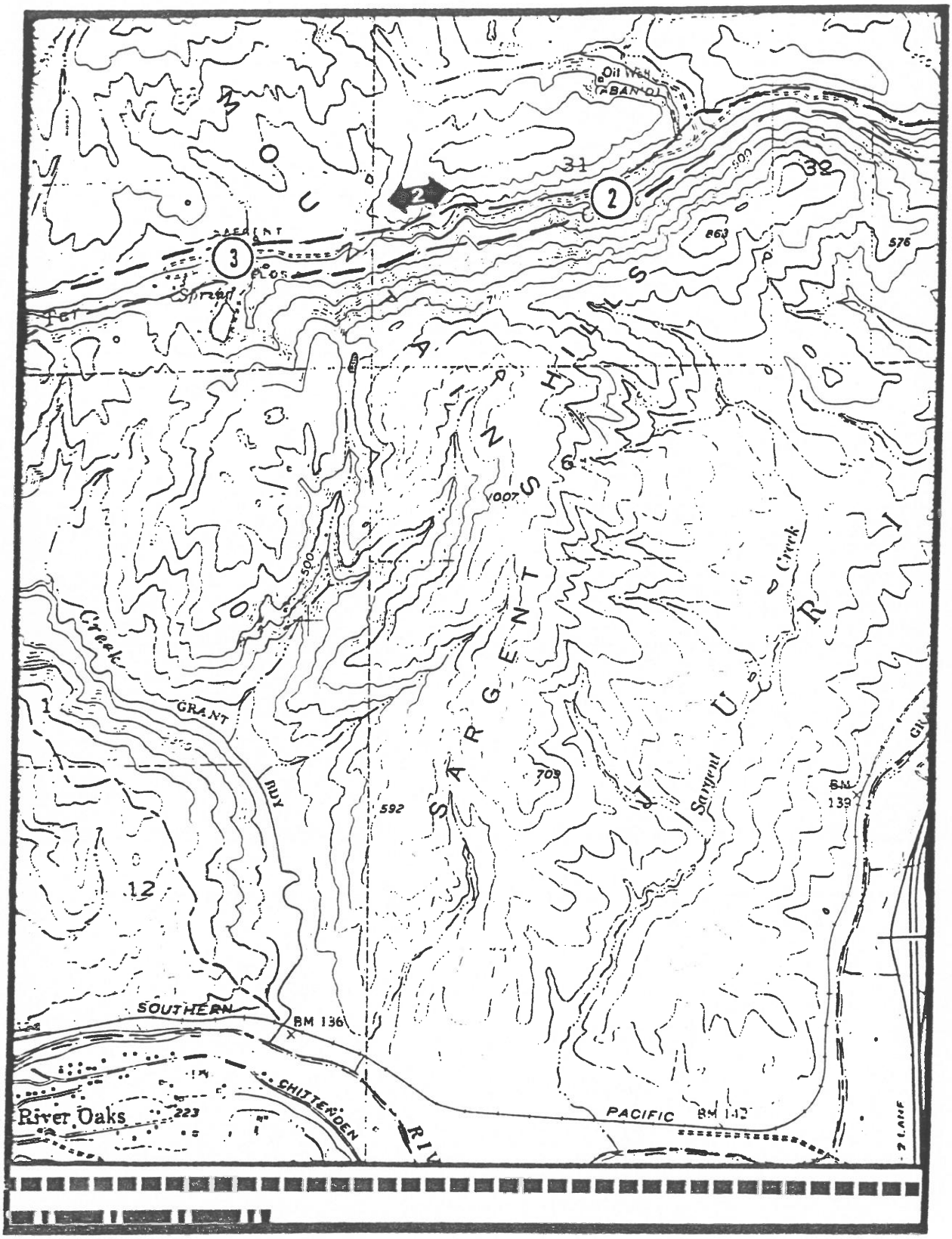


PLATE TC-2

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

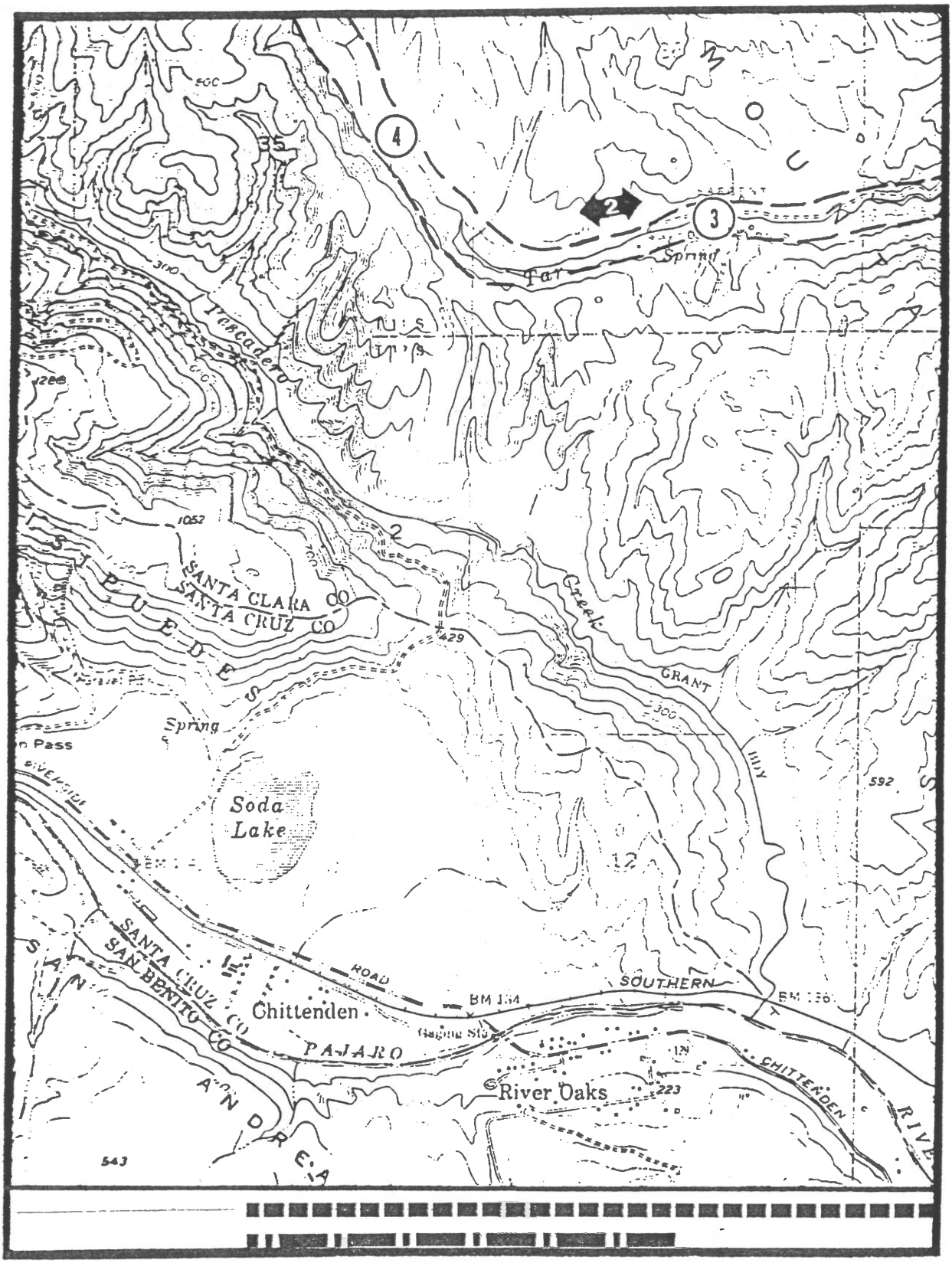


PLATE TC-3

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

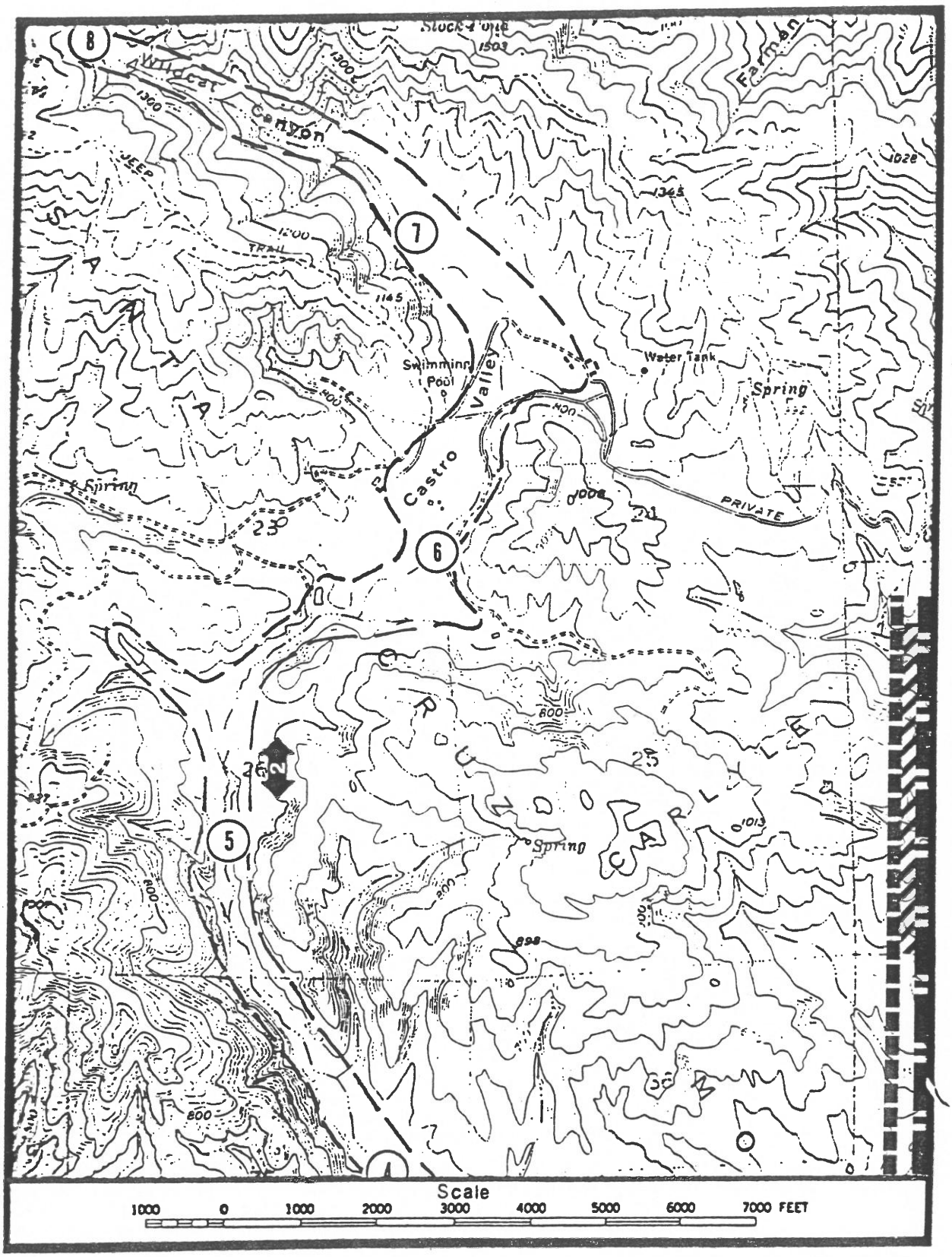


PLATE TC-4

Carnadero/ Uvas Creek

CHITTENDEN QUADRANGLE

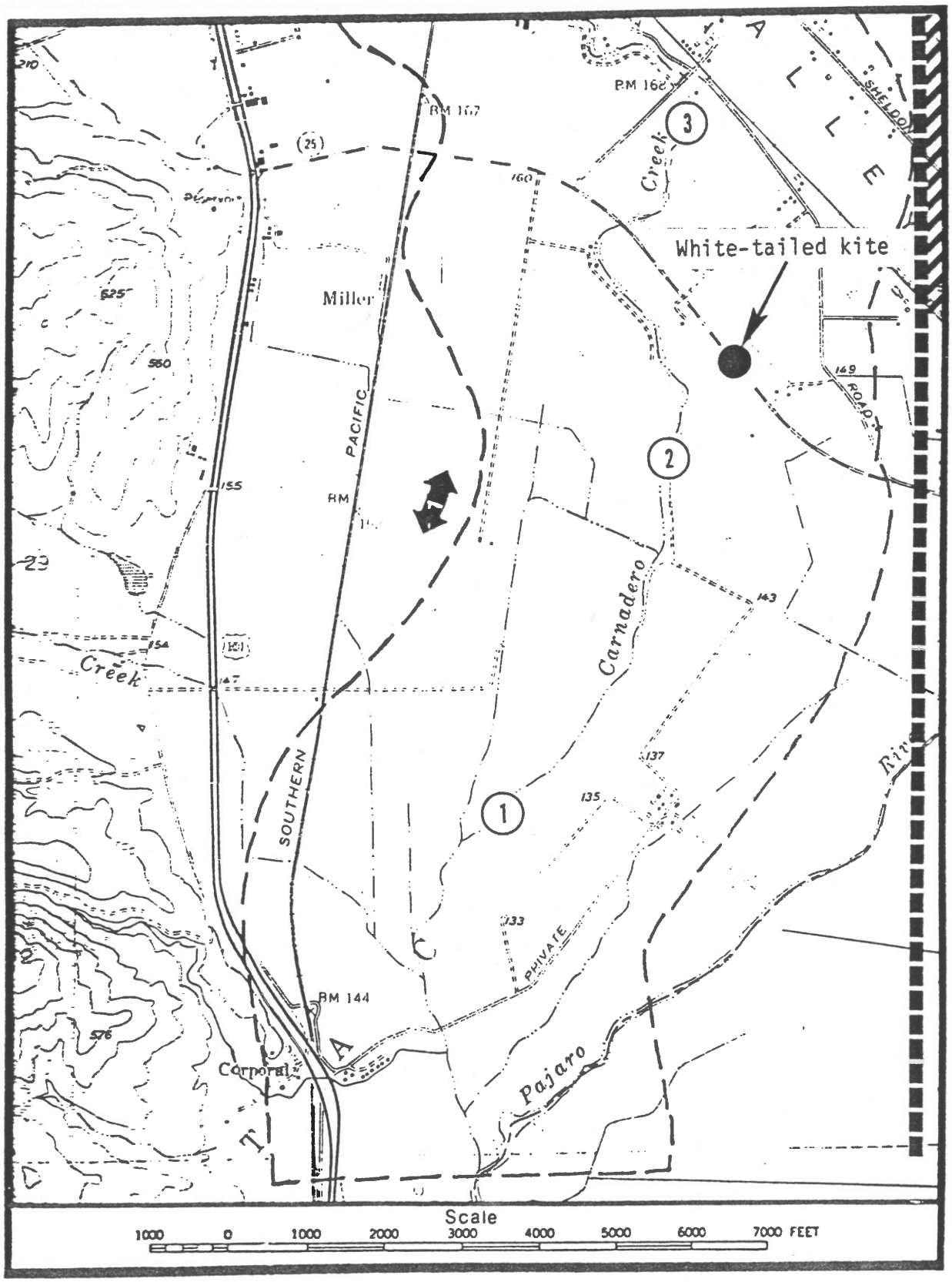


PLATE CU-1

Carnadero / Uvas Creek

CHITTENDEN QUADRANGLE

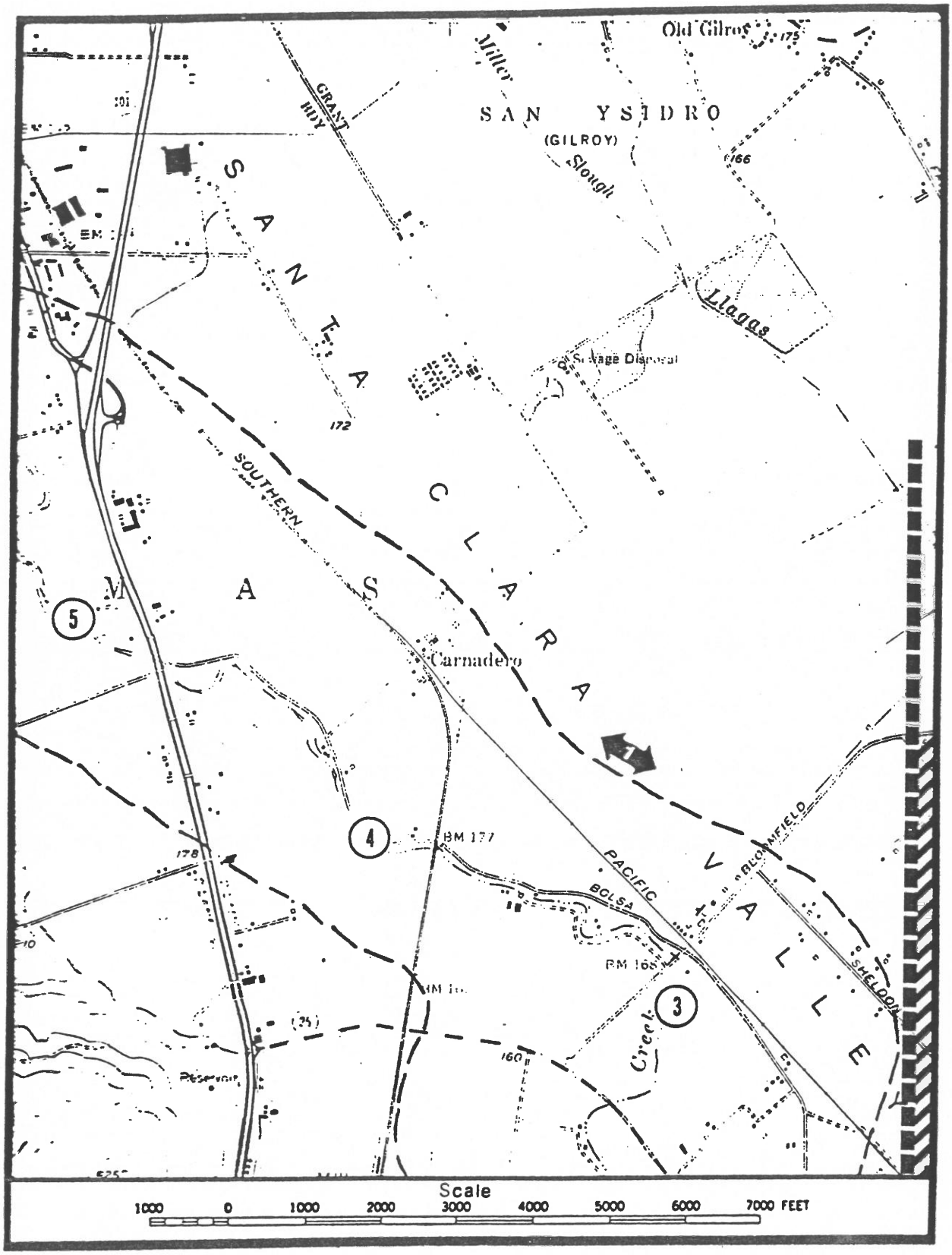


PLATE CU-2

Carnadero/Uvas Creek

CHITTENDEN QUADRANGLE

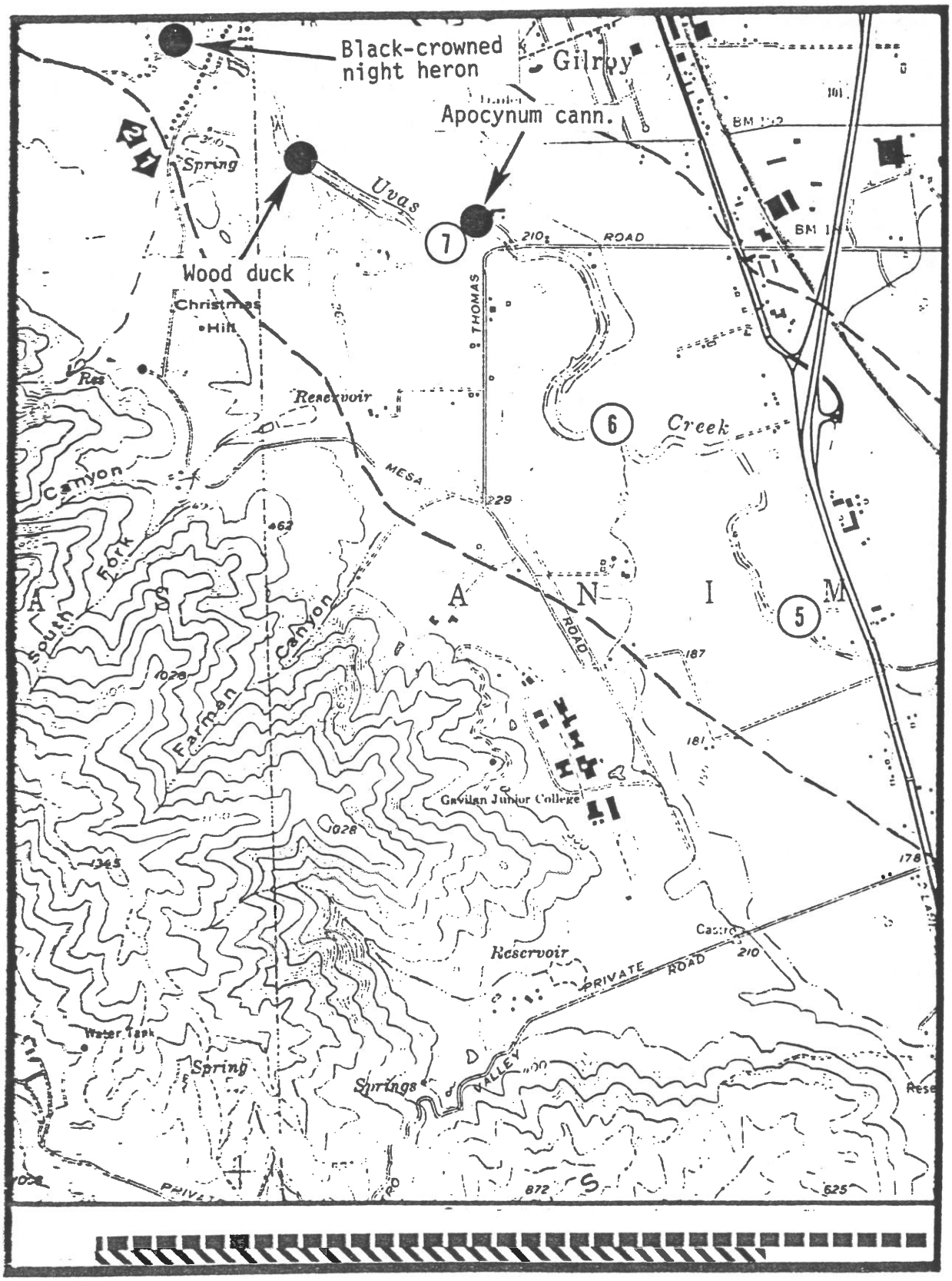


PLATE CU-3

Carnadero/Uvas Creek

GILROY QUADRANGLE

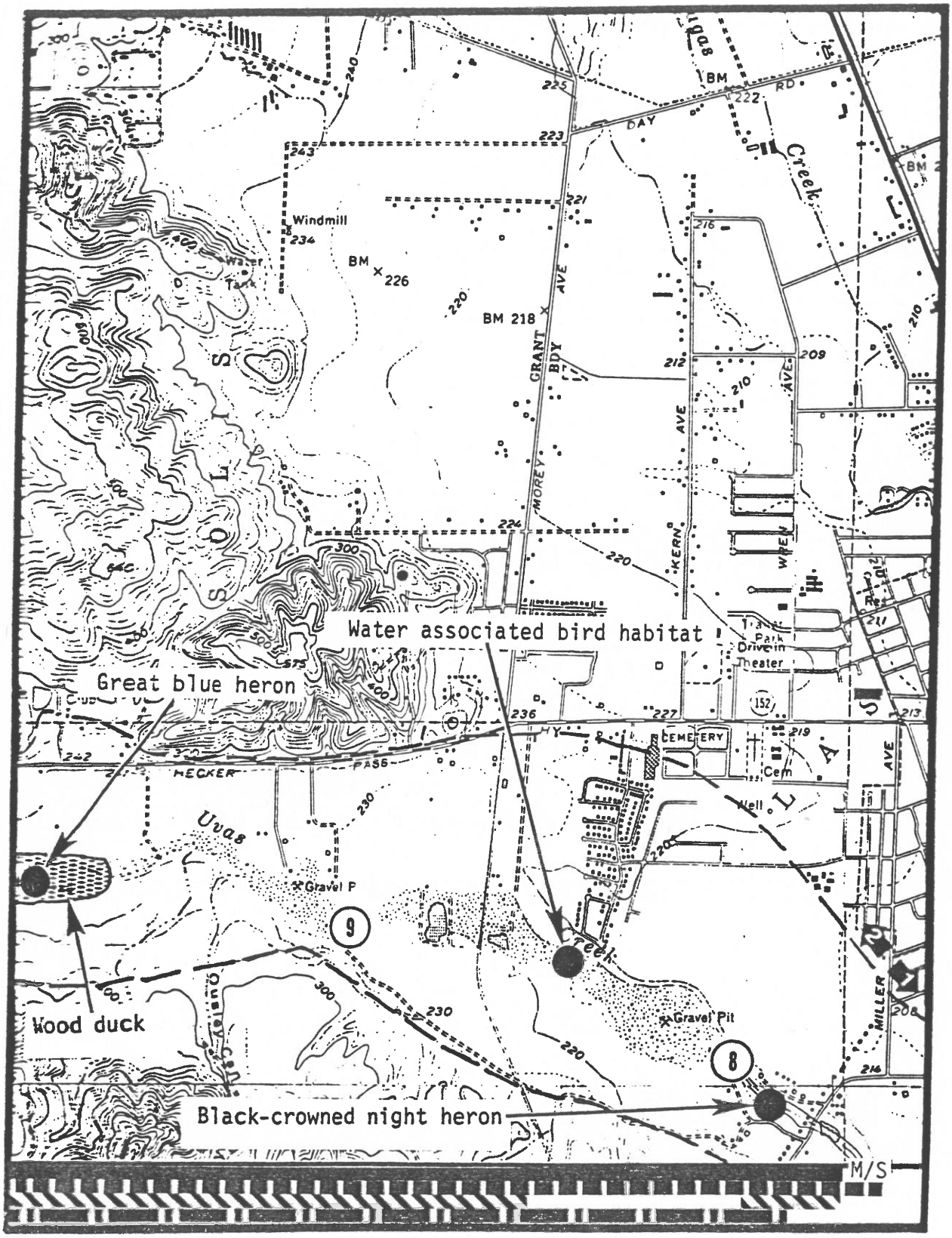


PLATE CU-4

Carnadero / Uvas Creek

Mount Madonna Quadrangle

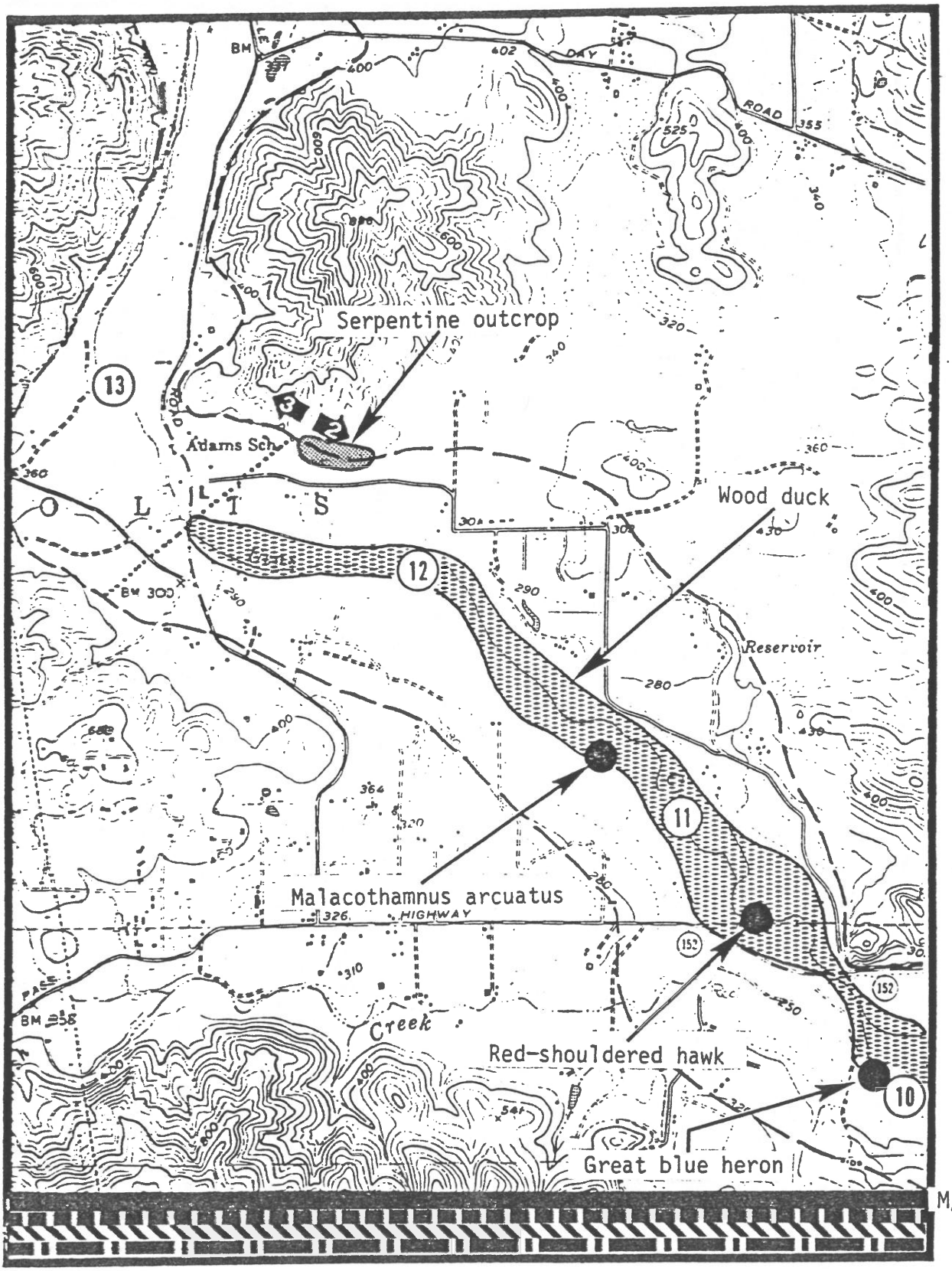


Plate CU-5

Carnadero/Uvas Creek

MOUNT MADONNA QUADRANGLE

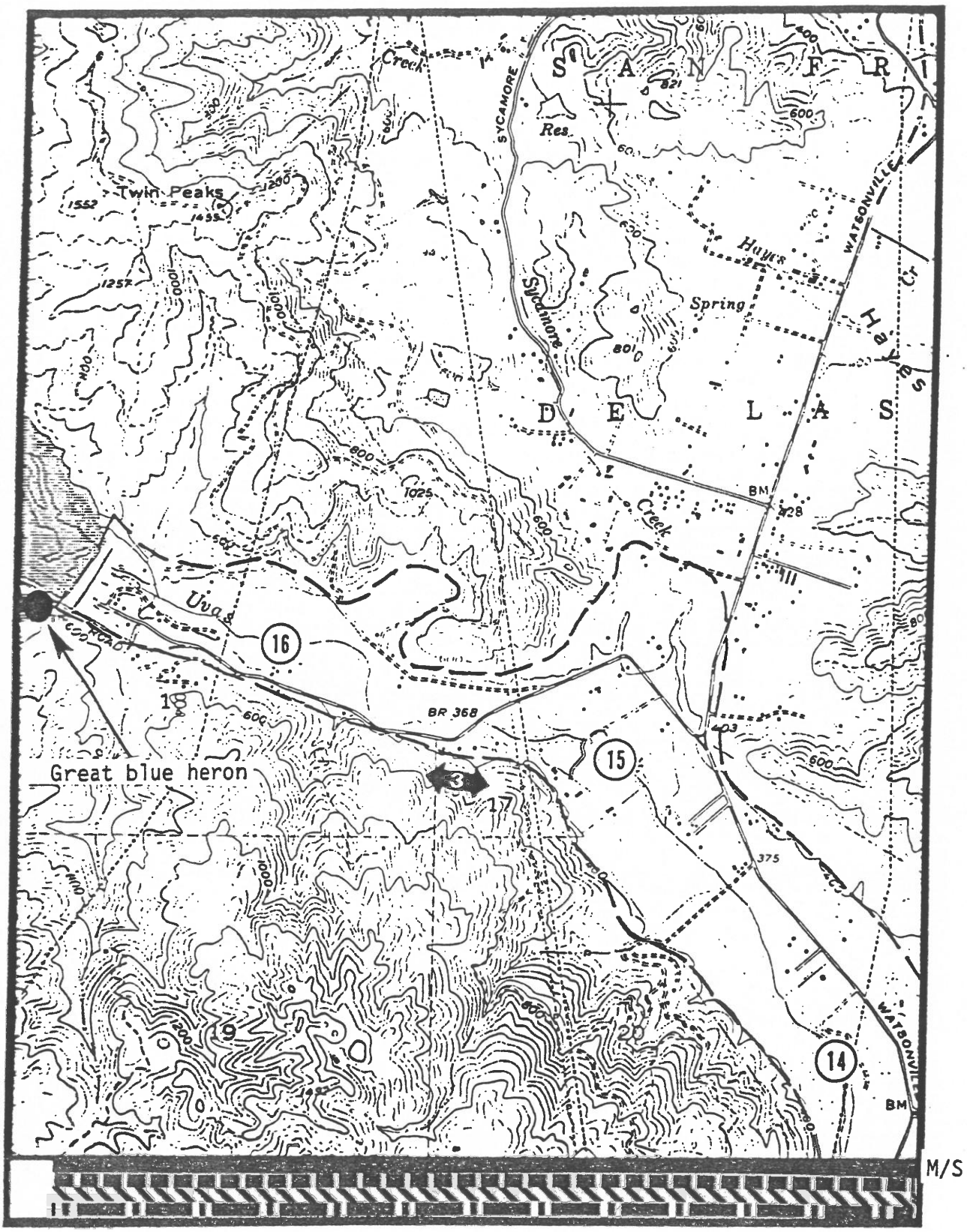


PLATE CU-6

Bodfish Creek

Mount Madonna Quadrangle

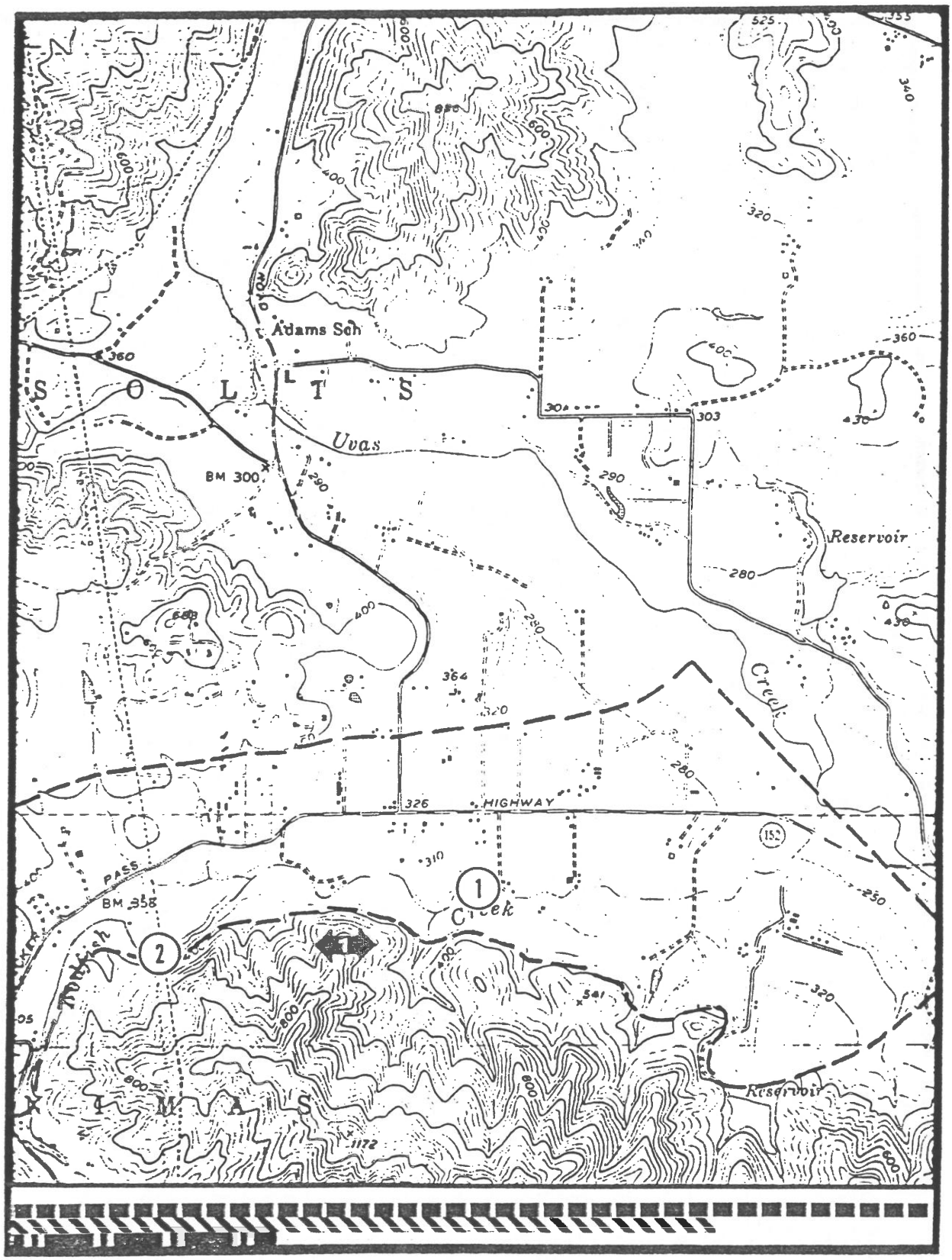


Plate BO-1

Bodfish Creek

Mount Madonna Quadrangle

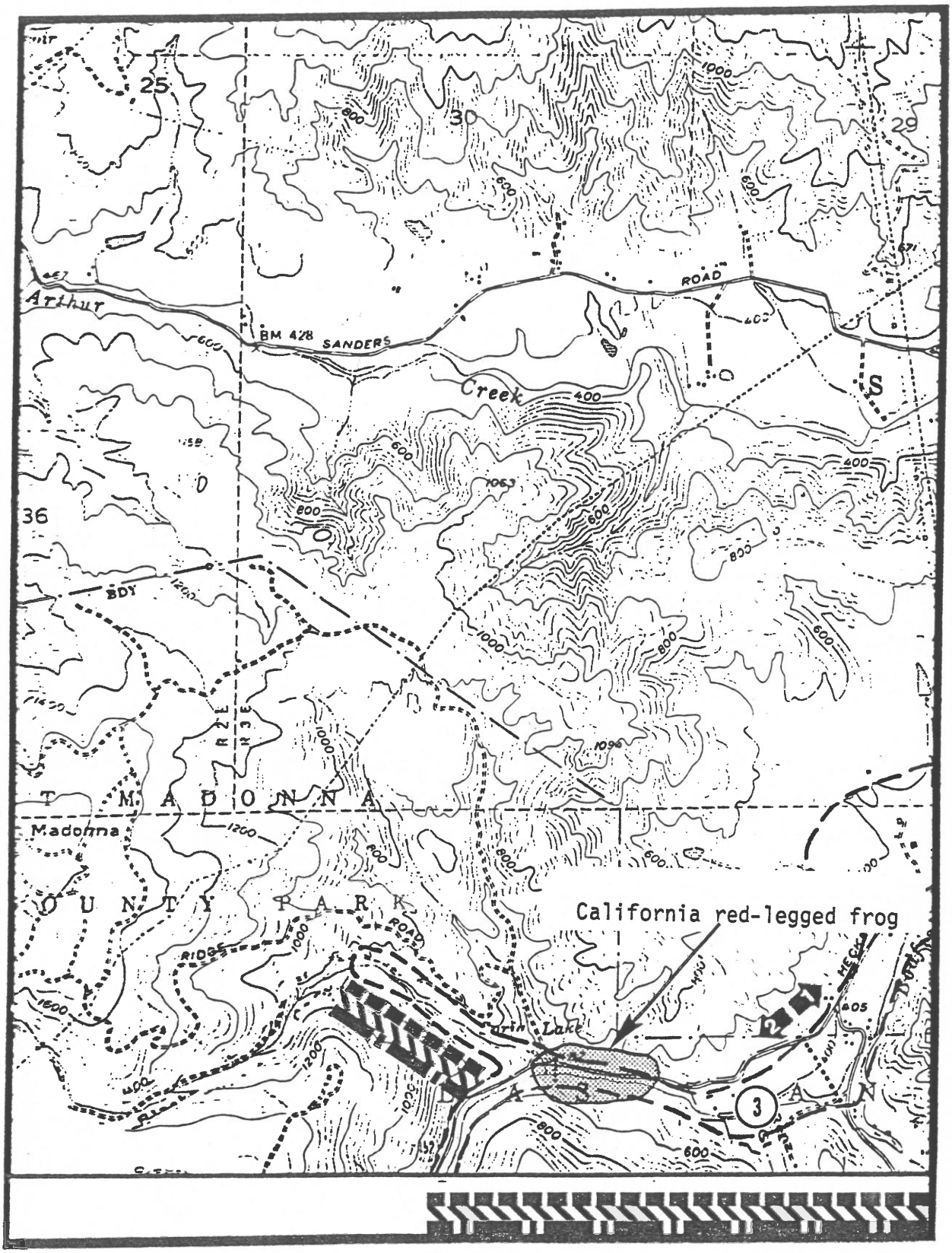


PLATE BO-2

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

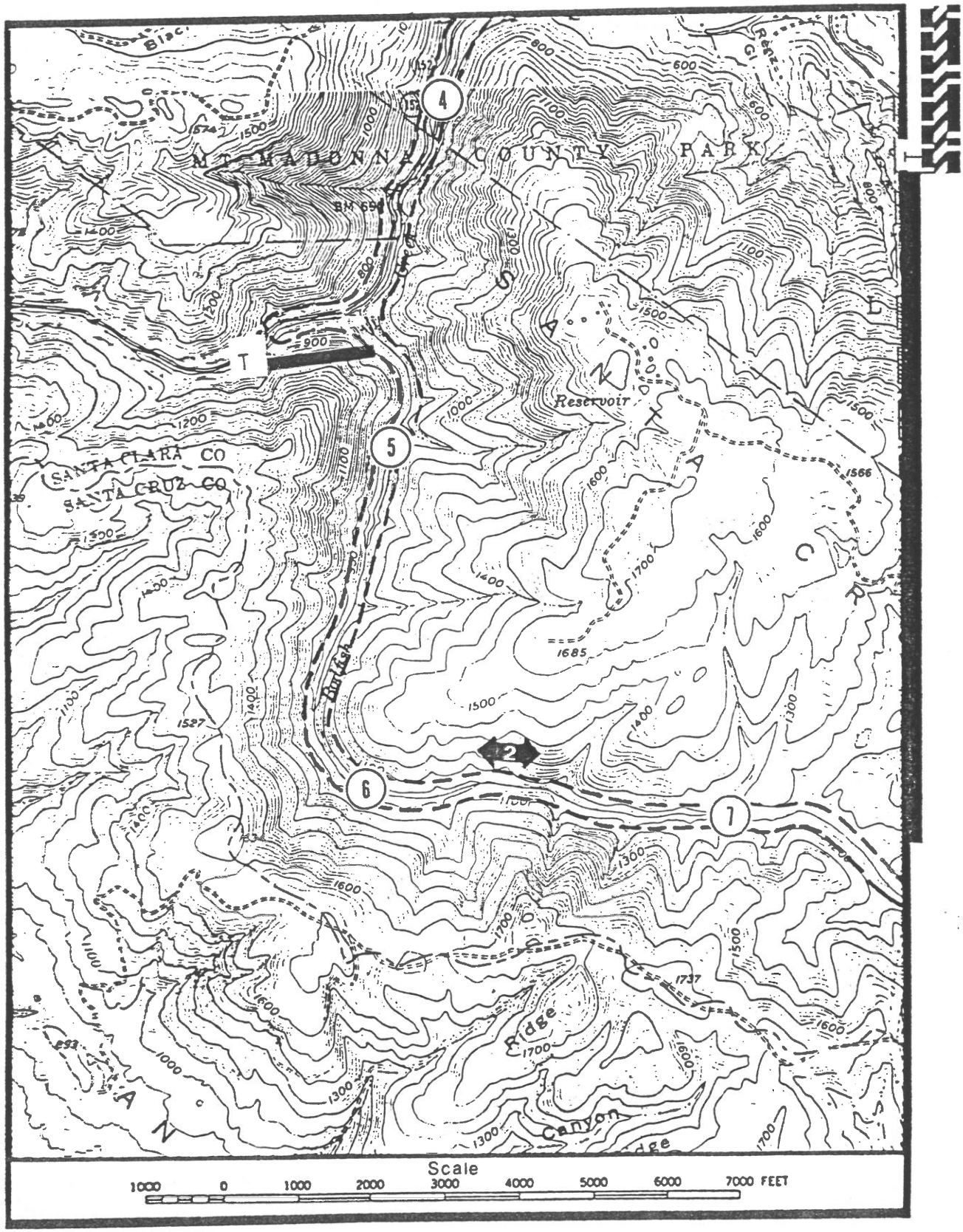


PLATE BO-3

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

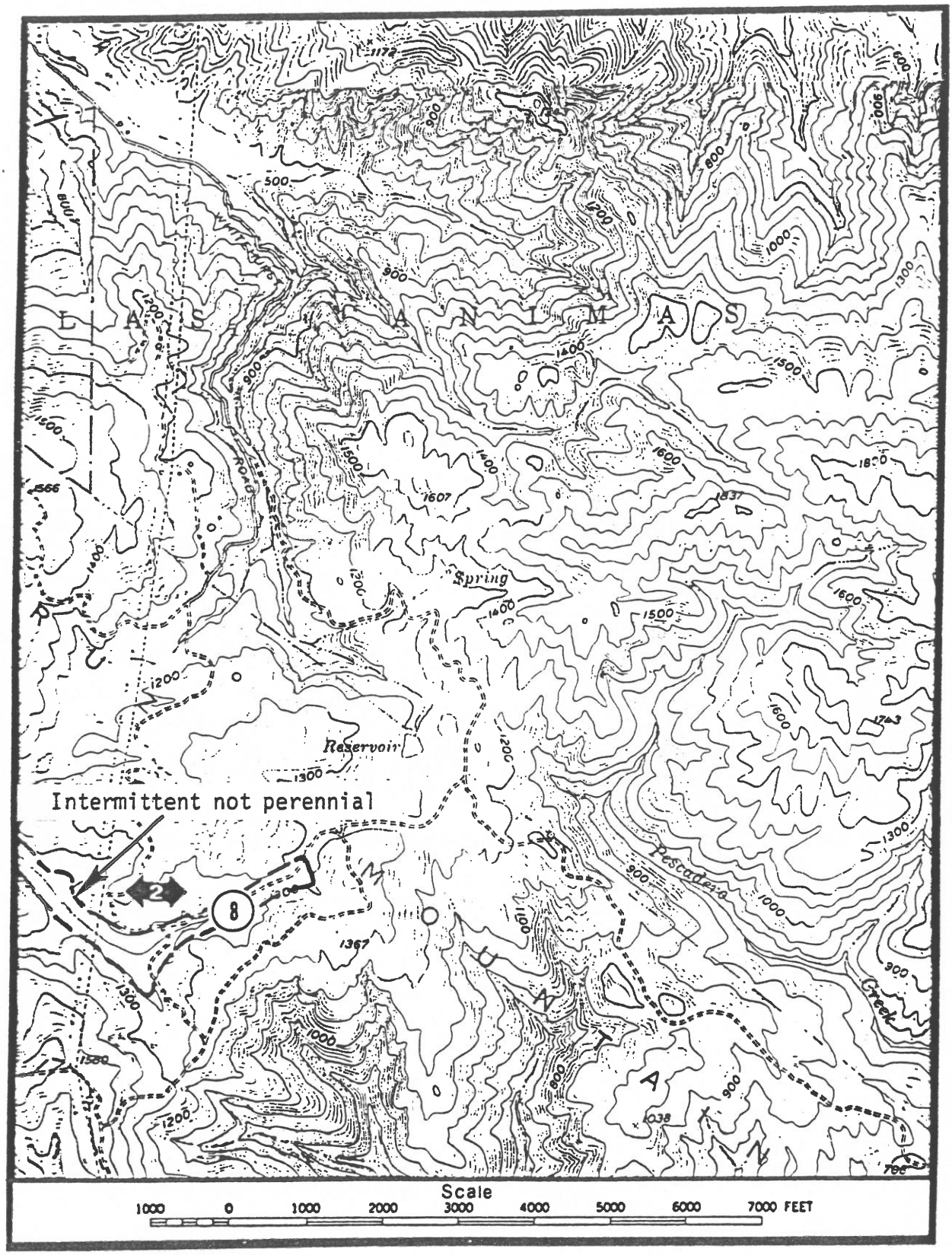


PLATE BO-4

Little Arthur Creek

Mount Madonna Quadrangle

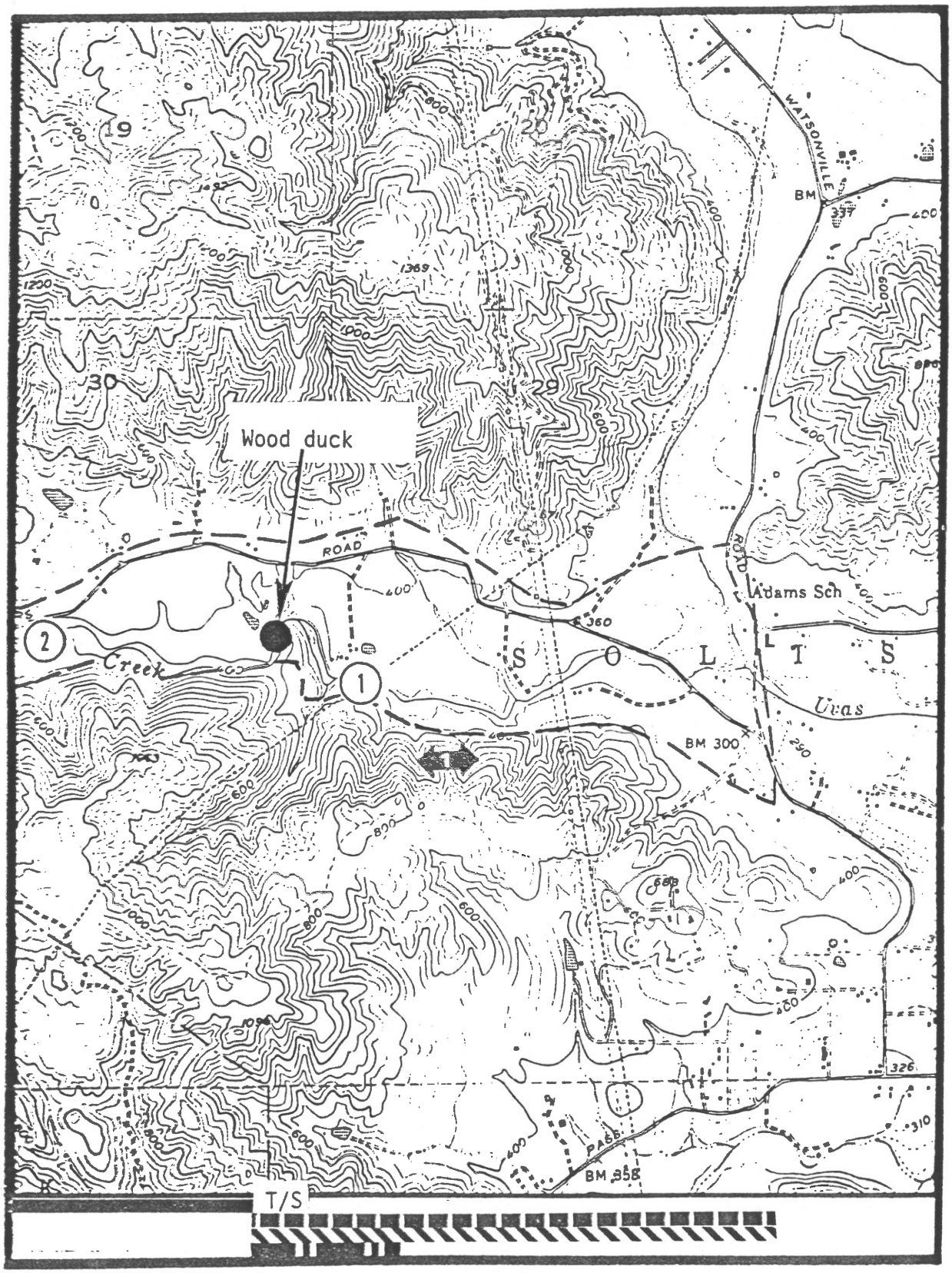


Plate LA-1

Little Arthur Creek

Mount Madonna Quadrangle

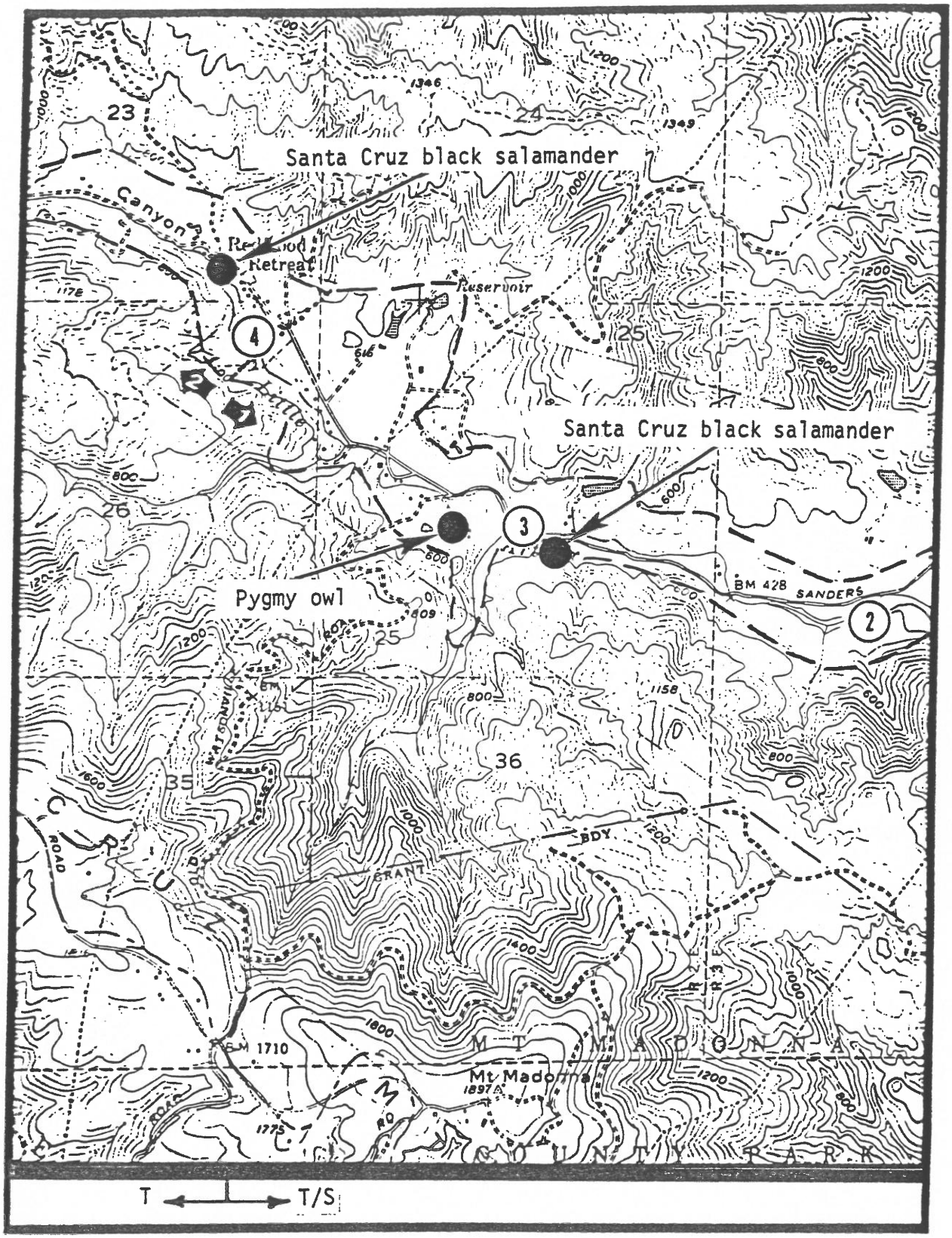


Plate LA-2

Little Arthur Creek

Mount Madonna Quadrangle

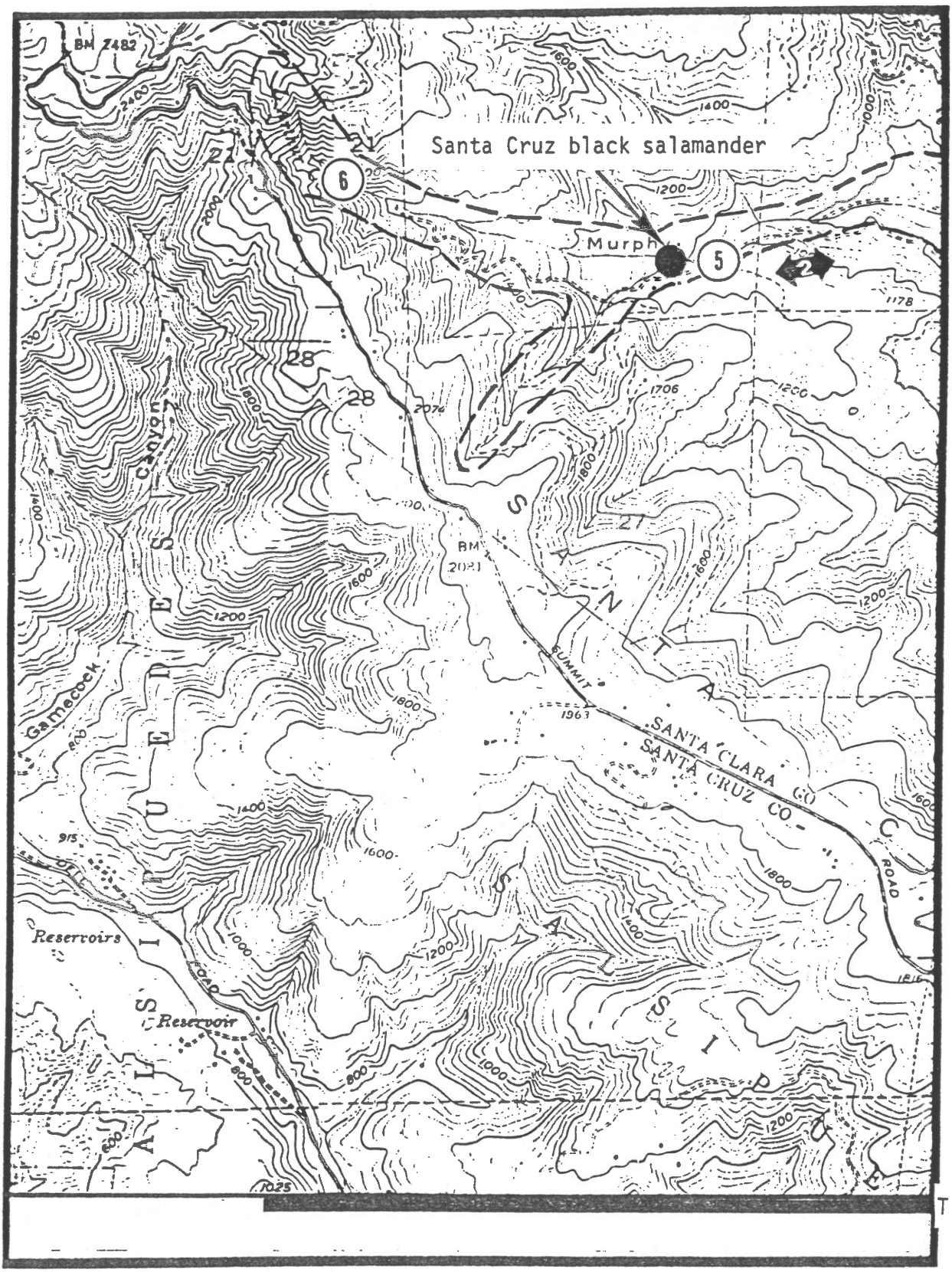


Plate LA-3

Llagas Creek

CHITTENDEN QUADRANGLE

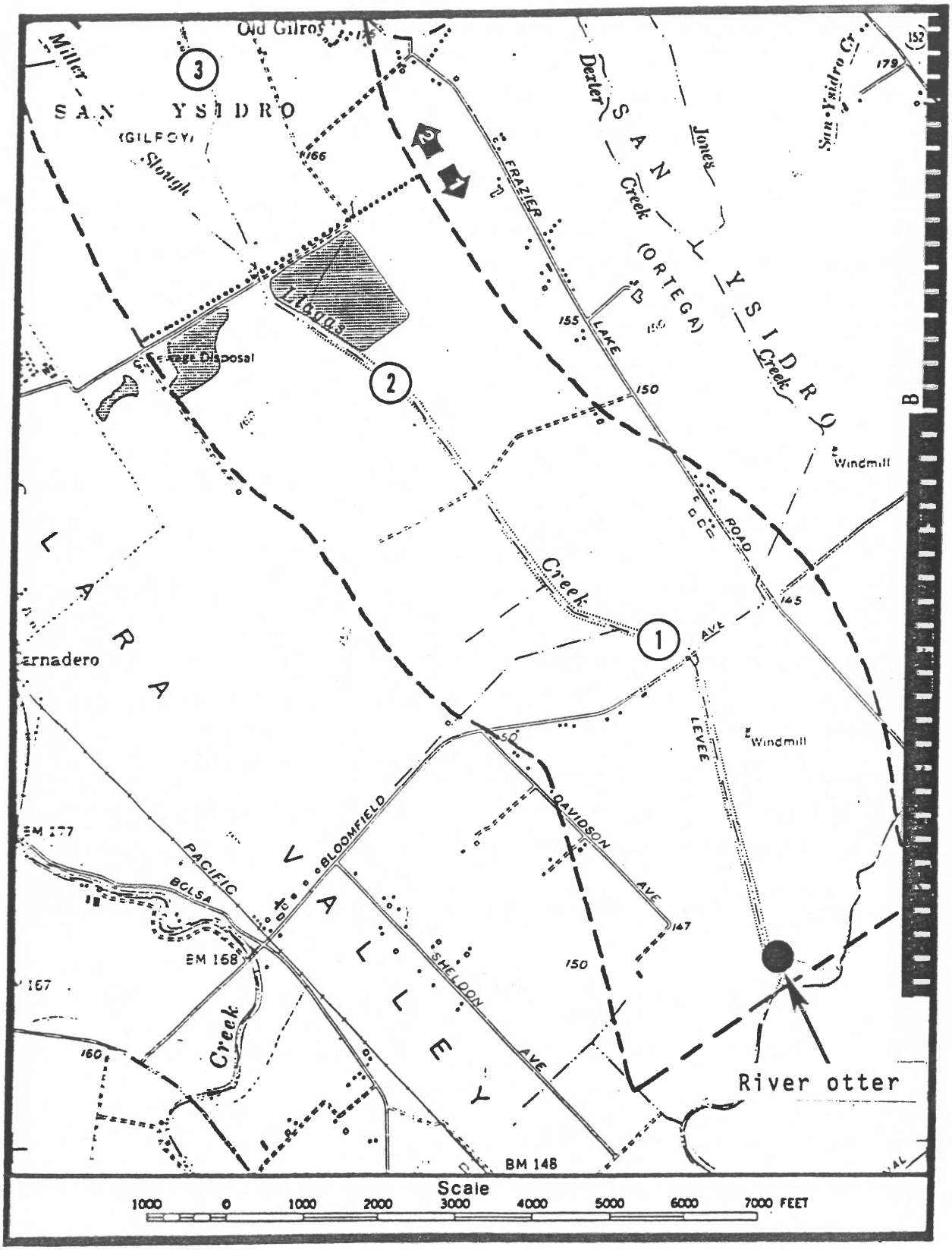


PLATE LC-1

Llagas Creek

GILROY QUADRANGLE

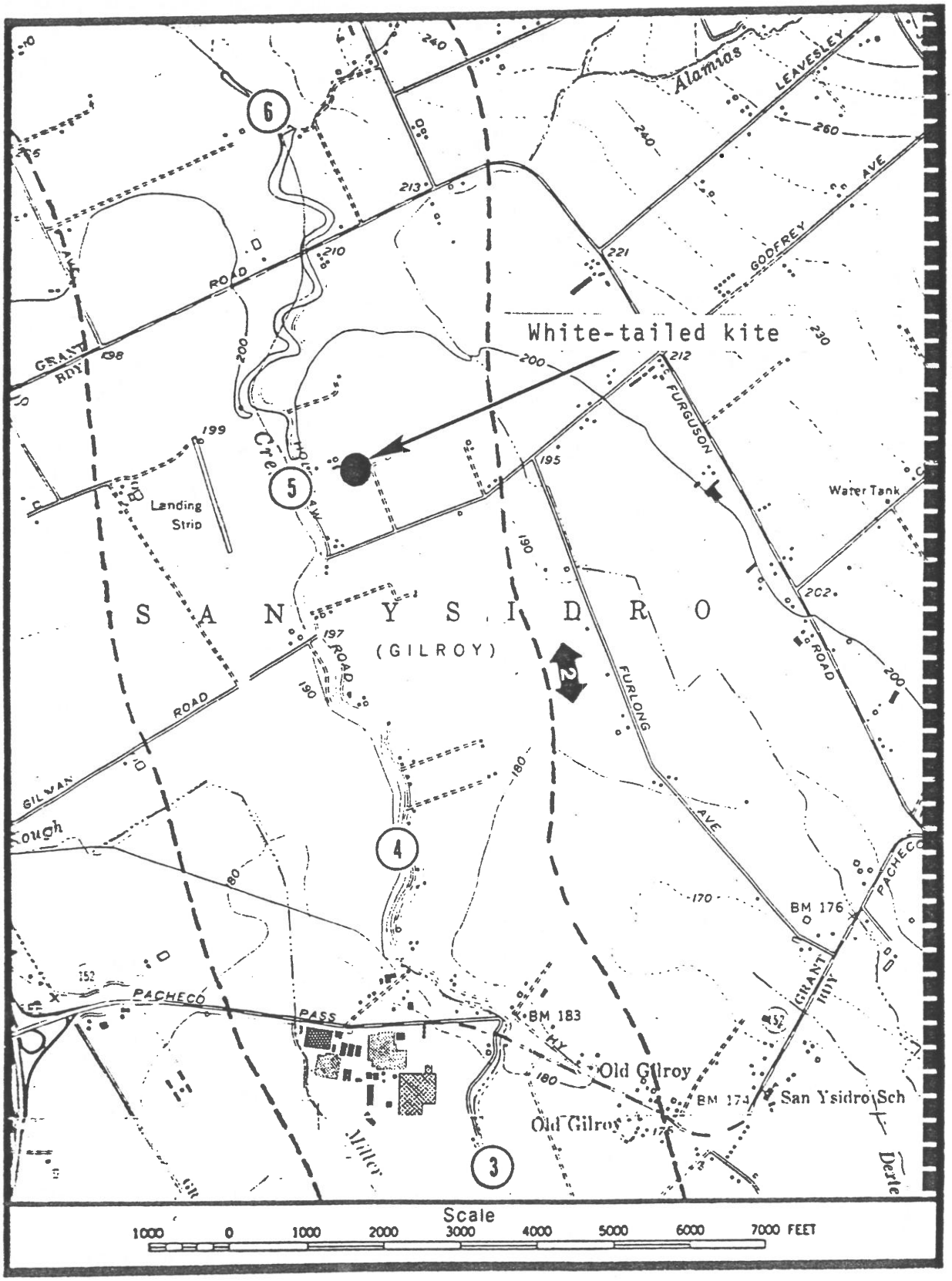


PLATE LC-2

Llagas Creek

GILROY QUADRANGLE

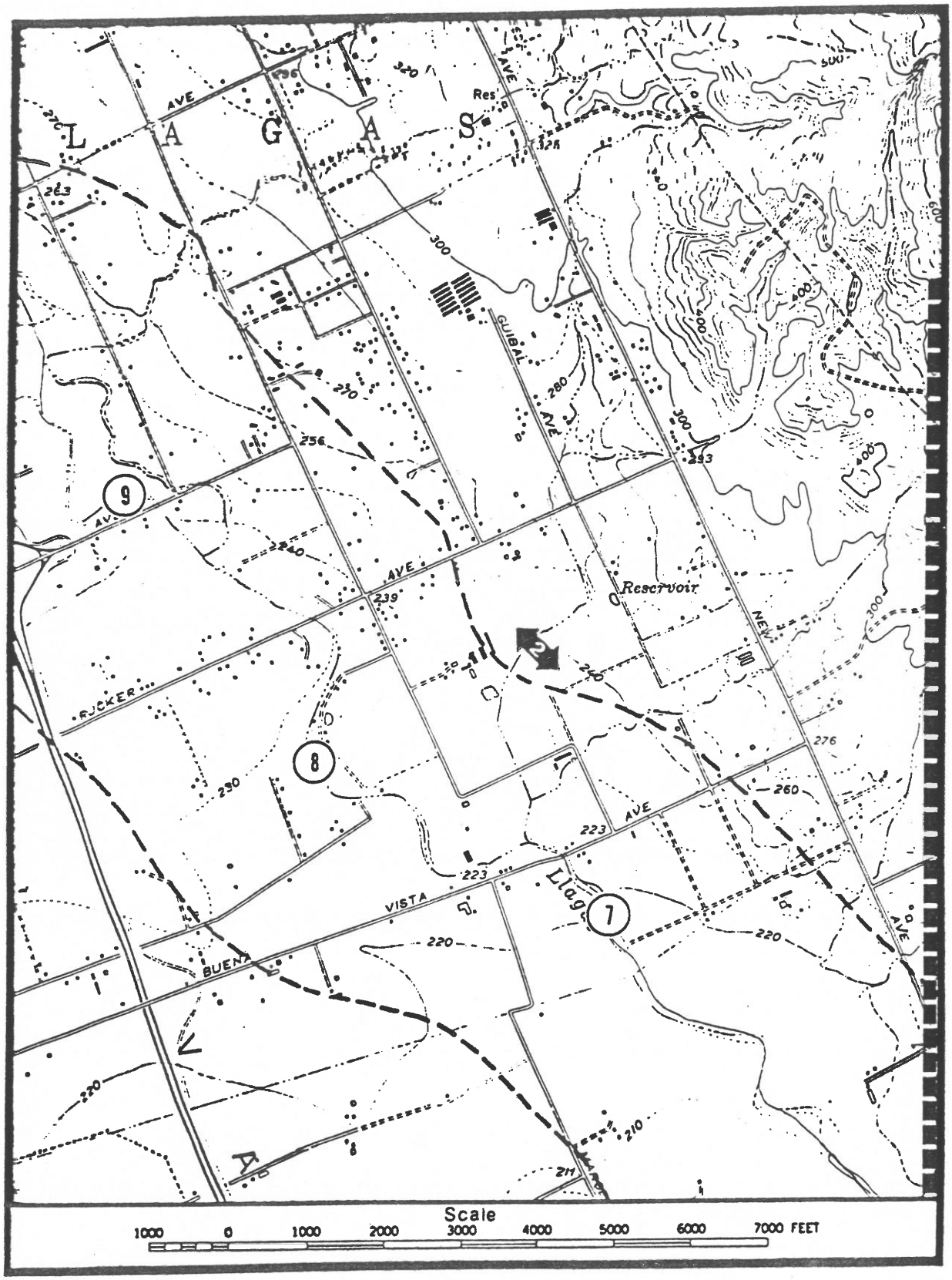


PLATE LC-3

Llagas Creek

GILROY QUADRANGLE

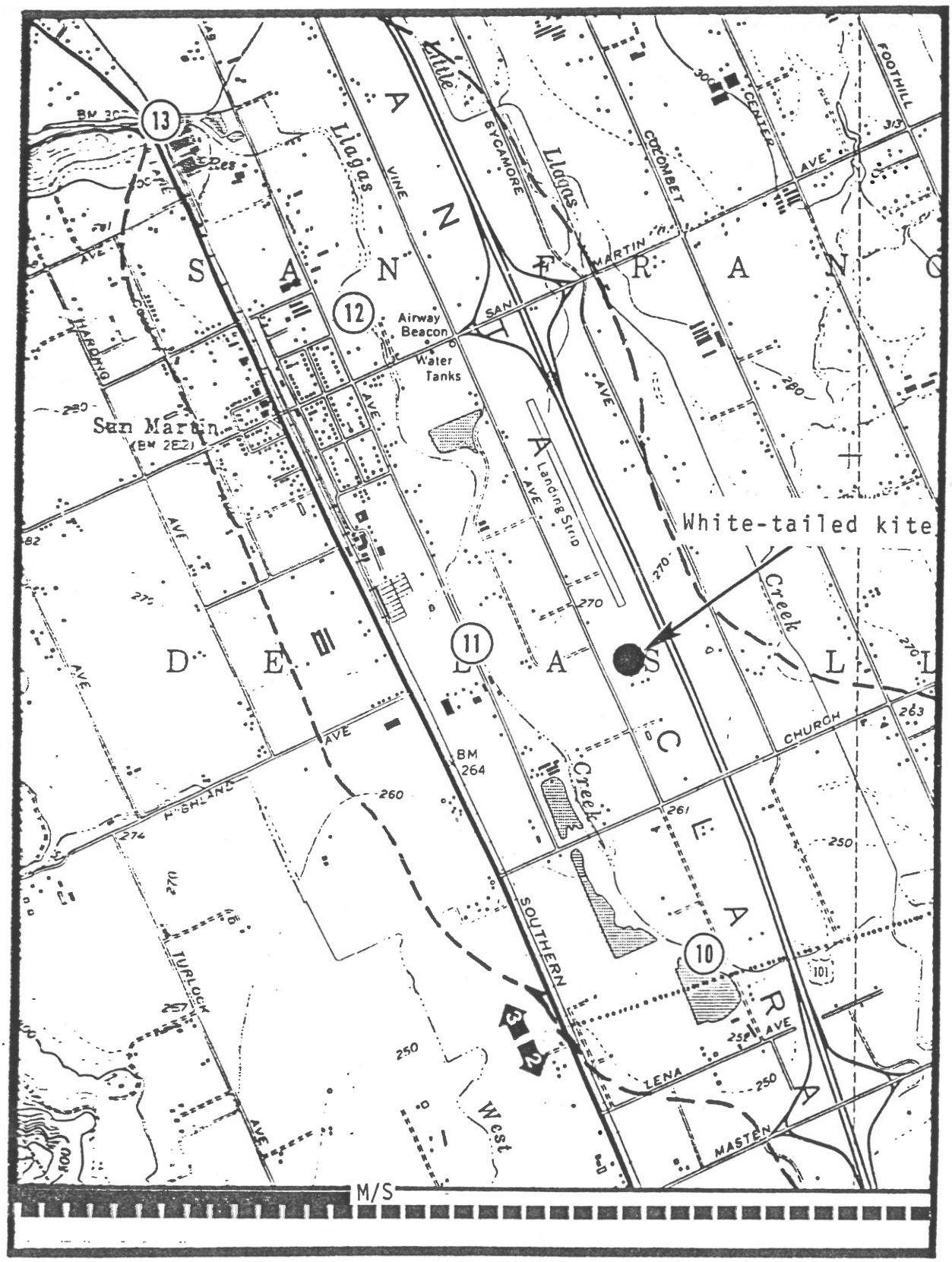


PLATE LC-4

Llagas Creek

Mount Madonna Quadrangle

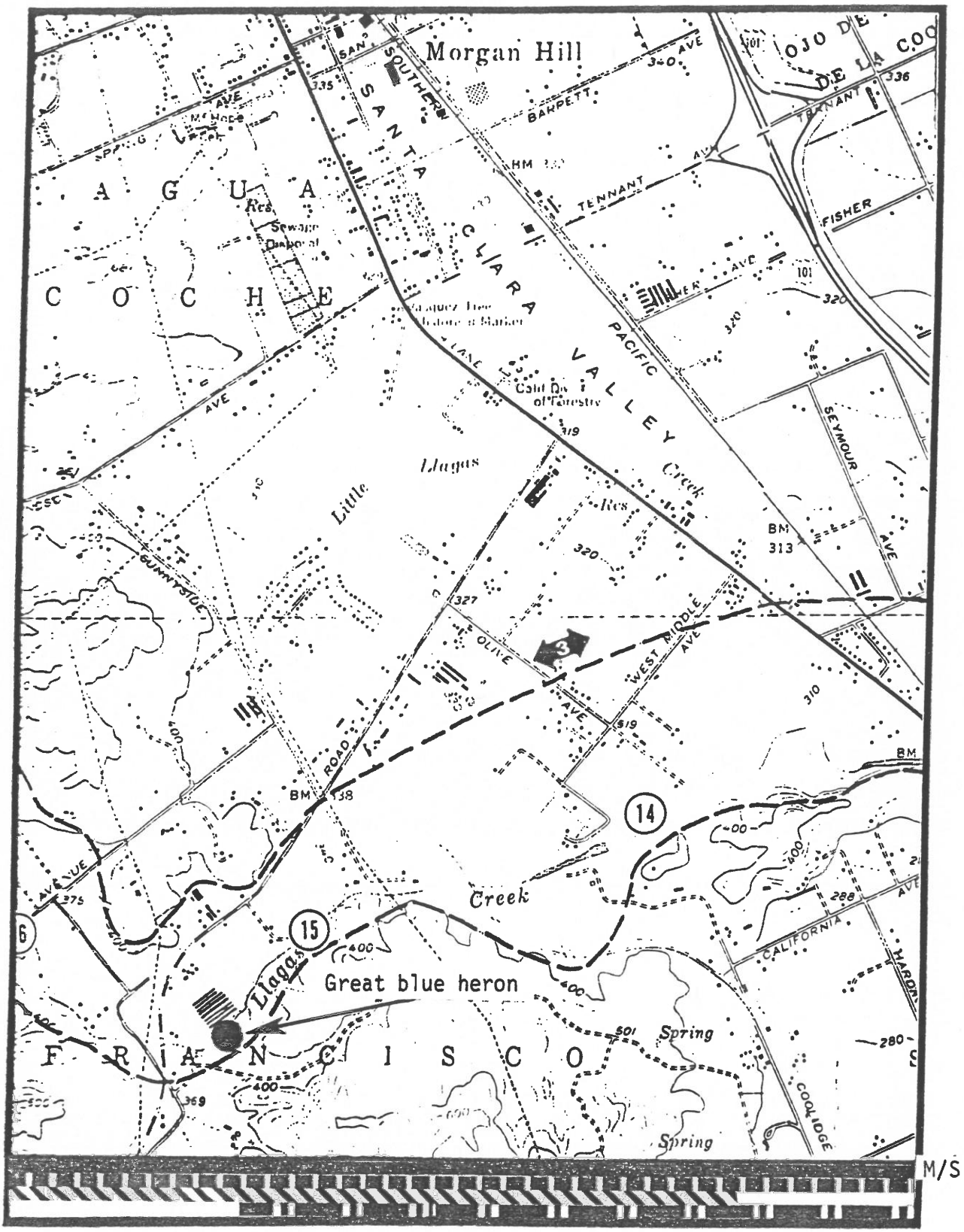


PLATE LC-5

Llagas Creek

Mount Madonna Quadrangle

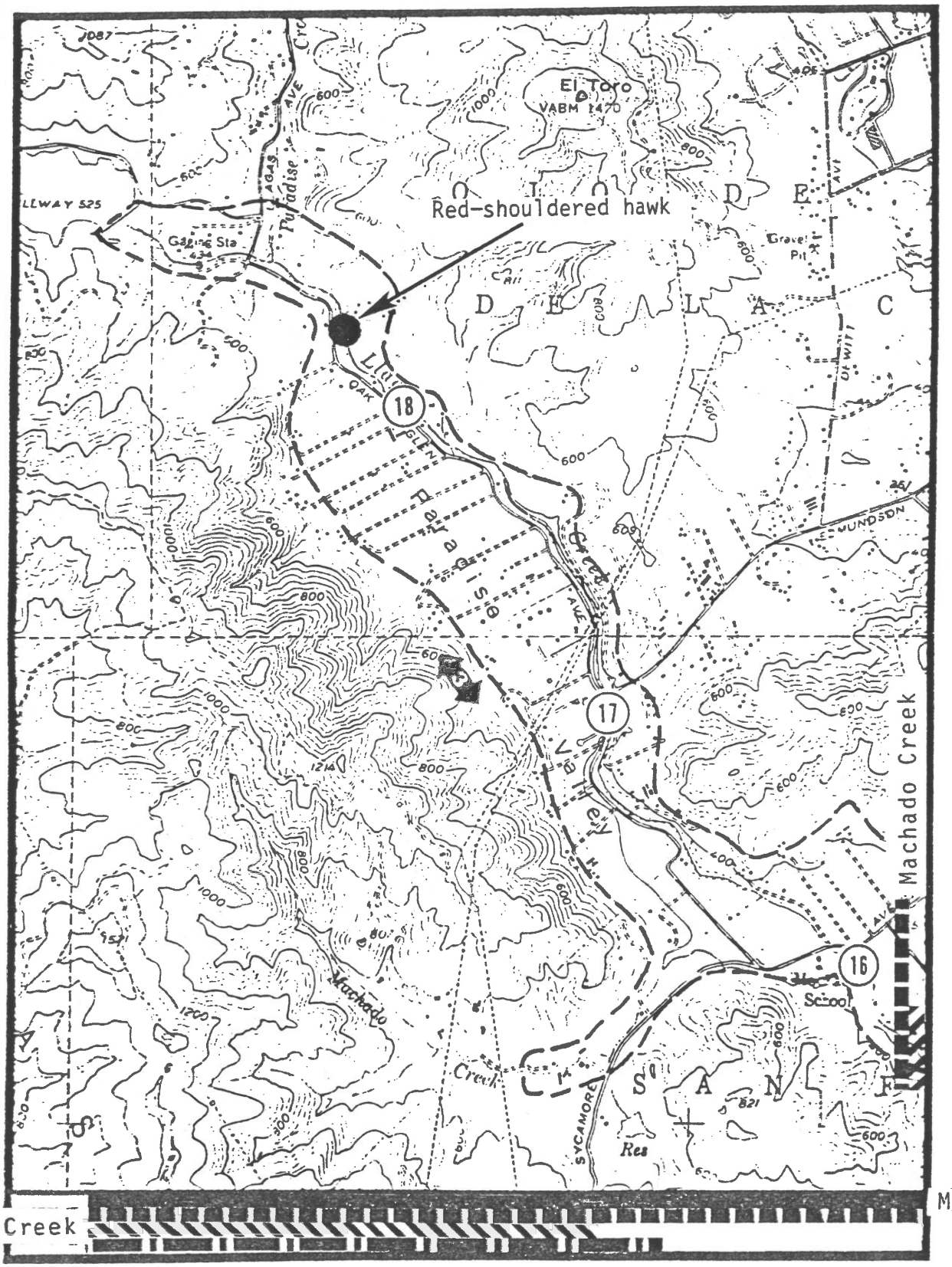


Plate LC-6

Millers Canal

CHITTENDEN QUADRANGLE

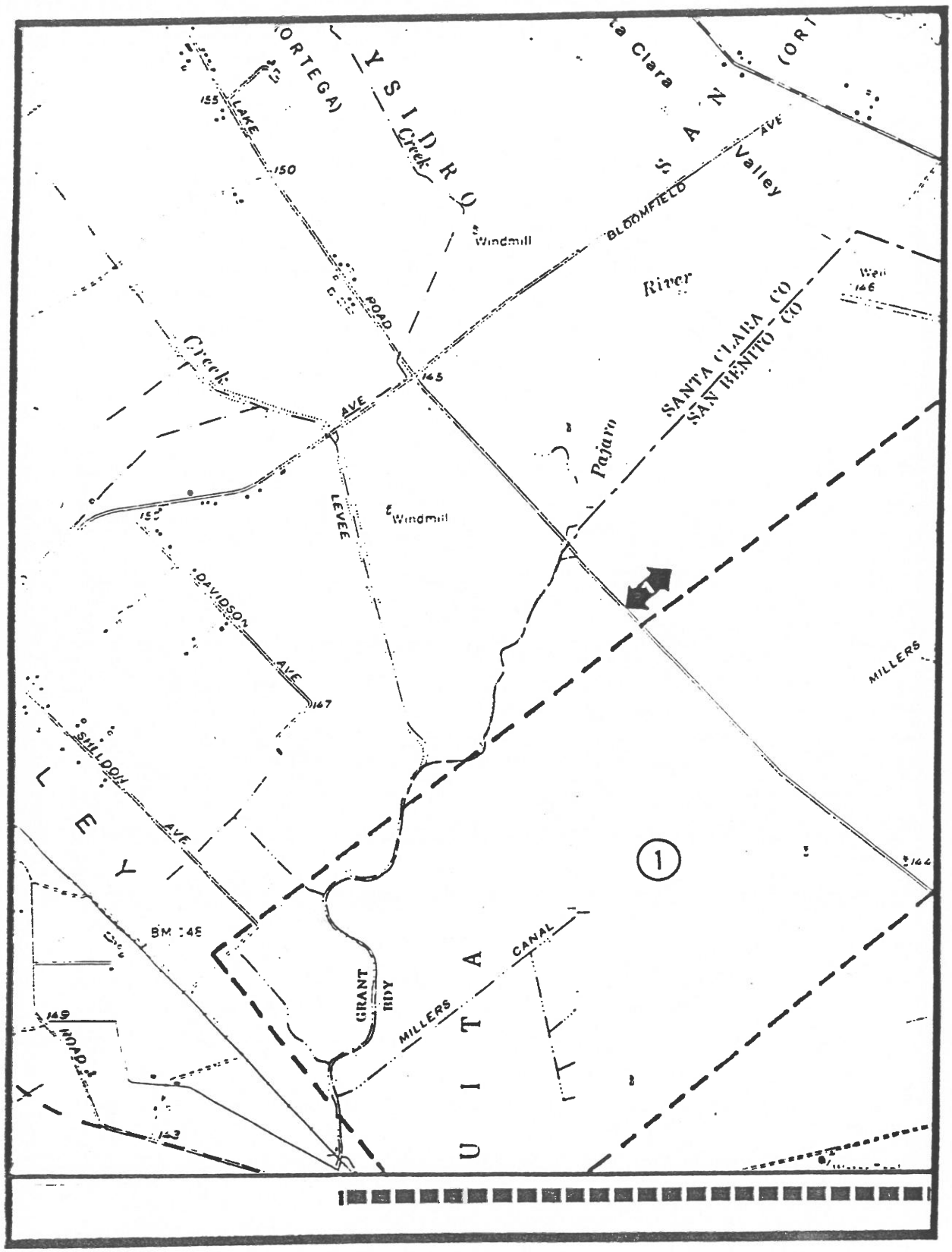


PLATE MC-1

Millers Canal

San Felipe Quadrangle

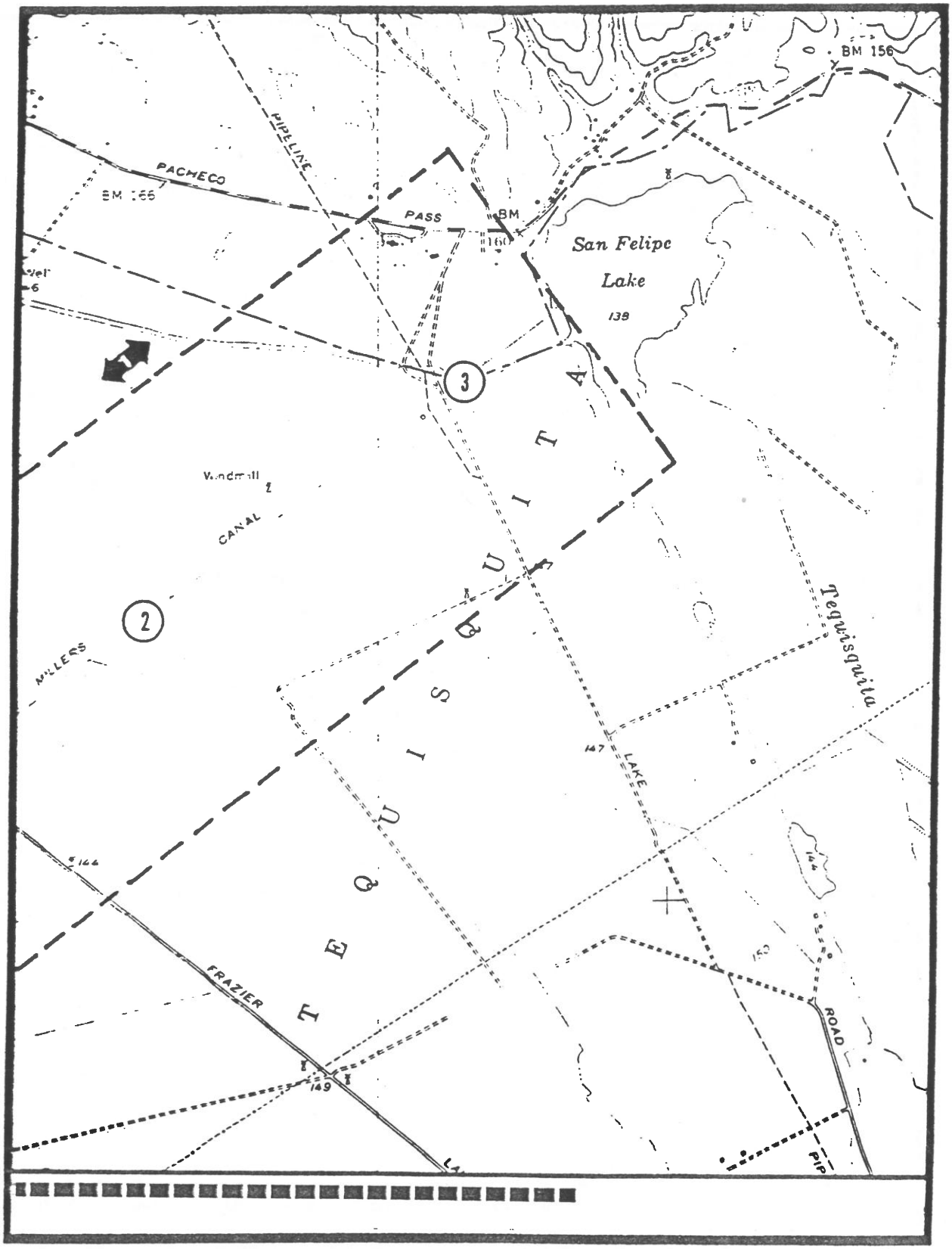


PLATE MC-2

San Felipe Lake

San Felipe Quadrangle

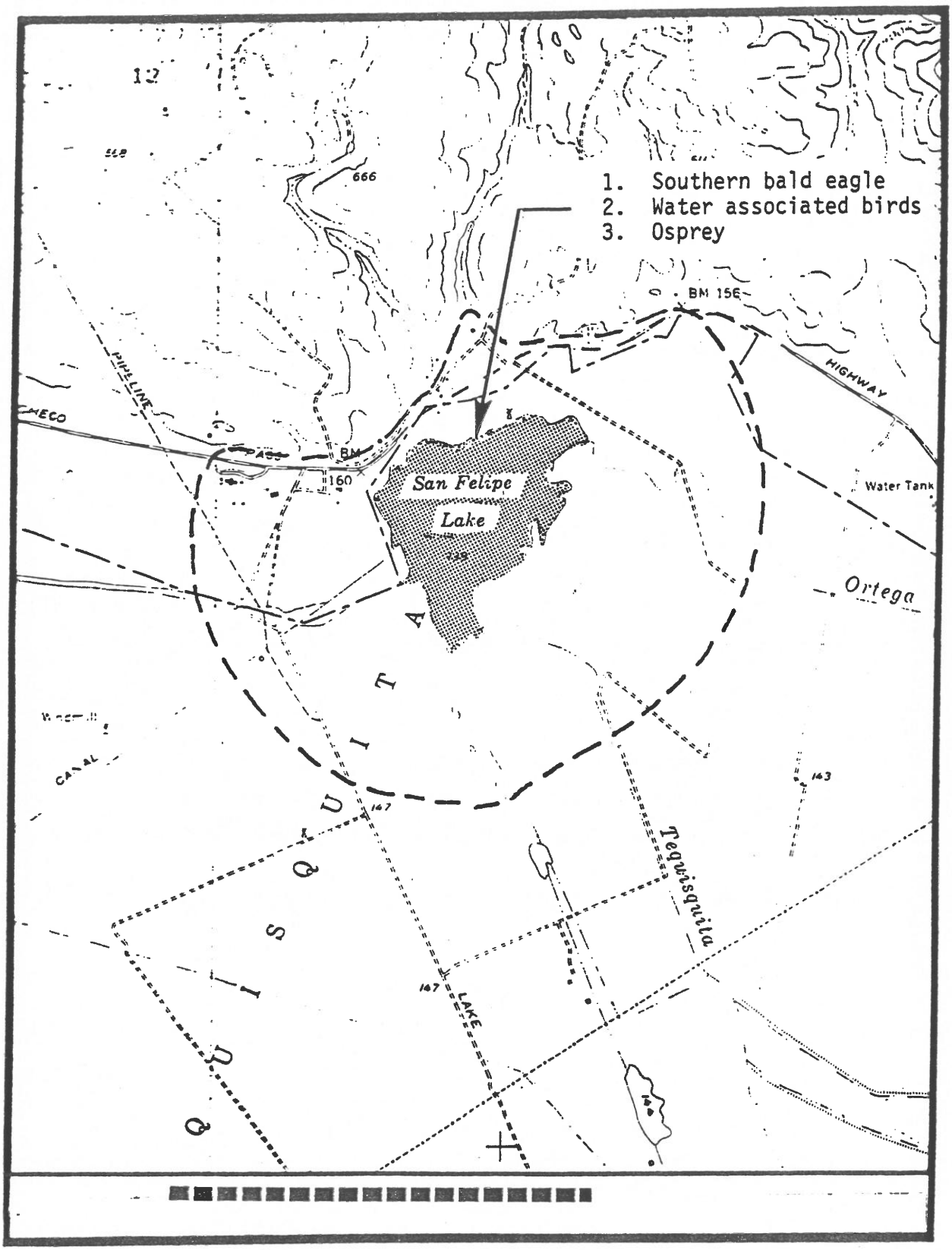


Plate SF-1

Pacheco Creek

San Felipe Quadrangle

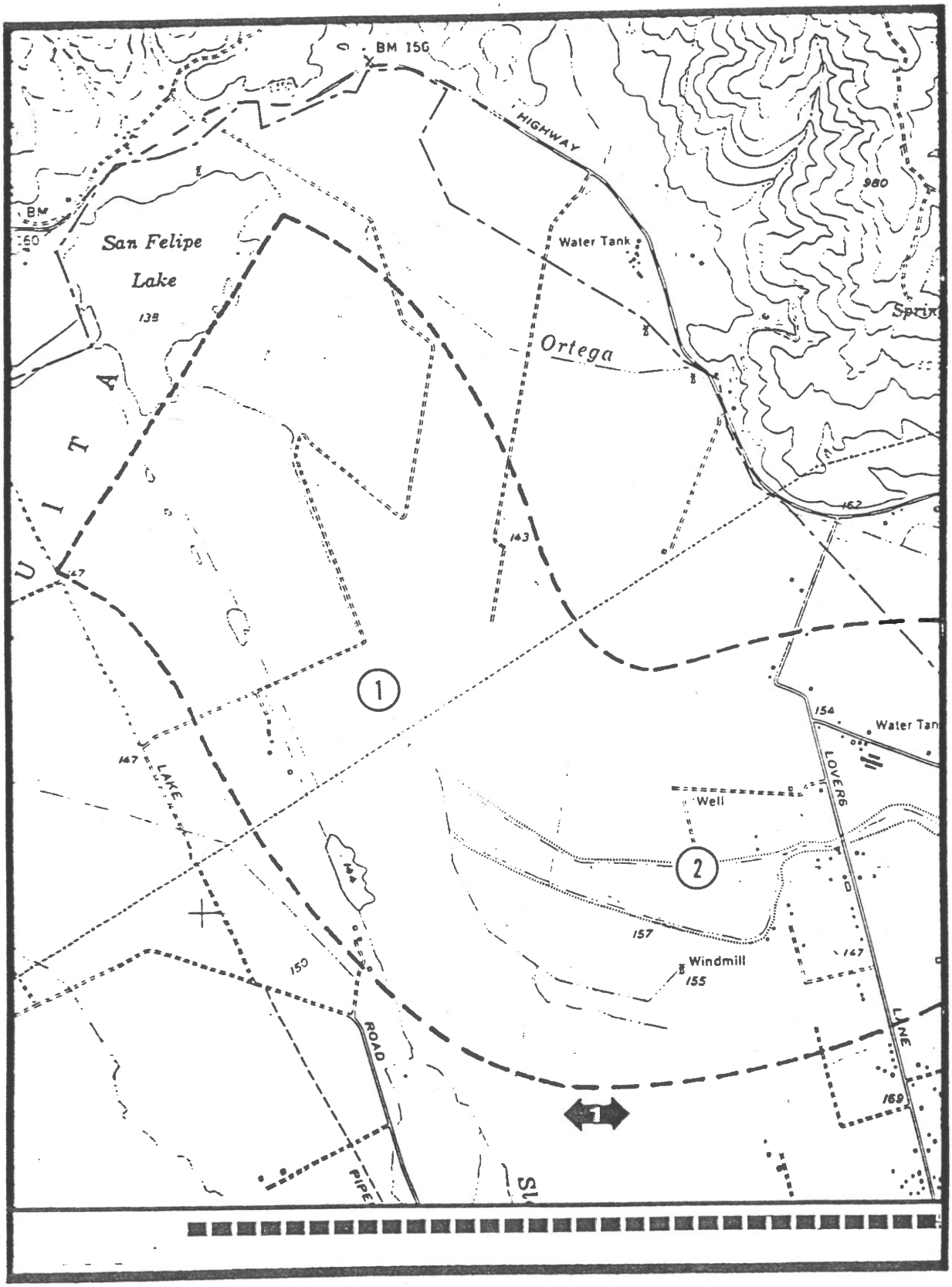


PLATE PA-1

Pacheco Creek
SAN FELIPE QUADRANGLE

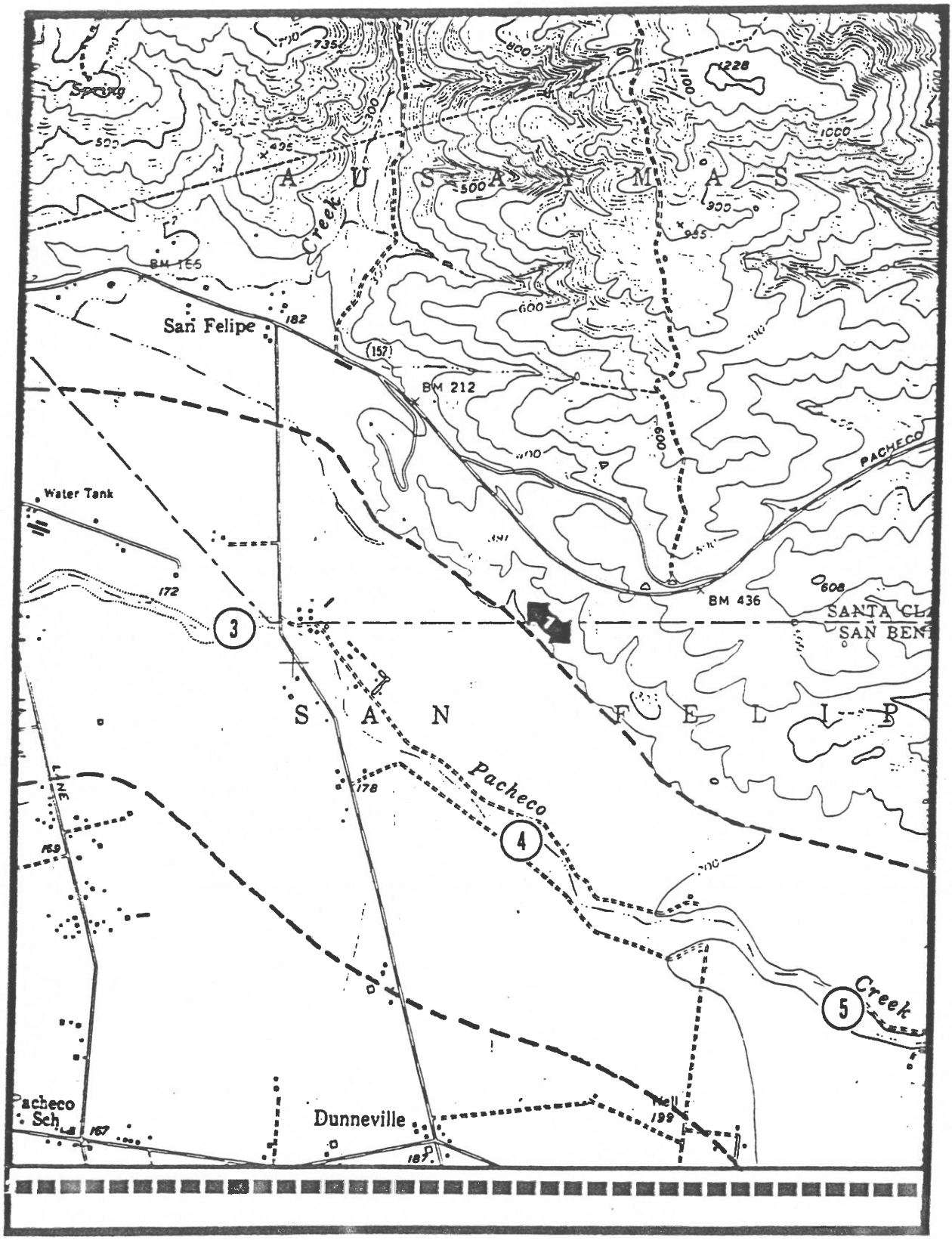


PLATE PA-2

Pacheco Creek

THREE SISTERS QUADRANGLE

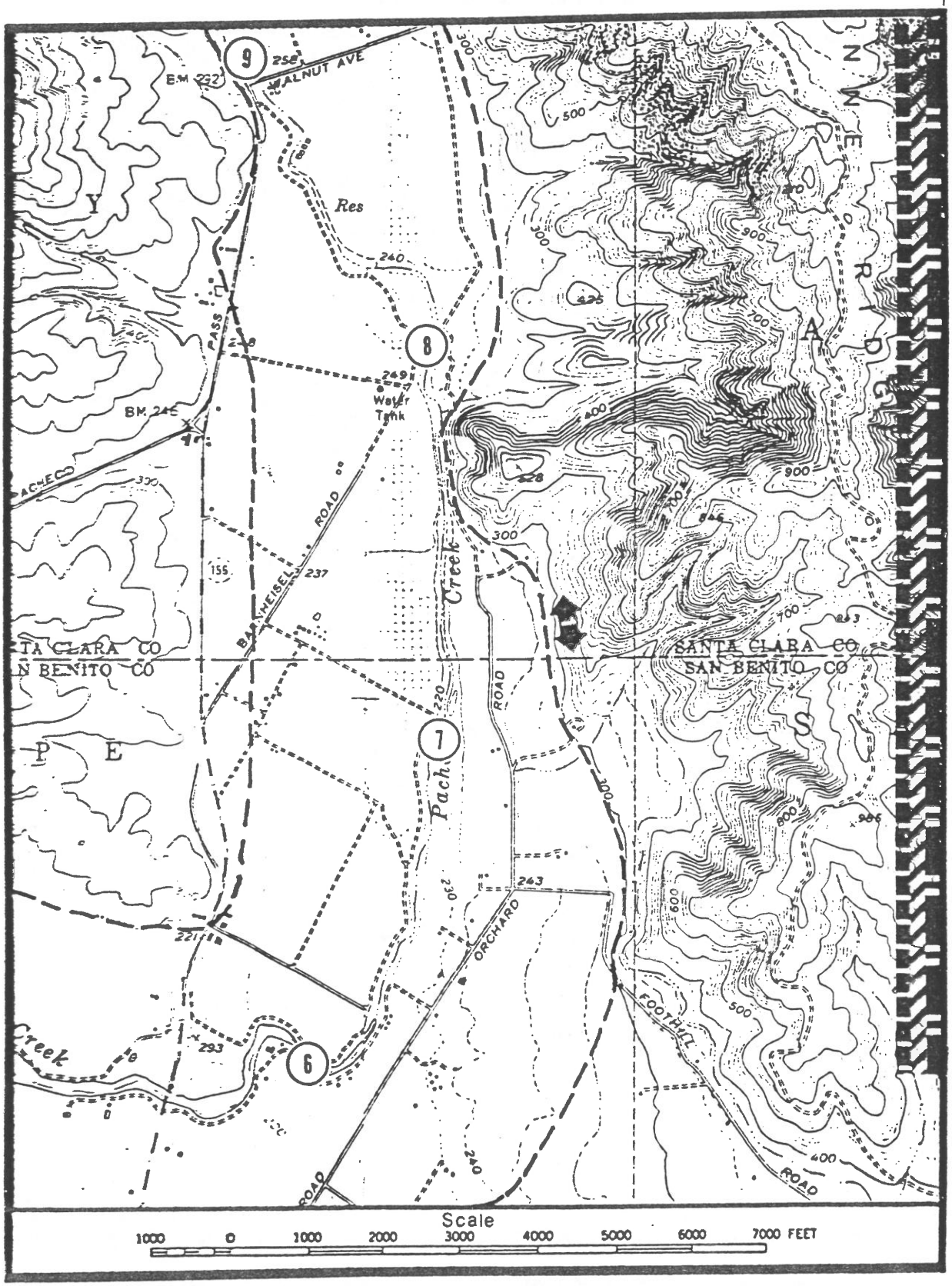


PLATE PA-3

Pacheco Creek

Pacheco Peak Quadrangle

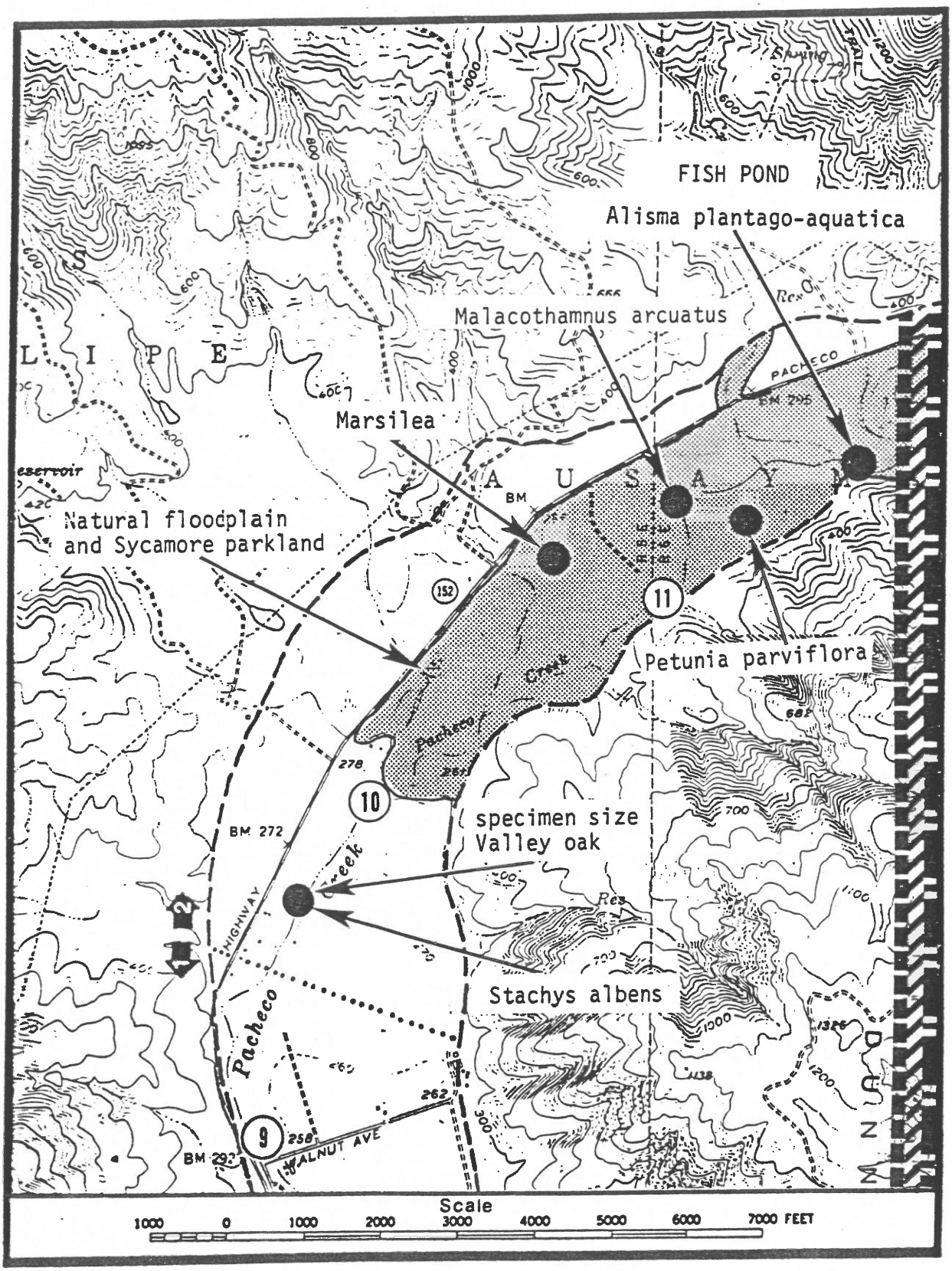


Plate PA-4

Pacheco Creek

PACHECO PEAK QUADRANGLE

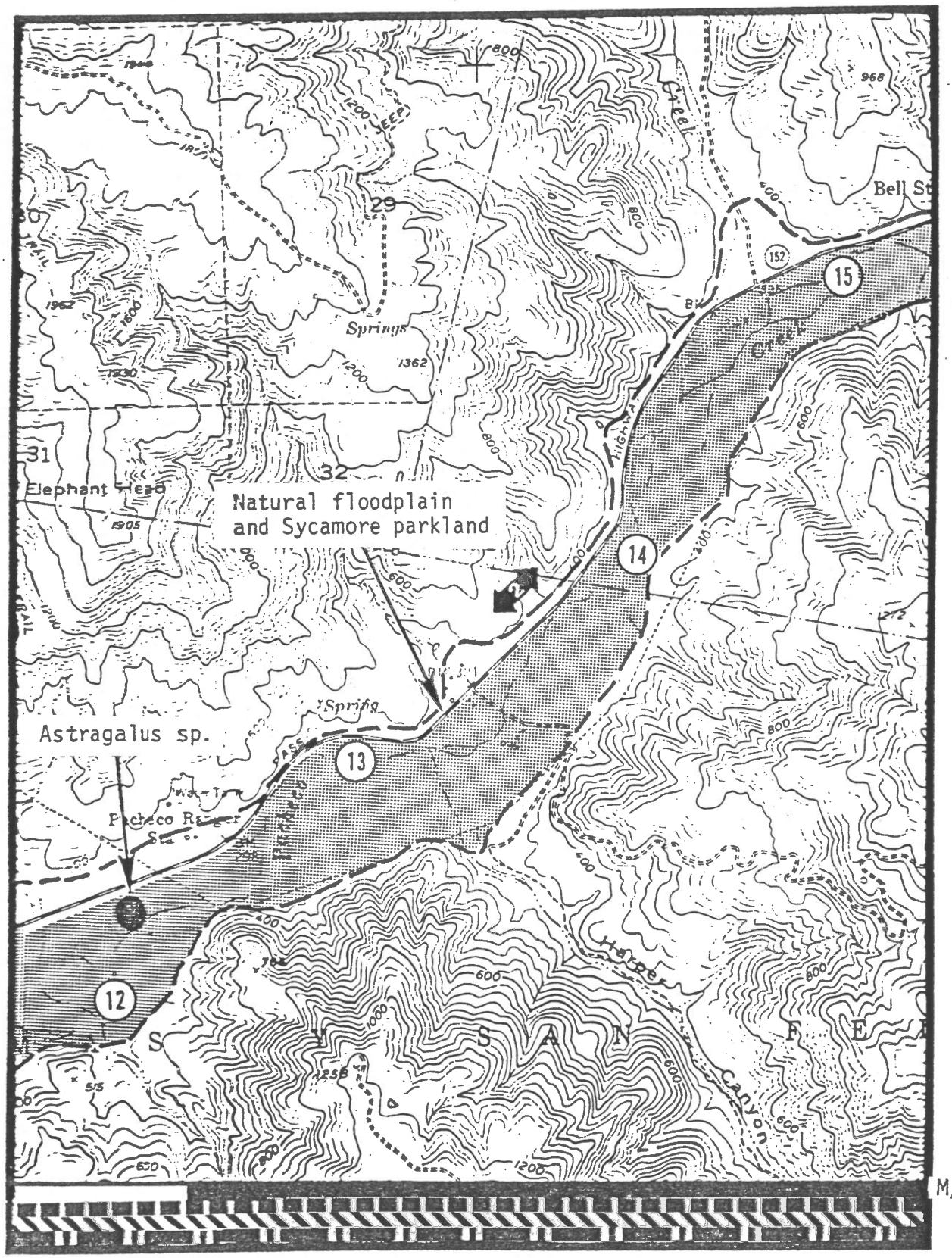


PLATE PA-5

Pacheco Creek

Pacheco Peak Quadrangle

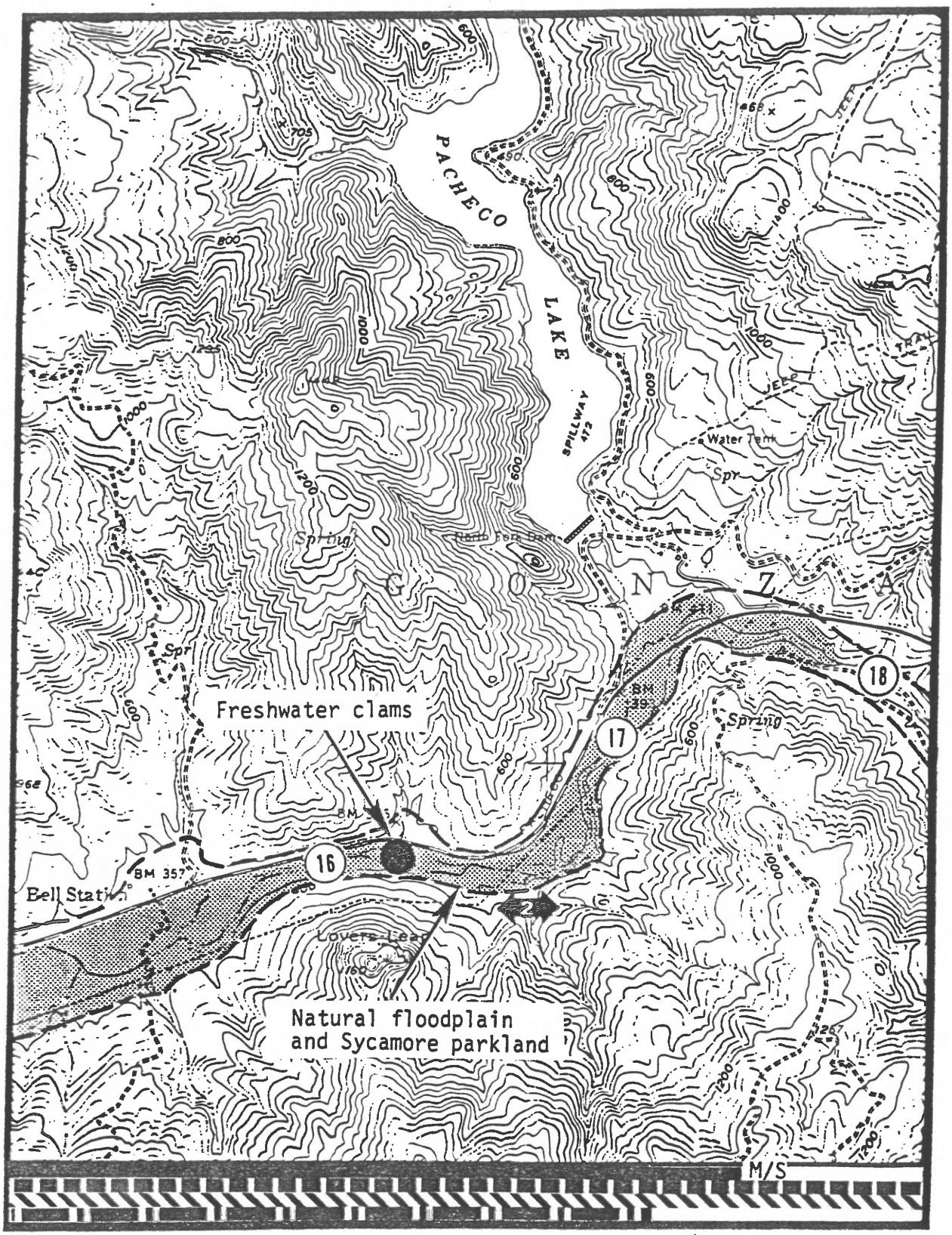


Plate PA-6

Pacheco Creek

Pacheco Peak Quadrangle

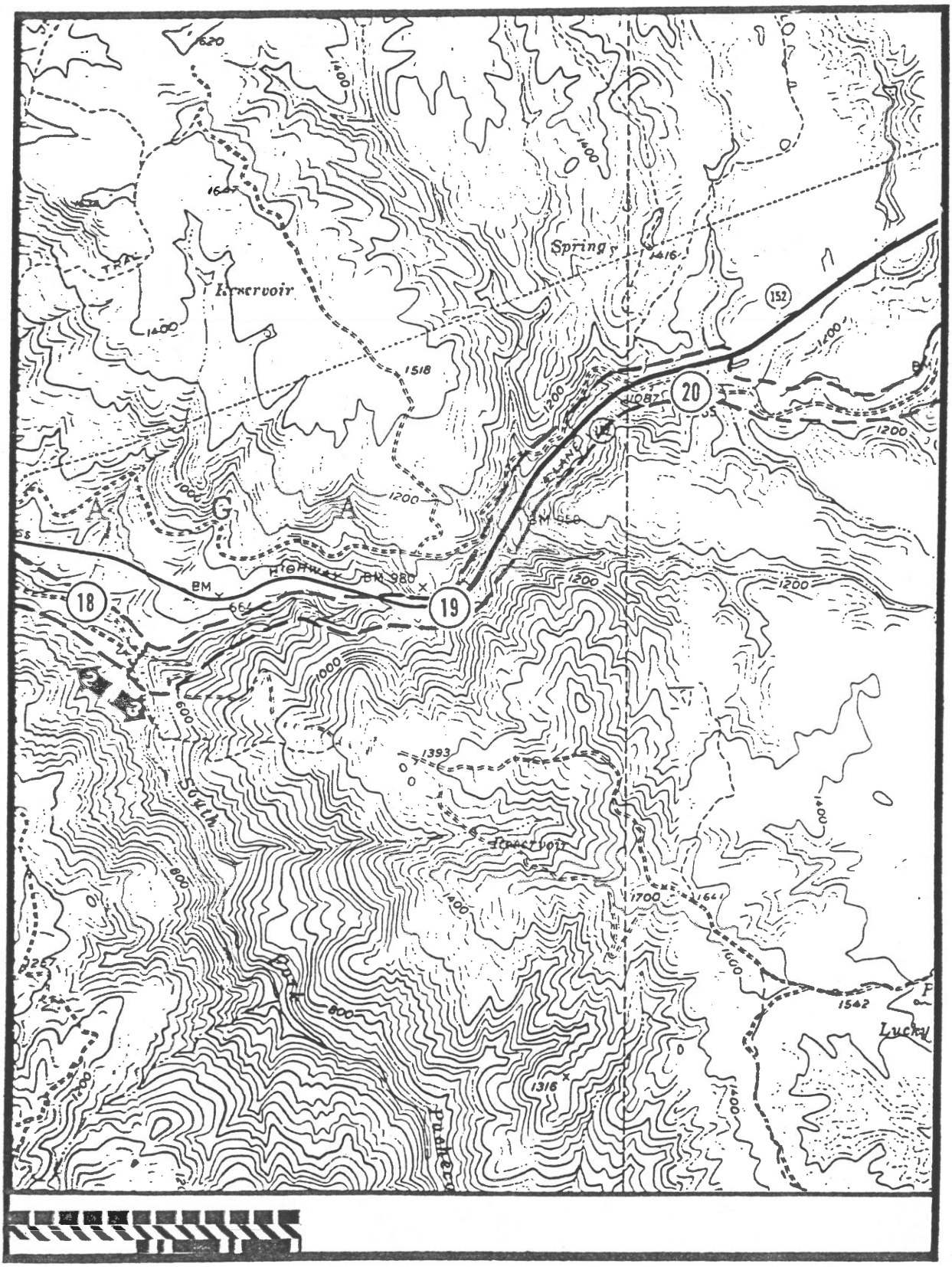


Plate PA-7

Pacheco Creek

Pacheco Pass Quadrangle

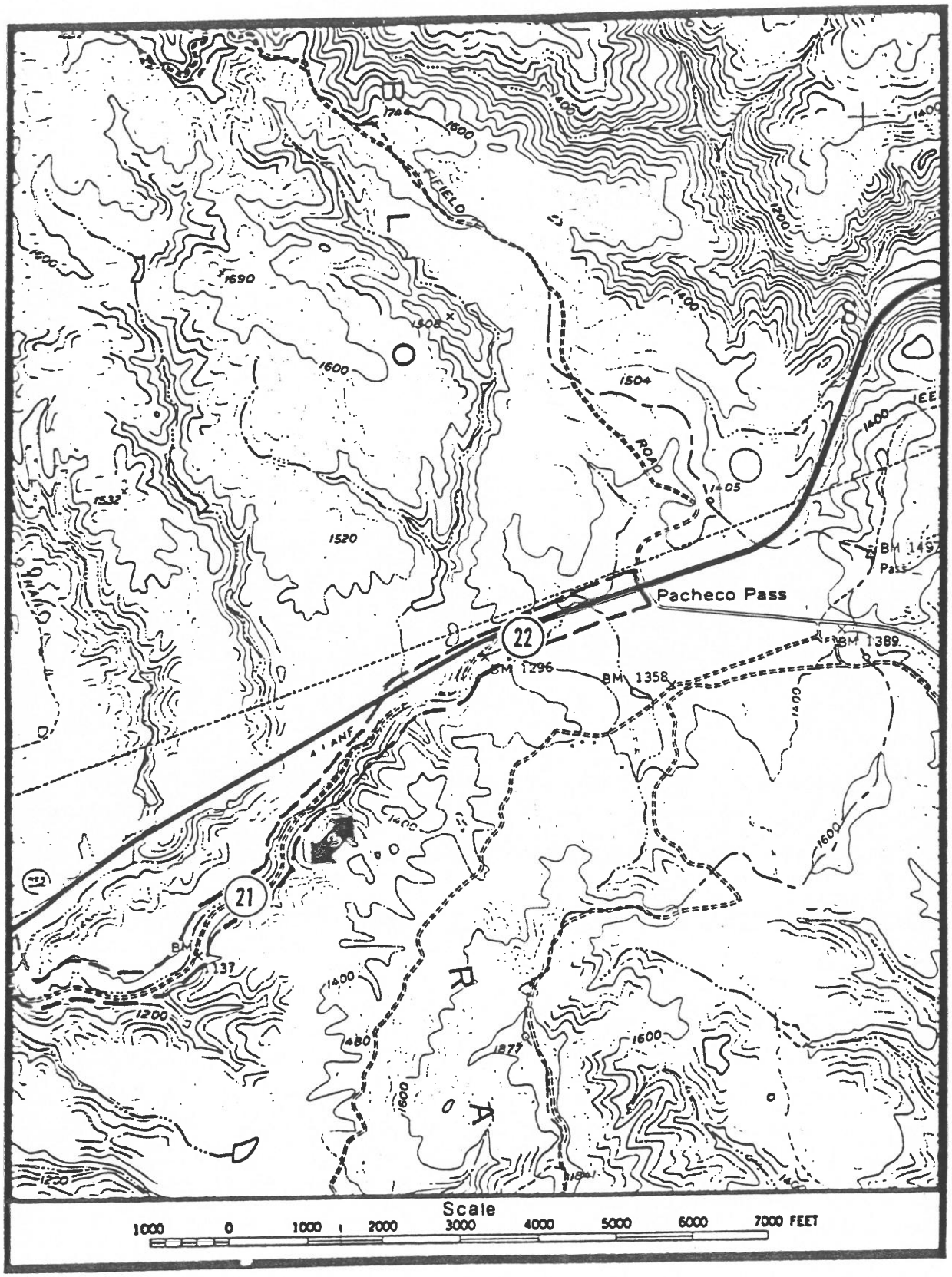


PLATE PA-8

Cedar Creek

Pacheco Peak Quadrangle

T/S

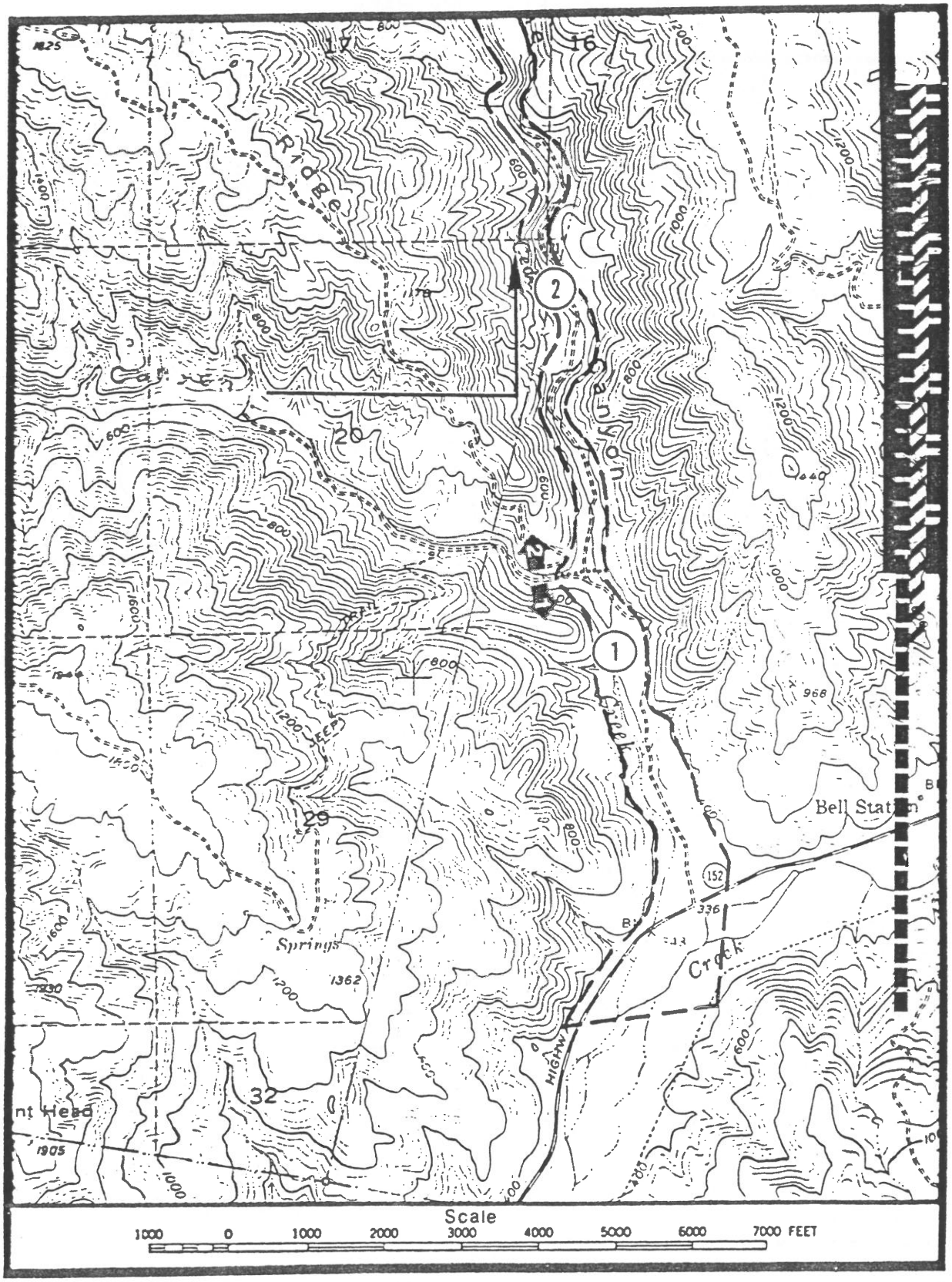


Plate CE-1

Cedar Creek

Pacheco Peak Quadrangle

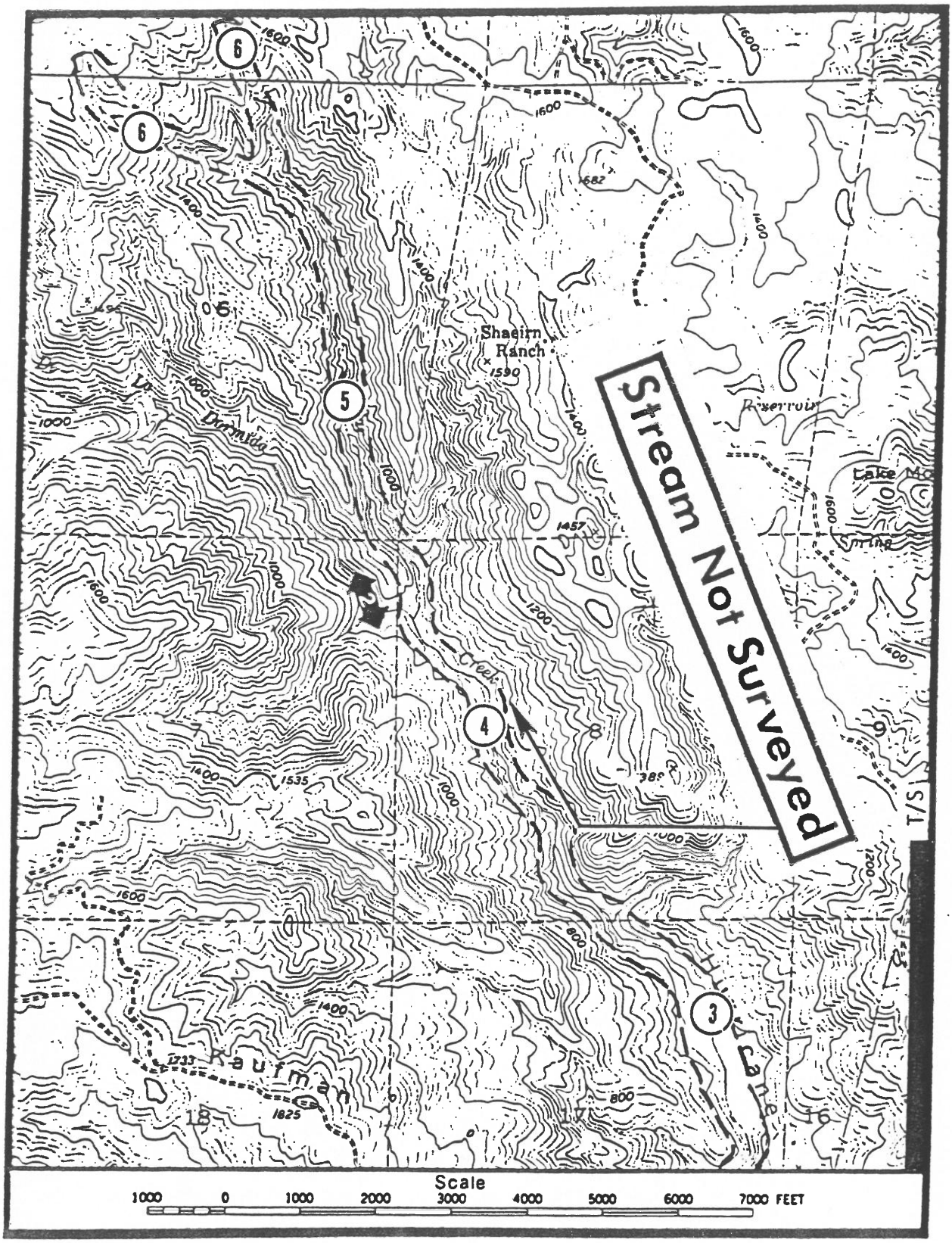


Plate CE-2

No. Fork Pacheco Creek

Pacheco Peak Quadrangle

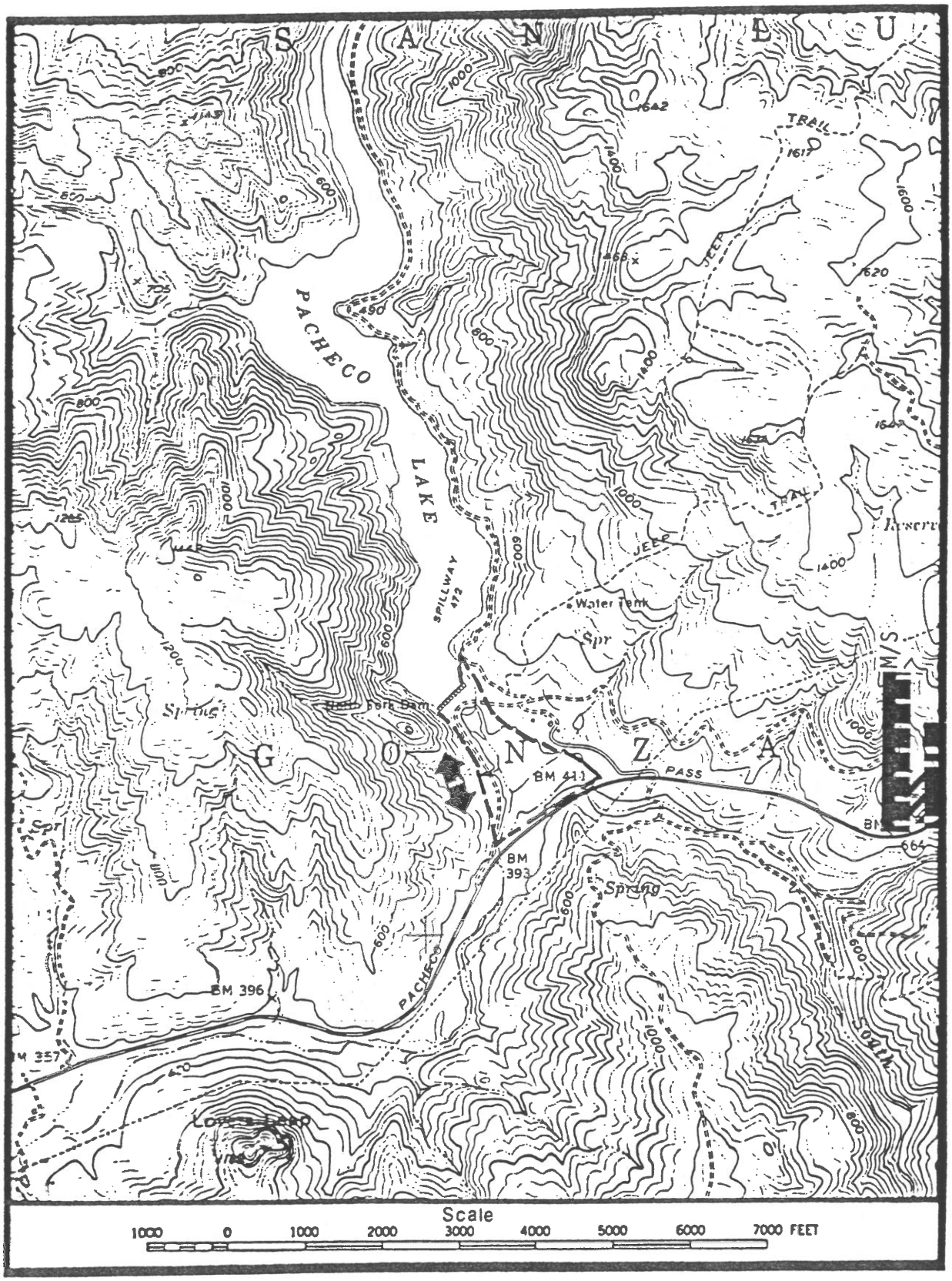


PLATE NP-1

South Fork Pacheco Creek

Pacheco Peak Quadrangle

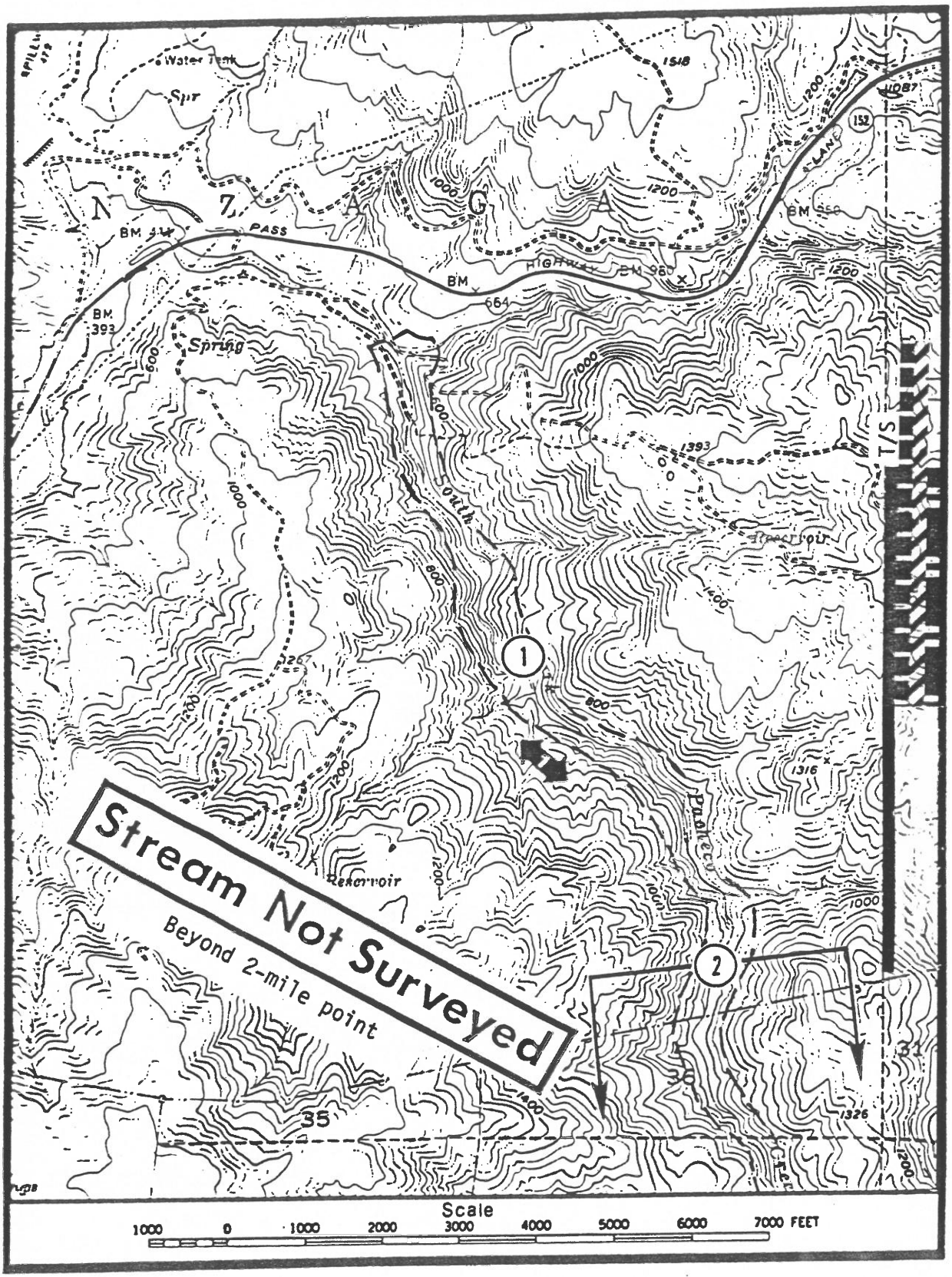


PLATE SP-1

South Fork Pacheco Creek

Three Sisters Quadrangle

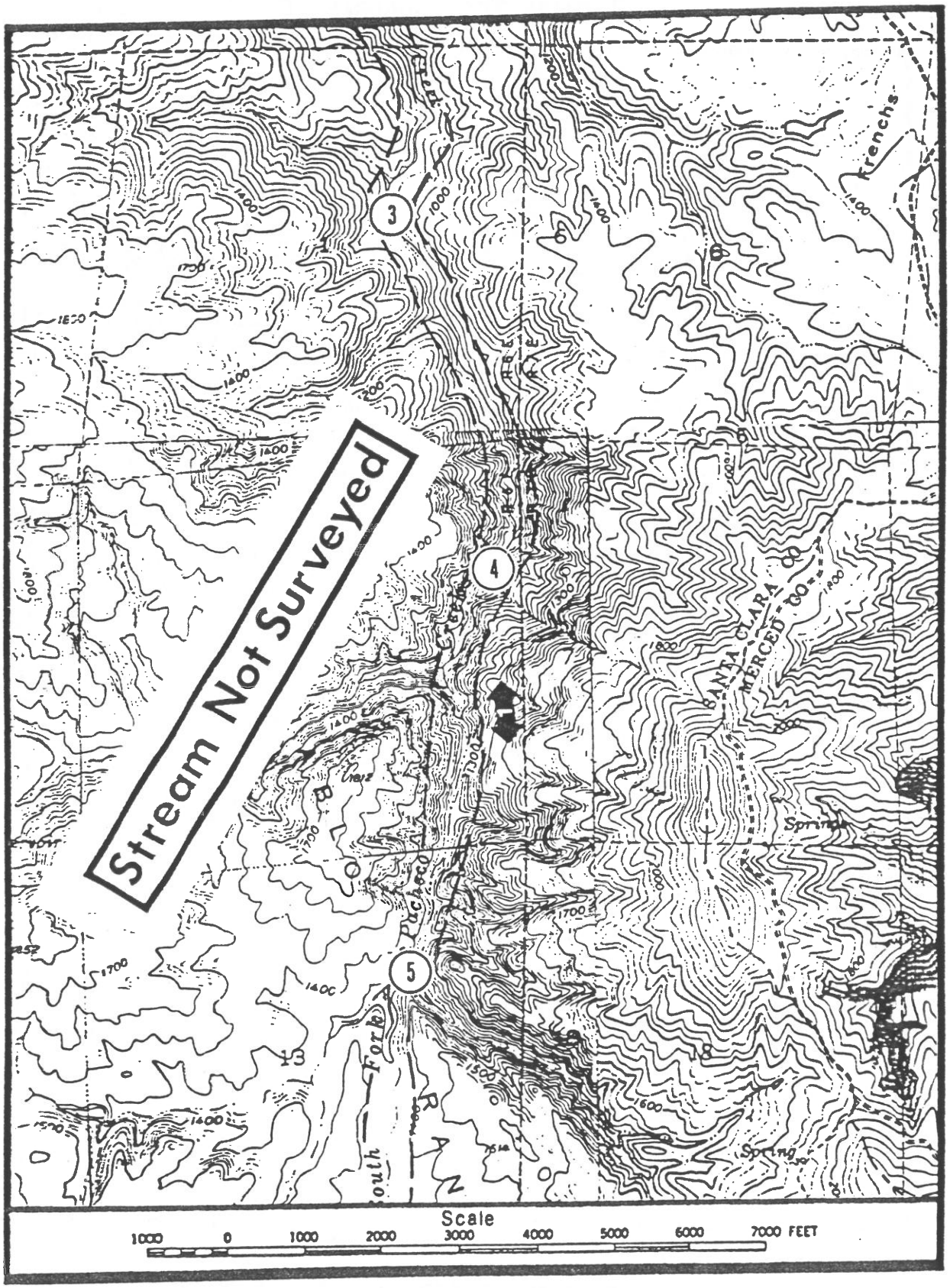


Plate SP-2

South Fork Pacheco Creek

Three Sisters Quadrangle

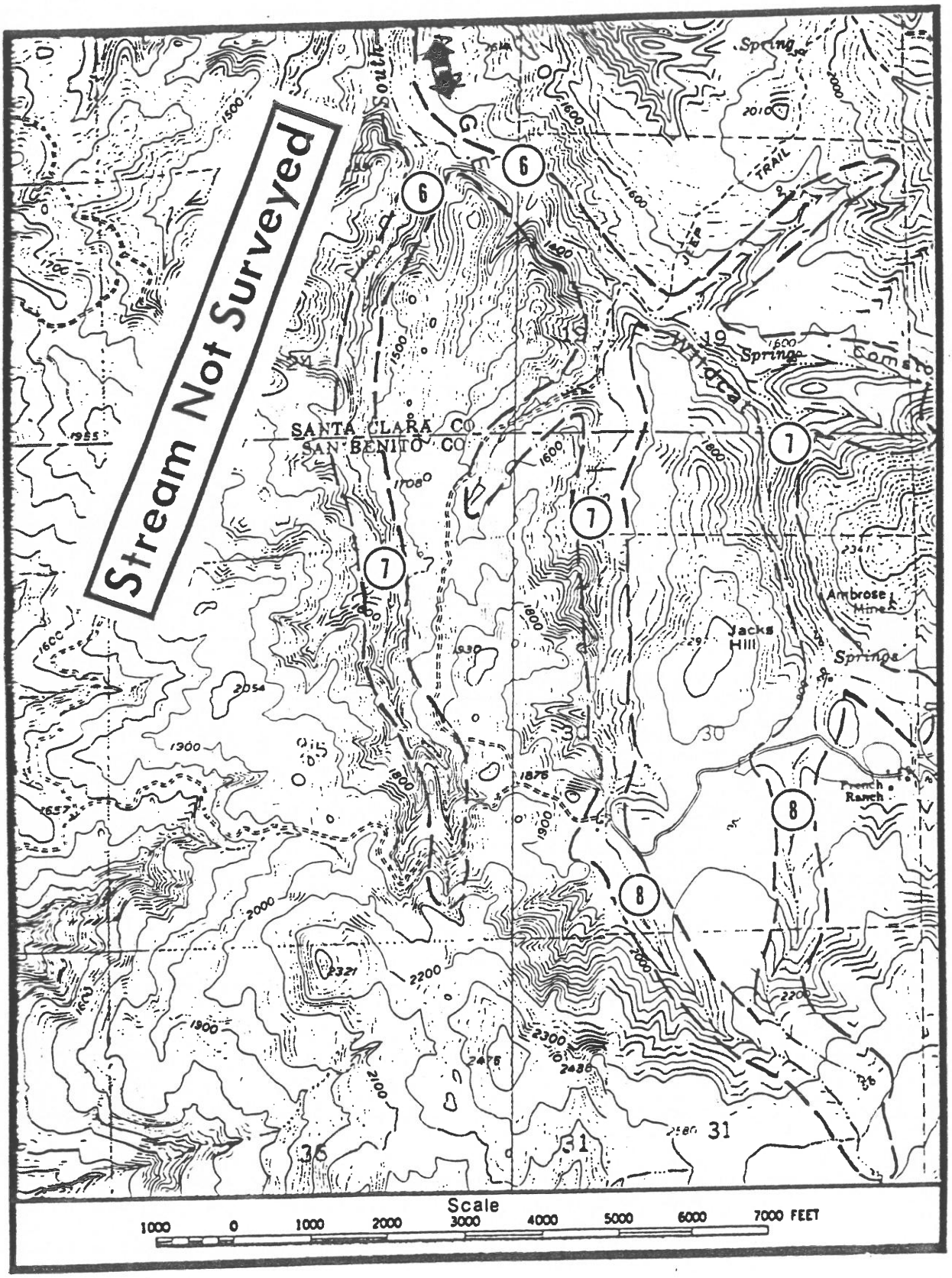


Plate SP-3

Tequisquita Slough

San Felipe Quadrangle

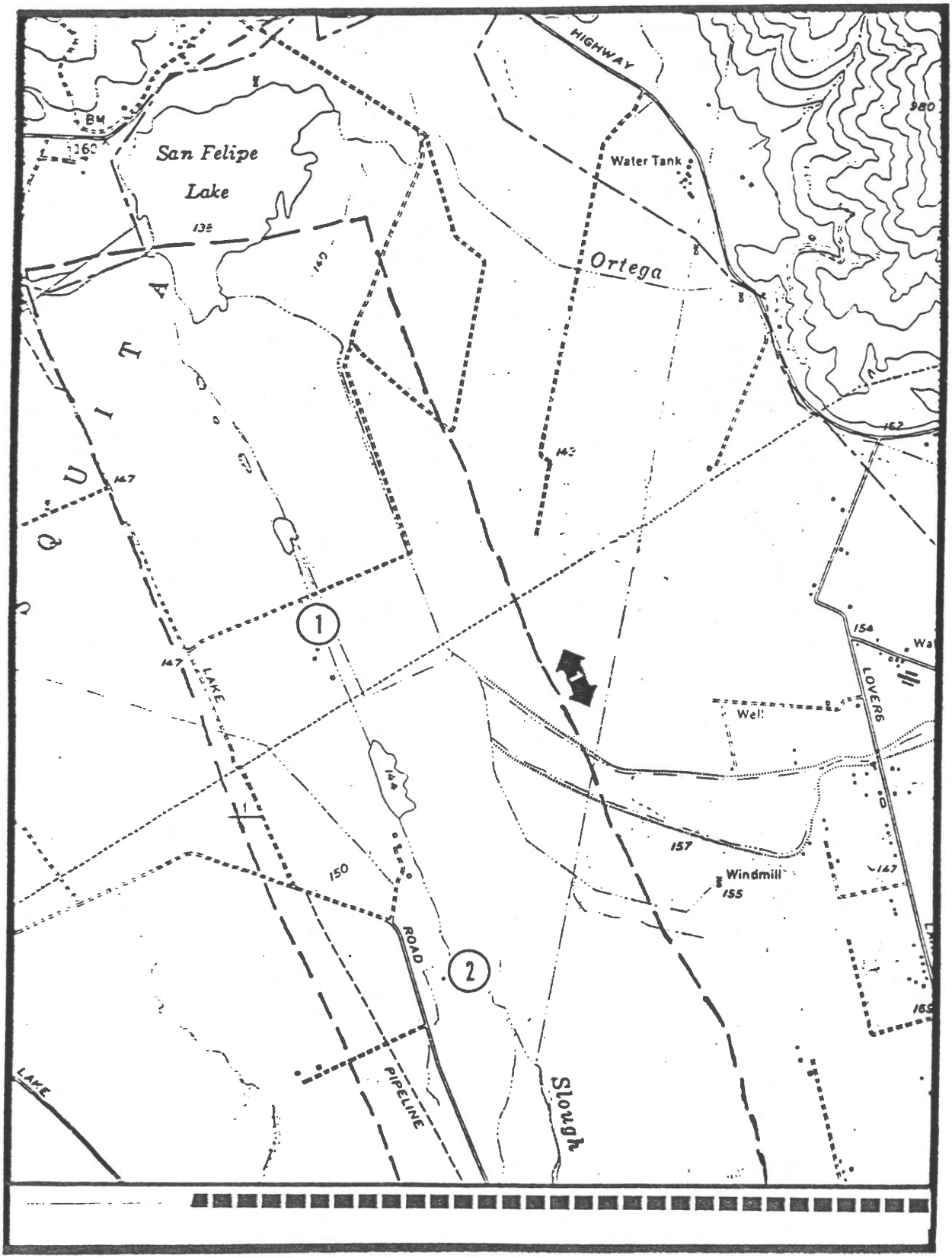


Plate TS-1

Tequisquita Slough

San Felipe Quadrangle

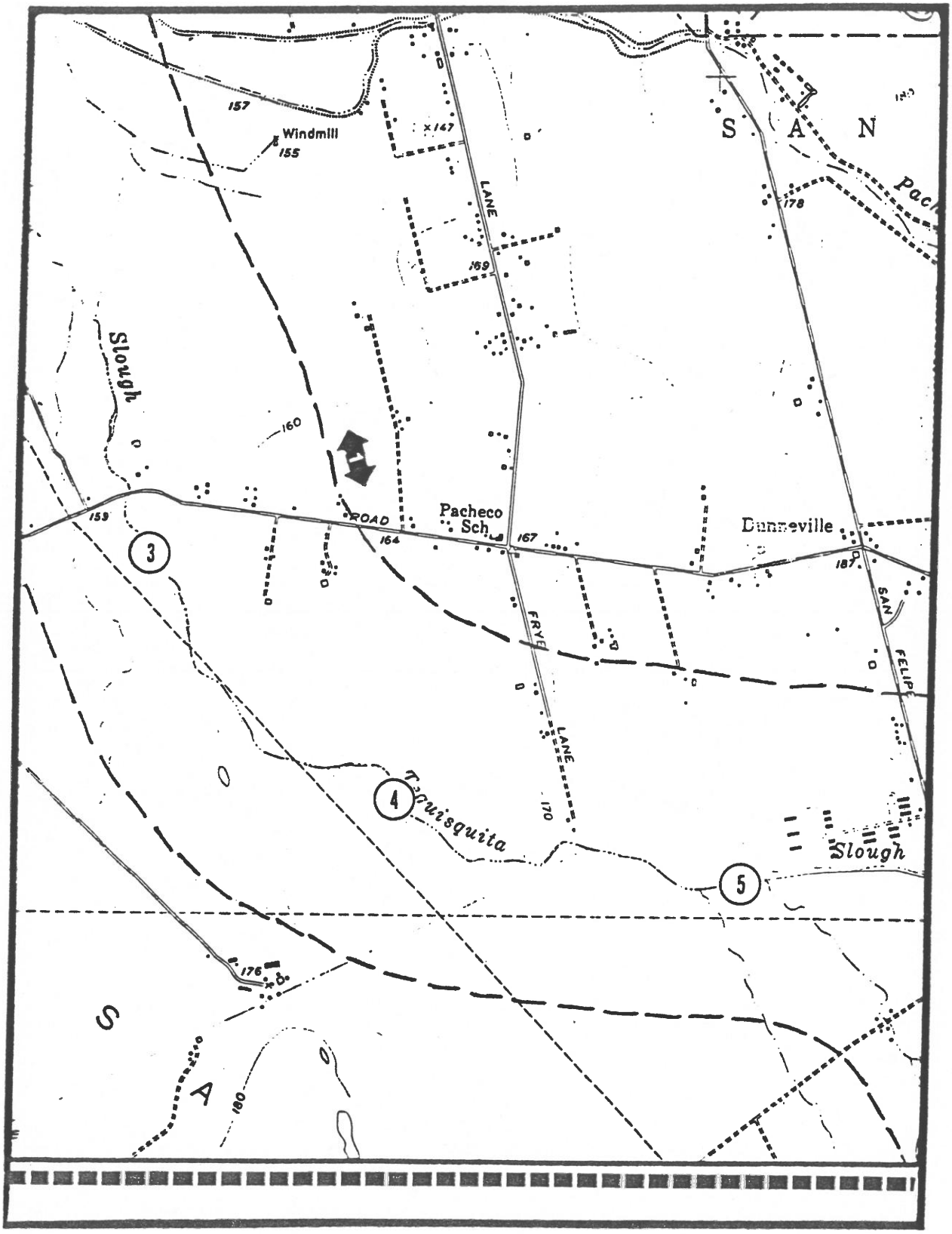


PLATE TS-2

Tequisquita Slough

SAN FELIPE QUADRANGLE

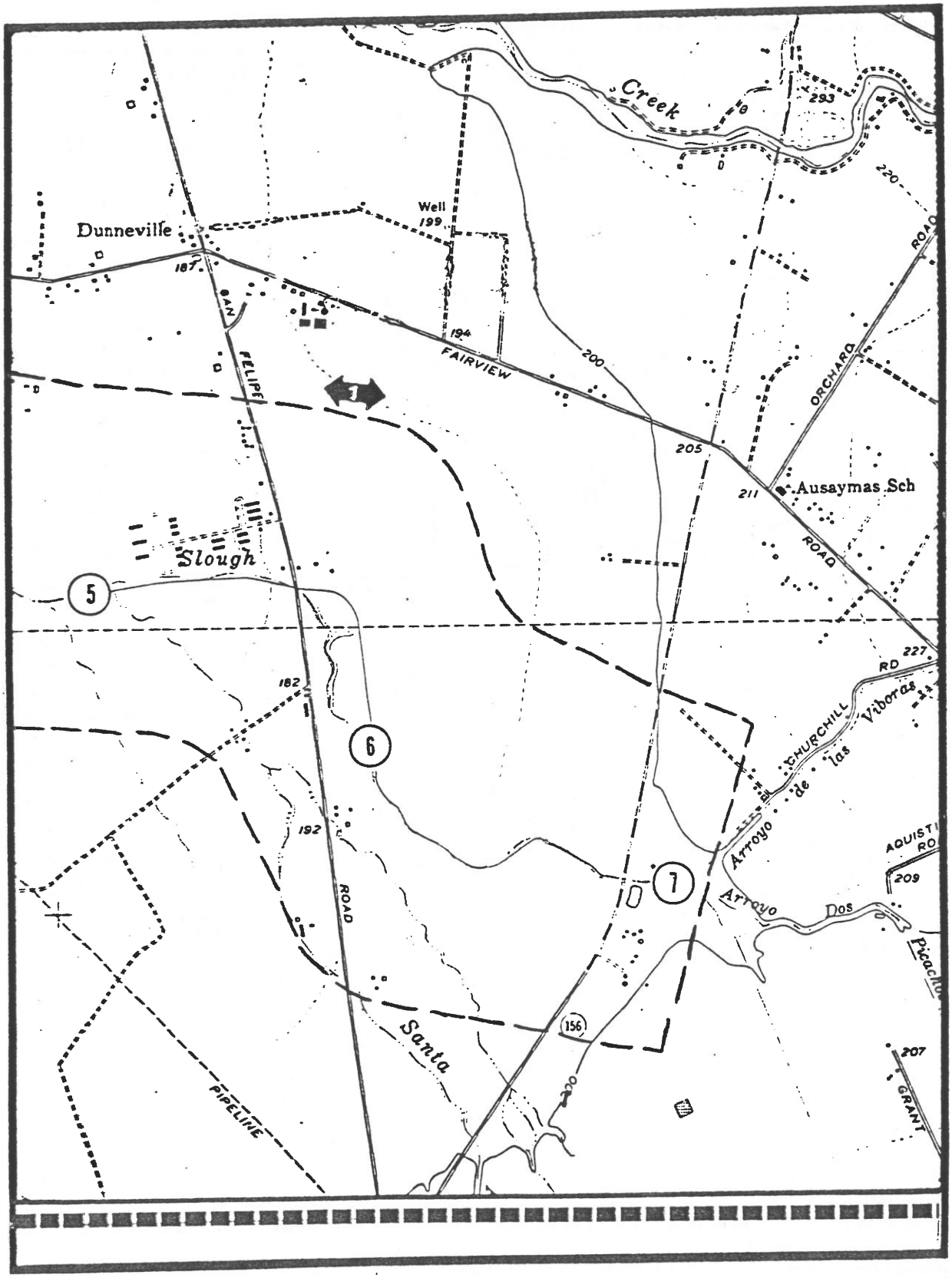


PLATE TS-3

Arroyo Dos Picachos

San Felipe Quadrangle

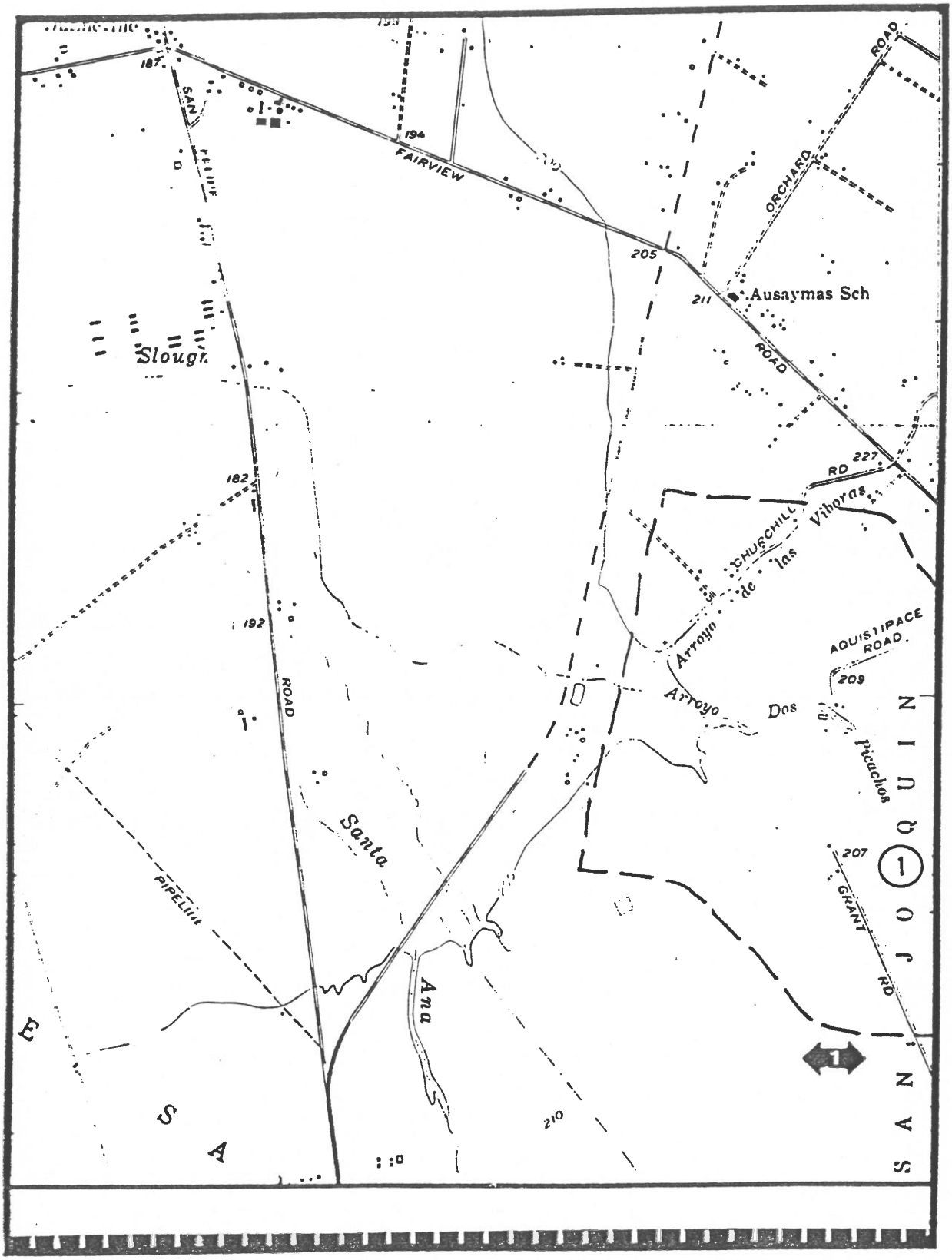


Plate AP-1

Arroyo Dos Picachos

Three Sisters Quadrangle

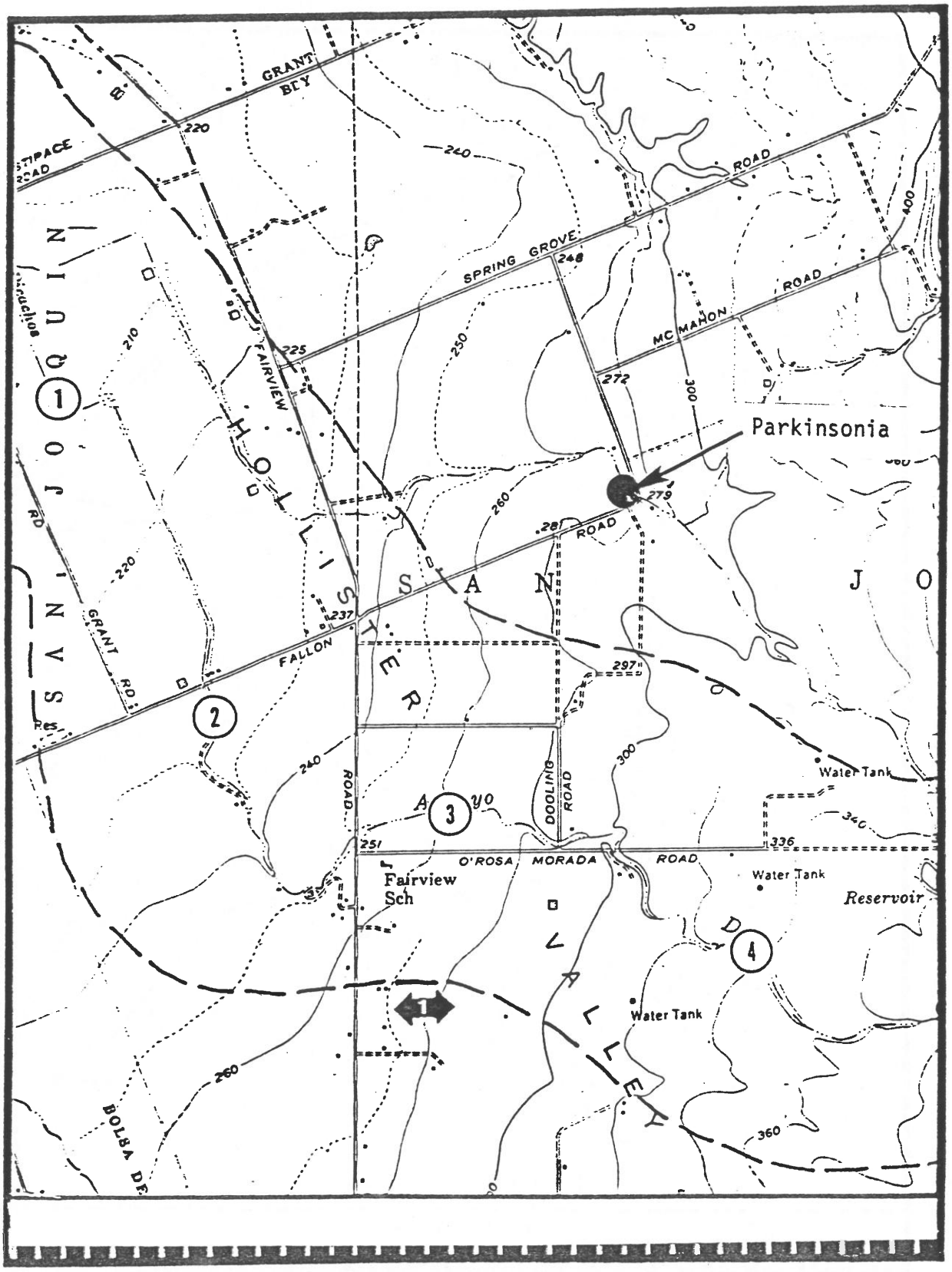


PLATE AP-2

Arroyo Dos Picachos

Three Sisters Quadrangle

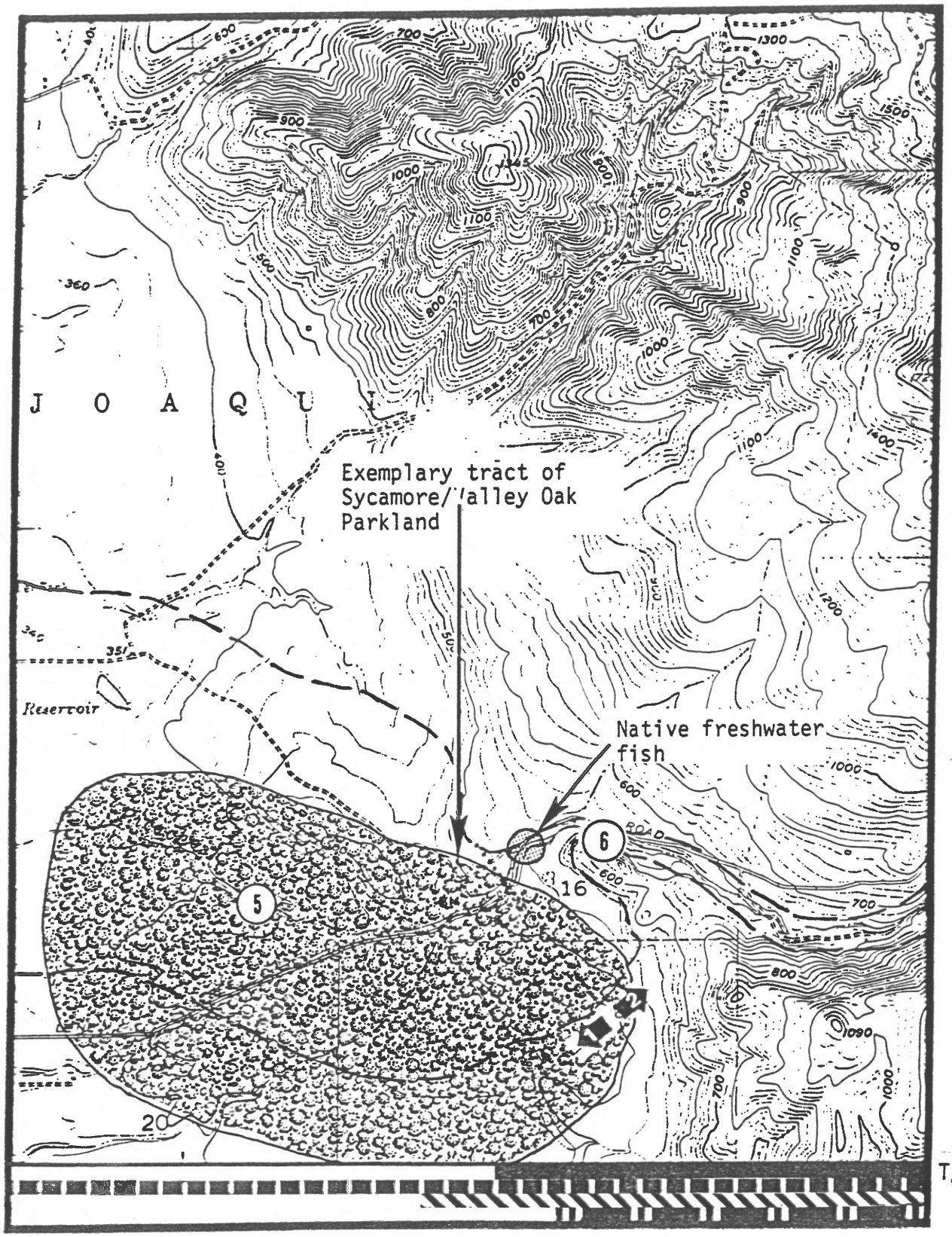


Plate AP-3

Arroyo Dos Picachos

Three Sisters Quadrangle

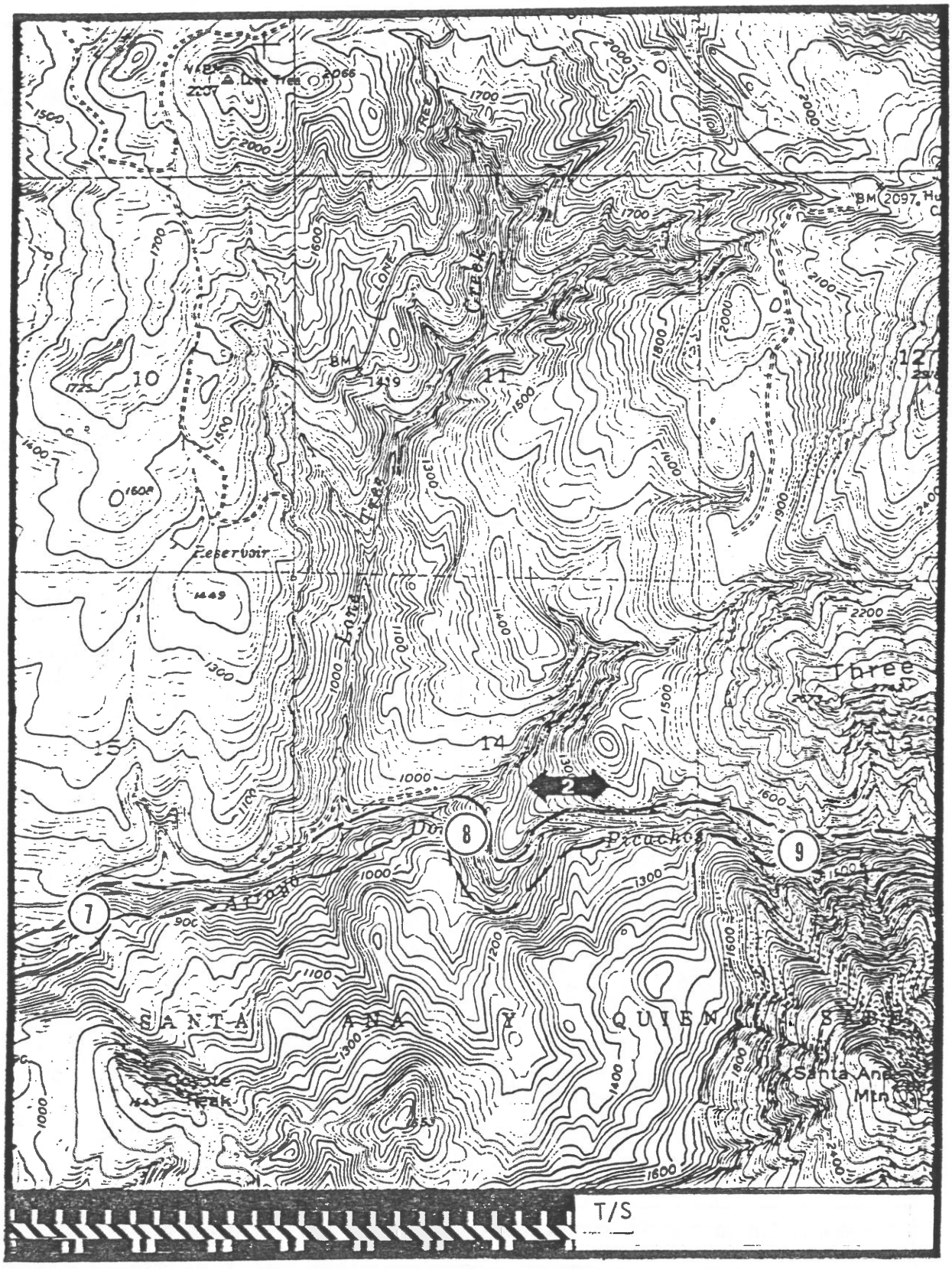


Plate AP-4

Arroyo Dos Picachos

Mariposa Peak Quadrangle

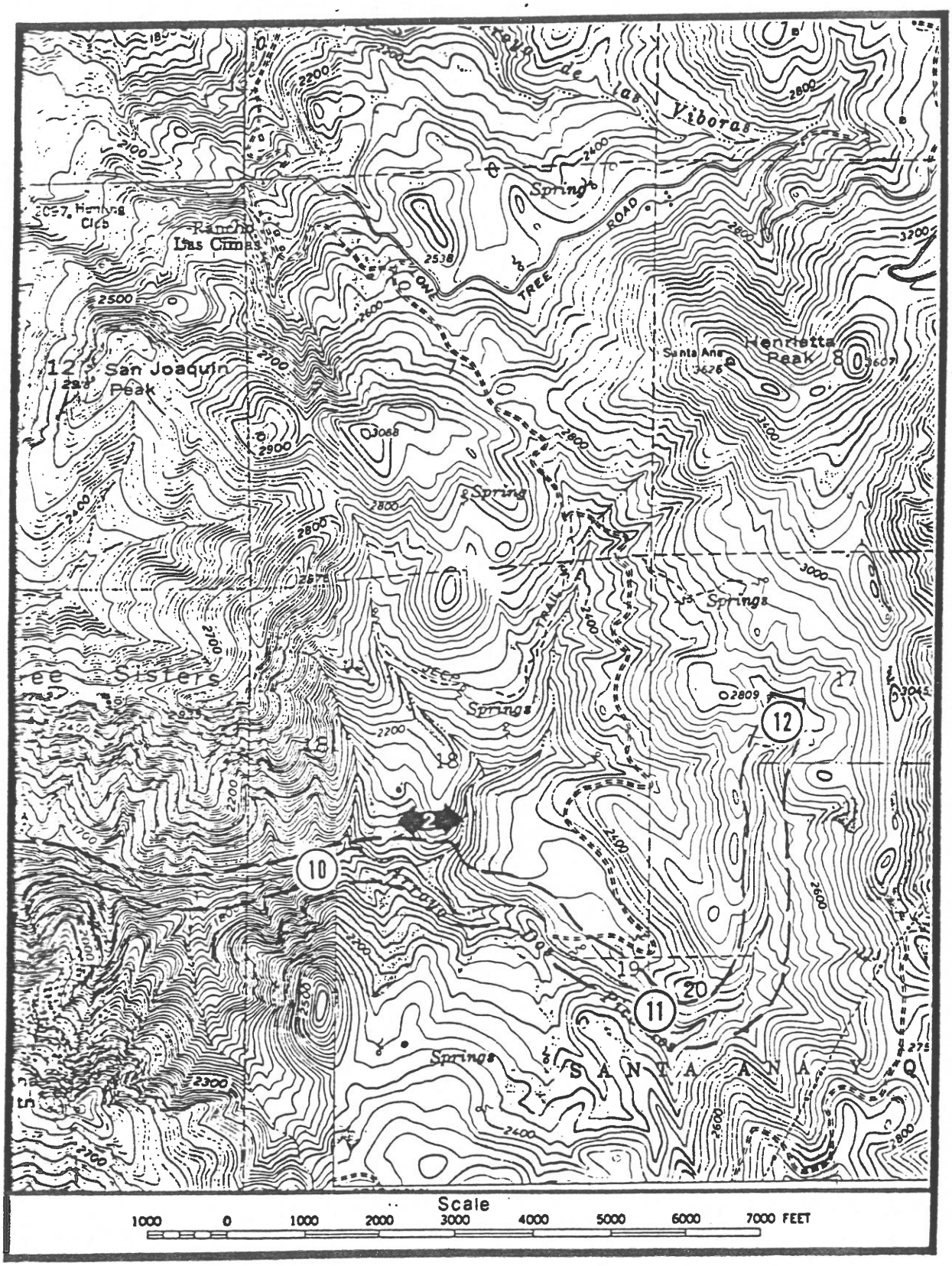


Plate AP-5

Arroyo de las Viboras

San Felipe Quadrangle

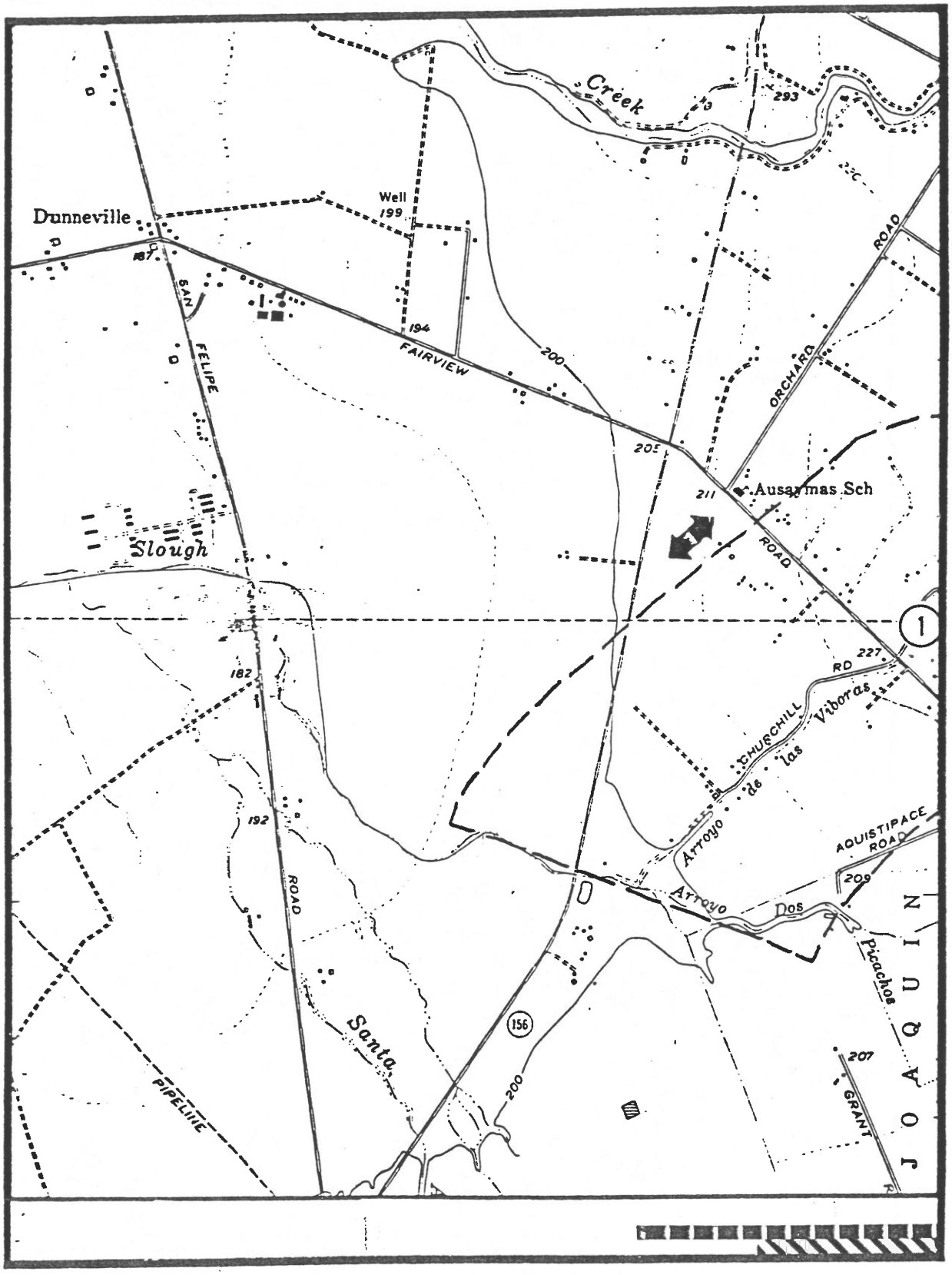


PLATE AV-1

Arroyo de las Viboras

THREE SISTERS QUADRANGLE

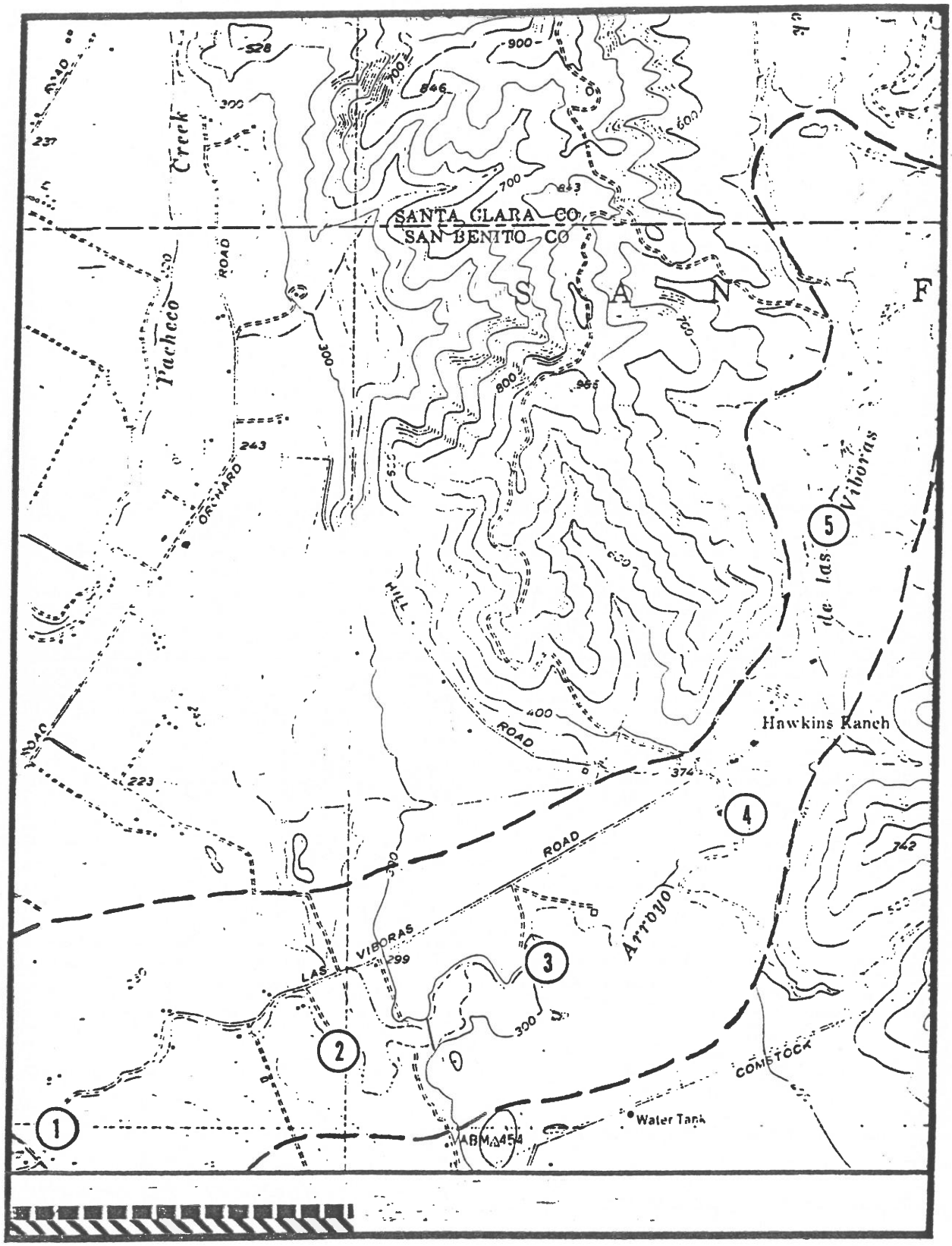


PLATE AV-2

Viboras

THREE SISTERS QUADRANGLE

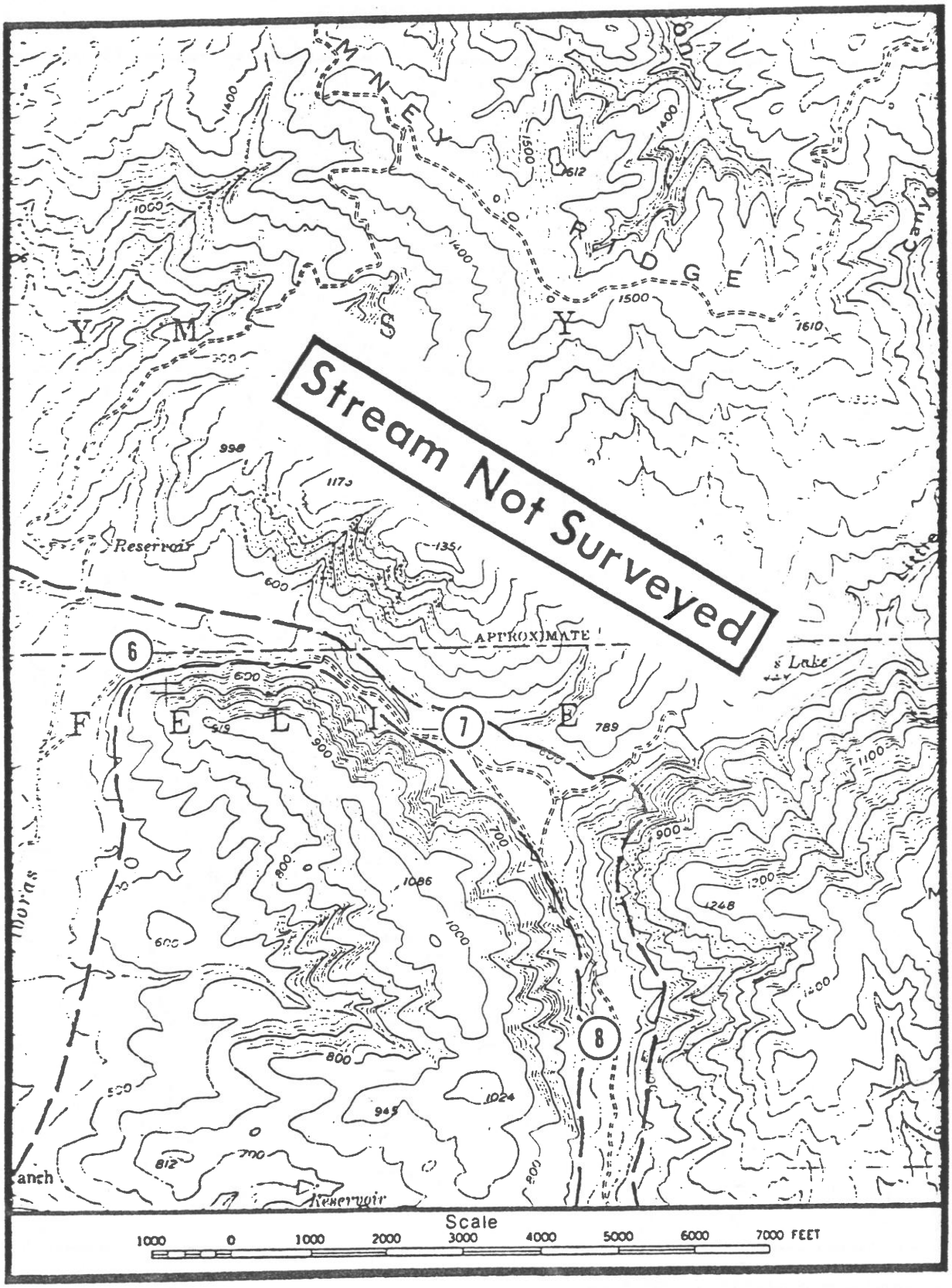


PLATE AV-3

Arroyo de las

Viboras

Three Sisters Quadrangle

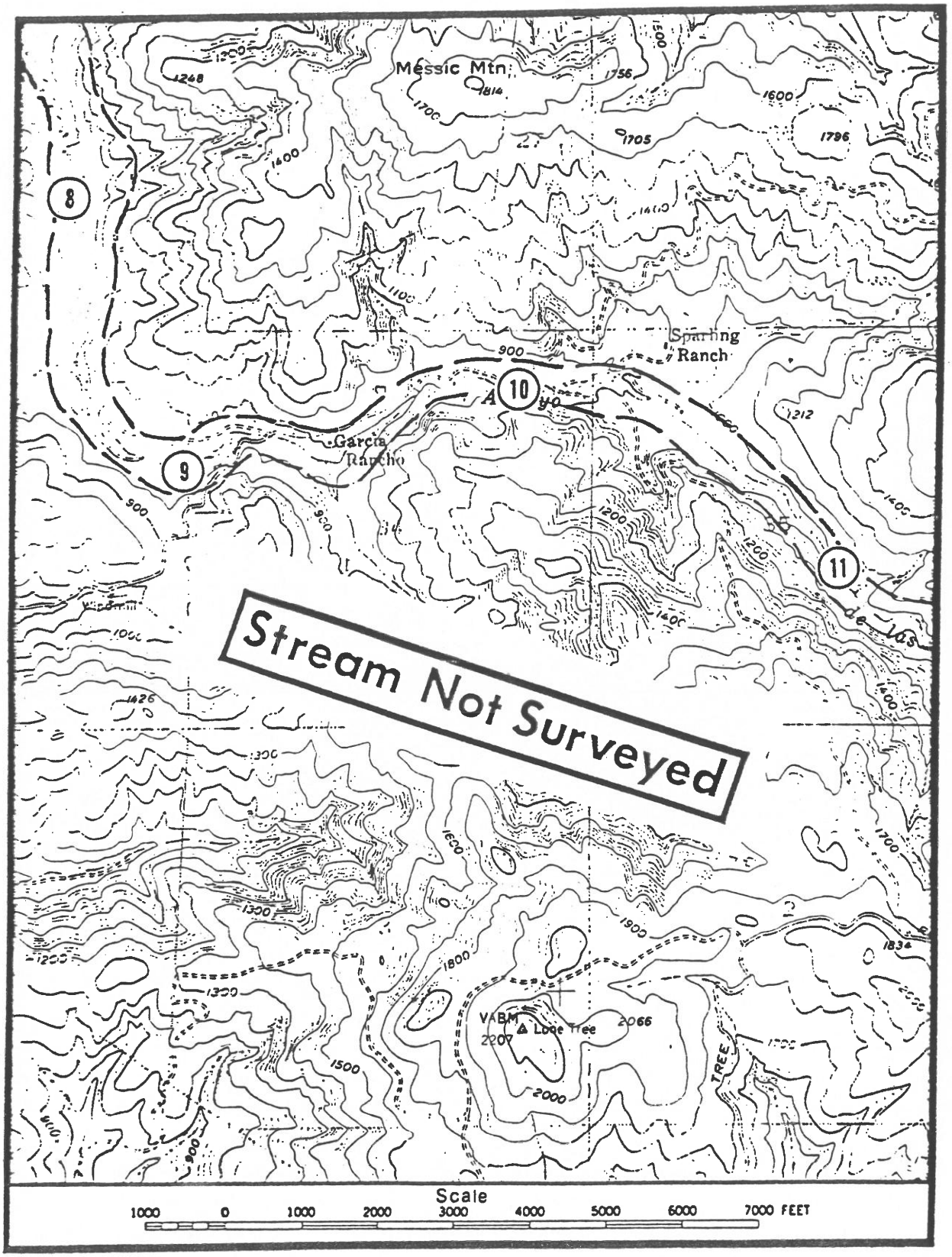


PLATE AV-4

Arroyo de las

Viboras

THREE SISTERS QUADRANGLE

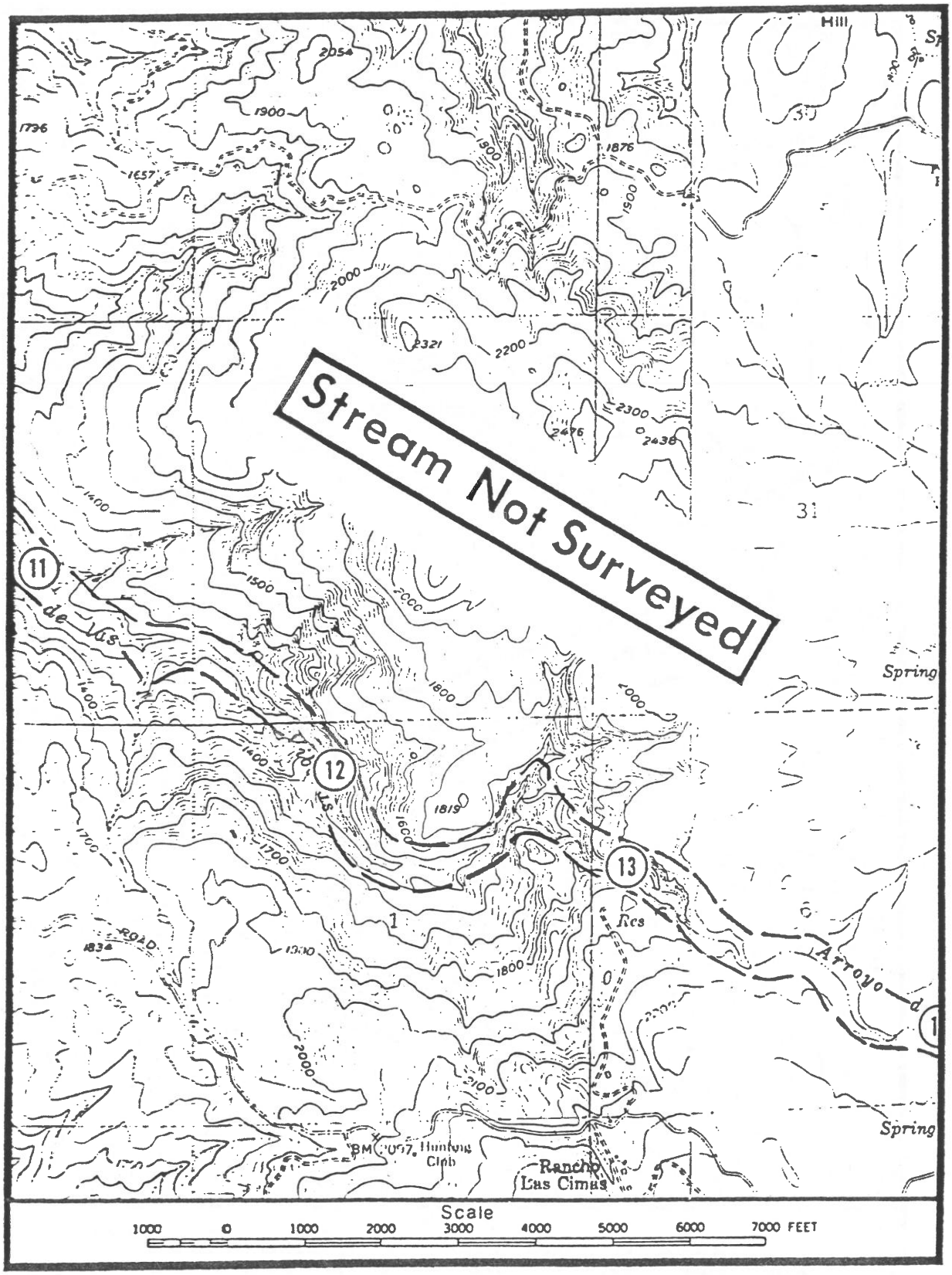


PLATE AV-5

Arroyo de las Viboras

Mariposa Peak Quadrangle

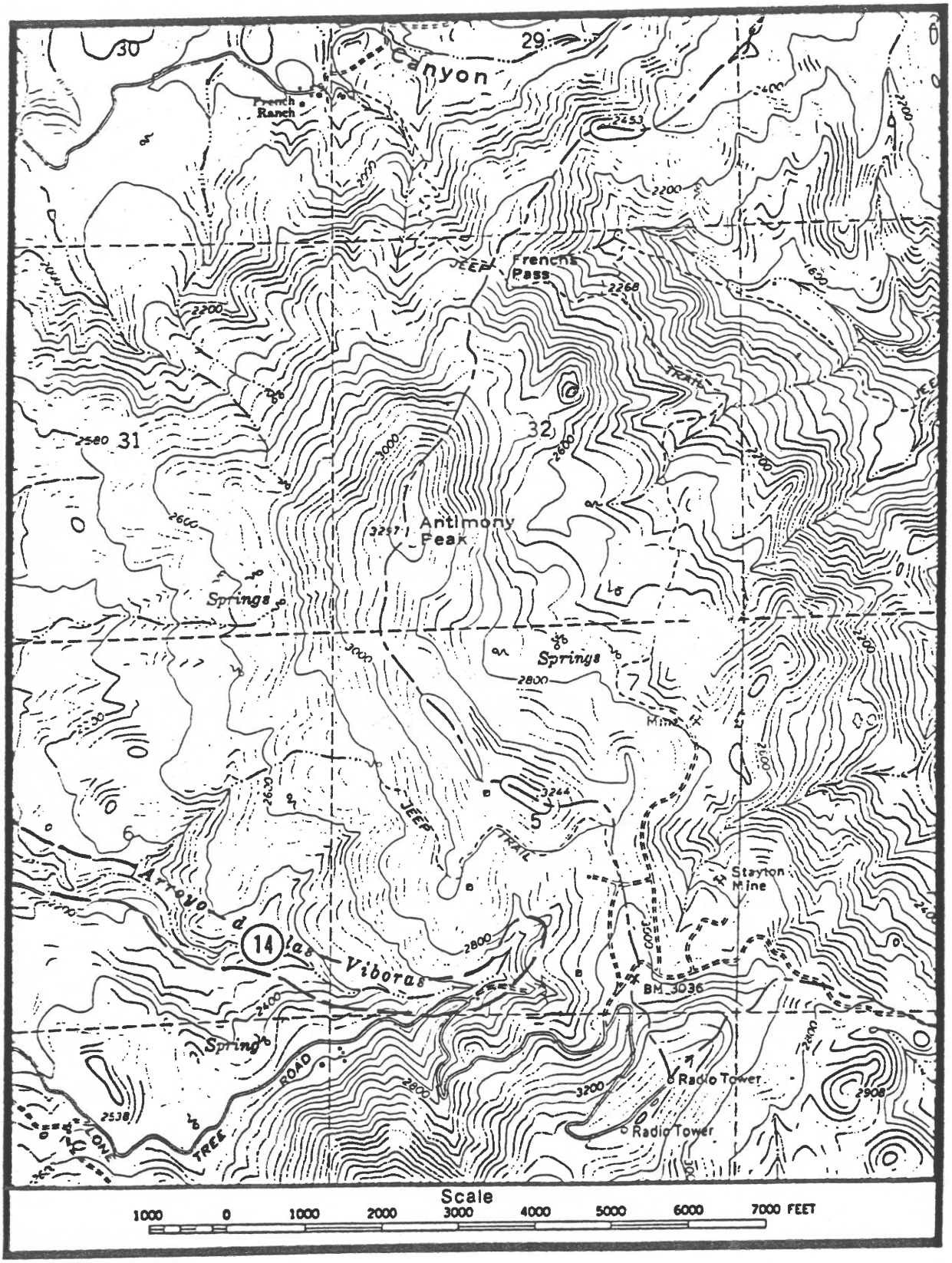


Plate AV-6

San Benito River

CHITTENDEN QUADRANGLE

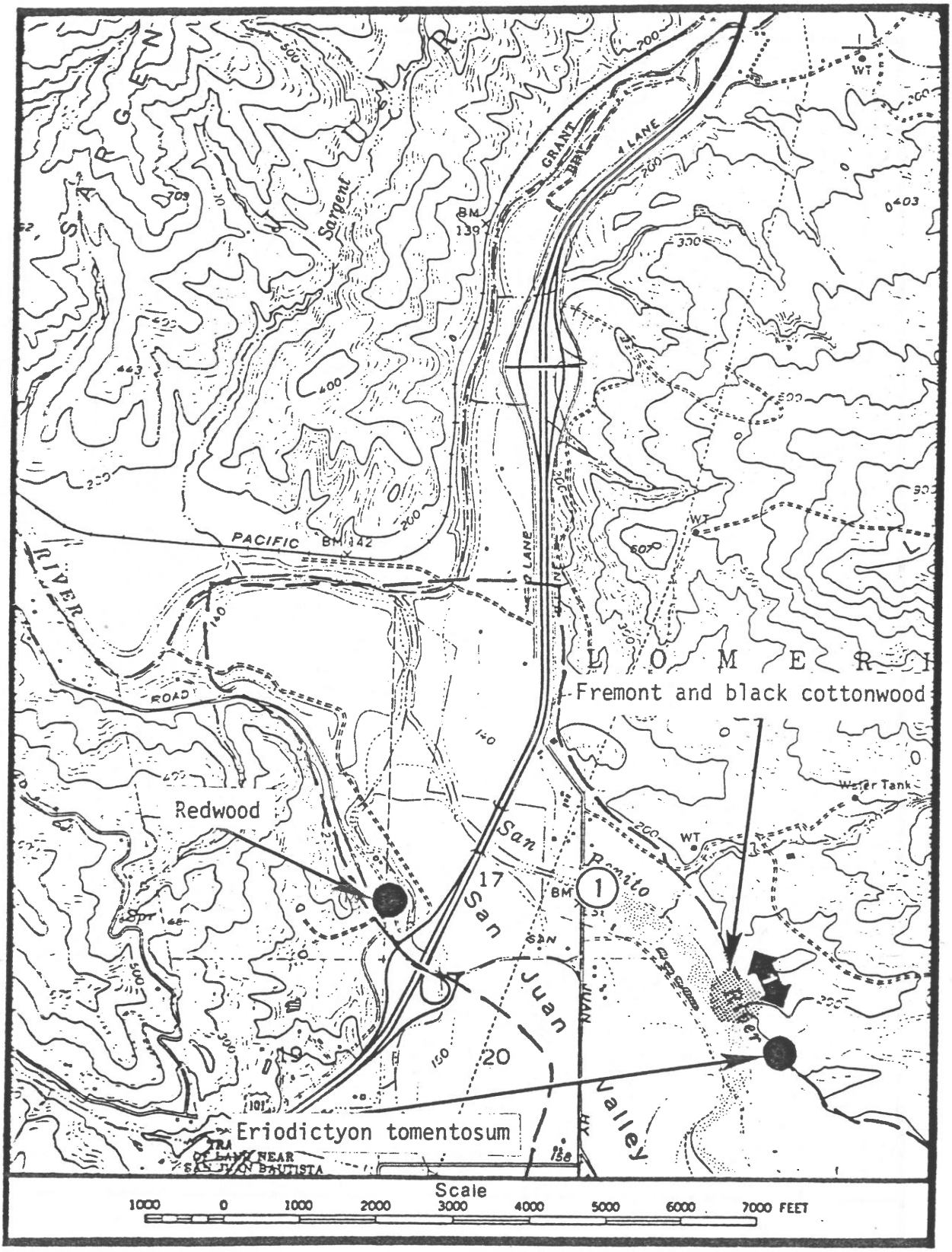


PLATE SB-1

San Benito River

San Juan Bautista Quadrangle

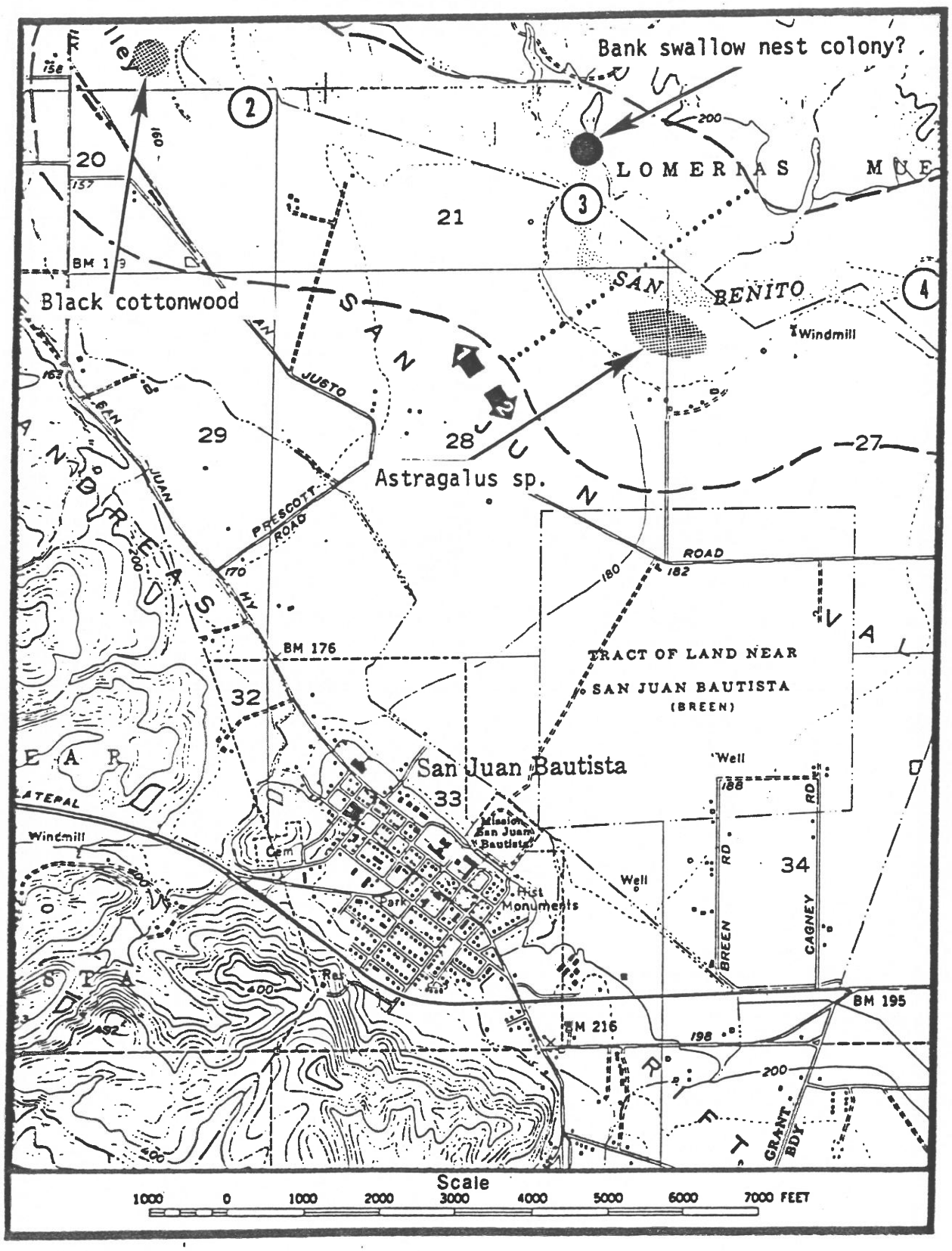


PLATE SB-2

San Benito River

HOLLISTER QUADRANGLE

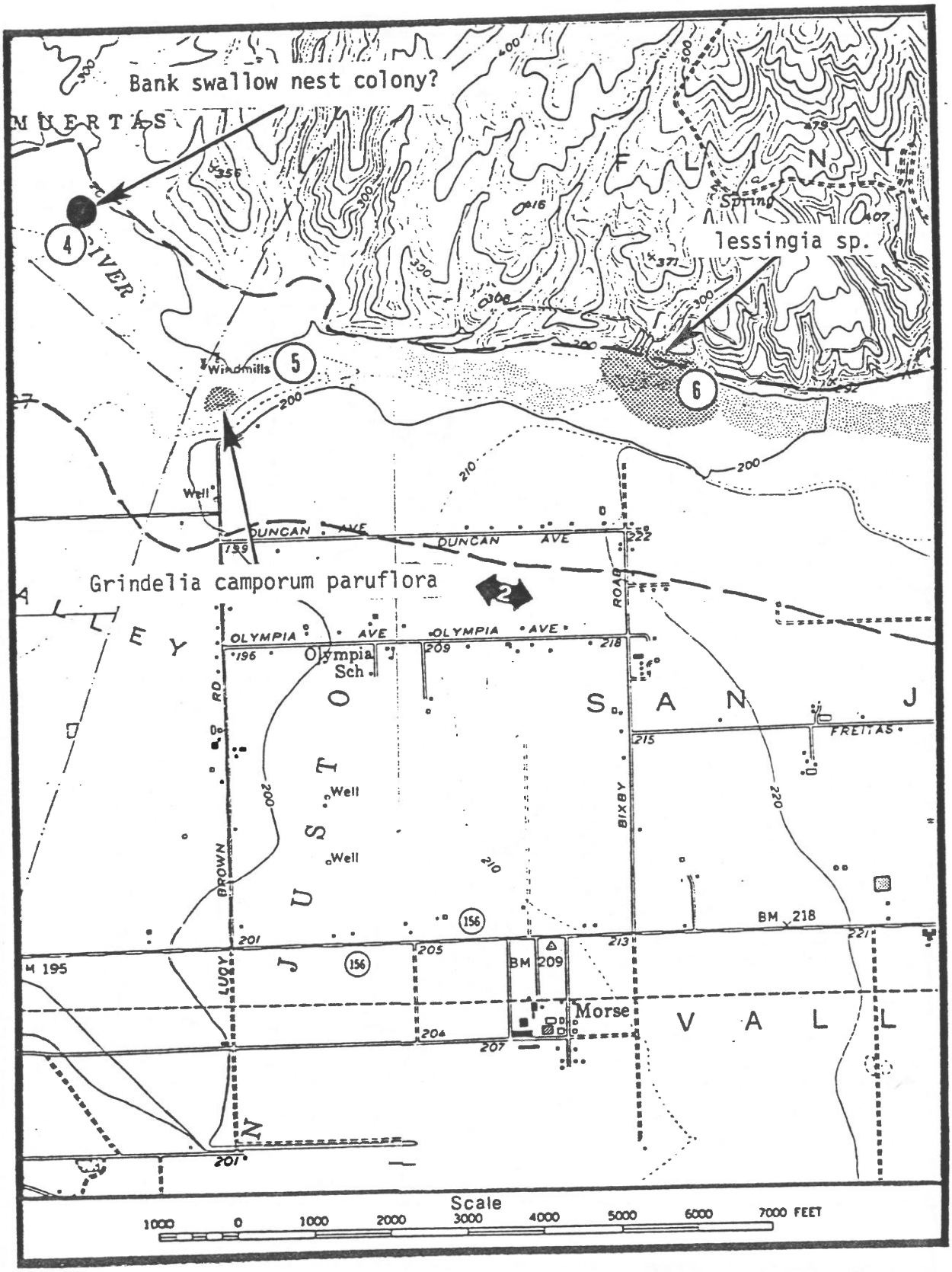


PLATE SB-3

San Benito River

HOLLISTER QUADRANGLE

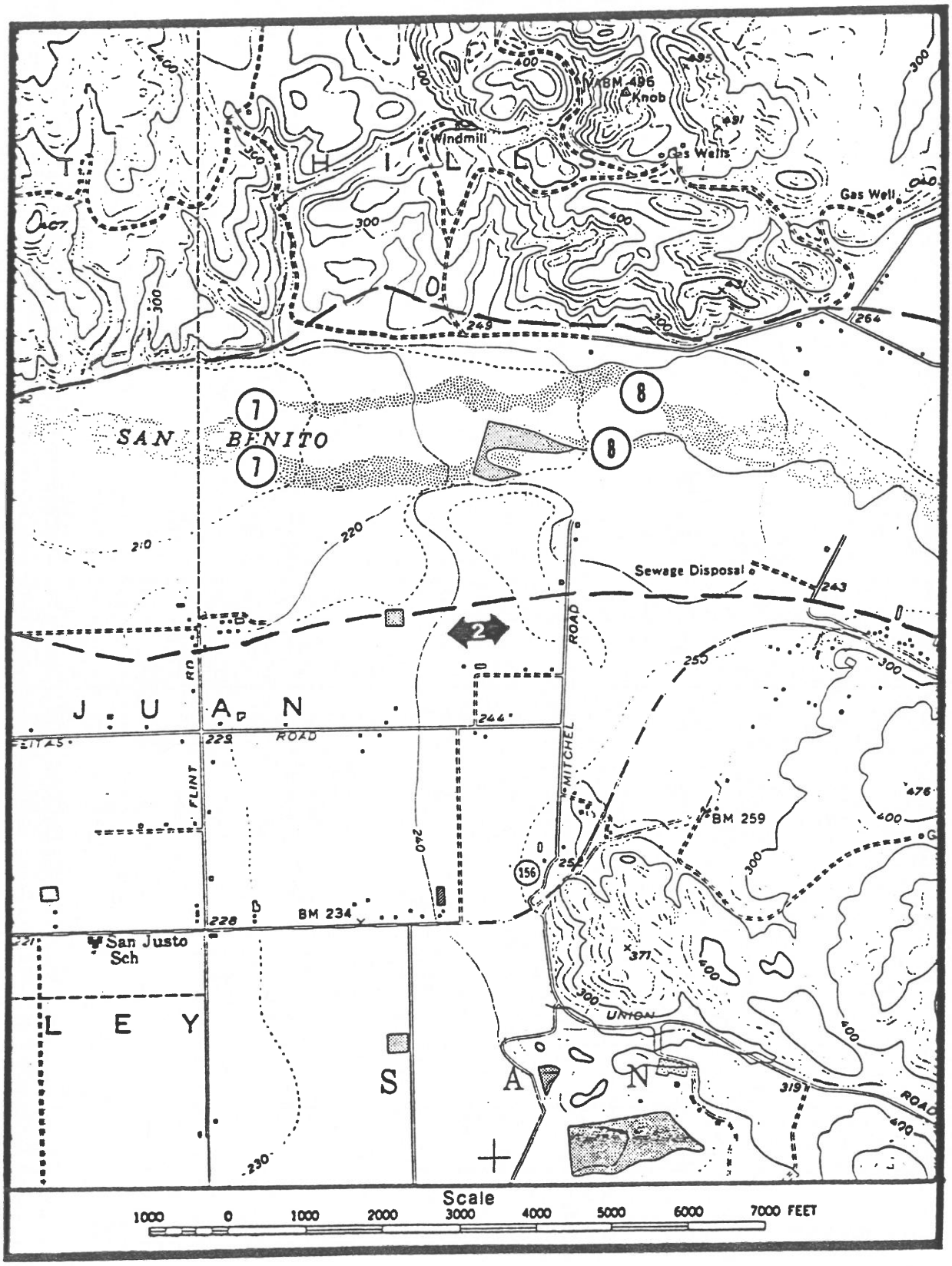


PLATE SB-4

San Benito River

HOLLISTER QUADRANGLE

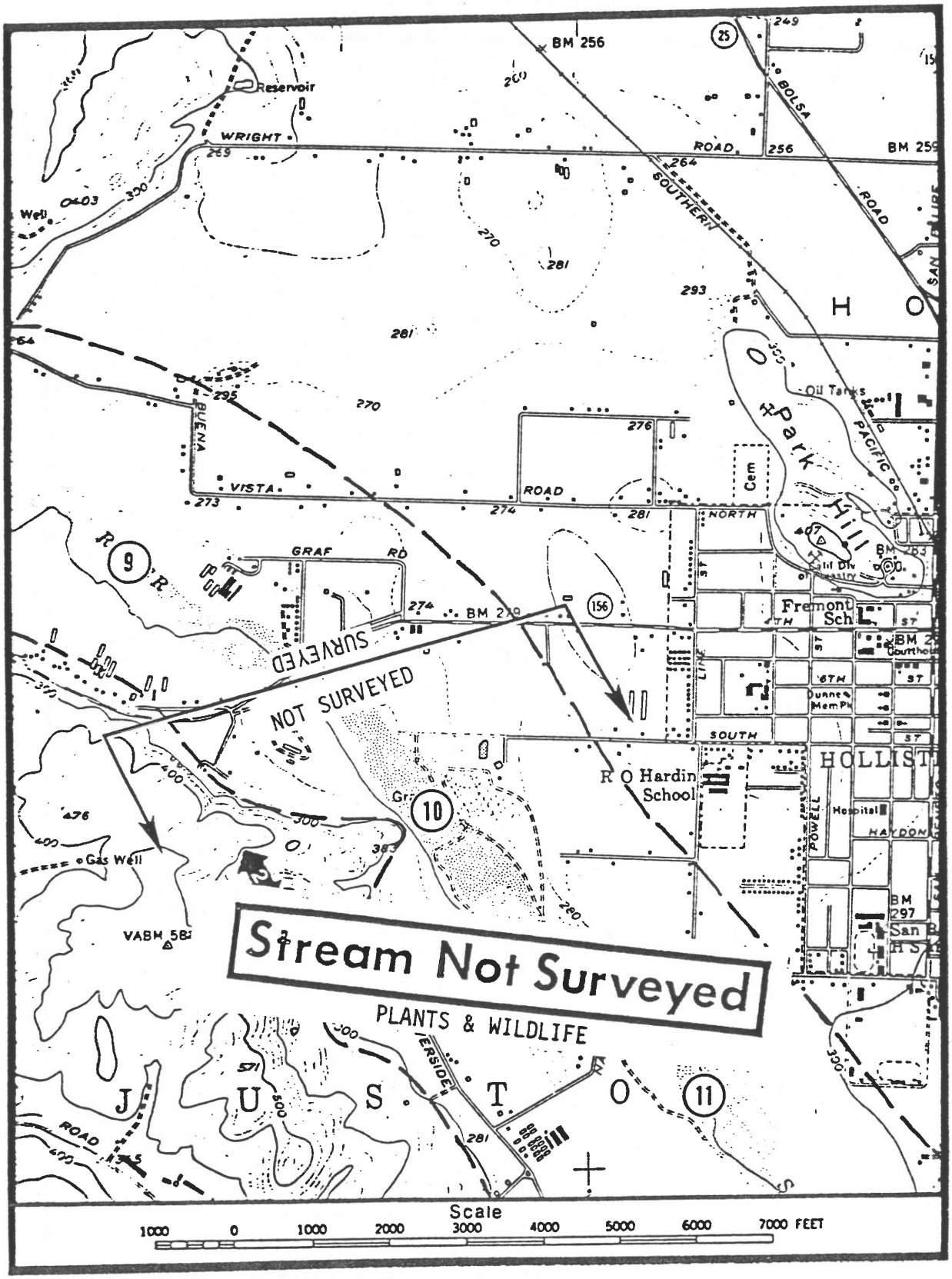


PLATE SB-5

San Benito River

HOLLISTER QUADRANGLE

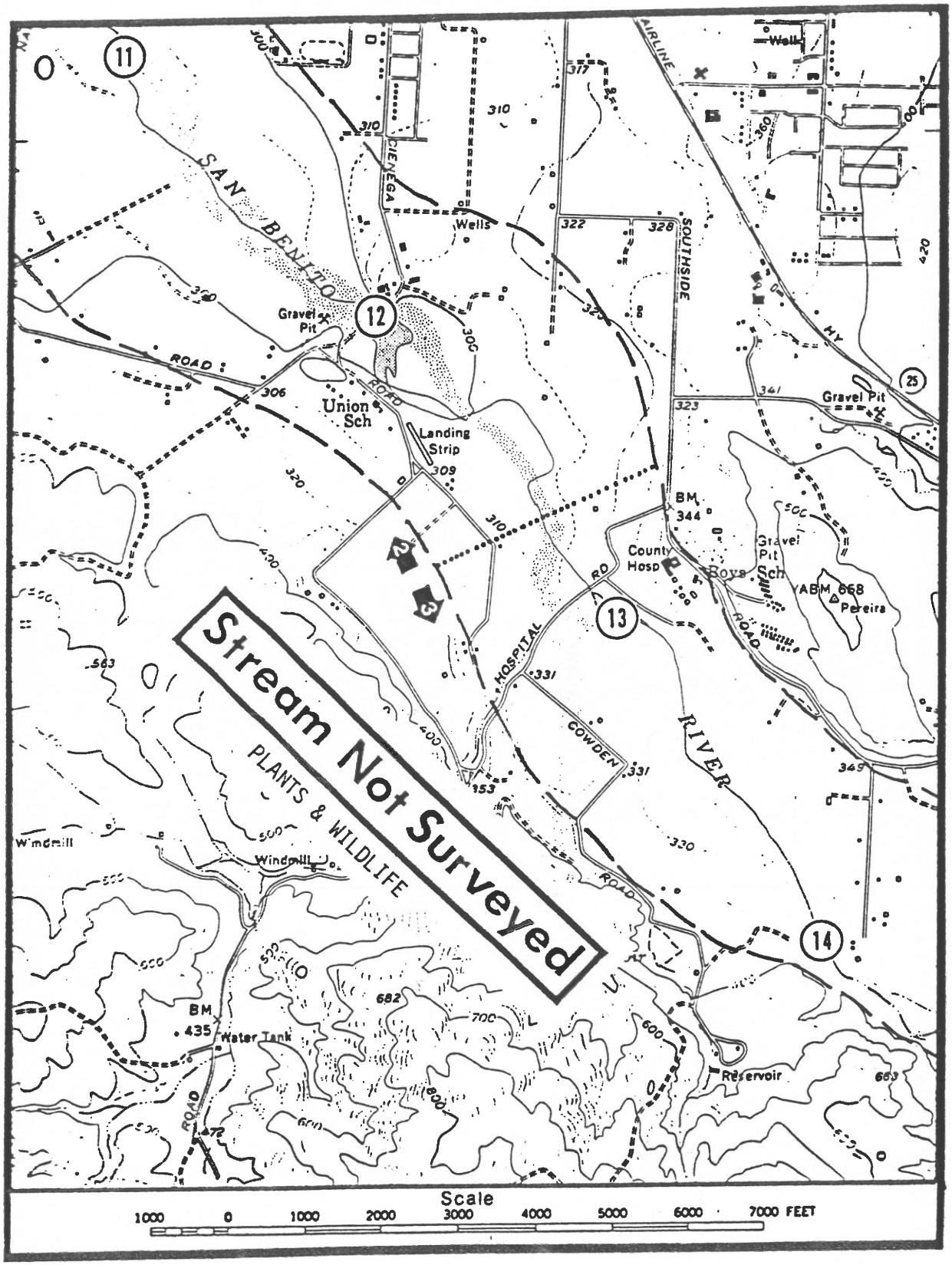


PLATE SB-6

San Benito River

Tres Pinos Quadrangle

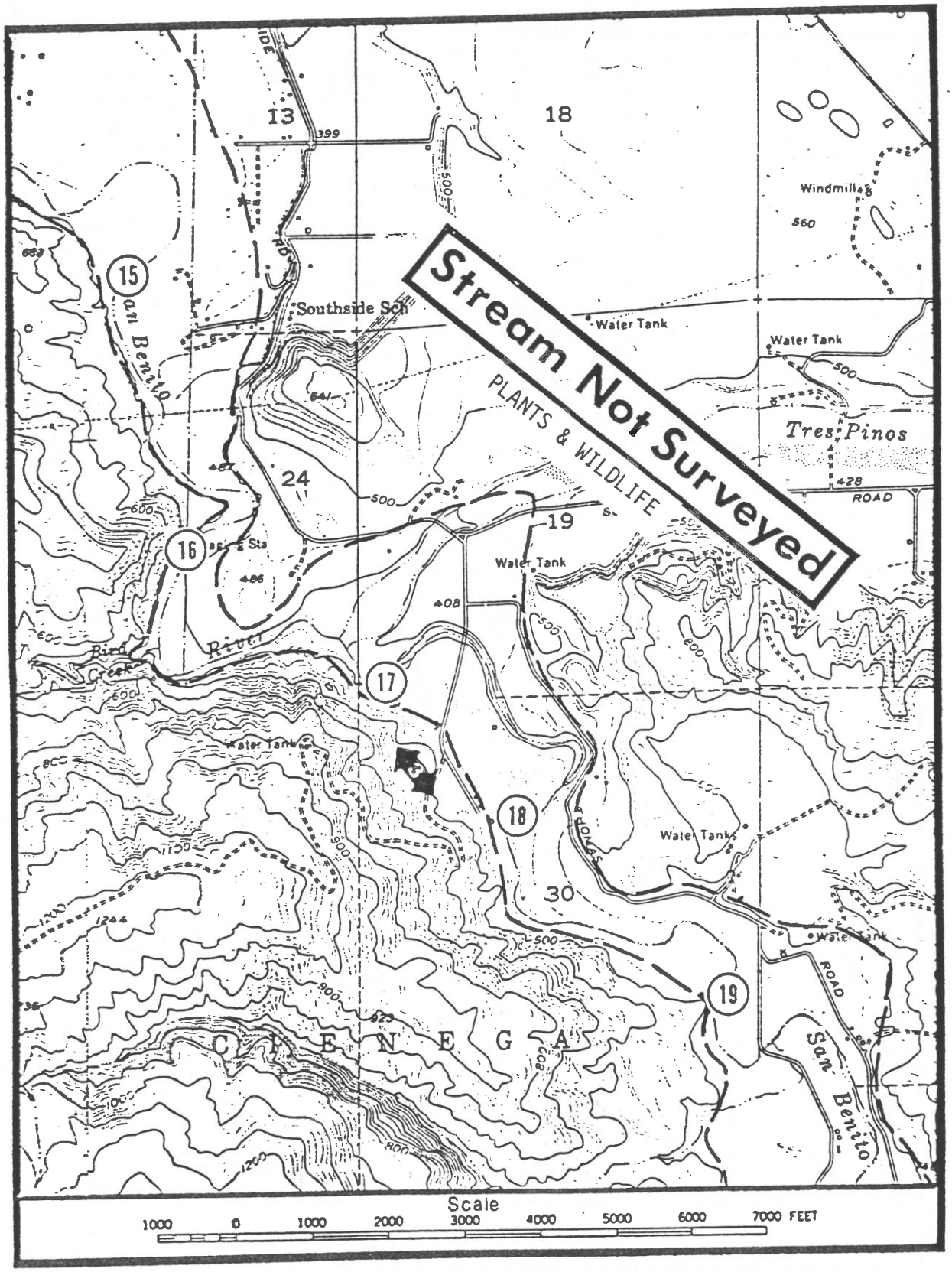


Plate SB-7

San Benito River

Tres Pinos Quadrangle

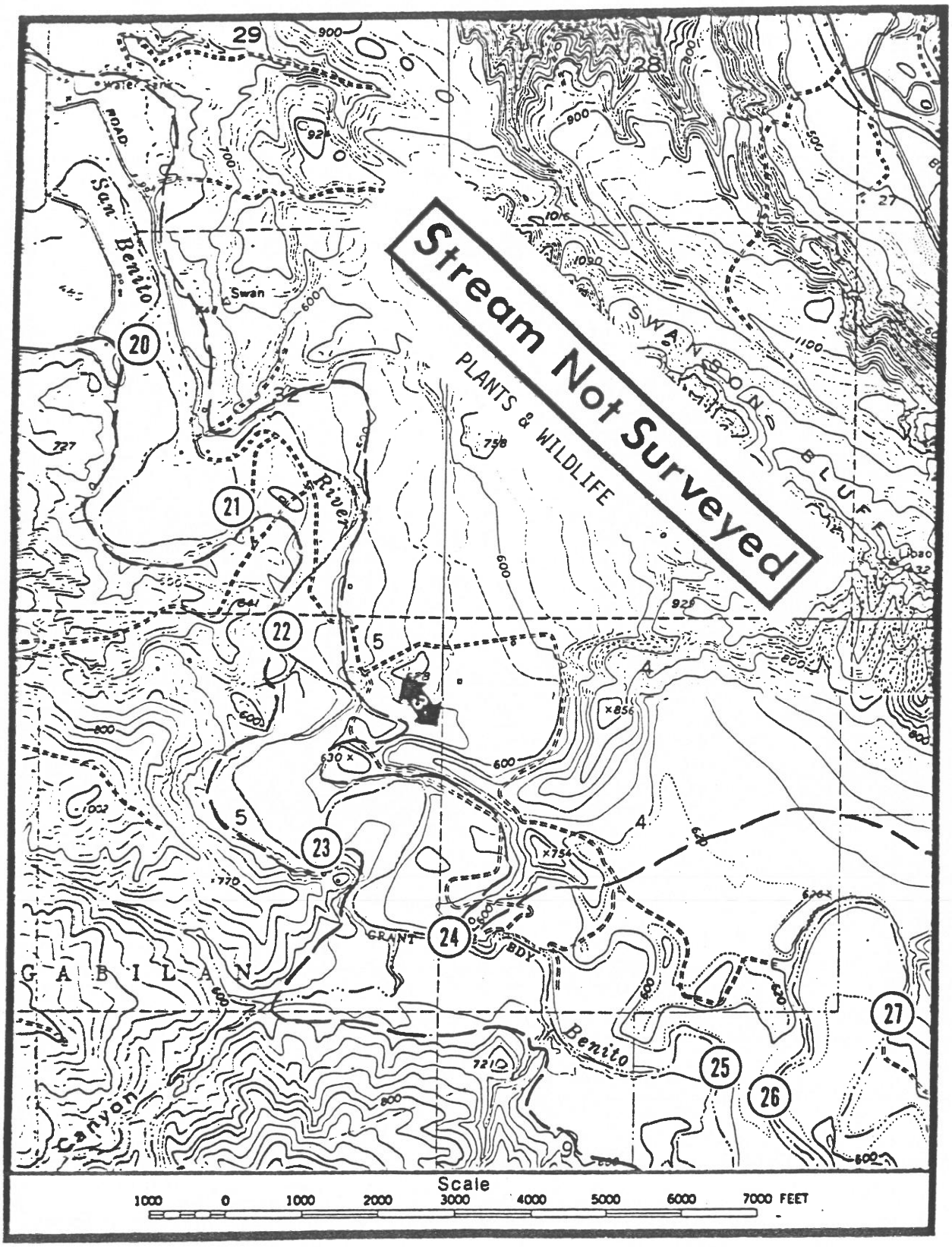


Plate SB-8

San Benito River

PAICINES QUADRANGLE

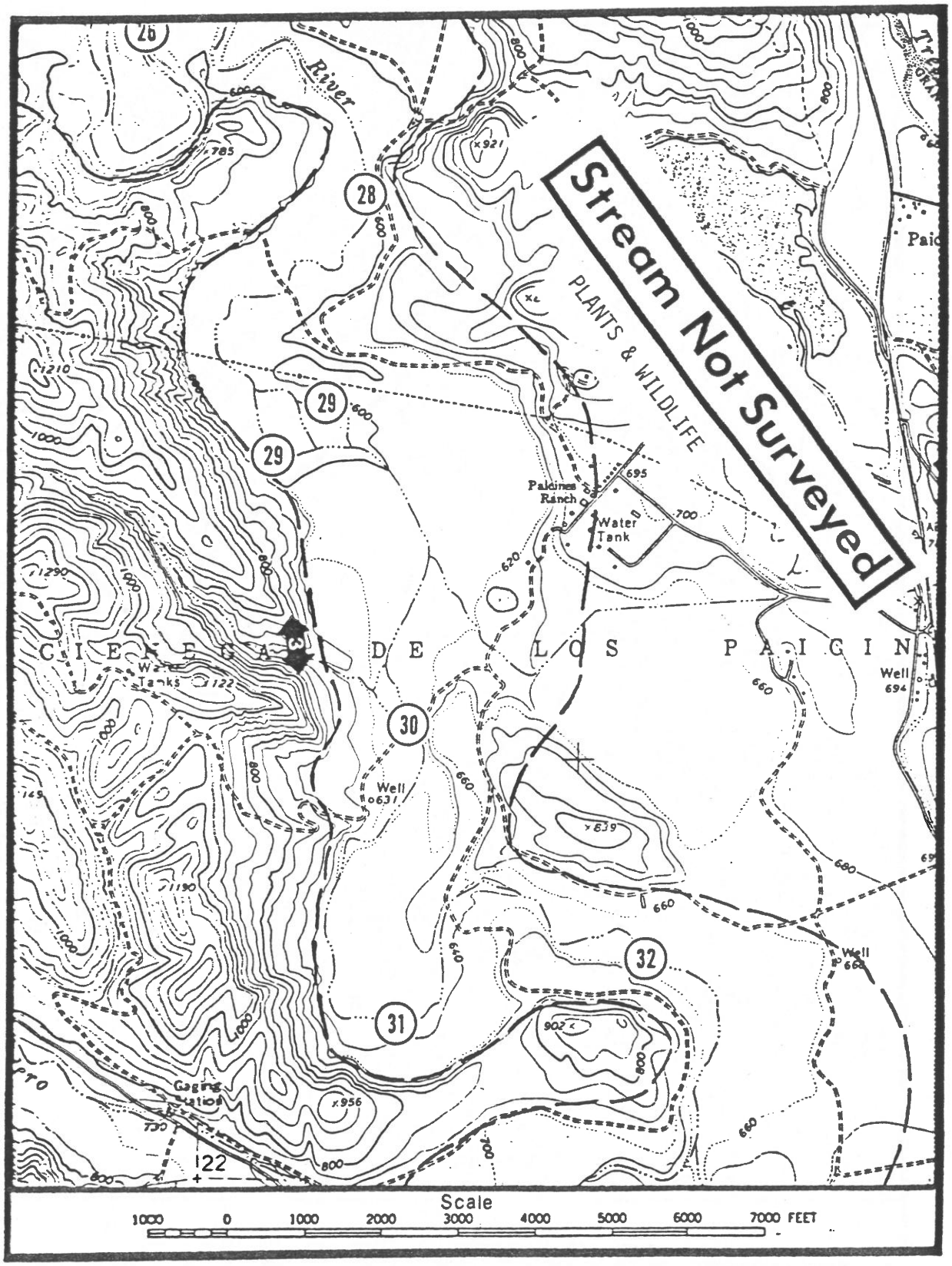


PLATE SB-9

San Benito River

PAICINES QUADRANGLE

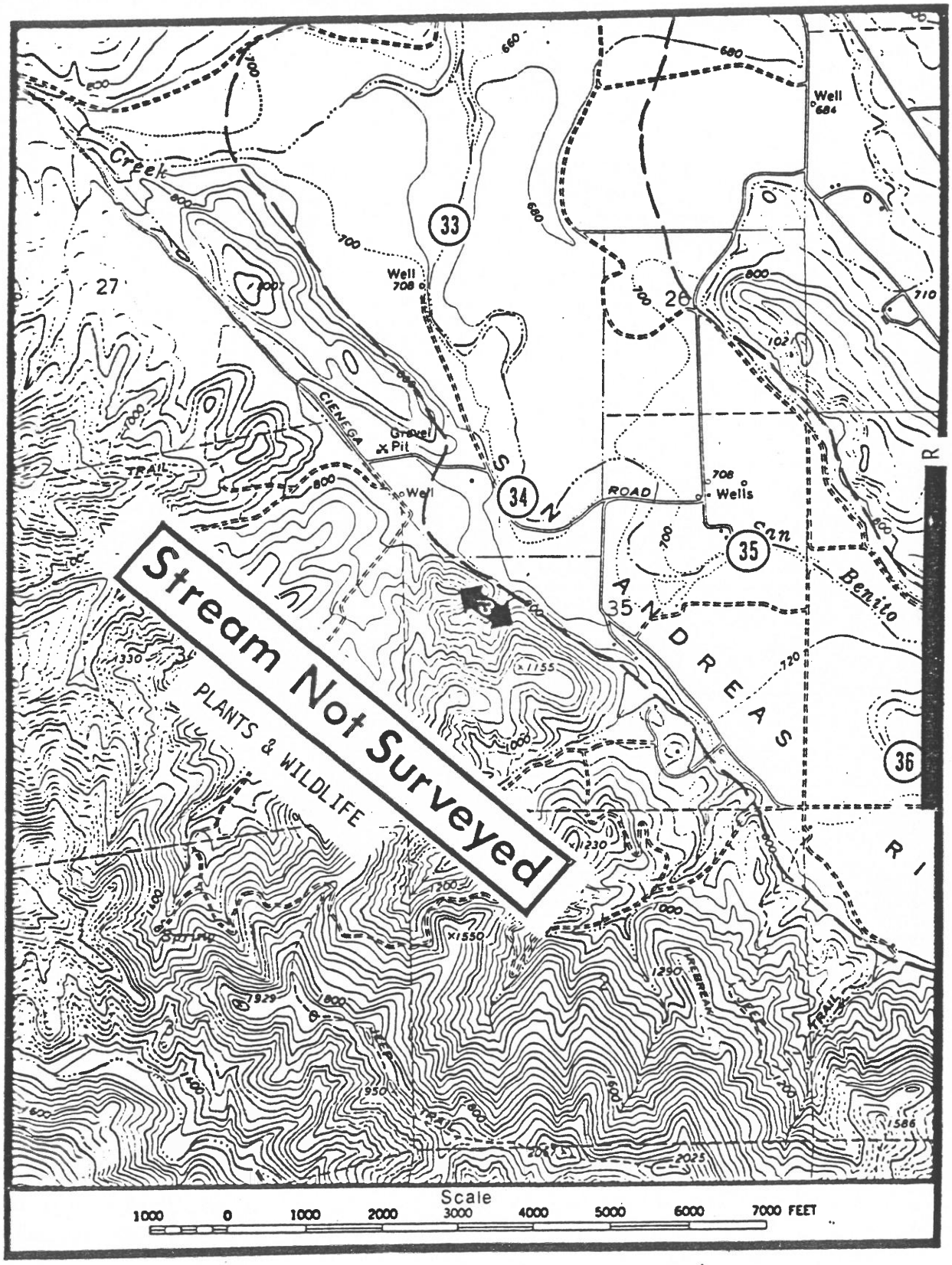


PLATE SB-10

San Benito River

PAICINES QUADRANGLE

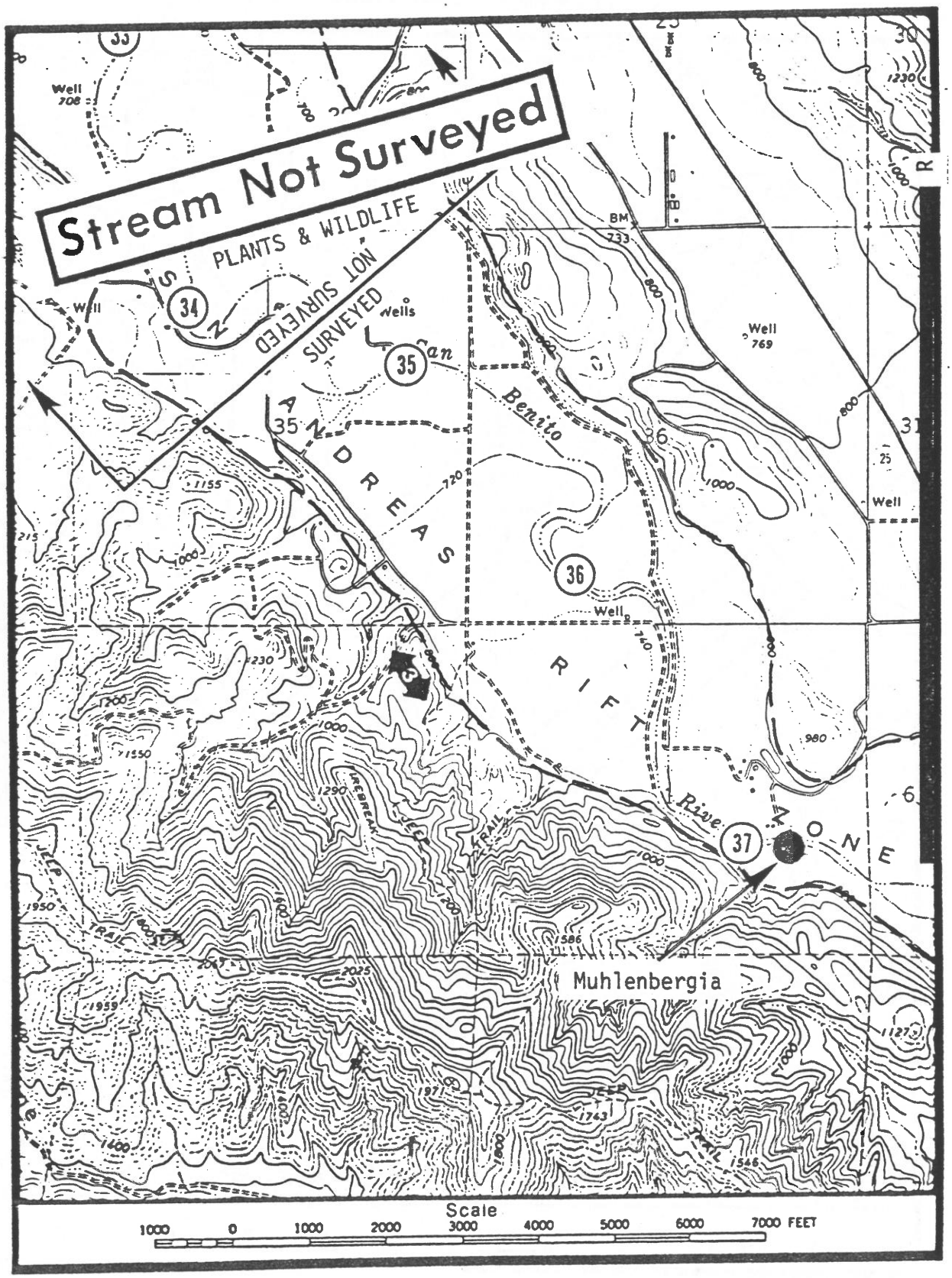


PLATE SB-11

San Benito River

Cherry Peak Quadrangle

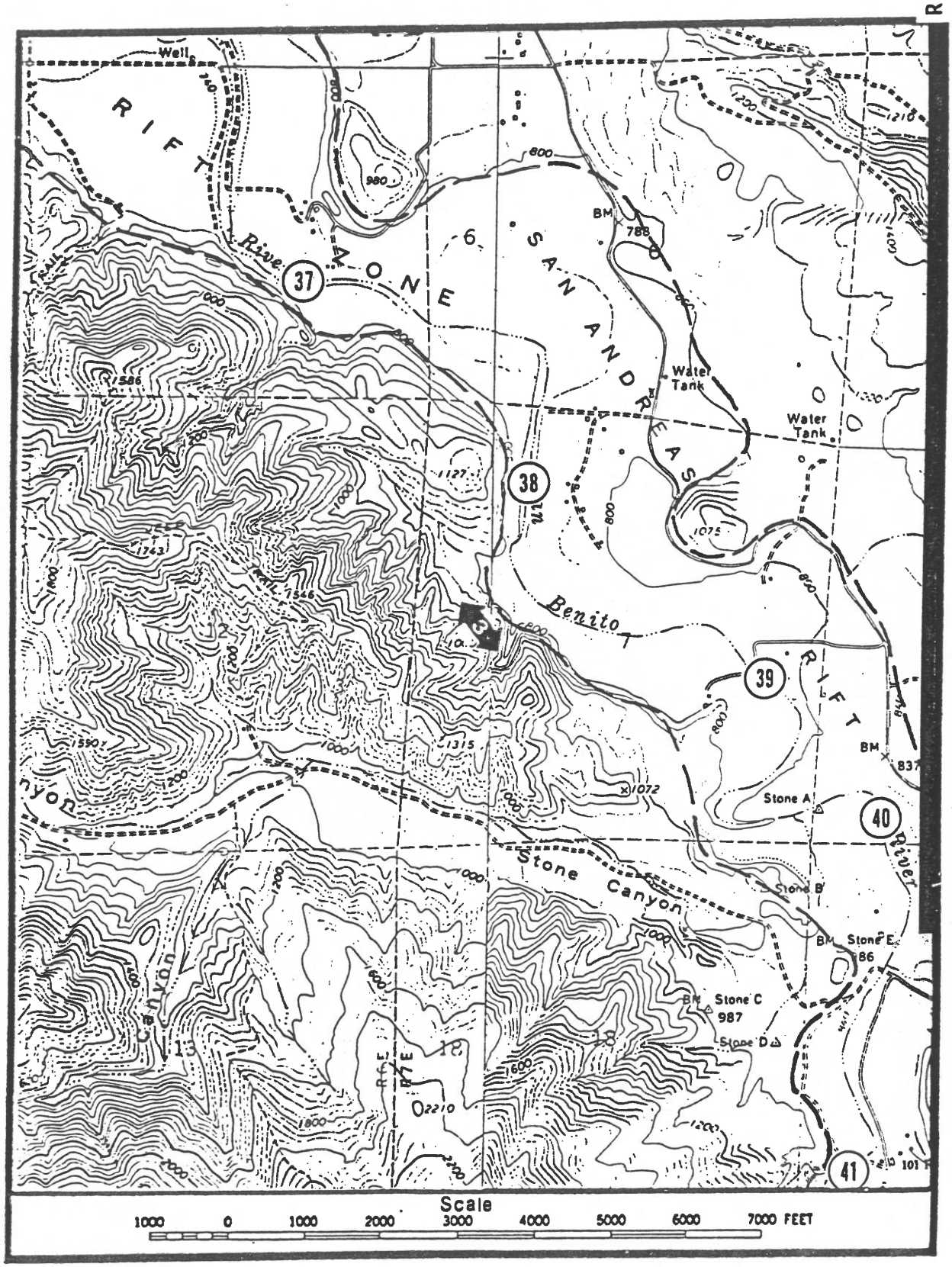


PLATE SB-12

San Benito River

Bickmore Canyon Quadrangle

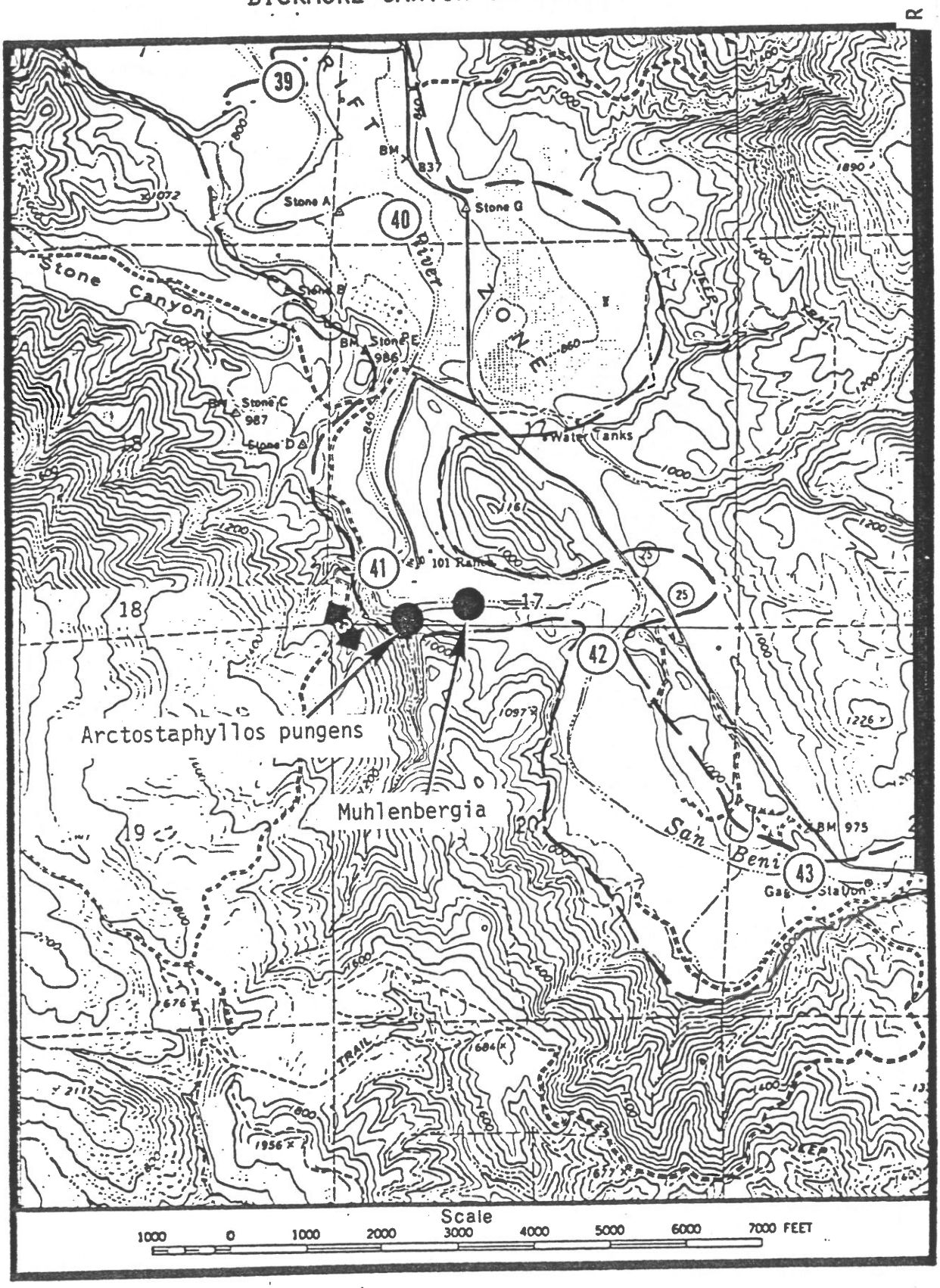


Plate SB-13

San Benito River

Bickmore Canyon Quadrangle

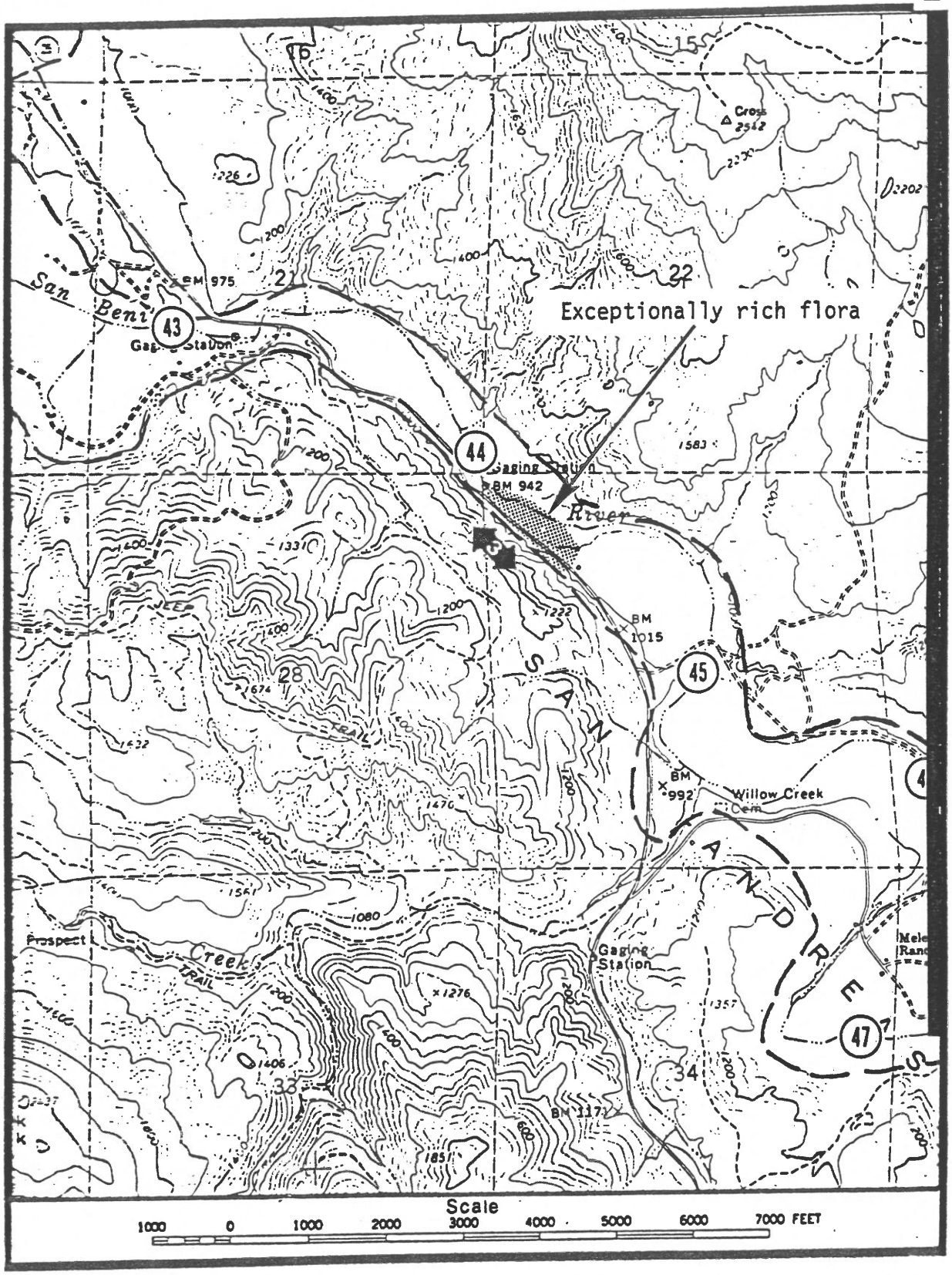


PLATE SB-14

San Benito River

Bickmore Canyon Quadrangle

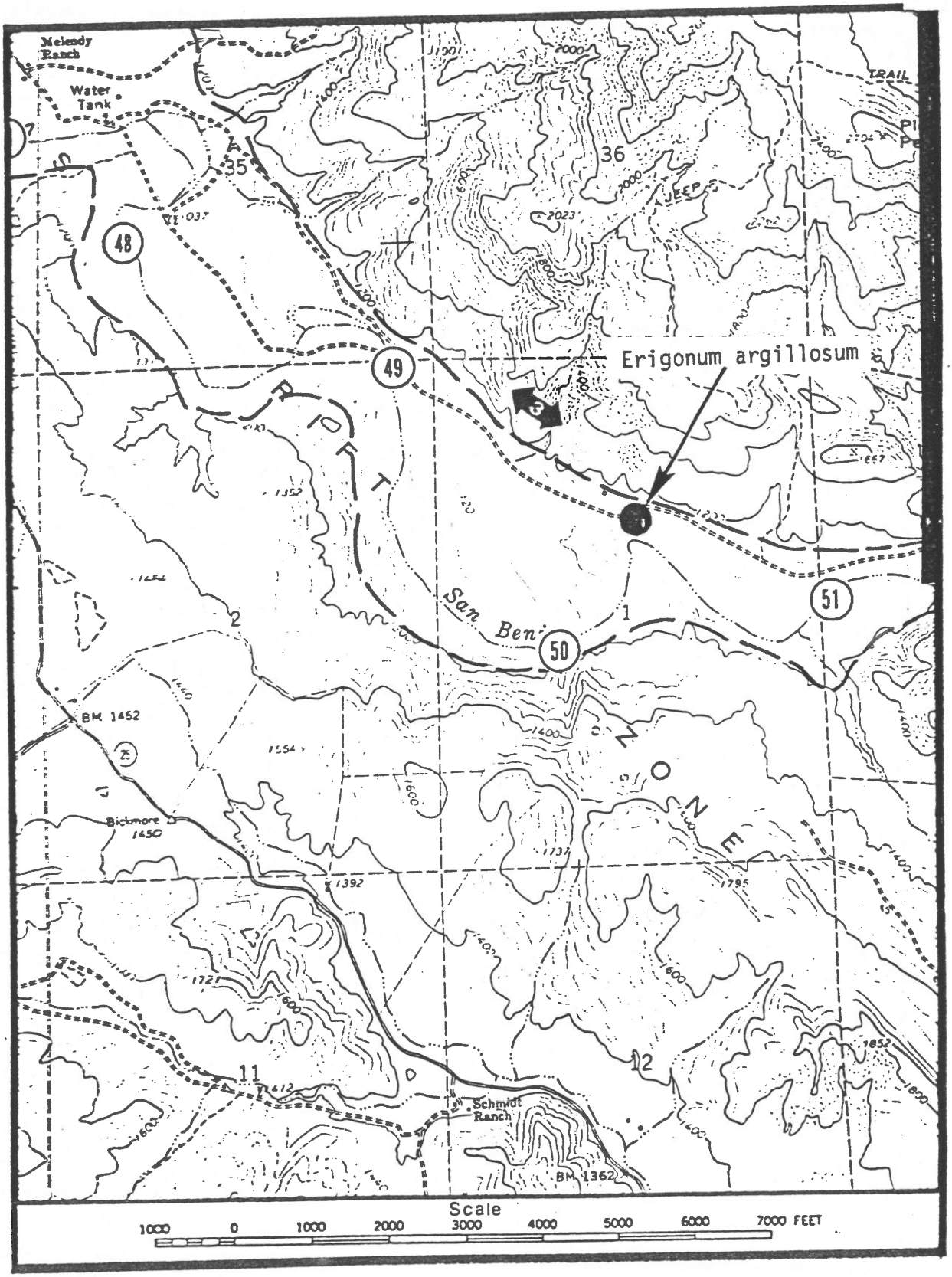


PLATE SB-15

San Benito River

Bickmore Canyon Quadrangle

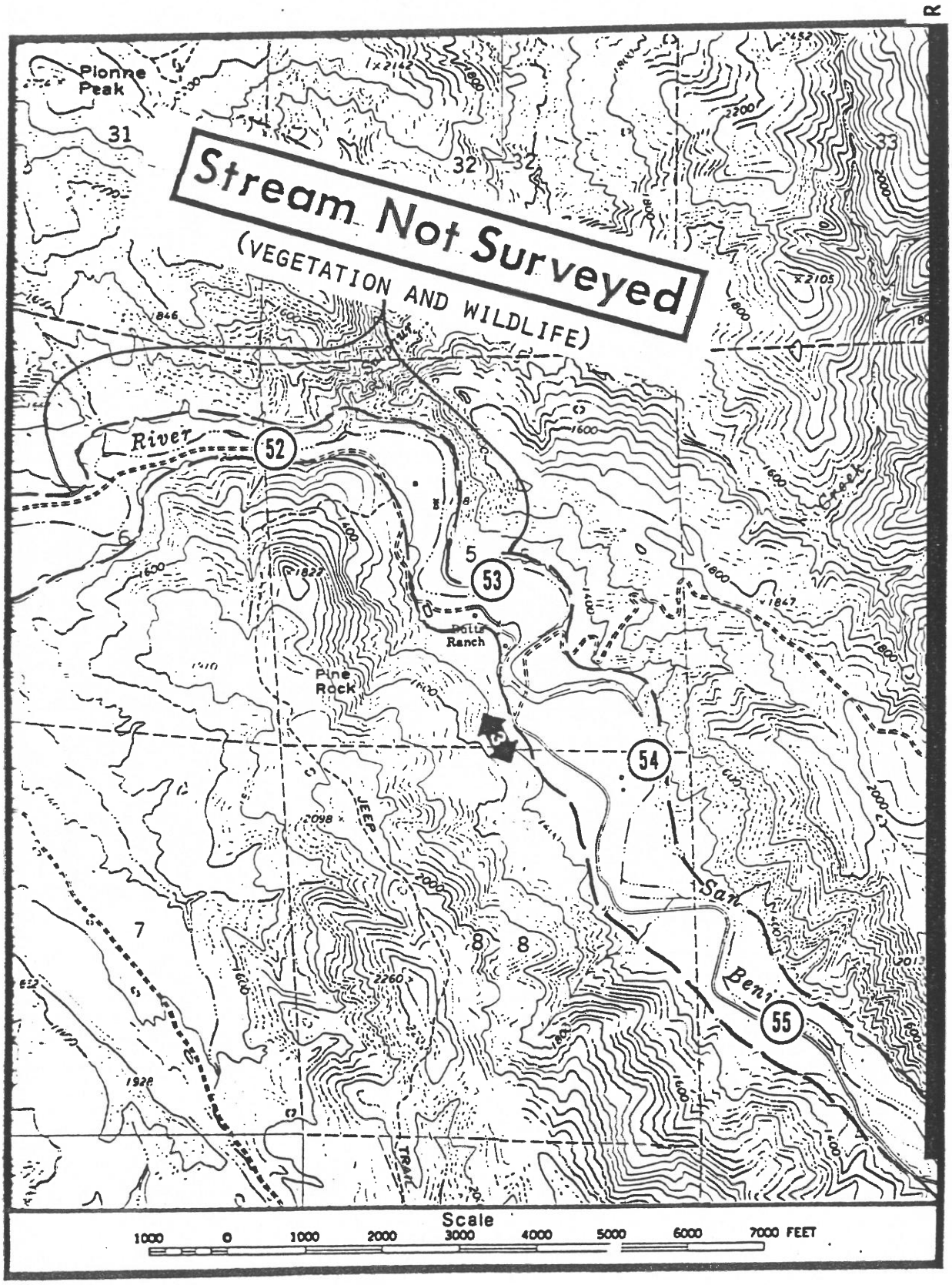


Plate SB-16

San Benito River

San Benito Quadrangle

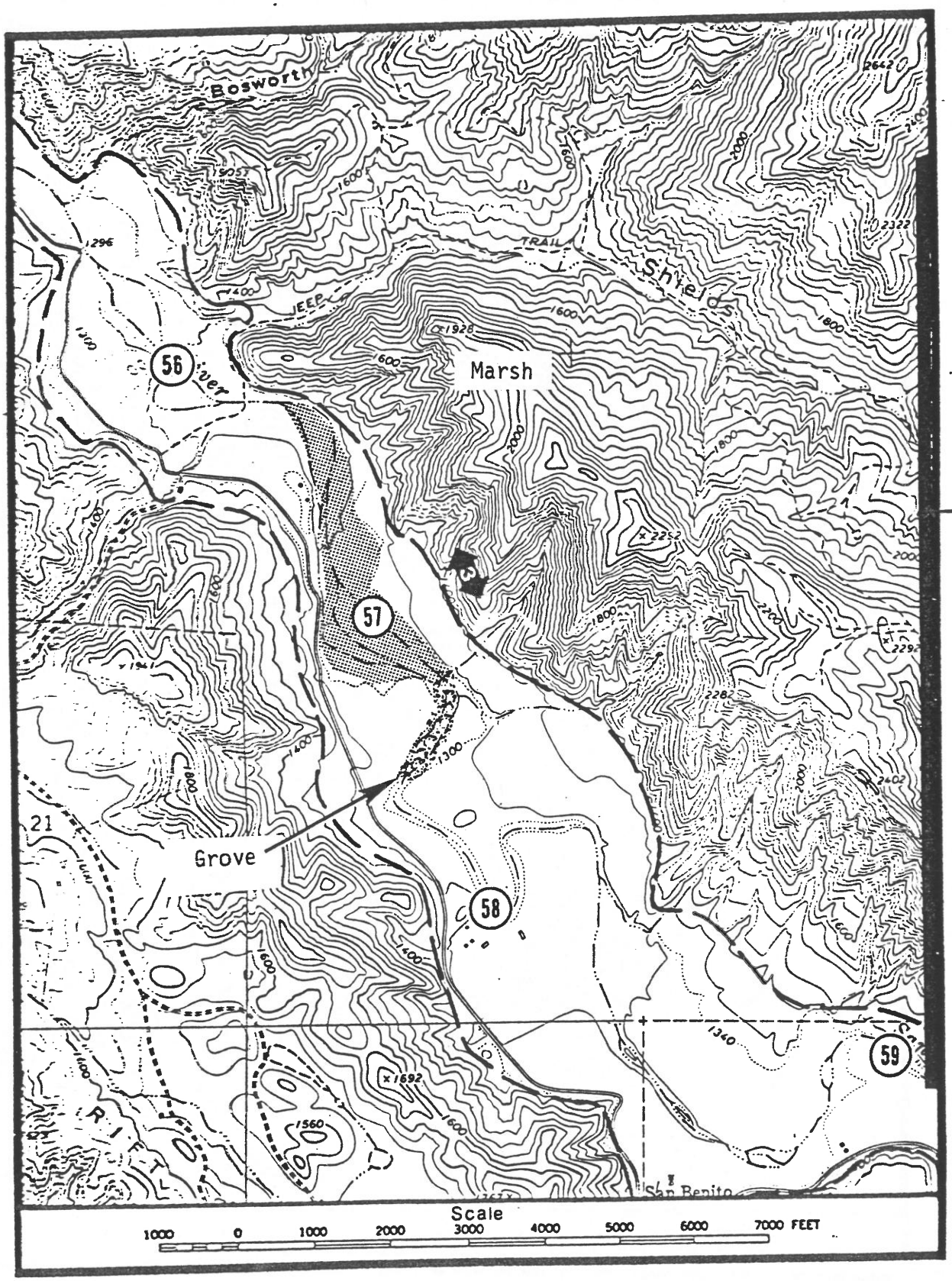


PLATE SB-17

San Benito River

San Benito Quadrangle

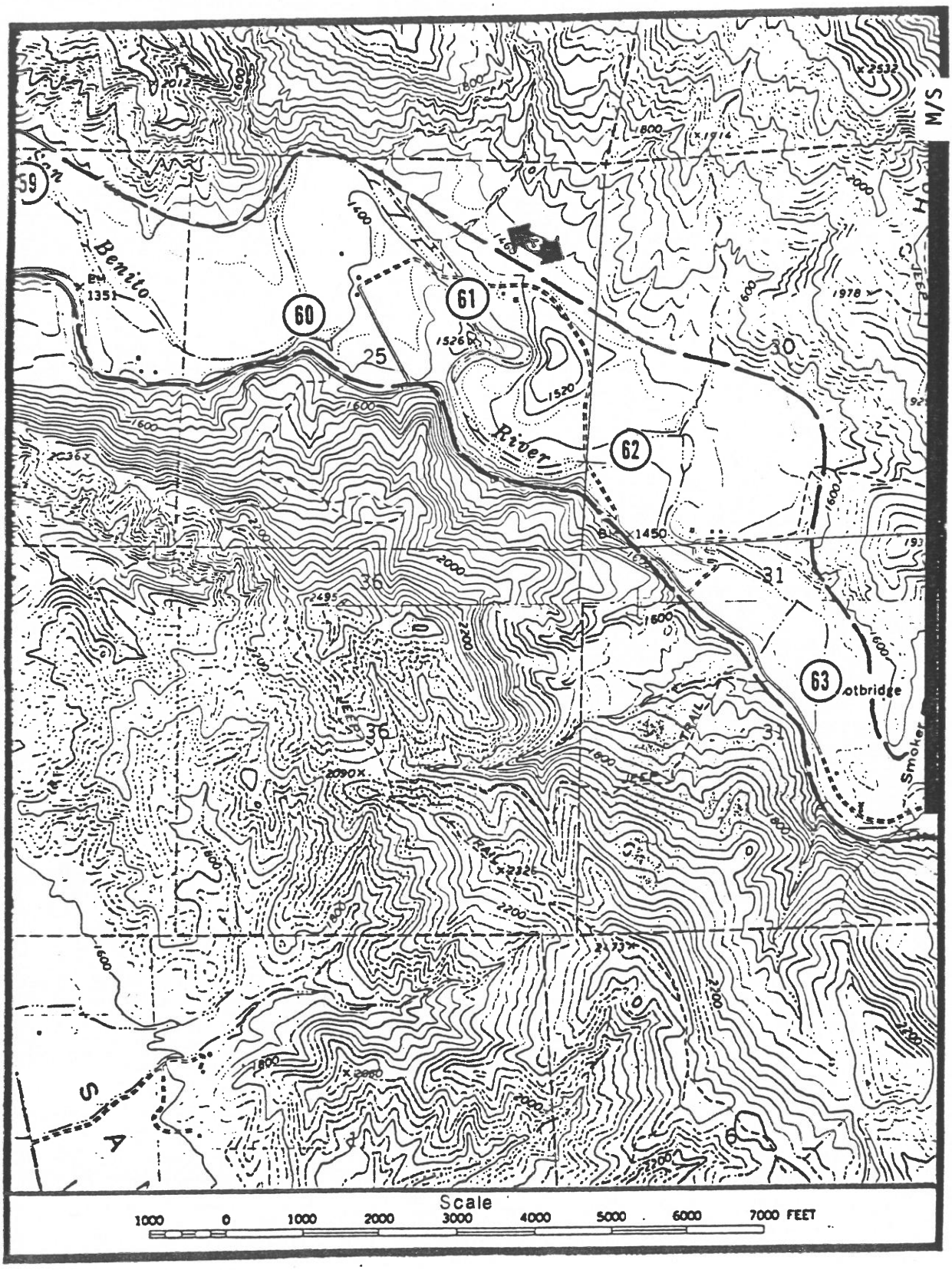


Plate SB-18

San Benito River

Topo Valley Quadrangle

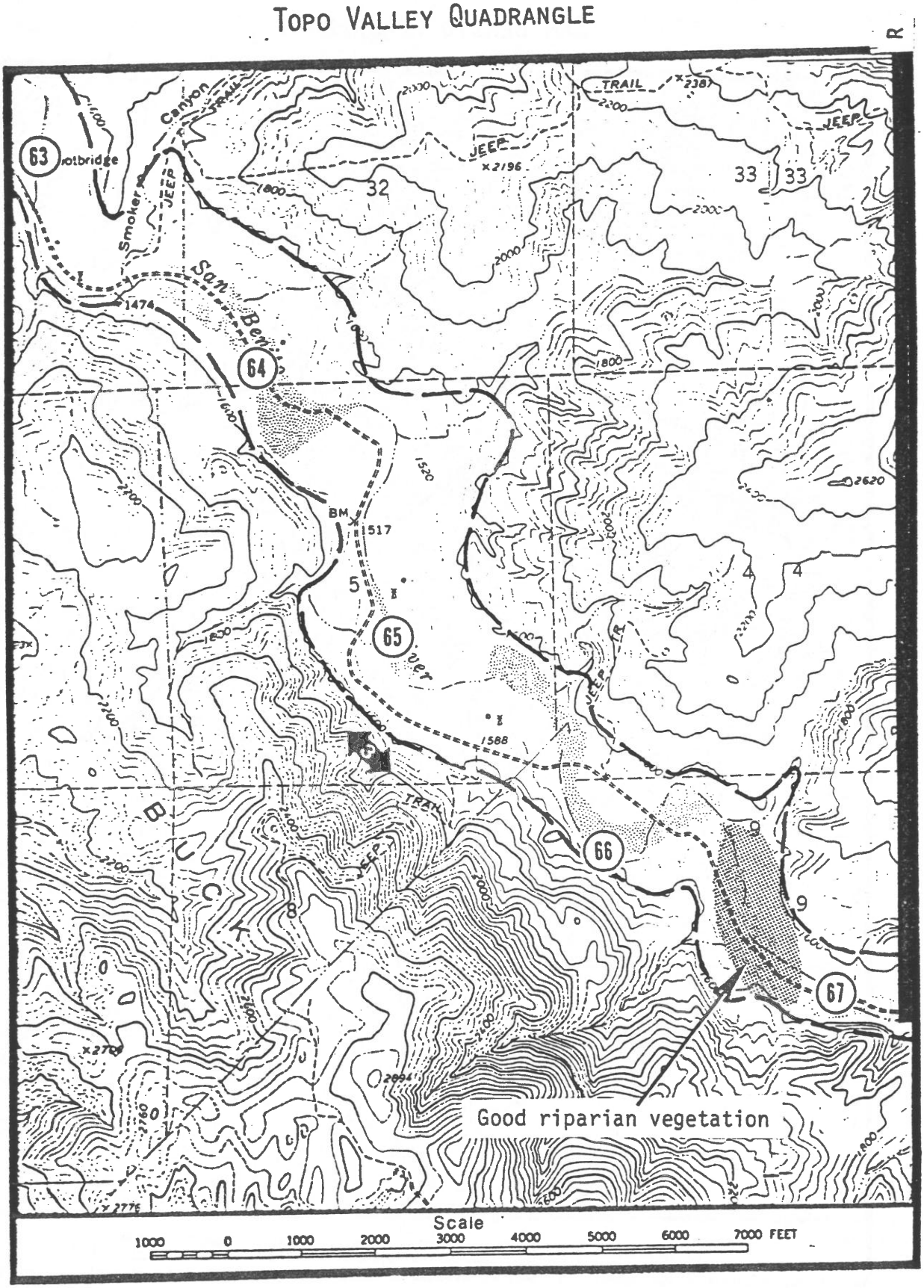


Plate SB-19

San Benito River

Rock Spring Peak Quadrangle

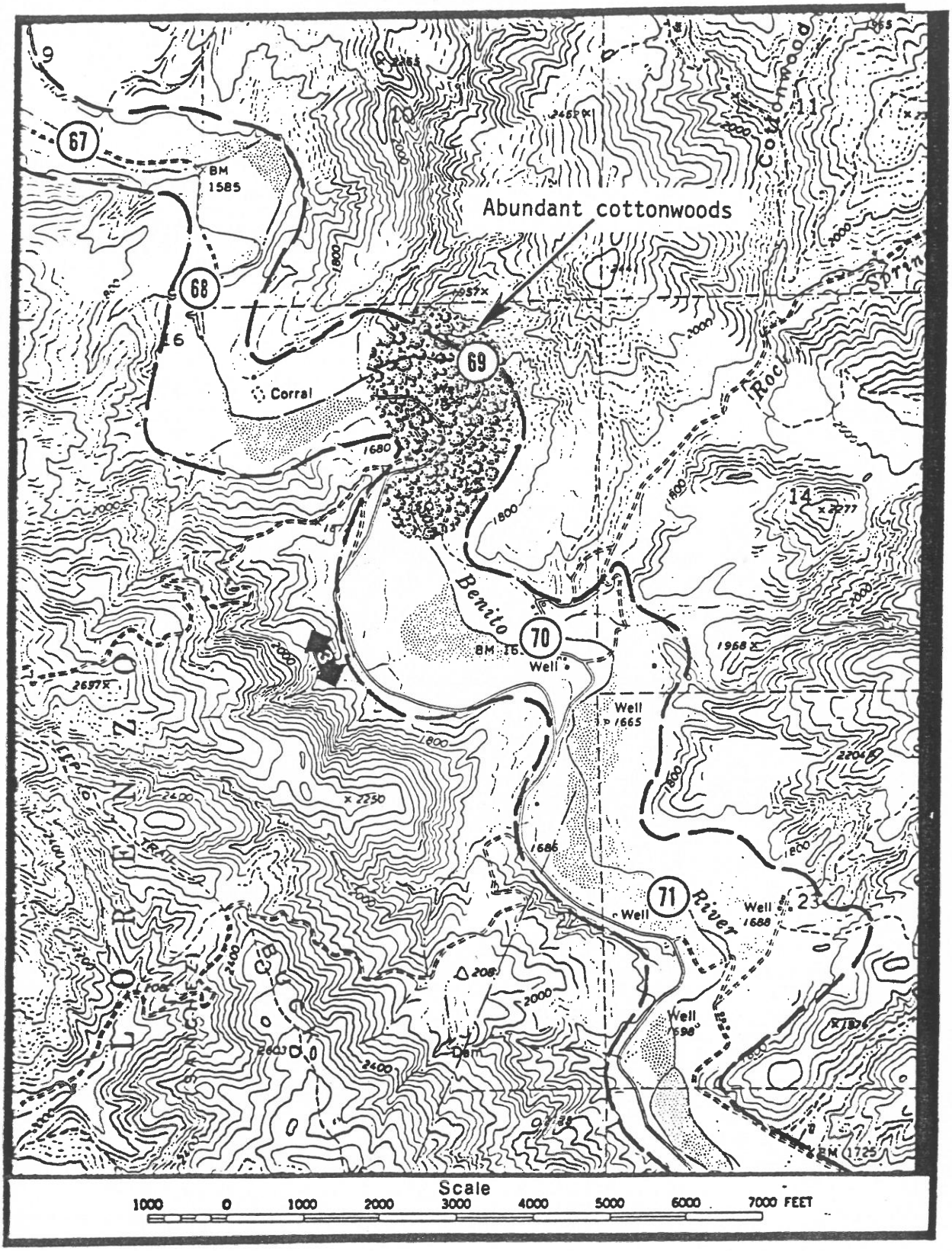


Plate SB-20

San Benito River

Rock Spring Peak Quadrangle

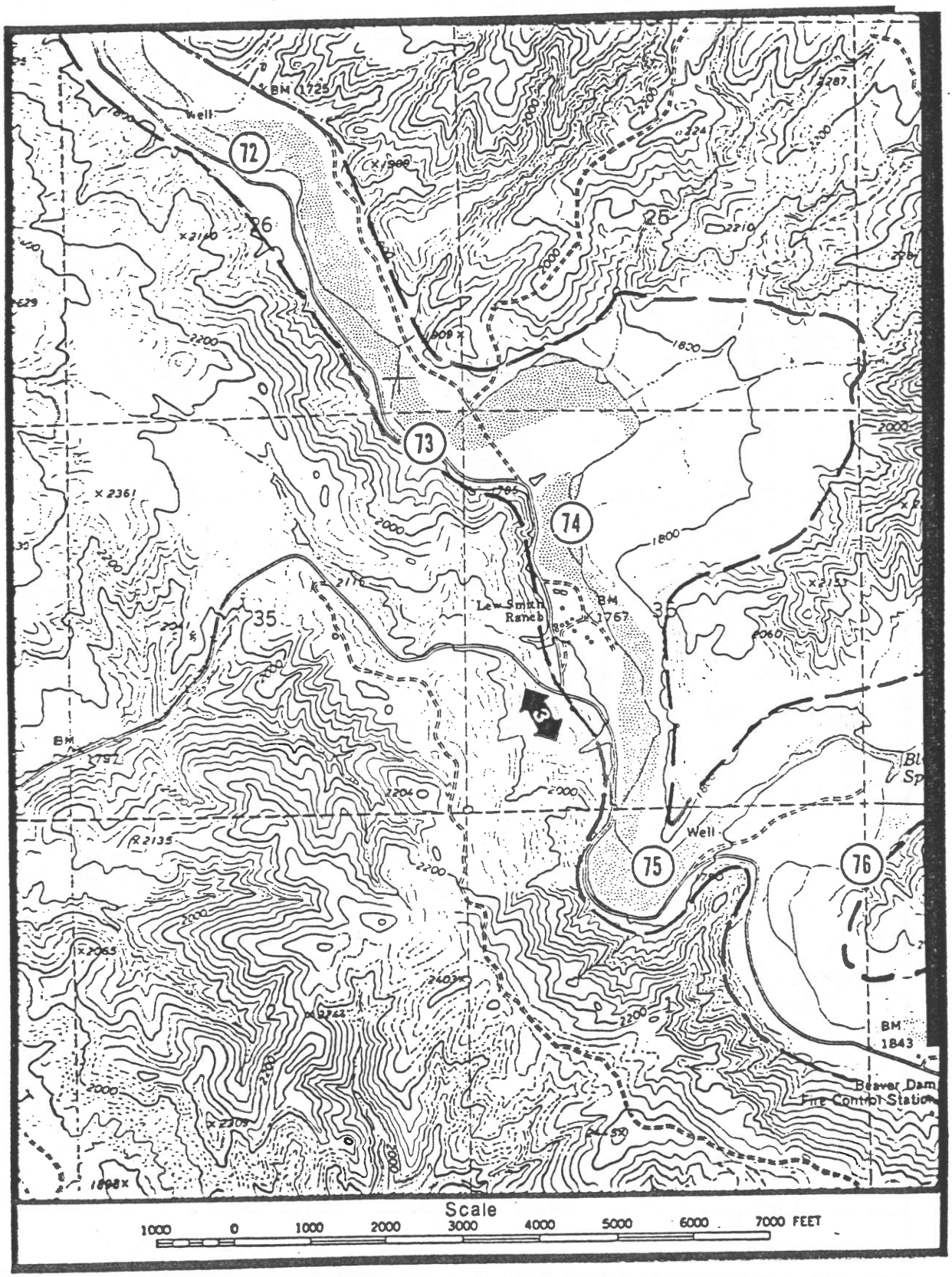


Plate SB-21

San Benito River

Rock Spring Peak Quadrangle

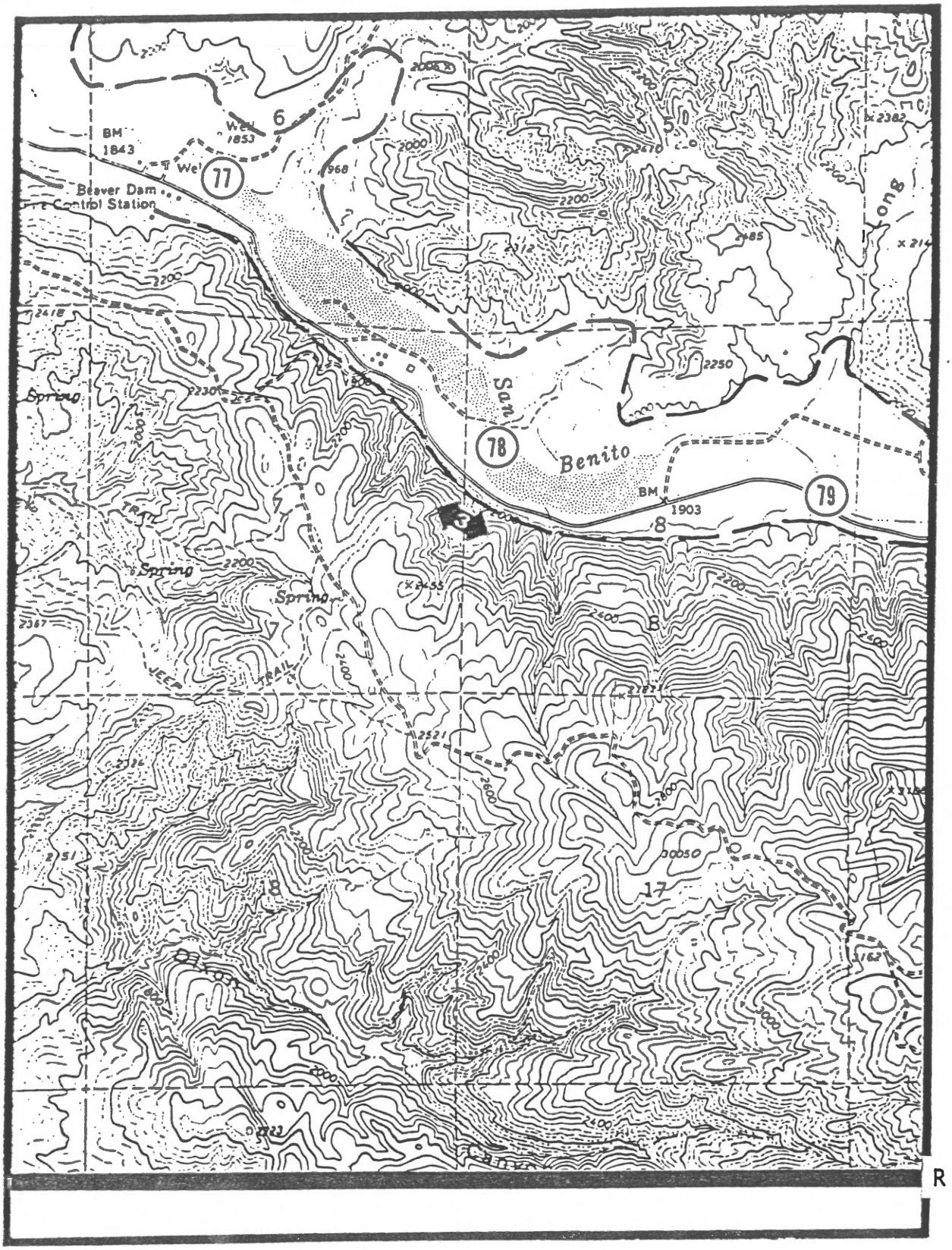


Plate SB-22

San Benito River

Rock Spring Peak Quadrangle

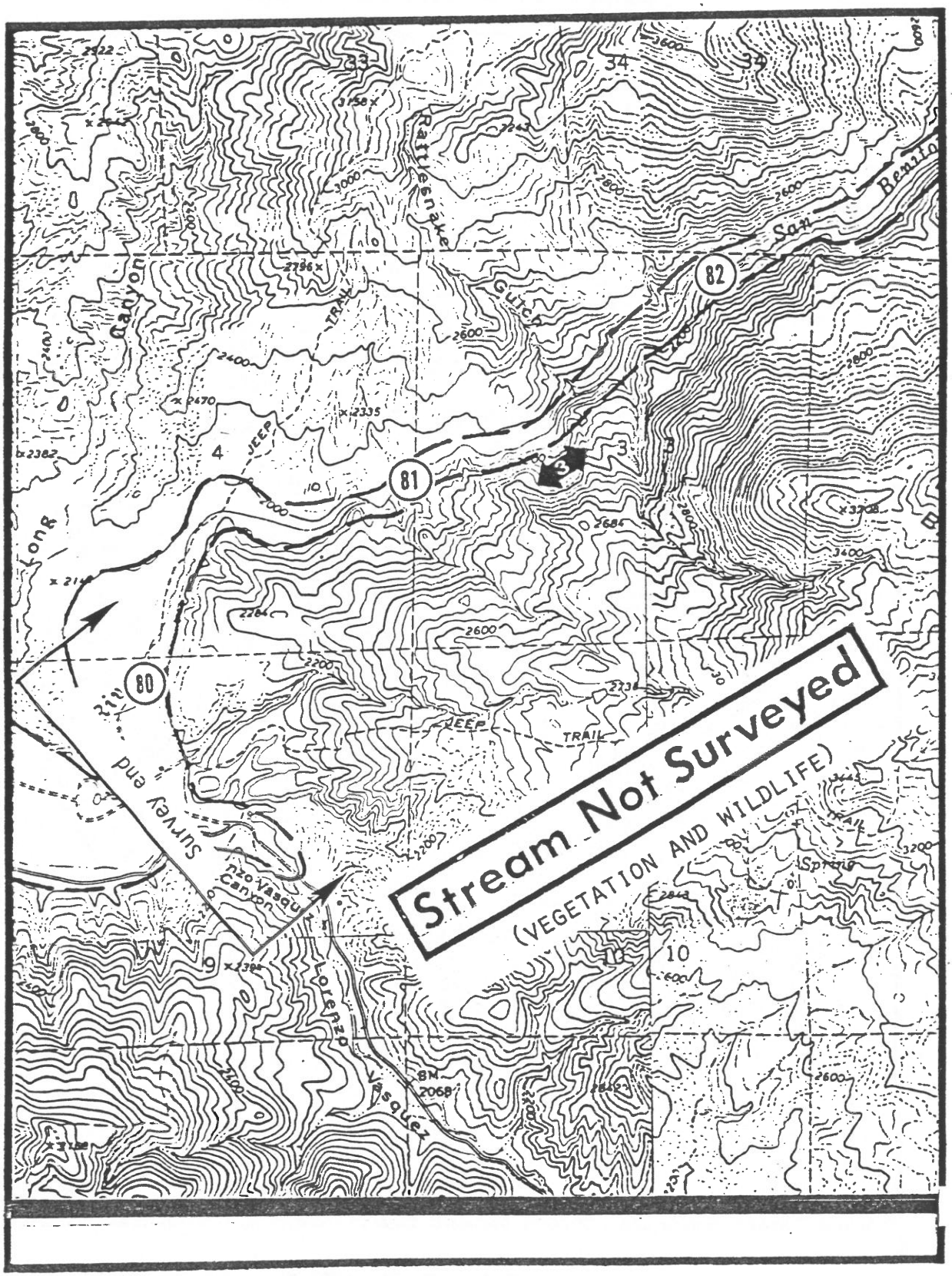


Plate SB-23

San Benito River

Hernandez Reservoir Quadrangle

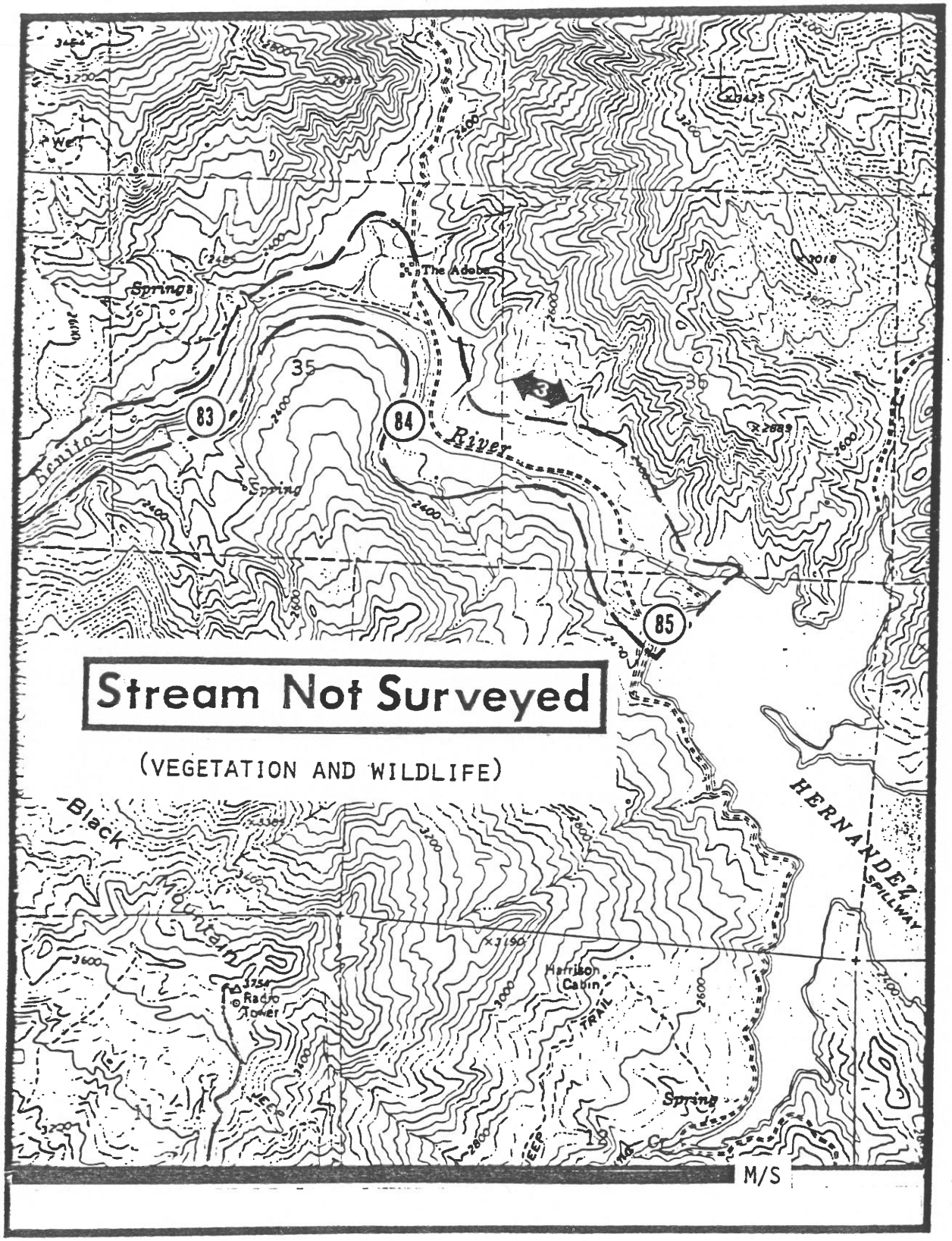


Plate SB-24

Diversion (D)

Diversions alter amount or seasonal pattern of streamflow. As such they affect flows for migration, spawning and rearing, but also may affect flushing of sediment and temperature or turbidity of flows for miles downstream. Most small diversions are for domestic or agricultural use. However, Watsonville has large appropriative diversions on Browns and Corralitos Creeks. Reservoirs on Uvas, Llagas and Pacheco Creeks and on the San Benito River store water for groundwater percolation; Uvas Reservoir diverts a portion of its storage to Llagas Creek.

Excavation or Quarrying (EX)

Excavation within the stream channel or adjacent riparian zones for gravels or sand can result in alterations in riparian and aquatic vegetation and may also affect turbidity, stream substrate and water temperatures. The ponding of water in quarries also can greatly increase percolation rates (such as on Uvas Creek) and reduce streamflow downstream.

Fishing Pressure (FP)

In a few locations in the river system (Uvas Creek and Sprig Lake) heavy fishing pressure is sufficient to reduce smolt production. Elsewhere, poaching at barriers is probably significant but its extent and impact are not known.

P. 197-198 missing

Flow (FW)

Low flows during spawning or rearing seasons are one of the major habitat problems in the drainage. Flow reductions during rearing reduce pool and riffle depth, surface turbulence as a source of cover, insect production, and availability of fast-water feeding stations. Flow also affects water quality and temperature. Much of the low summer stream flow is natural, but diversions, as well as groundwater pumping and fire suppression, contribute to reduced flows. Since most stream sections in the basin have flow problems these problems were rated, but not mapped.

Grading (GD)

Reworking the streambed to alter stream bottom configuration or to remove riparian vegetation is practiced for flood hazard reduction. Besides altering substrate and pool characteristics, grading is probably responsible for increased percolations and reduced streamflow. Grading is periodically practiced in several lowland stream reaches, especially of the lower Pajaro River. An evaluation of the relationship of channel vegetation to flood control concerns and to wildlife habitat is give in Appendix C.

Gravel Recruitment (GR)

Grading and dam construction alter bedload movement resulting in "unnatural" net export of gravels necessary for spawning. This problem occurs below Pacheco, Chesbro and Uvas Reservoirs.

DESCRIPTION OF PROBLEMS BY STREAM

Pajaro River

From the mouth to the sewage treatment plant the levees prevent development of marshy wetland (fresh and saltwater) habitat. Rare spills from the Watsonville sewage treatment plant represent the major water quality problem. From the sewage plant to downstream of Aromas, channelization and streambed grading have resulted in extensive percolation and reduced streamflows in spring. This often causes a significant barrier to downstream migration of steelhead smolts. A portion of the stream up and downstream from Murphy's Crossing is normally dry in summer. The wide channel and riparian vegetation removal (except for a narrow strip on the levees) result in high summer stream temperatures in areas with summer flow. Due to the removal of riparian vegetation, and the predominately sand substrate, pool development is poor.

From below Aromas to Highway 129, grading is minor and the riparian border is quite dense. Stream temperatures are marginal or excessive for steelhead, but turbidity is low enough for Sacramento squawfish and threespine sticklebacks. Occassional steelhead spawning and rearing take place despite the generally poor sand/silt substrate; sediment from quarrying above Aromas has been a problem in the past. Perennial flows are almost always present, although the lower portion of the reach did go dry in 1977.

From Highway 129 to Highway 25 riparian vegetation is generally dense and the corridor quite wide. In 1982, nearly all riparian vegetation on the north side of the river was removed from Highway 101 to the mouth of Carnadero Creek. Extensive sedimentation has reduced pool depth (few pools are greater than three (3) feet deep) and resulted in turbidities too high for squawfish or stickleback. Trout would be unable to use the area even if the high temperatures were reduced and flows and dissolved oxygen increased.

Upstream of Highway 25 riparian vegetation progressively decreases. Water quality is poorer than downstream because of reduced summer flows; from Llagas Creek to San Felipe Lake the stream is merely a leveed drainage channel with little flow, even in winter.

Salsipuedes/Corralitos Creek

From the mouth to Highway 152 most of the stream channel is leveed and most riparian vegetation has been removed. The low perennial flows are too warm for rearing steelhead, but substrate does allow steelhead spawning. From the mouth to Highway 129 riparian vegetation has been left on the levees and some juvenile steelhead survive until mid summer before being eliminated by warm water temperatures.

From Highway 152 to about one (1) mile above Green Valley Road the stream is well shaded, but very low flows and high water temperatures severely limit steelhead rearing. Steelhead did survive within the reach in the summers of 1973, 1974, and 1978.

From one mile above Green Valley Road upstream to the City of Watsonville diversion dam (BM2) the stream is usually dry or has severely reduced summer flows. In 1981 the entire September flow (except for small leakage) of Corralitos Creek was diverted. In the lower portion of this section, pool development and substrate are below average. If summer streamflow were available, these factors, along with high water temperatures, would reduce steelhead production with the effects generally increasing downstream. Extensive riparian cutting, vegetation loss, and bank erosion occurred in January 1982 within the section; bank stabilization projects by the Soil Conservation Service were conducted in Summer 1982.

From the diversion dam upstream to Rider Creek the major problem is the excessive sediment from Rider Creek. In late spring most of the stream bottom becomes smothered with Rider Creek sand when Corralitos Creek flows become too little to flush the sediment. The diversion dam (BM-2), in the past, presented a formidable barrier to access upstream and may have significantly restricted spawning in some years. It has been (1982) modified to repair storm damage and ease steelhead passage. The dam and a culvert upstream (BM-3) are sites of very heavy poaching of adult steelhead.

Upstream of Rider Creek major sources of sediment include Clipper Gulch and especially Eureka Gulch. Apparently these tributaries contribute sediment only in winter and early spring storm events. Numerous slides occurred in this section in January 1982. Flows decrease upstream but pool development and

substrate also generally improve. The culvert road crosssing above Rider Creek (BM-3) is a substantial barrier which was worsened by lowering of the pool level since January 1982.

Rider Creek, Clipper Gulch and Eureka Gulch have barriers and poor substrate which prevent their use for steelhead rearing. Their significance is primarily as sources of sediment.

Corralitos Creek upstream of Shingle Mill Gulch has low summer flows and somewhat restricted pool development. As the gradient increases boulder barriers (B5-11) block upstream access; 3 of the barriers (B5-7) were formed in 1982.

Diablo Gulch is inaccessible to adult steelhead due to a large boulder barrier (B1). Two other smaller barriers (B2, B3), low summer stream flows, and poor to fair pool development would limit steelhead rearing success to levels similar to upper Corralitos if access were available.

Shingle Mill and Rattlesnake Gulches suffer most from low summer streamflows. Pool development, however, is generally good. A bridge apron (BM1) near the mouth of Shingle Mill Gulch and a rock falls (B2) and washed out concrete dam (BM4) restrict access by adult steelhead to periods of high flow.

Browns Creek

Summer flows throughout Browns Creek are low compared to Corralitos Creek (less than 0.15 cfs in 1981). In 1981 pool development was poor to fair in much of the stream above the diversion dam. Landslides in January 1982 degraded pool depth and substrate in the lower half of the stream, but partial

recovery has occurred. Similar degradation appears to have occurred downstream of Gamecock Canyon.

The diversion dam (BM1) on Browns Creek is a substantial barrier, even when it is intact. It has been remodeled to ease passage and to repair 1982 storm damage to the jump pool at the base of the fish ladder. Poaching is common at the barrier.

Redwood Canyon is not accessable to steelhead due to log jams, but low flows and poor substrate would severely limit steelhead spawning and rearing quality. The stream is a major source of sediment to Browns Creek.

Ramsey Gulch and Gamecock Canyon each have relatively low summer flows with 0.8 to 0.9 miles of habitat accessable downstream of barrier clusters in high gradient areas. Within the "accessable" portions of each stream significant barriers (B1-4 in Ramsey and B1-6 in Gamecock) are present, which block adult steelhead access except at high flows. Significant diversions for agricultural use exist on Gamecock Canyon.

College Lake

College Lake presently is drained in summer for agriculture; if restored it would provide habitat for warm-water fish and for waterfowl. Drainage channels do provide access upstream to Green Valley and Casserly Creeks for steelhead during winter.

Green Valley Creek

From College Lake upstream to the second crossing of Green Valley Road, summer stream flows are limited and water

temperatures are marginal for steelhead rearing. Substrate is substantially degraded, but riparian canopy is intact.

From the second road crossing upstream to the fifth road crossing the stream is normally dry in summer. At the second and fourth bridge crossings drop structures form barriers (BM1 and BM2) which allows access upstream on peak winter flows only.

From the fifth road crossing upstream to impassable barriers (B4 and B5) in the headwaters the major habitat problems are the very low summer flows and partially silted substrate. Landsliding occurred in January 1982, and some riparian cutting occurred near Simas lake in response to January flooding.

The tributary which parallels Hazel Dell Road has very low summer flows and is dry in drier years (1981).

Casserly Creek

Most of the lower portion of Casserly Creek (from the mouth to below Mt. Madonna Road) flows through agricultural land and the channel is partially leveed, and significant riparian cutting has occurred. Summer water temperatures are probably too warm for steelhead due to low streamflows and lack of riparian shade along portions of the stream. Substrate was substantially improved by the storms in winter 1982 and with sufficient streamflow, the section would function as steelhead rearing habitat, at least where shade is present. Casserly Creek has less winter and spring flow than Green Valley Creek so steelhead access up and downstream is restricted in dry years by streamflow. No specific barriers are present within the section, however.

From 0.3 miles below Mt. Madonna Road to the confluence of Banks and Gaffey Creeks summer streamflow is low, but the major rearing habitat problem is the lack of good pool development. The storms of winter 1982 did generally improve substrate composition by rinsing out much of the finer sediment. Two culverts are present (BM1 and BM2) in the section but BM1 presents the only major passage problem, because of the presence of a concrete apron below the culvert. A partial log jam (B3) formed in winter 1982 and may have restricted steelhead access during part of the winter.

Gaffey Creek was mostly dry in 1981 and pool development was limited, restricting rearing habitat. Significant private diversions are present, and some riparian vegetation has been cleared due to homesite developments. Two impassable barriers are present 0.4 miles upstream from the mouth, but little or no habitat exists upstream of the barriers.

Banks Canyon had very low flows in 1981 and pool development was only fair. Pools and substrate improved in 1982. Log jams (B1-8) restrict or prevent access by adult steelhead to upper portions (above channel mile 0.4) of the creek except at high flows. The stream is well-shaded, probably to the point of reducing food production. Calcium carbonate deposits, produced by algal action, have resulted in some cementing of riffle substrate. Landslides occurred on the stream prior to 1982, and significant new landsliding and log jams were produced by the storms of winter 1982. The stream is within Mt. Madonna County

Park (Santa Clara County), but apparently the area receives little use.

Coward Creek

The lower section of Coward Creek flows in leveed channel through agricultural land. The lower channel was dry in summer 1981 and most of the channel bottom is of silt and sand. Water temperatures and lack of pool development would severely limit steelhead rearing even if summer flows were present. Good flows are present during and after storms and passage upstream is probably good for adult steelhead; no specific barriers are present. Smolts would have to move downstream with or immediately after peak flows.

The upper section of the stream (Thompson Grove area and upstream) has summer flow but spawning substrate is very poor. Pools are shallow and rearing habitat is also poor (no fish were seen in 1982). Two log jams (B1 and B2) prevent access beyond mile 3.6.

Mattos Creek

The lower section of Mattos Creek is dry in summer and has considerable riparian (blackberries, etc.) encroachment into the channel. The stream has little flow, except during storms, so passage would be possible only if no barriers were present. However, a culvert (BM1) and a log jam (B3) probably restrict or prevent access. An abandoned, silted-in dam, whch is 9 feet high, is present 1 1/2 miles from the mouth.

Despite perennial flows in upstream areas, pool depth and substrate are poor; both spawning and rearing would be poor (no fish were seen in 1982).

Pescadero Creek

The lower one mile of Pescadero Creek was dry in 1981; in wetter years, portions of the section would have surface flows but the low flows and generally warm water temperatures would restrict steelhead rearing habitat quality.

From mile 1 upstream to 0.5 miles above Hatfield Canyon confluence, flows were low (.1 cfs) or intermittent in 1981. Pool development was generally fair, so rearing quality would substantially improve in wet years. Some logging takes place near the stream and logging slash did produce jams in 1979; no barriers were found in 1981, however. Several small, natural oil seeps are present.

The stream was dry in summer 1981 from 0.5 miles above Eatfield Canyon upstream to the ranch road crossing. In wetter years surface flows should be present, but pools would generally be warm and shallow. Some steelhead rearing (especially of juveniles) should take place.

From the road crossing upstream 0.8 miles, surface flows were present in 1981. The lowermost portion of the section is poorly shaded, but high water temperatures did not preclude steelhead rearing. Fair to good pool development and improved flows in wet years provide for good steelhead rearing habitat. Log jams were removed from the section (and upstream) in 1979. A single partial log jam (B2) existed in 1981.

Upstream of an east bank tributary, 0.8 miles above the ranch road crossing, no surface flows were present in 1979 and 1981. The higher gradient upstream provides for good pool development if surface flows are present, but also would restrict steelhead access and spawning. The perennial east bank tributary has an impassable barrier near its mouth.

There is a proposal (Monterey County) for a dam and reservoir on Pescadero Creek which would block off a major portion of the stream's spawning and rearing habitat.

Tar (La Brea) Creek

From the mouth upstream to Highway 101, Tar Creek is merely a ditch with little or no riparian vegetation on the top of the bank. Willows, cattails, and other riparian plants are present within the channel in the upper portion of the section. Summer flows are present in most of the channel, partially due to irrigation runoff. Stream water temperatures are warm, and the substrate is primarily silt and clay. Some juvenile steelhead may persist in the upper portion of the reach in wet years, despite the warm water temperatures.

From Highway 101 upstream to the Ranch road crossing no surface flows were present in 1981, but intermittent flow was present in 1979. In wet years the wet-shaded, but shallow and silty stream provides steelhead rearing habitat. An oil well is located near the upper limit of the section and a soil dam (BM12) and some riparian cutting resulted from oil field activity in

1981. There may be some water quality problems associated with the oil field and with natural seeps.

From the bridge crossing, upstream, flows increase (the lower 1.2 miles of stream channel was dry in summer 1981) providing better rearing habitat. Pool development and stream substrate (very silty in 1979 and 1981) are below average. Although the stream is well-shaded, low flows in drought years may also cause some water temperature problems.

The upper 0.65 miles of accessible channel (below BM2, a small concrete dam) has perennial flows due to seepage from the Sargent Fault. The stream bottom has a large percentage of silt.

Carnadero/Uvas Creek

From the mouth to near Thomas Road summer flows are generally restricted to a short stretch of stream channel above and below Highway 25. Water temperatures and oxygen levels (due to excessive algae growth) are unsuitable for steelhead within this short perennial section; the section also receives some irrigation runoff. The lowermost portion of the stream channel has been channelized, graded and all riparian vegetation has been removed. Substantial sediment from agriculture is washed into lower Carnadero (and the Pajaro River). A concrete slab, with concrete blocks downstream, (BM1) at the Southern Pacific rail crossing is a barrier to adult steelhead at low flows. Significant poaching may also take place at the barrier.

From Thomas Road to Miller Road (and sometimes as far upstream as Highway 152) surface flows are absent in dry years.

In wet years, low flows and warm water prevent steelhead rearing in the section. At the present time much of the levee vegetation (Eucalyptus) and some of the channel vegetation (Arundo) is introduced. A stream channelization project (U.S. Army Corp. of Engineers) is planned for the section.

From Miller Road upstream to 0.5 miles above Santa Teresa Blvd. the stream channel was quarried in the past for gravels. Several of the quarry pits were as deep as 20 feet in 1973, but most are now less than 6 feet deep due to filling by bedload movement. The shallowness of the quarries, the lack of shading, and the relatively low flows in the section in most years result in water temperatures which are probably marginal for steelhead rearing. When the quarries were deeper and releases from Uvas Reservoir high (summer of 1973) the quarries were utilized as rearing habitat. Offroad vehicle use is heavy along this stream section (and further upstream), resulting in some destruction of the streambanks and riparian vegetation.

From 0.5 miles above Santa Teresa Blvd. upstream to 0.65 miles above Highway 152 surface flows are usually present during the summer. In years of high reservoir release (1973, 1978, 1980) the section provides substantial steelhead rearing habitat despite high water temperatures. Most of the stream channel is poorly shaded, but food and fast-water feeding areas are abundant in high flow years; steelhead growth rates are high in the section with most fish reaching 6" long by September. Fishing pressure for these juvenile steelhead is also high within the section. In low flow years (1975, 1979, 1981) the lack of fast-

water feeding areas and high water temperatures prevent, or severely restrict, use by juvenile steelhead. Spring 1982 storms produced substantial bank erosion and riparian vegetation loss within this portion of stream; the Soil Conservation Service graded and rerouted the stream above Highway 152 in November 1982.

From 0.65 above Highway 152 upstream to Watsonville Road (and the mouth of Little Arthur Creek) shade progressively increases. Substrate for spawning and insect production is good due to flushing flows from Little Arthur Creek. In years of high releases from Uvas Reservoir this section is probably the most productive rearing habitat in the creek. In low flow years fast-water feeding areas disappear and water temperatures increase and rearing habitat quality sharply declines. Riparian cutting at the Watsonville Road bridge took place in 1982 as a flood control measure (Santa Clara Valley Water District).

From Watsonville Road upstream to Uvas Reservoir the stream is generally well-shaded, but substantial riparian cutting (and apparently streambank grading) is taking place, associated with homesite development and road crossing protection. Besides increasing water temperatures, this cutting has eliminated valuable overhead and escape cover for juvenile steelhead and other species. Homesite development has also increased erosion and sediment inputs to the creek. Habitat quality in this reach is strongly dependent upon the quantity and quality of water releases from Uvas Reservoir. The reservoir has also blocked gravel recruitment, and the lack of spawning gravels is

especially significant in the first 1-2 miles below the dam. Fishing pressure on juvenile steelhead is now significant due to homesite developments along the creek.

A portion of the water stored in Uvas Reservoir is transferred to the Llagas Creek basin for groundwater percolation. The loss of this water, the timing of its transfer to Llagas basin, and variation in releases from Uvas Reservoir from year to year, limit steelhead production downstream of the reservoir. Because the water temperatures below the reservoir are warm and insect production is low (due to poor substrate and low riffle frequency), fast-water feeding areas are critical for juvenile steelhead rearing. The dam has also reduced flushing flows and allowed accumulation of sediment downstream. This problem is aggravated because Uvas Reservoir (as do the other reservoirs in the Pajaro River system) captures turbid flood peaks and then releases the turbid water downstream over a period of several months - resulting in fine silt deposits in pools and on algae, reducing insect production. Prior to reservoir spilling, low winter flows often limit access by steelhead upstream of Little Arthur Creek. In addition, when the reservoir spills in spring the warm surface waters drastically reduce steelhead hatching and early rearing success. When water is released from the bottom of the reservoir it is cooler and does not present this problem. Uvas Dam blocks access to about 7 miles of high quality steelhead spawning and rearing habitat above the reservoir.

Bodfish Creek

From the mouth upstream about 1.5 miles, surface flows are generally absent in summer due to streambed percolation. In wet years some flow or intermittent pools exist in the upper portion of the section. At the upstream limit of the section a flashboard dam (BM2) with a two step base is a significant barrier to adult steelhead at low flows.

From 1.5 miles above the mouth upstream to Whitehurst Road, some summer flows are present in most years. The section was dry in 1972, 1976, 1977 and very low flows were present in 1979 and 1981. Because of low flows water temperature may be a problem.

From Whitehurst Road upstream to 0.6 miles above the confluence with the Sprig Lake tributary surface flows are usually present. Portions were dry in 1972, 1976, 1977 and 1981. Pool development generally increases upstream with increasing gradient. Landsliding and substantial filling of pools occurred with the January 1982 storm, but most pools have already returned. Diversion of water to Sprig Lake by the Santa Clara County Parks and Recreation Department (Mt. Madonna County Park) occurs in some years, reducing flows in about 0.4 miles of stream. Several boulder falls (including B3, B4, B6) and partial log jams presently exist in the section.

A 0.15 mile steep section of channel exists starting 0.6 miles above the Sprig Lake tributary. Several boulder falls (B7-11) exist in the section, and at least two (B10 and B11) and possibly a third (B7) are impassable.

From the steep section upstream one mile to where Bodfish Creek leaves the road, the streambed is quite level and most pools are shallow. Substrate quality improved with the January 1982 storm and gravels are now abundant. A single partial log jam (B12) exists in the section.

From the road upstream two miles summer streamflows were very low in 1981 (portions of the stream were intermittant) but pool development is good. There are small diversions associated with homesite development and three flashboard dams (BM 14, 15, 16) are present. Numerous log jams were present (B12, 13, and 17-22) in 1981 and at least one (B17) appears impassable.

A west bank tributary to Bodfish Creek, which parallels Highway 152, has low flows, shallow pools, and substrate problems due to landslides and road runoff. Only 0.3 miles of the tributary is accessible to steelhead due to high gradient and many barriers.

Sprig Lake provides good to excellent rearing habitat for juvenile steelhead in most years, despite the high water temperatures. A catchable trout fishery in the lake results in heavy fishing pressure on juvenile steelhead in late summer when the fish become catchable size. The lake is drained in October and generally filled in May, but the culvert outlet (BM1) is a barrier to upstream access at low flows.

Blackhawk Canyon has low flows and generally poor pool development, although the storms of winter 1982 did increase pool development. One boulder falls (B2) 0.5 miles upstream restricts adult steelhead access, but 0.3 miles above it the stream

gradient is steep and many barriers (including B3 and B4) are present. Several partial log jams are now also present. Landsliding and runoff from a dirt road have resulted in siltation of the pools in the upper portion of the stream. Blackhawk Canyon provides important spawning habitat; most of the fry may move down to Sprig Lake for summer rearing because of lack of pools in Blackhawk Canyon.

Little Arthur Creek

Most of the creek from the mouth upstream to Pickel's Dam (BM1) goes dry in summer. Some warm, intermittent stretches exist in wet years, and surface flow is present for 0.1 mile below the dam, even in dry years. Spawning is somewhat limited immediately below the dam. The dam, which is used to provide irrigation water, is a complete barrier to fish passage upstream.

From Pickel's dam upstream to the second road crossing (Redwood Retreat Road) summer flows are very low and much of the streambed is dry in dry years.

From the second road crossing upstream to Old Watsonville Road, surface flows are present in all but the driest years. Pool development is limited and water temperatures may be high in portions of the section. The section would provide generally fair to good steelhead rearing if access were provided.

From the Old Watsonville Road crossing upstream to the end of the paved road, summer flow is almost always present and pool development is good. Numerous flashboard dams (BM3-8) and diversions are present, but the section would provide good

steelhead rearing habitat if access were provided. Several private fords and flashboard ponds (BM7) may be significant sources of sediment.

From the end of the paved road upstream, gradient and pool development progressively increase. Barriers (B12-16+) become numerous in the upper portion of the section and would block steelhead access. A dribbler dam (BM9), two concrete drop structures (BM10, 10A) and a treeroot/boulder jam (B11) would be significant barriers in the lower-gradient portion of the section.

Llagas Creek

From the mouth to the sewage treatment plant warm summer flows are always present. The stream is generally turbid and oxygen levels can be quite low. Although the reach has been channelized, a low flow channel exists and an extensive cattail marsh and associated wildlife are present. Pumping of groundwater into the creek has been allowed by the Water Quality Control Board to increase percolation from the sewage lagoons.

From the sewage treatment plant upstream to Monterey Highway, the extent of surface flows depends upon releases from Chesbro Reservoir. Even in wet years, over half of the reach is dry. In very dry years the entire channel is dry in summer. The reach requires heavy rainfall, and usually spilling of Chesbro Reservoir, before surface flow is restored throughout the reach in winter; the reach is therefore a substantial barrier to adult steelhead and especially to down-migrating smolts. Summer water

temperatures are too high to allow steelhead rearing within the reach, but warm-water species are present. Most of the channel is presently leveed and poorly shaded. Additional channelization and channel modification (Soil Conservation Service) are planned for the reach.

From Monterey Highway upstream to Chesbro Reservoir, summer flows are usually present due to releases from the reservoir (and from a transfer pipeline from Uvas Reservoir which enters downstream of Watsonville Road). As with Uvas Creek, rearing habitat for steelhead is strongly dependent on high flows, which provide fast-water feeding habitat. Releases from Chesbro Reservoir are usually turbid (resulting in sediment problems) and often very warm in late summer. The reservoir also blocks flushing flows (it does not spill in about one year in four) and causes a moderate to severe gravel recruitment problem. Homesite developments in the Paradise Valley area have caused increased sediment problems and may present problems due to road crossings; one ford (BM1) presently blocks adult access at low flows. Extensive riparian cutting for flood control in 1982 reduced cover for fish, habitat for wildlife and slightly reduced shade from near Machado School upstream to the dam.

Machado Creek is a small tributary which goes dry in summer, but has provided steelhead spawning in the past. Most of the fry are stranded and have depended upon human assistance (such as by George Britton in 1973) to reach Llagas Creek.

Miller Canal

Miller Canal provides the access between the Pajaro River and San Felipe Lake during winter when runoff is sufficient to cause San Felipe Lake to spill. It is often dry or merely a stagnant ditch in summer. A two step concrete slab (BM1) blocks access upstream at low flows.

San Felipe Lake

San Felipe Lake provides steelhead passage from Miller Canal to Pacheco Creek and Tequisquita Slough. Although the lake size has been substantially reduced in the past by agricultural development, it provides a permanent (although it did go dry in 1977) warmwater habitat for fish and abundant waterbirds. In wet winters the lake floods adjacent level farmland to more than triple in size.

Pacheco Creek

From San Felipe Lake to near Highway 156, Pacheco Creek is normally dry in summer. The lower portion, near San Felipe Lake, has been channelized, and some grading and riparian cutting take place. Because the gravel channel is wide and level, fairly high flows must be present to allow fish passage.

From Highway 156 upstream to Casa de Fruta, the temperature of summer flows (when present) is usually marginal for steelhead rearing. Unless releases from the reservoir (North Fork Pacheco Lake) are unusually heavy, fast-water feeding areas are also rare. An abandoned concrete dam (BM1) within the section is a

significant barrier to upstream migration of steelhead, except at very high flows.

From Casa de Fruta upstream to Bell Station summer rearing habitat improves as flows increase and water temperatures are reduced. Presence and extent of rearing are dependent upon stable, large releases, maintainence of pools and runs with good cover, and abundant deep riffles for feeding. There is presently one floodplain gravel extraction operation near the mouth of Cedar Creek (and along Cedar Creek); channel configuration has been modified and channel morphology destabilized. Other gravel extraction plans have been proposed.

Immediately upstream from the Casa de Fruta complex extensive riparian vegetation removal and channel grading have taken place. This recent destruction of riparian corridor vegetation occured prior to the property owner receiving a 1602 streambed alteration permit from the Department of Fish and Game. The present channel is now wider and may present passage problems for steelhead at low flows. The property owner was cited and fined but a permit for 1982 was granted.

From Bell Station upstream to the North Fork, summer flows and water temperatures are usually suitable for steelhead rearing, and in some years (1973, 1975, 1982) very high densities of juvenile steelhead can be present. Growth rates can also be very high. Even in drought years, surface flows are present in the upper portion of the section, although no steelhead rearing can take place due to high water temperatures and lack of fast-

water feeding areas. Road building (widening of Highway 152) is a source of sediment.

From the North Fork upstream to the South Fork, Pacheco Creek is normally dry by late summer. From the South Fork confluence upstream 0.5 miles some surface flows are usually present, especially in the upper part of the section, below Pacheco Pass. Impassable falls (B3, B4) prevent steelhead access further upstream, along Highway 152.

The short stretch of the North Fork downstream of the North Fork dam has several deep pools, but fast water feeding areas are rare. Spawning gravels within this short section are absent due to blockage of recruitment by the dam.

The North Fork dam and reservoir store water for groundwater percolation in the streambed downstream, but several operational procedures often reduce the effectiveness of summer flows for steelhead rearing. First, very low releases are often provided in late spring to dry portions of the streambed downstream, for algae suppression and improved percolation. The lack of flows, and the warm water temperatures which often result (to 80^0+), can severely reduce or eliminate the steelhead fry, making the suitable summer releases useless. Second, because the stream is generally poorly shaded, cutoffs of flow in late summer or in fall can also result in high water temperatures and severe juvenile steelhead mortality. Although turbid water from the reservoir is often a problem in winter, spring, or late summer, the silt is rinsed out in winter by the unregulated flows from

the main stem of Pacheco Creek and from the South Fork. For the same reason, gravel recruitment is not a significant problem.

The South Fork of Pacheco Creek has been checked only partway (about 2 miles) upstream. A boulder falls (B1) at mile 1.2 is probably a complete barrier to steelhead access. The lower portion of the South Fork is intermittent and in portions water temperature is high. There is some sediment from the Pacheco Tunnel construction operation.

Cedar Creek

At the mouth of Cedar Creek streamflow percolates through the gravels, requiring fairly high flows (>5 cfs) to provide steelhead access. Gravel extraction took place in January 1983 in the stream channel on lower portion of Cedar Creek. This may affect channel configuration and fish passages. Downstream of Hagerman Canyon the stream is usually dry in summer.

From Hagerman Canyon upstream surface flows are apparently present in most years. The stream was surveyed in 1973 when low summer flows (and steelhead) were found in the lower portion of the reach. In 1982 it was surveyed 3 1/2 miles upstream. Two boulder falls (B1, B2) near mile 2 1/2 are probably barriers to steelhead except at very high flows.

Tequisquita Slough

Major portions of this stream, between San Felipe Lake and Arroyo dos Picachos and Arroyo de Las Viboras are dry in summer. Winter flow throughout the slough is primarily associated with,

and immediately after storms, and this fact, along with localized cattail congestion, make steelhead passage difficult. The problem appears most serious between San Felipe Lake and Frazer Lake Road, where the channel is shallow and poorly defined; channelization may actually improve steelhead passage.

Arroyo dos Picachos

Whether steelhead still use this stream for spawning and rearing is not known. The stream from 0.2 miles below Lone Tree Road, upstream, offers good rearing habitat. From the mouth upstream to below Lone Tree Road the channel is dry in summer, and rapid percolation may restrict steelhead passage substantially in winter and spring. A boulder falls (B5) is probably a complete barrier to access further upstream.

Arroyo de las Viboras

From the mouth to one mile above Fairview Road the stream is dry in late spring and summer. Unused dams at miles 2 and 2 1/2 (BM5, BM6) block steelhead access to perennial habitat upstream. No suitable rearing habitat is now present below the dams due to low flows and high water temperatures. Adult steelhead do occassionally enter the stream (one was seen at BM1 in March 1982).

San Benito River

From the mouth upstream to Prescott Road, the San Benito River is dry in summer (and most of the rest of the year).

Portions of the channel here and upstream have been graded and sand quarrying appears to be taking place. From Prescott Road to Hollister surface flows are normally present in wet years only.

From Hollister upstream to Hernandez Reservoir the extent and timing of surface flows is dependent upon releases from the reservoir. Even in extremely dry years perennial sections exist where the stream occurs in the San Andreas Fault zone. Water temperatures, even during years of high releases, are too warm for juvenile steelhead. When the Hernandez Reservoir water level is low large amounts of silt are released downstream, causing loss of fish populations in the first several miles below the reservoir.

FUTURE THREATS TO HABITAT

In addition to present problems in the Pajaro River watershed, new problems may arise as population increases, land uses are altered, and water demands are increased. The following possible future threats should be considered in developing management options:

Pajaro River

Increased homesite and other urban development along tributaries to the pajaro River (especially along Llagas and Uvas Creeks) will result in increased storm runoff from impervious surfaces. The increased runoff, along with channelization projects which will speed the runoff downstream, may significantly increase flood hazard along the lower Pajaro River channel. The increased hazard may intensify pressures for more intensive flood control measures (increased riparian cutting, channel grading, or levee modifications) in the channel near Watsonville.

Increased water demands in the lower Pajaro River basin have resulted in proposals for diversion of river water to an off channel reservoir (the proposed Pescadero Reservoir) and to percolation basins. These proposed diversions may alter passage flows for adult steelhead and especially for smolts migrating downstream in spring. Because of low water quality, summer flows

will probably not be diverted, so summer habitat for native warm-water fishes should not be affected.

Future imports of water into the basin (San Felipe Project) may result in the introduction of new fish species to the basin. At the present time a limited amount of water from the Coyote Creek watershed is diverted to the basin (from Anderson Reservoir into Little Llagas Creek) for percolation. If additional imported water is supplied to perennial channels, Mississippi silversides, striped bass and other non-native species may become established within the basin; native fish associations may be adversely affected. In addition, the California roach, hitch, and Sacramento suckers present in the Pajaro River system are of different subspecies than those of the San Francisco Bay and Central Valley basins. Interbreeding between related subspecies may affect scientific studies of the taxonomy of the species involved.

Salsipuedes/Corralitos Creek and Browns Creek

Portions of upper Corralitos and Browns creek watersheds are extremely prone to erosion (especially along Rider Creek and Redwood Canyon). Any increase in homesite development, or agricultural devlopment (vineyards and orchards) without adequate planning and erosion controls, will increase landsliding and erosion from roads and cleared areas. Because of locally favorable soils and tax laws the potential for future agricultural development is great; erosion potential on agricultural land is at least as high as from homesites. At some locations,

including on Rider Creek, even with best erosion controls, severe erosion will occur with development. Sediment is already the major habitat problem on Corralitos Creek downstream of Rider Creek.

Where new homesites require stream crossings new barriers can be created. Bridges which span the channel are usually the only crossing possible where the channel is deep and steep-sided. Elsewhere the temptation to use fill and culvert crossings should be resisted because stream down-cutting downstream of the culvert can produced a barrier to fish passage.

Homesite or agricultural developments can also be expected to increase smallscale diversions from already-low summer streamflows. Inadequate septic tanks may increase pollution problems; the biggest threat from any pollution is not to fish populations, but to the water supply the streams provide for the City of Watsonville.

Although the streams are already closed to fishing (except for the steelhead season in the lower portion of Corralitos Creek), increased homesite development may increase fishing pressure on smolt-sized steelhead. Poaching of adult steelhead, which is already severe at barriers, may also increase.

With state preemption of controls on logging, portions of the watershed may be logged in the future. Besides increasing sediment from erosion, logging can result in barrier formation from slash and stumps. Stream down cutting and landslides in cutover areas can also result in formation of boulder barriers.

Green Valley Creek

In the upper portion of Green Valley Creek future problems may be similar to those indicated for Corralitos and Browns Creeks. Homesite developments are likely to result in increased erosion and sedimentation as well as cutting of riparian vegetation. Small scale agriculture may also expand. Portions of the upper watershed are landslide-prone. Summer stream flows are very low, and are therefore very sensitive to diversions for domestic and agriculture use.

In the lower portion of Green Valley Creek habitat for steelhead spawning and rearing is presently marginal. The riparian corridor, however, is a valuable, nearly unbroken, habitat for wildlife. Homesite developments along the corridor will likely intrude into, and fragment, the corridor. Larger mammals, including raccoons and grey fox, which presently use the corridor, will probably be elminated.

Pescadero Creek

A proposed reservoir on Pescadero Creek would be used to store runoff from the creek and also to store water back-pumped from the Pajaro River. The dam would block access to the majority of the rearing habitat on the creek. Rearing habitat downstream of the reservoir would also be eliminated if stored water is moved through pipeline downstream to the Pajaro, rather than released down the streambed. At the present time, the creek consistantly provides fair or better rearing habitat for steel-

head. In wet years good habitat is provided downstream to near the mouth; fish densities and growth rates are probably high. In dry years rearing habitat is greatly reduced, with much of the lower streambed going dry. Even in dry years, however, the stream is important for steelhead rearing because migration into and out of the creek is still possible. In dry years many of the other Pajaro tributaries, including Llagas Creek and sometimes Uvas Creek, do not allow adequate migration passage.

Alluvial soils along portions of Pescadero Creek are potential sites of future agricultural development.

Uvas Creek

Homesite developments in the last 10 years along Uvas Creek have resulted in substantial habitat changes. Continued development will increase the problems of siltation, riparian cutting, and shade removal, channel grading, and fishing pressure. Much of the ongoing riparian cutting is to "manicure" residential lots. By leaving much of the shade (and larger trees) in place, stream temperatures are probably not substantially increased. However, fish and wildlife habitat are severely affected. The removal of bank vegetation (through cutting or grading) has resulted in bank erosion, loss of undercut bank cover, as well as the loss of the very important cover supplied by the overhanging vegetation. The natural pool/riffle streambed configuration can also be altered to produce a continuous stretch of shallow riffles and runs, which are unsuitable for steelhead rearing.

Stream crossings to residential sites have produced streambank erosion; parts of the crossing on Old Creek Road have washed out several times in the last 3 years. Riparian cutting downstream of crossings to protect them leads to further streambank erosion, channel instability, and water temperature increases. If "across the river" development is to be continued, the number and type of stream crossings must be a factor in land use planning.

Fishing pressure is a significant factor for young steelhead in Uvas Creek. Even if the streams are closed to fishing, the pressure is likely to continue; much of the fishing is by kids in their "backyards". The City of Gilroy plans a major park development in the Santa Teresa Blvd. to Miller Ave. portion of the stream (the quarry region). Fishing opportunities are an expected attraction of all water-oriented parks. Steelhead might be affected by both fishing pressure, and by development of a fishery for introduced warm-water game fishes.

Recent proposals (which were denied by Santa Clara County) have been made for gravel extraction along Uvas Creek. Past quarrying upstream from Highway 152 distabilized the stream channel and resulted in channel migration, bank erosion, and stream down cutting.

Proposals made to Gavilan Water District include construction of off-channel percolation ponds along Uvas Creek, to augment percolation capacity. Depending upon design of the diversion system, migrating steelhead smolts might be lost to the percolation ponds. Increased percolation of Uvas Creek water on

Uvas Creek, rather than export to Llagas Creek basin, however, does offer possibilities for enhancing rearing habitat.

Uvas Reservoir is one of several reservoirs being considered for utilization of hydroelectric turbines. If electricity is generated without altered patterns of water release, there may be no additional adverse impacts. However, if releases are modified to provide peaking power, there will be severe impacts upon steelhead rearing habitat (effects upon cover, temperature, food production, etc.).

Bodfish Creek

Downstream of Whitehurst Road and in the vicinity of Renz Gulch, homesite development is taking place. This development is along the lowermost perennial reaches of the creek, where summer flows are already low, and thus very sensitive to any water diversion. Homesite development may also expand along the uppermost reach of Bodfish Creek.

In the recent past, proposals have been made to log redwoods in the upper watershed of Bodfish Creek. Regulation by Santa Clara County prevented the proposed logging, but regulation has now been preempted by the State. If logging occurs, it can be expected to increase sediment problems in the creek and to alter runoff patterns.

Little Arthur Creek

Homesite developments along the upper portion of Little Arthur Creek are already producing erosion and sedimentation

problems. Diversions for domestic and agricultural use are substantial and are the cause for some conflict among residents. Continued development in the watershed might jeopardize the potential for steelhead restoration (through barrier removal).

Llagas Creek

Residential development along Llagas Creek, from the dam downstream to Watsonville Road, has increased sediment input to the creek. Some additional development will probably occur. When the steelhead run is restored in Llagas Creek, fishing pressure is likely to be a factor in smolt production.

Chesbro reservoir is also the site of possible hydroelectricity generation. As mentioned for Uvas Creek, if release patterns are not altered there will be little environmental impact; if releases are altered to provide peaking power, impacts wil be severe.

San Felipe Lake

San Felipe Lake was indicated in a report to Gavilan Water District as one possible future reservoir site. By raising the water level of the lake and producing a summer drawdown, the reservoir would elminate the dense willow border on portions of the lake and reduce aquatic vegetation. Quality of habitat for water birds would be diminished. Depending upon design and operation of the necessary dam, migration of steelhead to and from Pacheco Creek and Arroyo dos Picachos would be impaired.

Pacheco Creek

Gravel excavations have been proposed along Pacheco Creek from near the State Forestry station, upstream. Most were proposed for the flood plain, but several proposals were for excavation within the stream channel. Santa Clara County has so far denied most permits. Excavation within the channel would lead to siltation problems, destabilization of the channel (and possibly channel braiding). Ponding would increase stream temperatures and percolation and would reduce downstream extent of suitable steelhead rearing habitat. Results would be similar if additional channel modifications take place for the Casa de Fruta expansion. Sewage disposal form an expanded Casa de Fruta complex may create water quality problems.

Diversion dams and pump stations have been proposed as possible future sources of water for Gavilan Water District. One proposed site is on the South Fork, the second is near Bell's Station. If diversion took place only during high winter flows the major impact would be upon migration passage (due to reduced flow and to diversion facilities).

If additional public access (or residential expansion) were allowed, fishing pressure on smolt-sized steelhead might become an important factor in steelhead production.

HABITAT PROBLEMS BY STREAM

Legend

B	Natural Barriers
BM	Artifical Barriers
C	Channelization
D	Diversion
EX	Excavation or Quarrying
FP	Fishing Pressure
GD	Grading
GR	Gravel Recruitment
IV	Introduced Vegetation
LS	Landslides
ORV	Offroad Vehicles
RC	Riparian Vegetation Cutting
SS	Sedimentation Source
WT	Water Temperature
WD	Wetland Drainage
WF	Wetland Filling
WQ	Water Quality

Pajaro River

Moss Landing Quadrangle

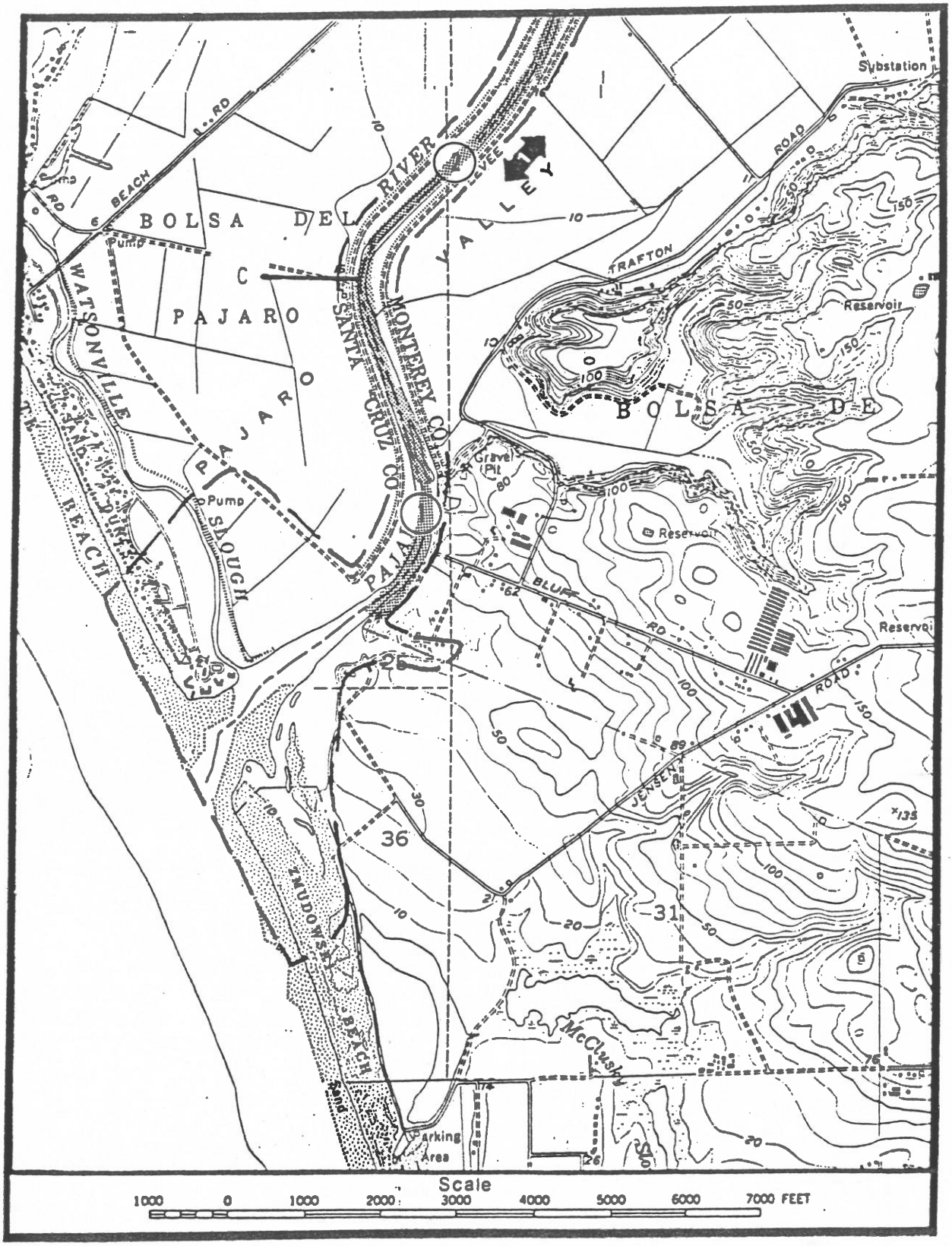


PLATE PR-1

Pajaro River

WATSONVILLE WEST QUADRANGLE

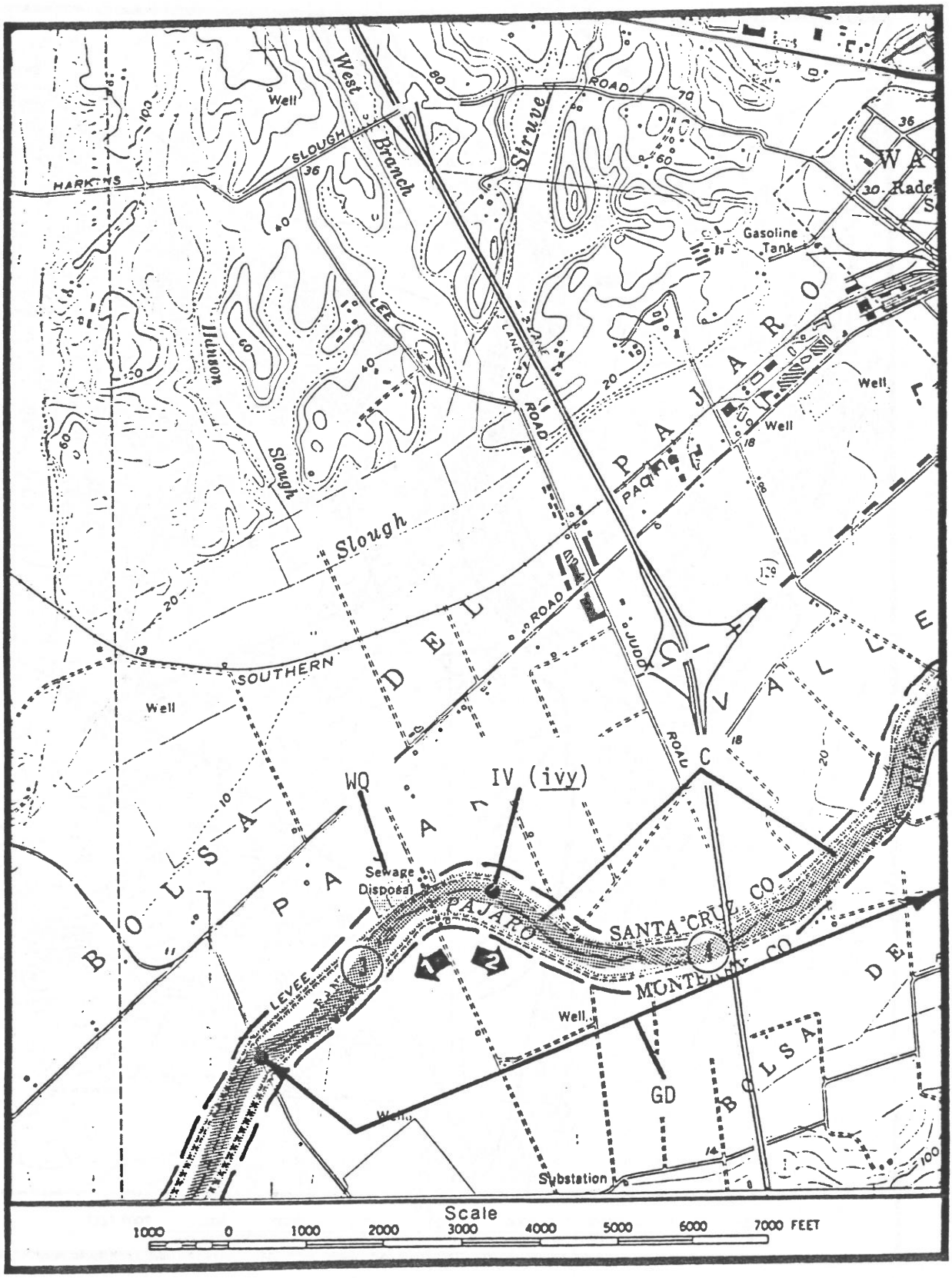


PLATE PR-2

Pajaro River

WATSONVILLE EAST QUADRANGLE

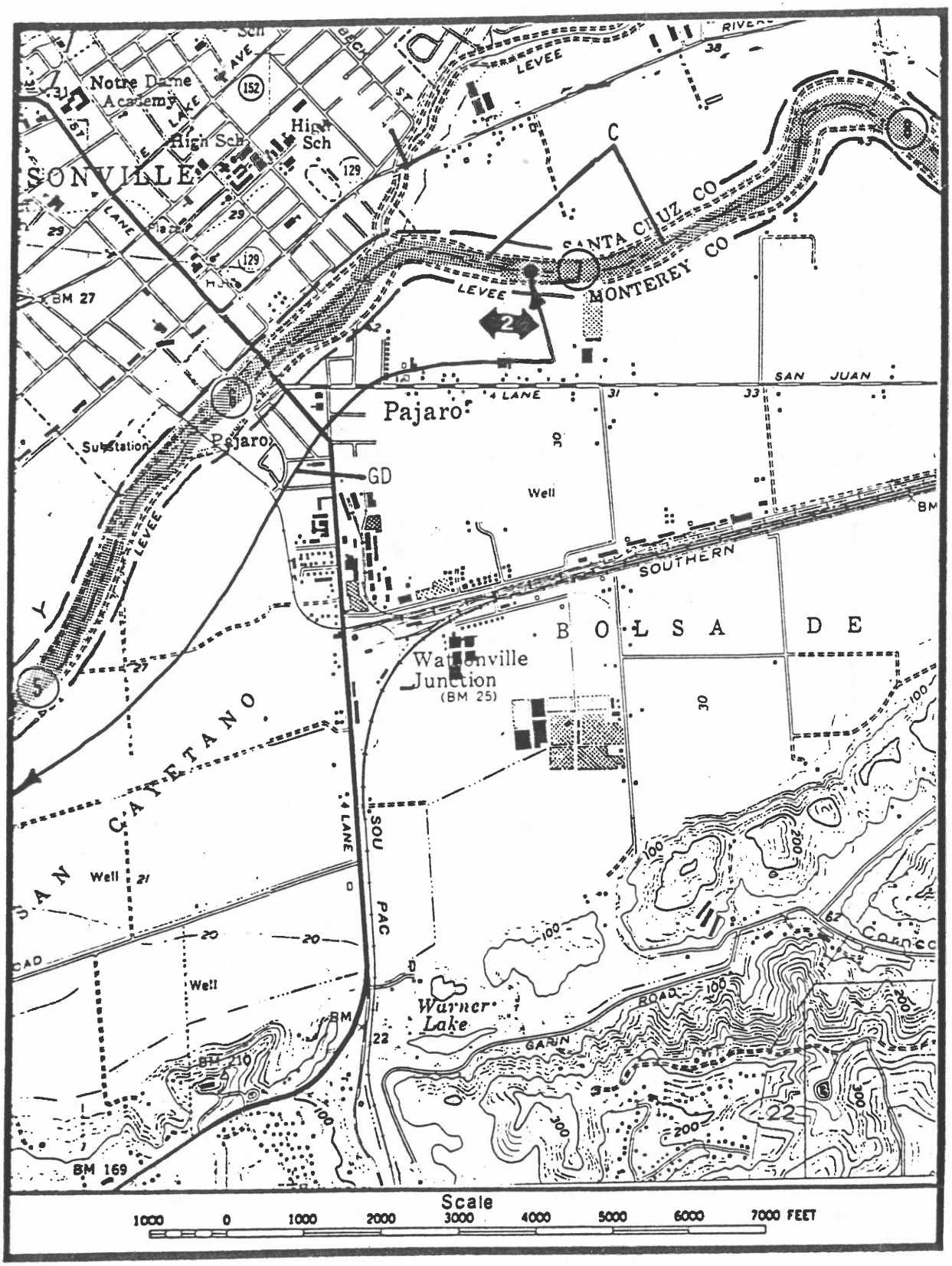


PLATE PR-3

Pajaro River

WATSONVILLE EAST QUADRANGLE

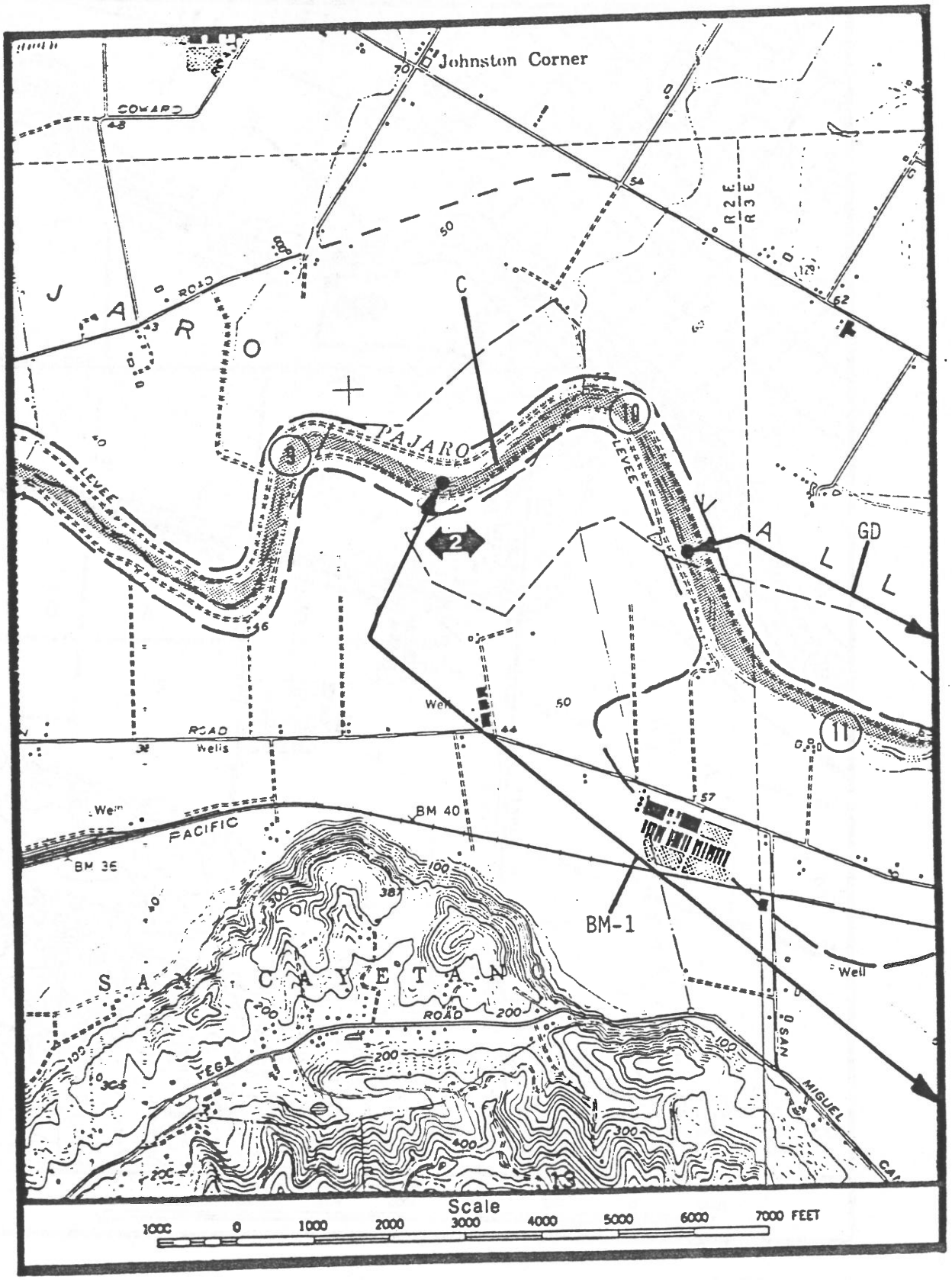


PLATE PR-4

Pajaro River

WATSONVILLE EAST QUADRANGLE

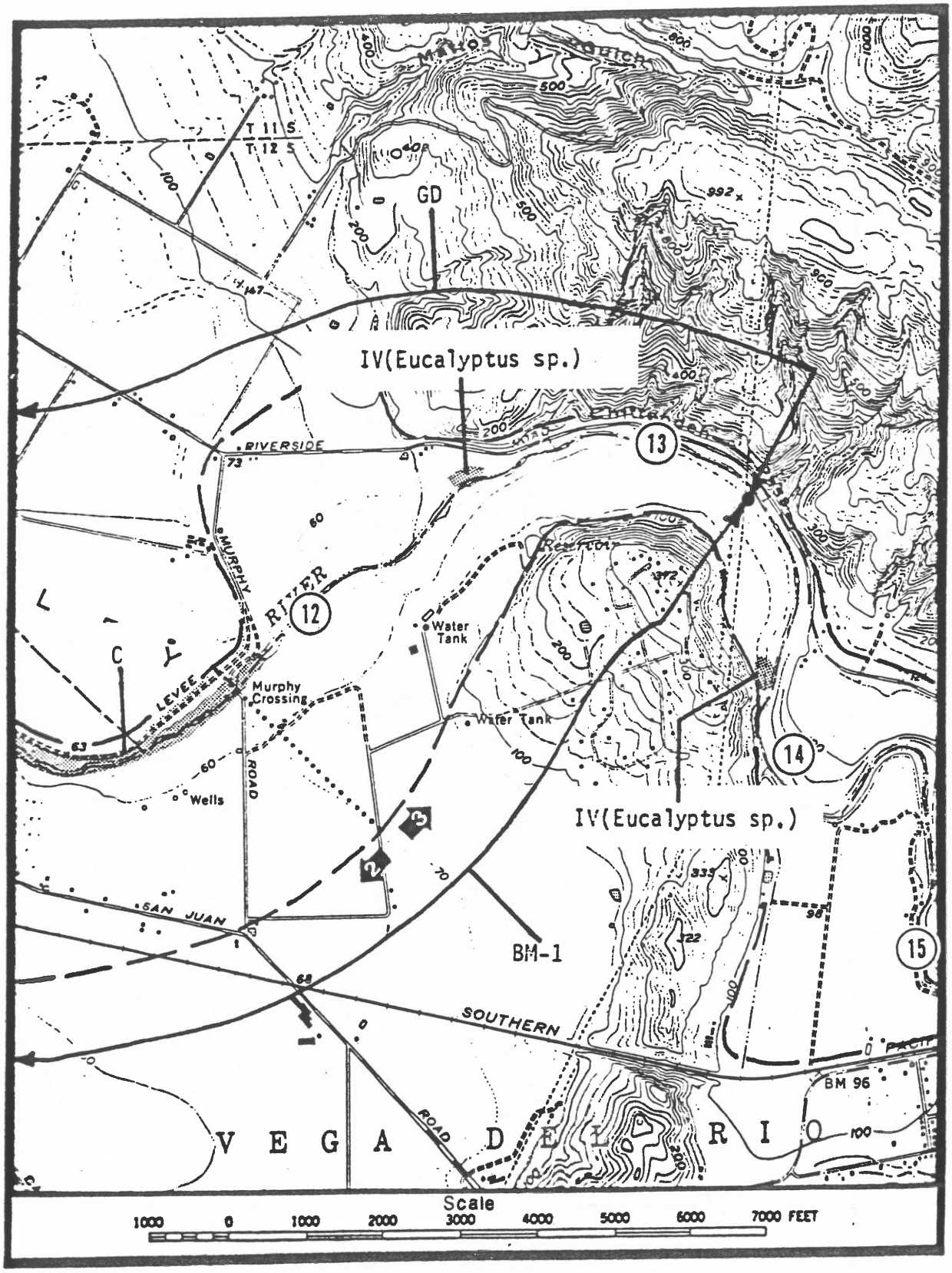


PLATE PR-5

Pajaro River

CHITTENDEN QUADRANGLE

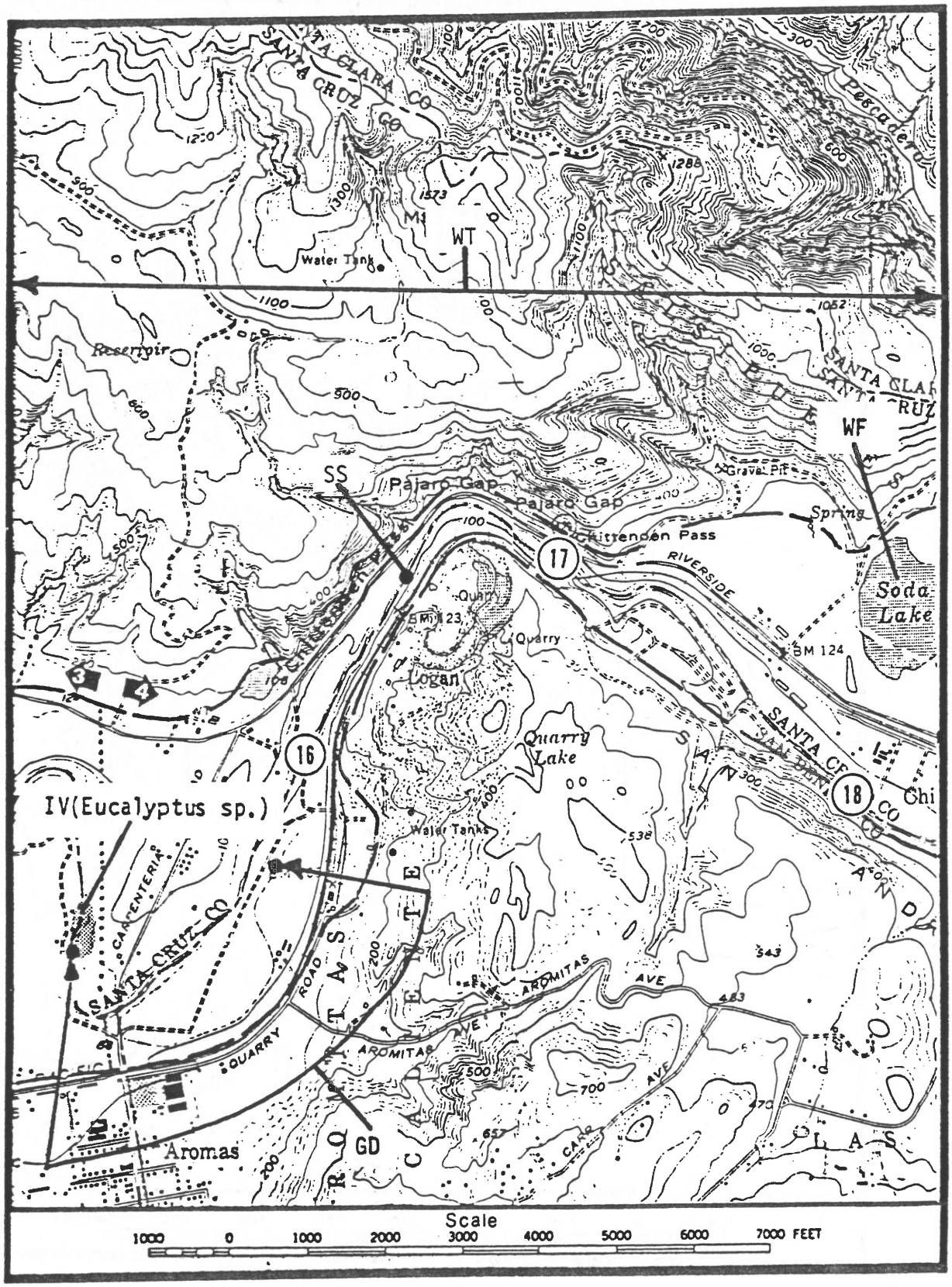


PLATE PR-6

Pajaro River

CHITTENDEN QUADRANGLE

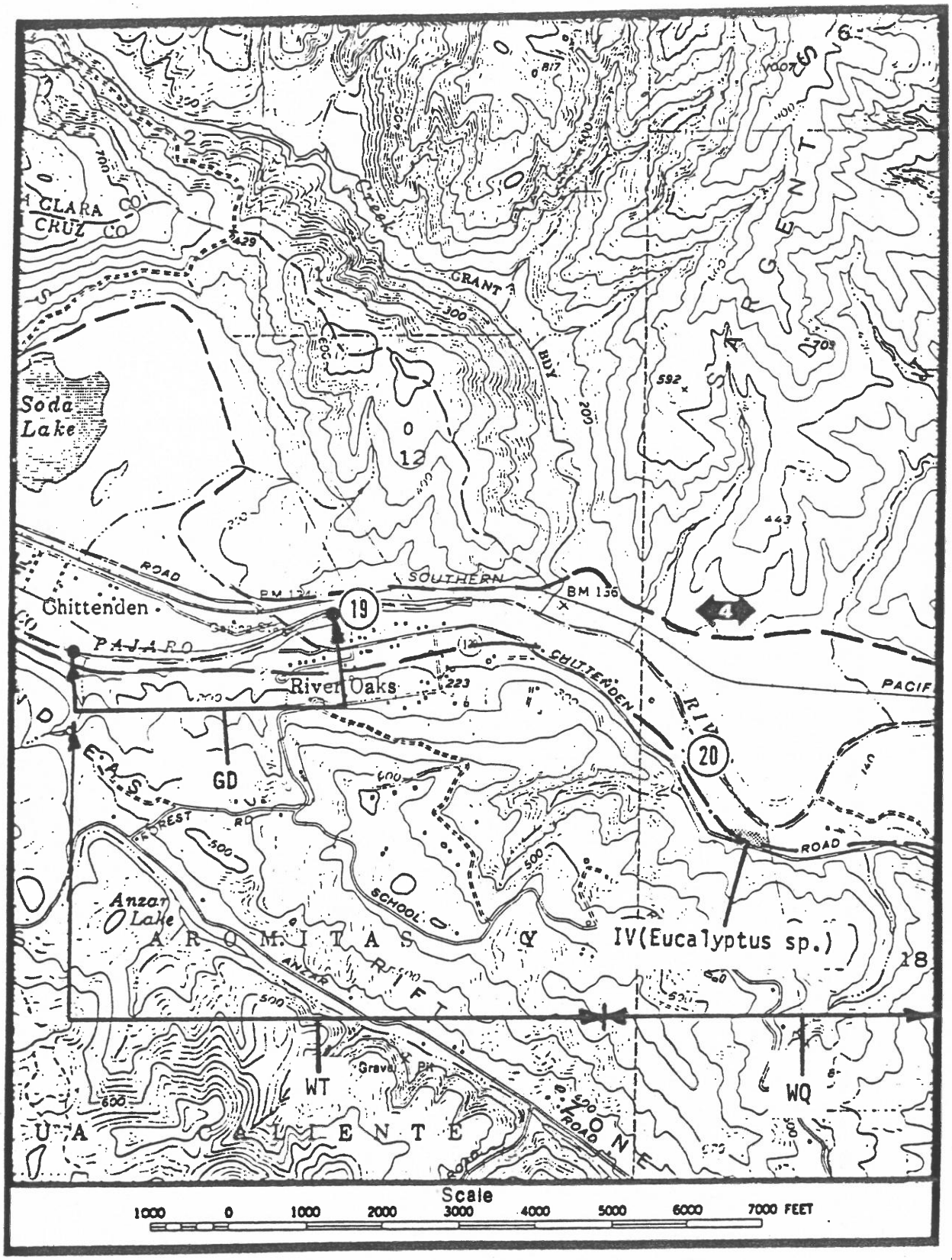


PLATE PR-7

Pajaro River

CHITTENDEN QUADRANGLE

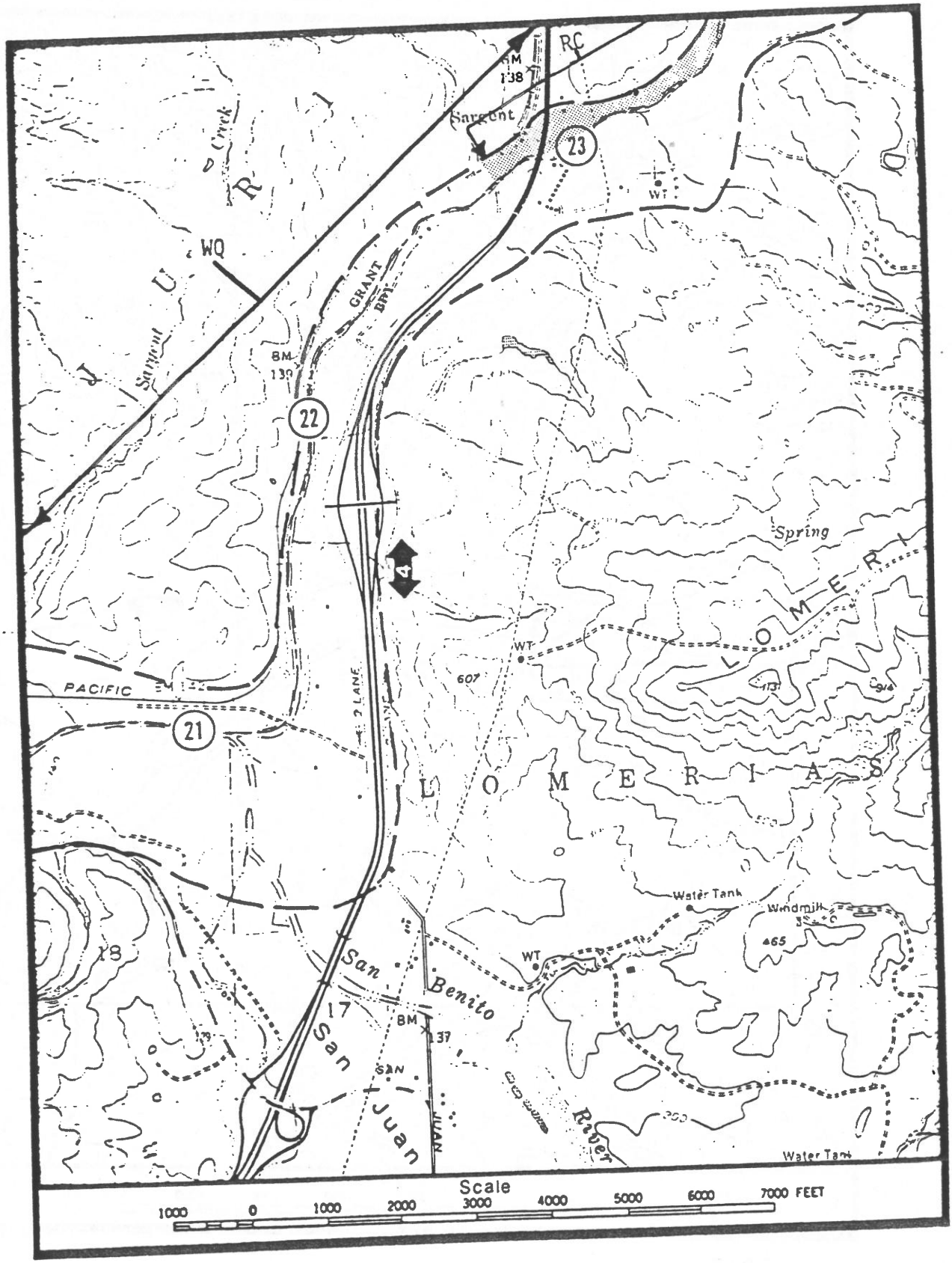


PLATE PR-8

Pajaro River

CHITTENDEN QUADRANGLE

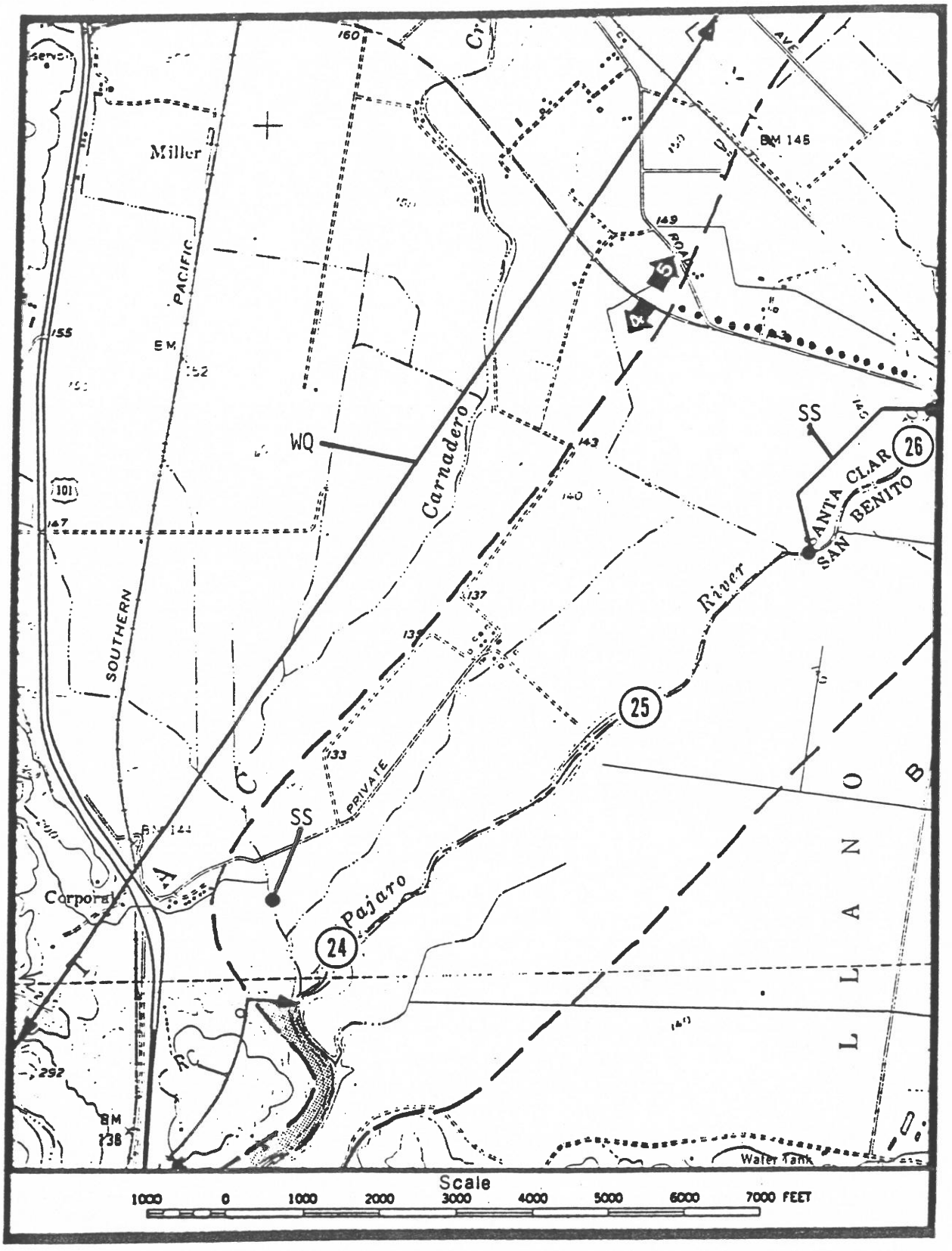


PLATE PR-9

Pajaro River

SAN FELIPE QUADRANGLE

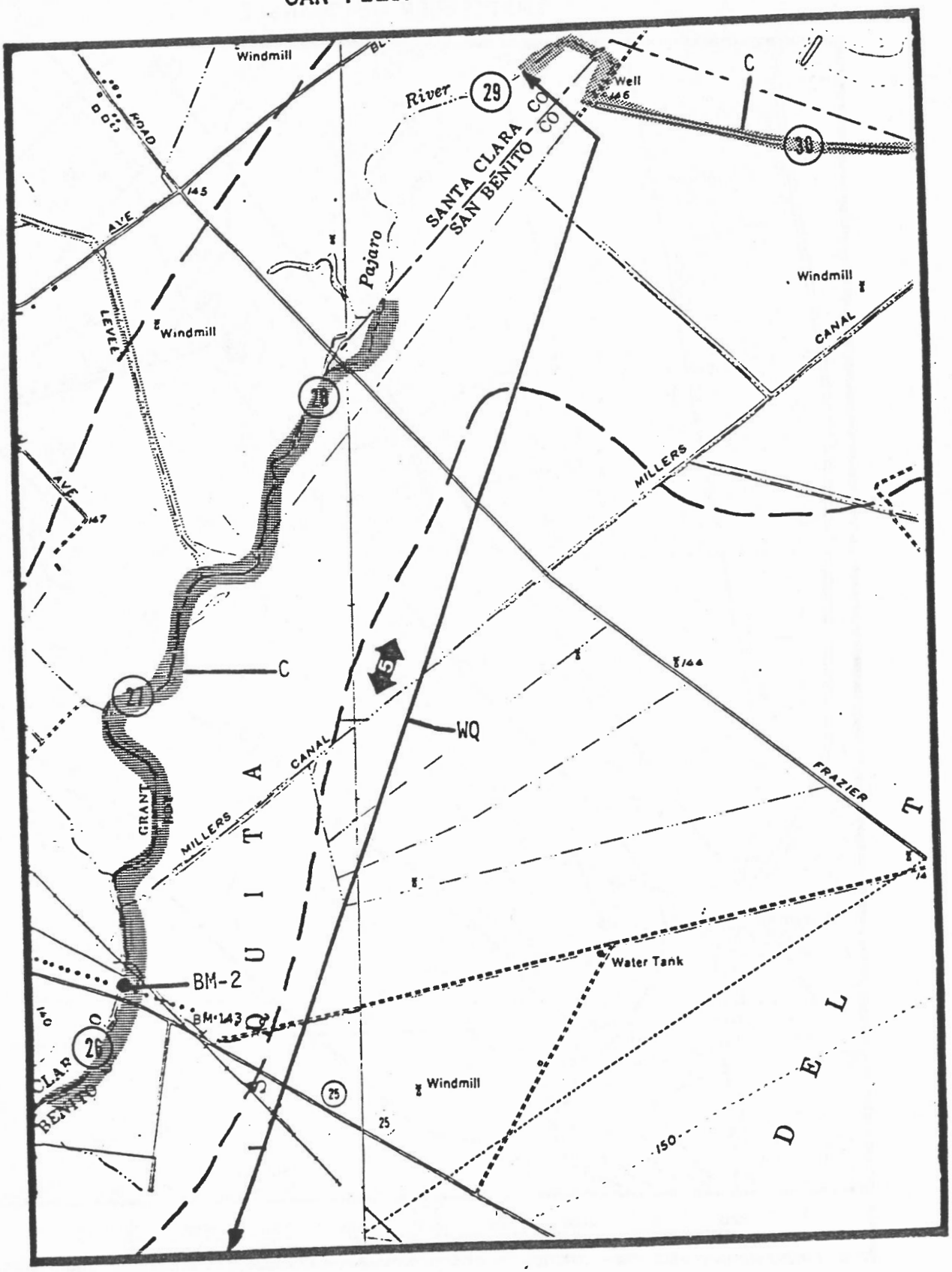


PLATE PR-10

Pajaro River

San Felipe Quadrangle

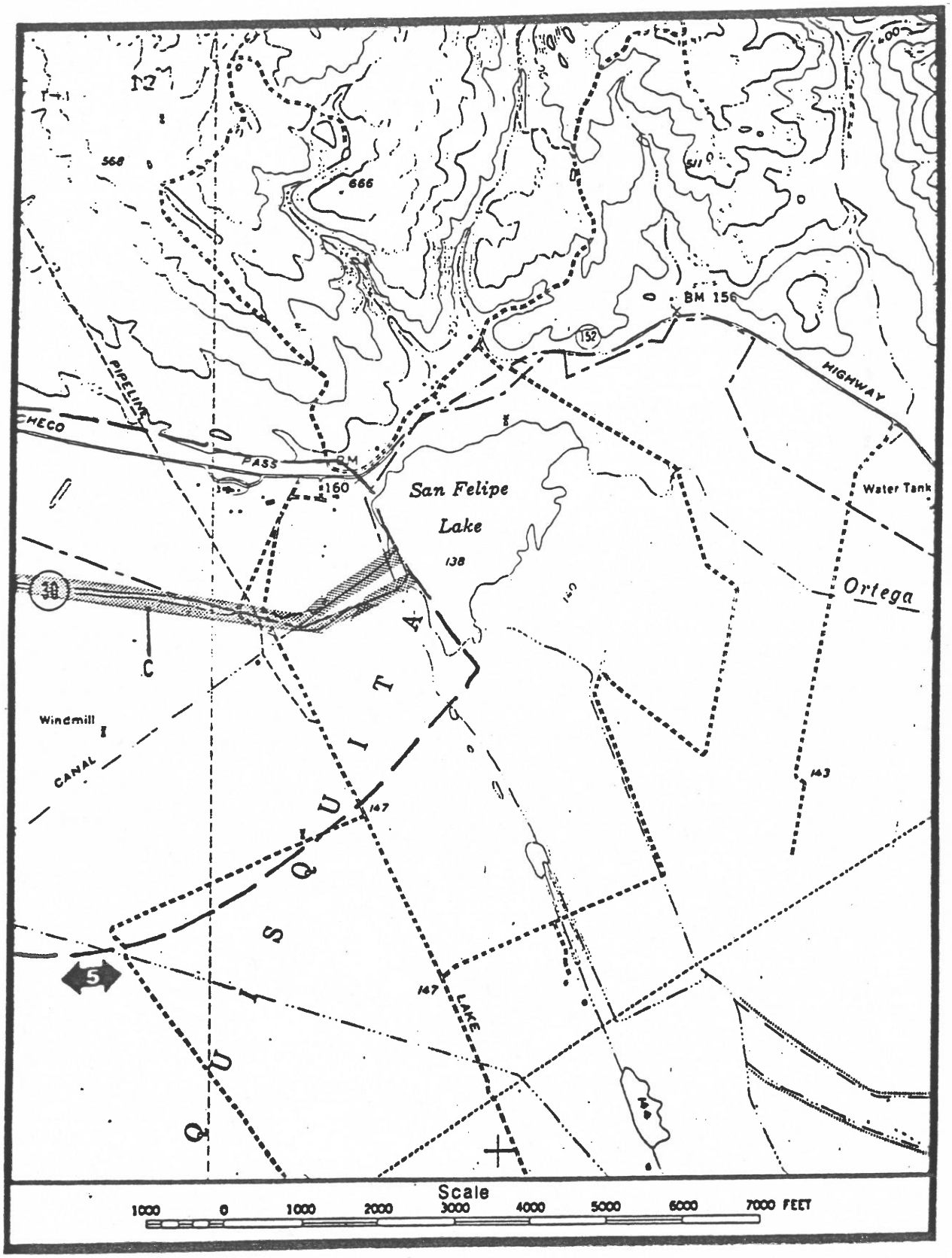


Plate PR-11

Salsipuedes / Corralitos Creek

WATSONVILLE EAST / WEST QUADRANGLE

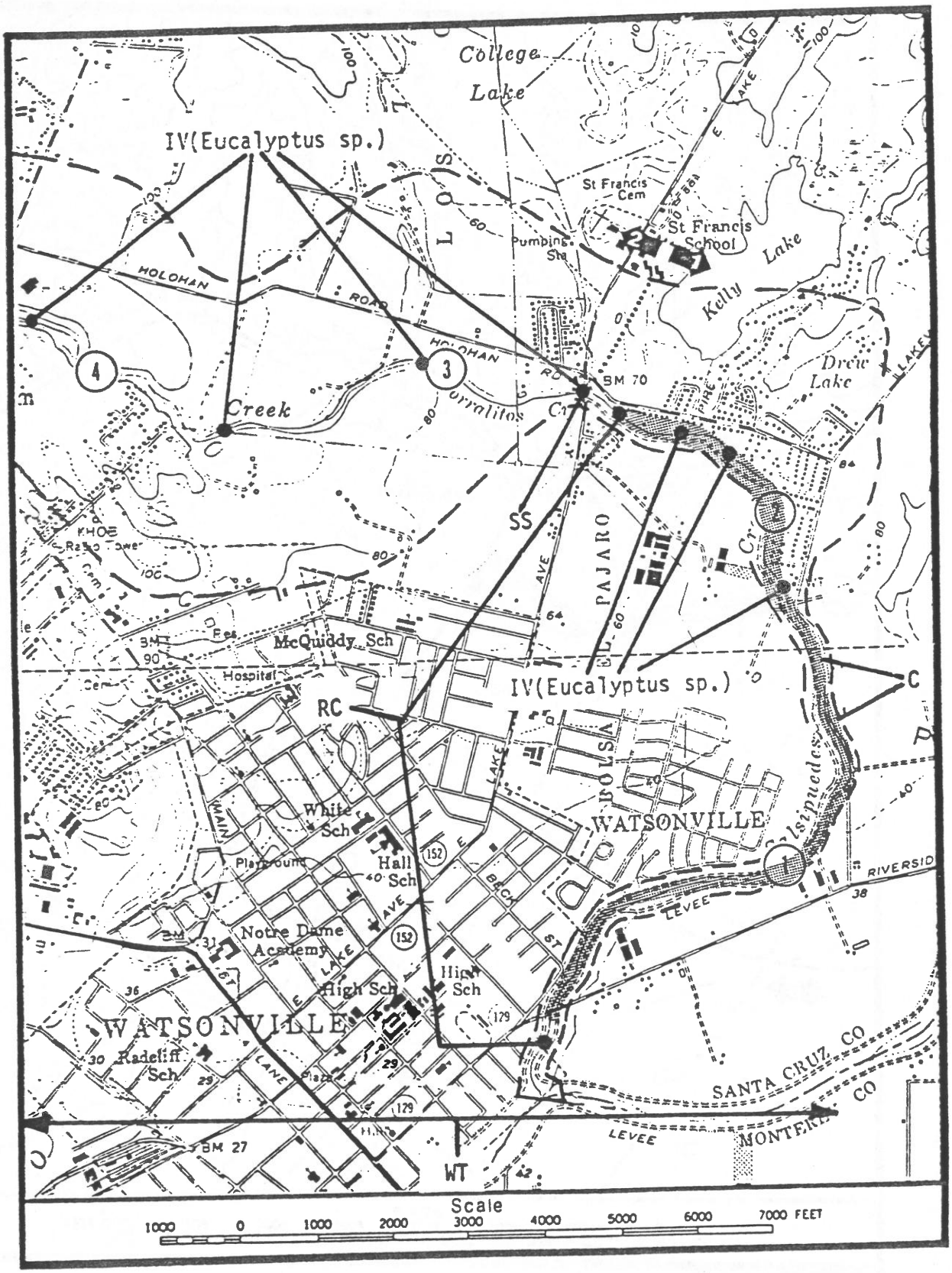


PLATE SC-1

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

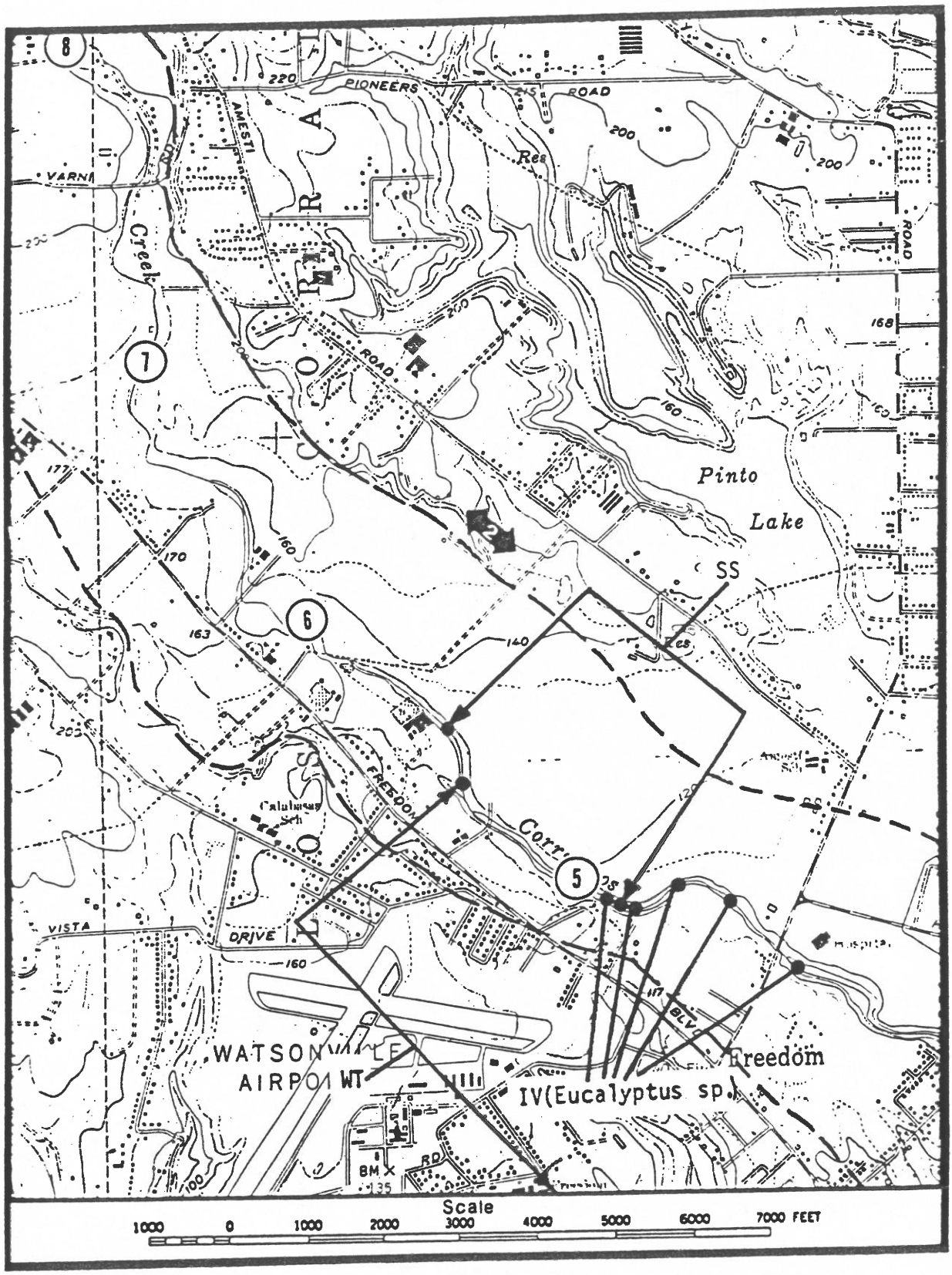


PLATE SC-2

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

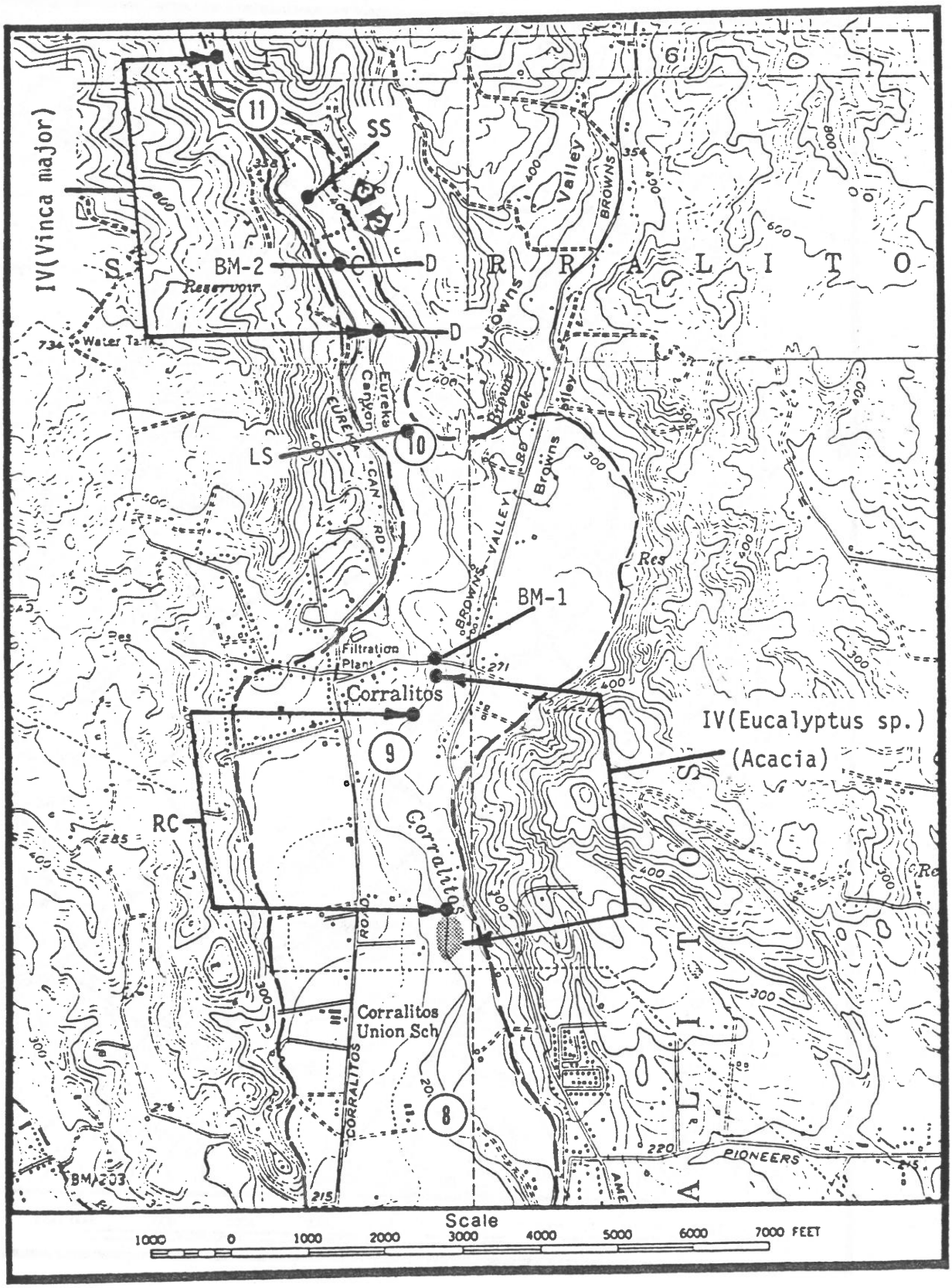


PLATE SC-3

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

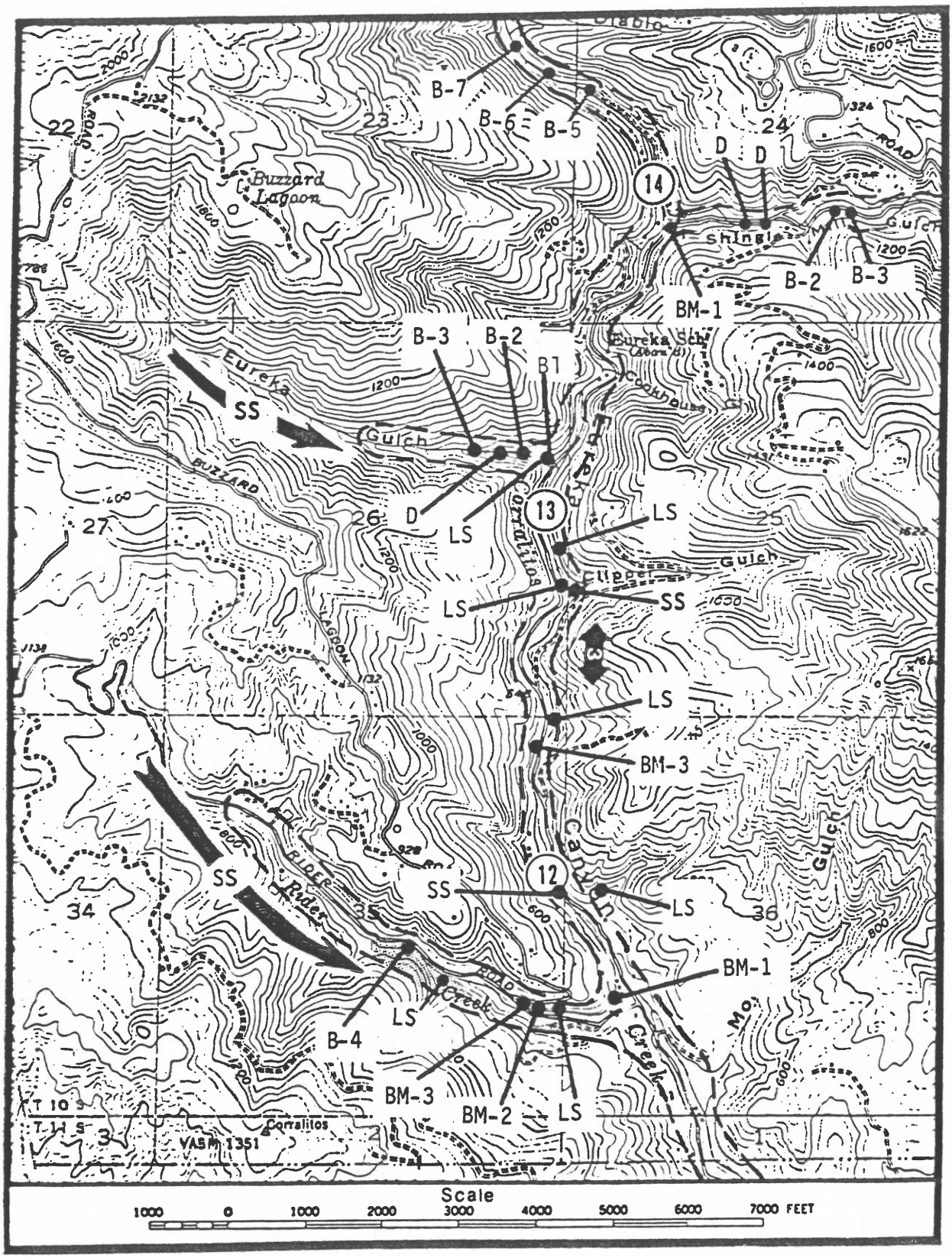


Plate SC-4

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

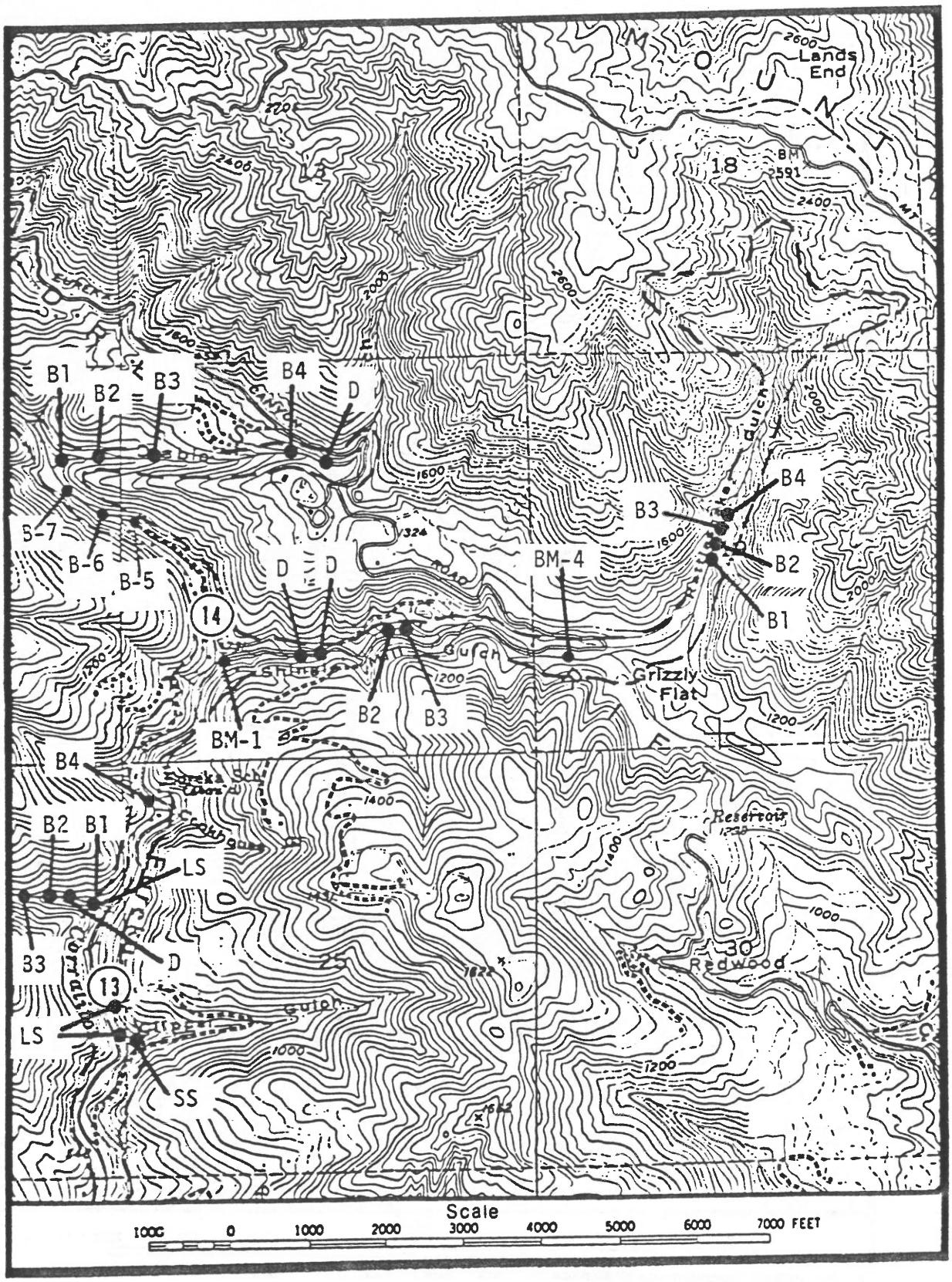


Plate SC-5

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

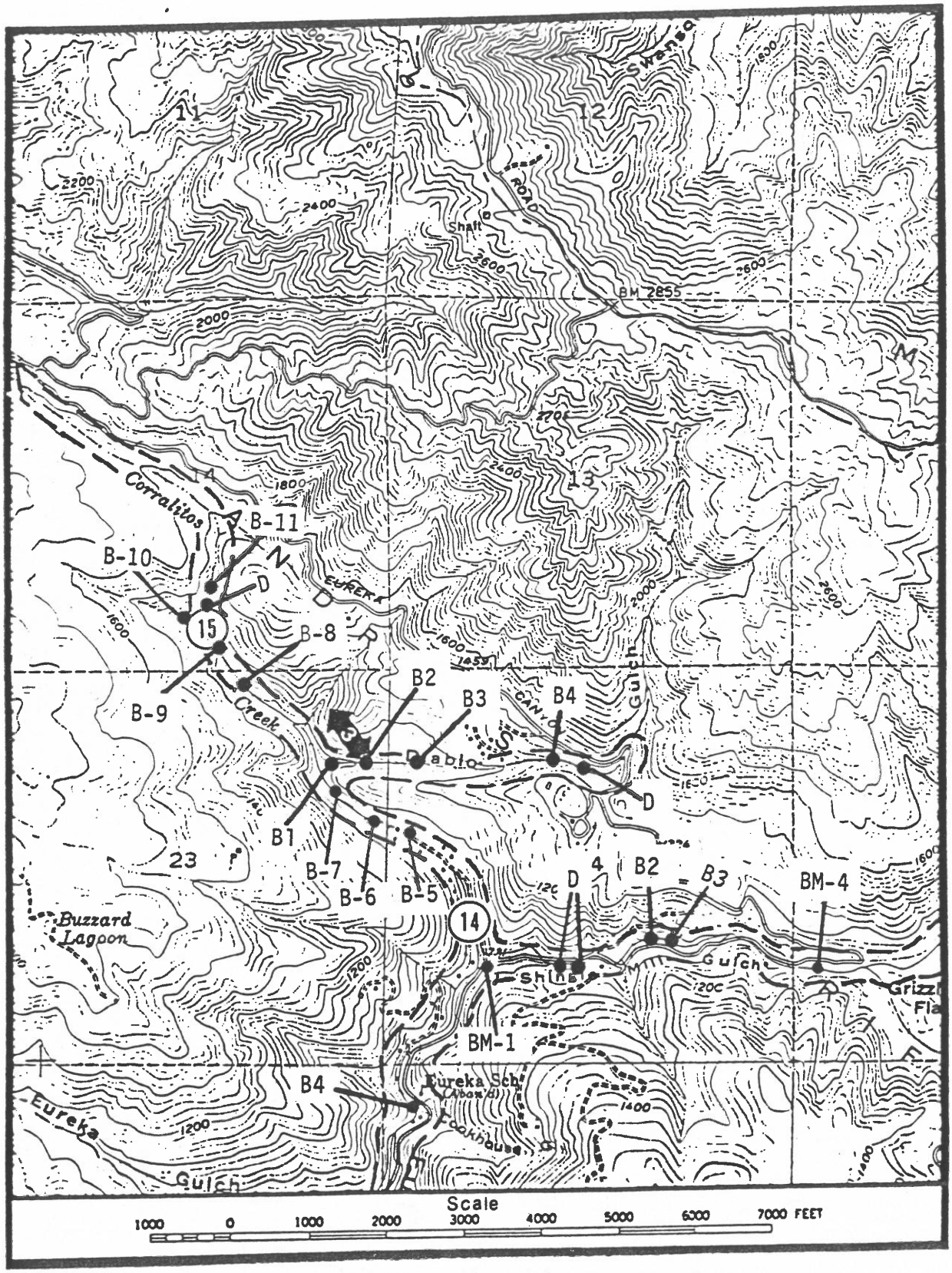


Plate SC-6

Browns Creek

Watsonville West Quadrangle

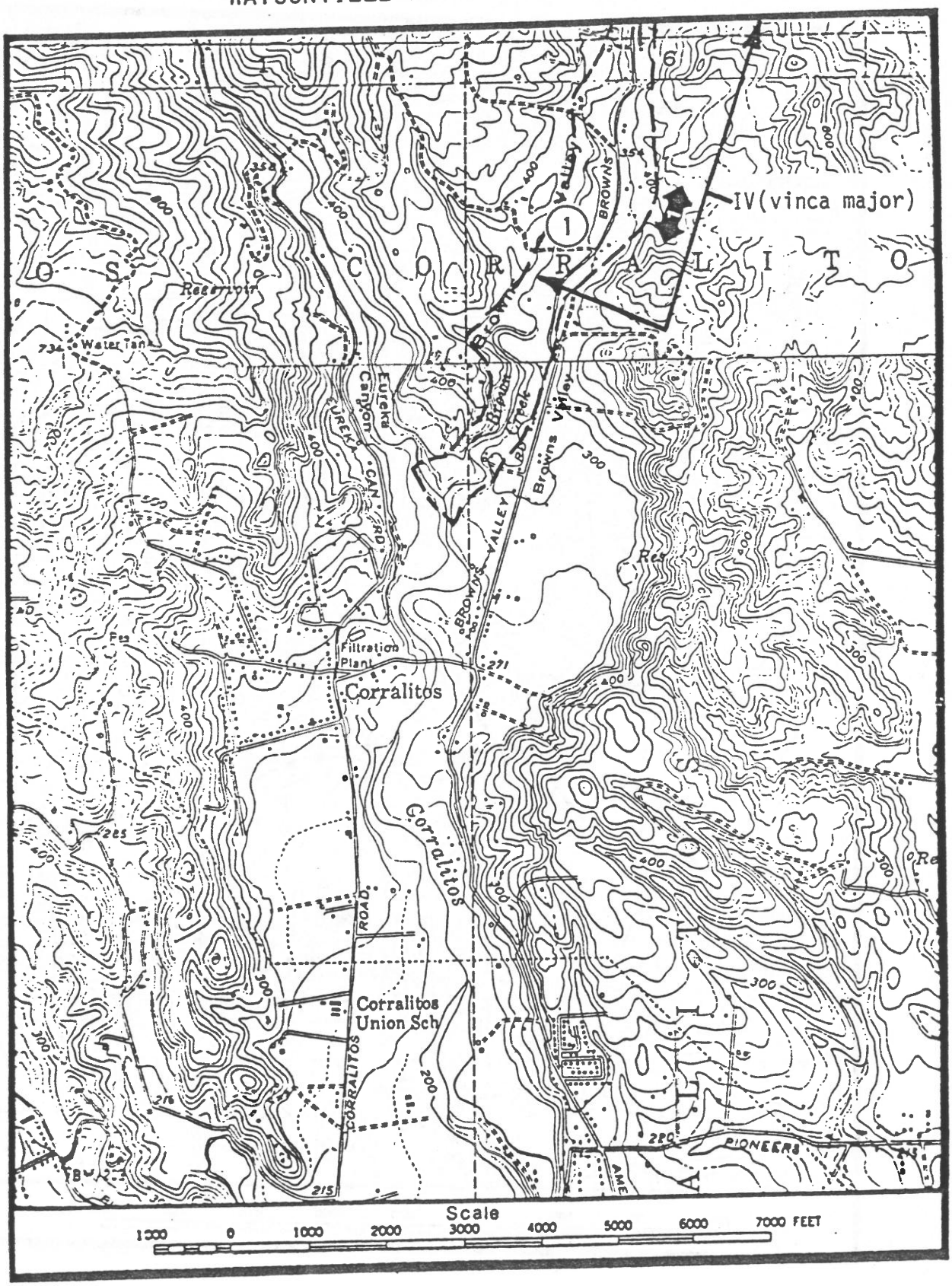


Plate BR-1

Browns Creek

Loma Prieta Quadrangle

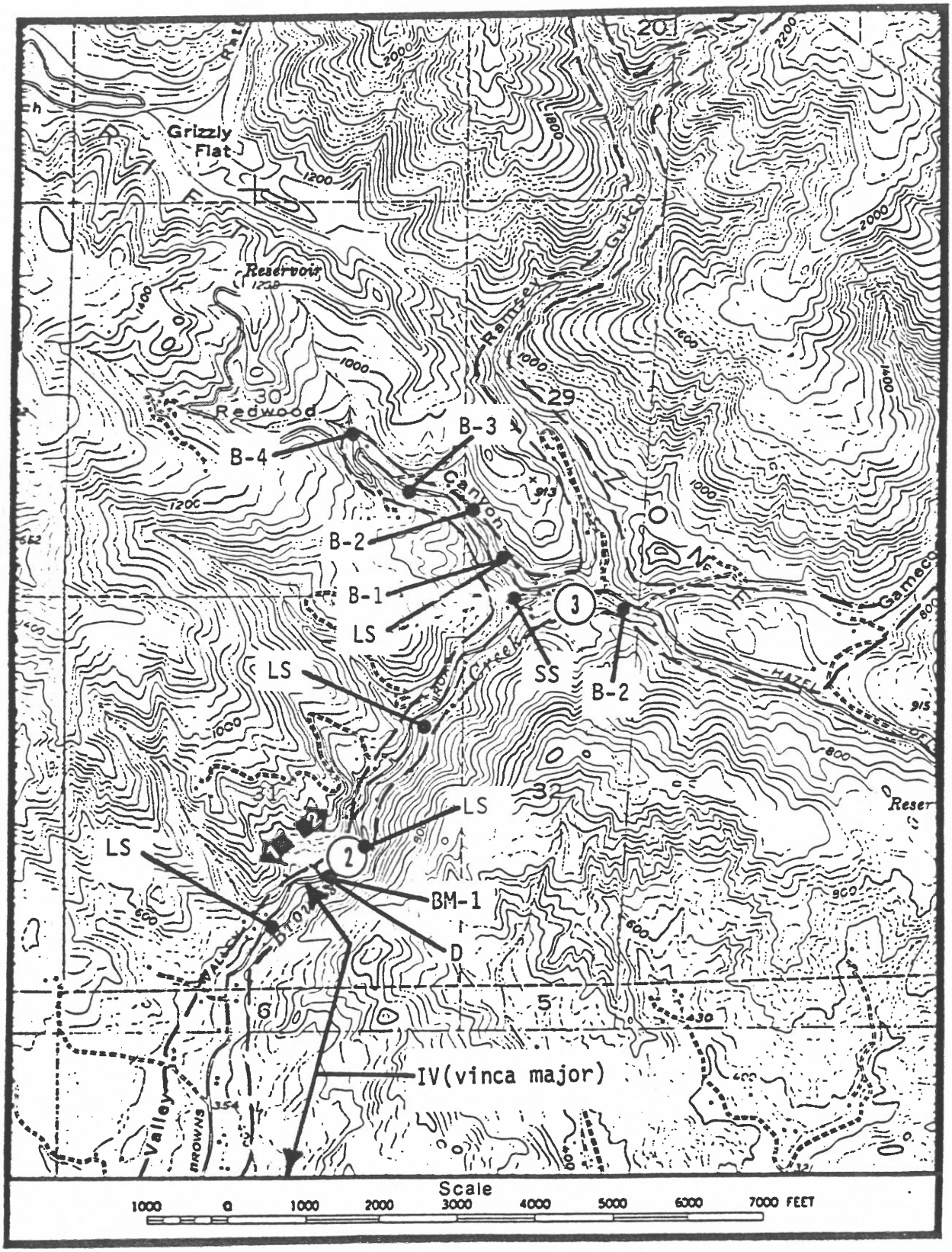


Plate BR-2

Browns Creek

Loma Prieta Quadrangle

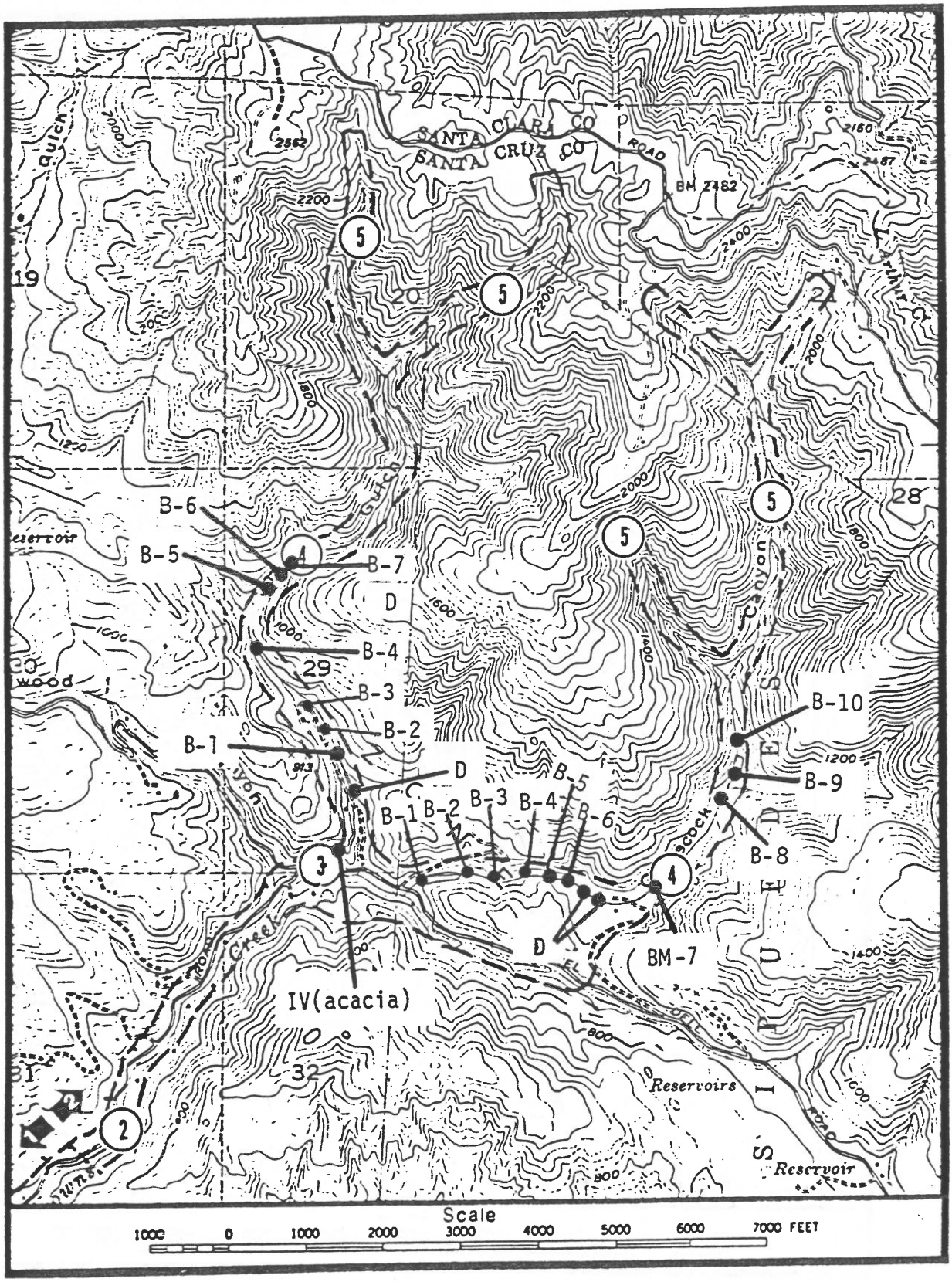


Plate BR-3

College Lake

WATSONVILLE WEST QUADRANGLE

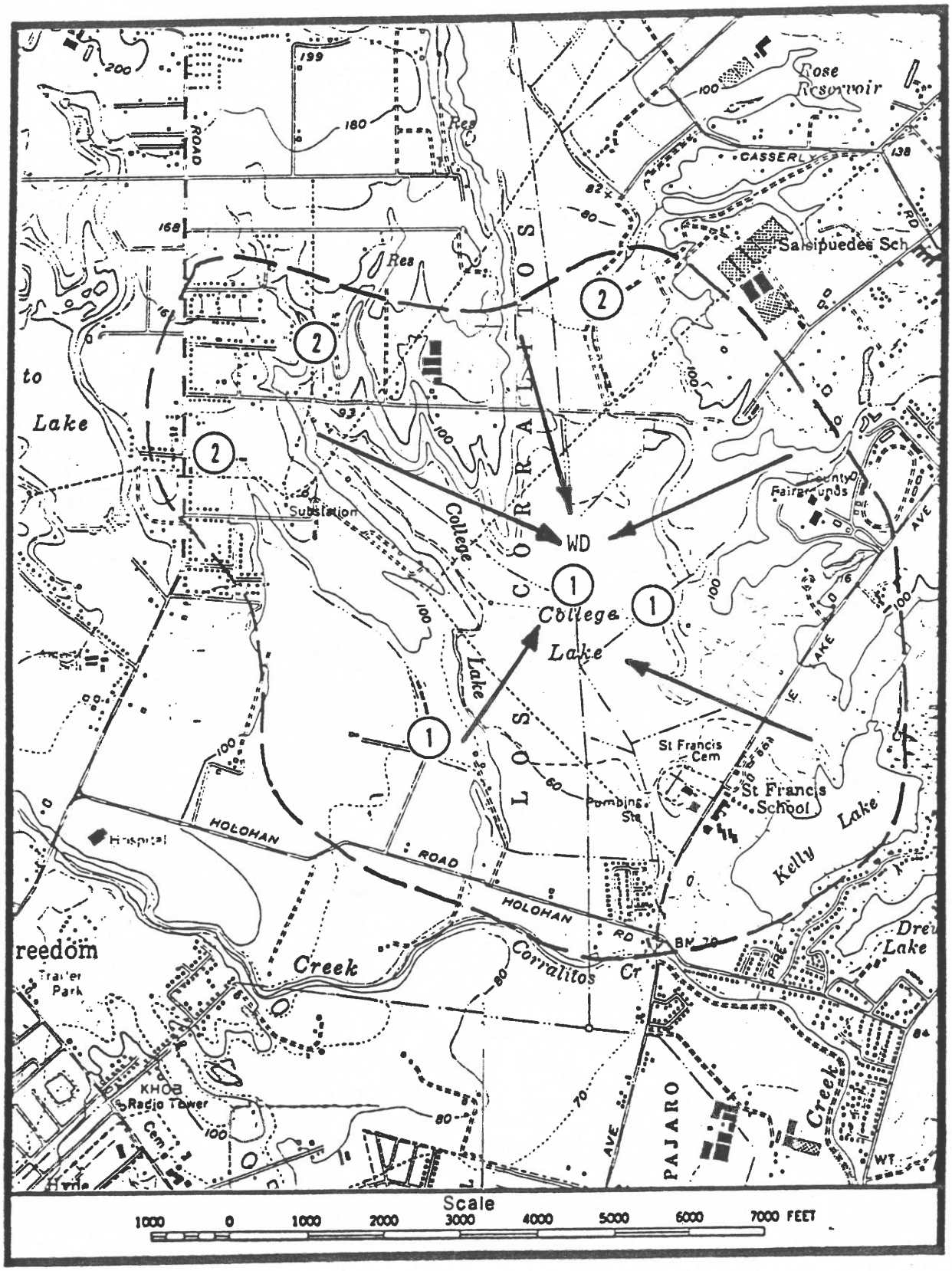


PLATE CL-1

Casserly Creek

WATSONVILLE EAST QUADRANGLE

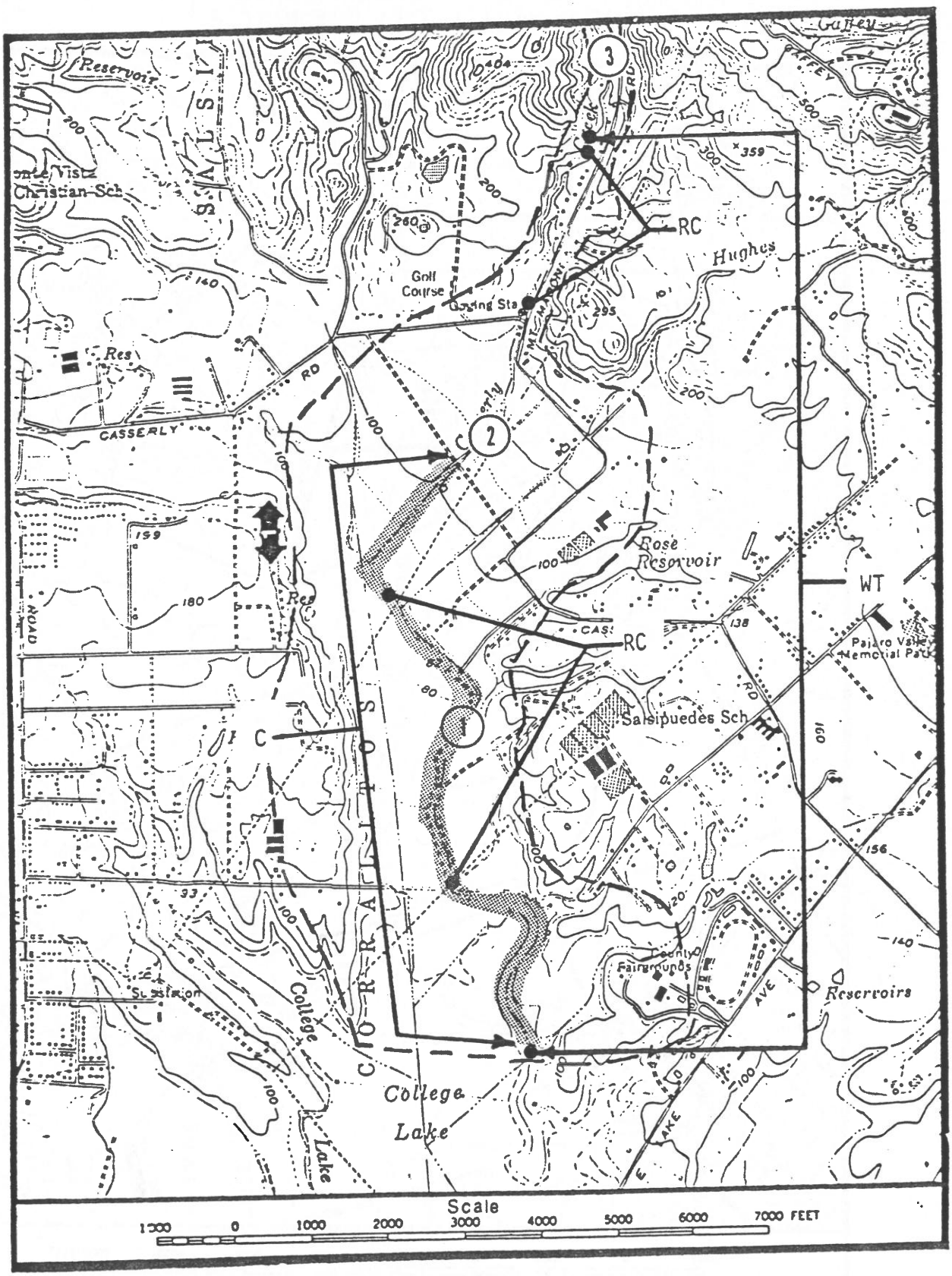


PLATE CC-1

Casserly Creek

Watsonville East Quadrangle

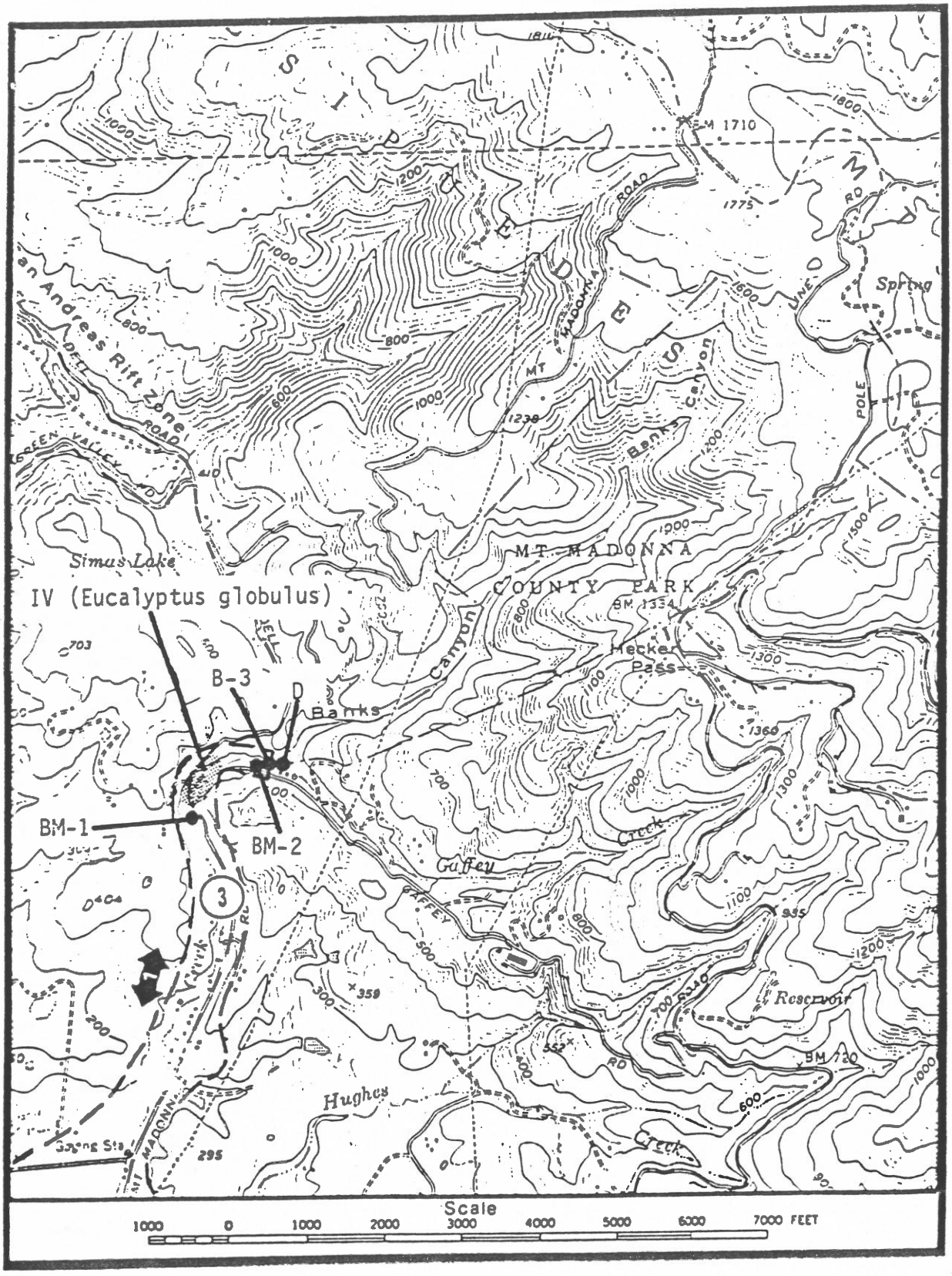


Plate CC-2

Gaffey & Banks Canyon Creeks

WATSONVILLE EAST QUADRANGLE

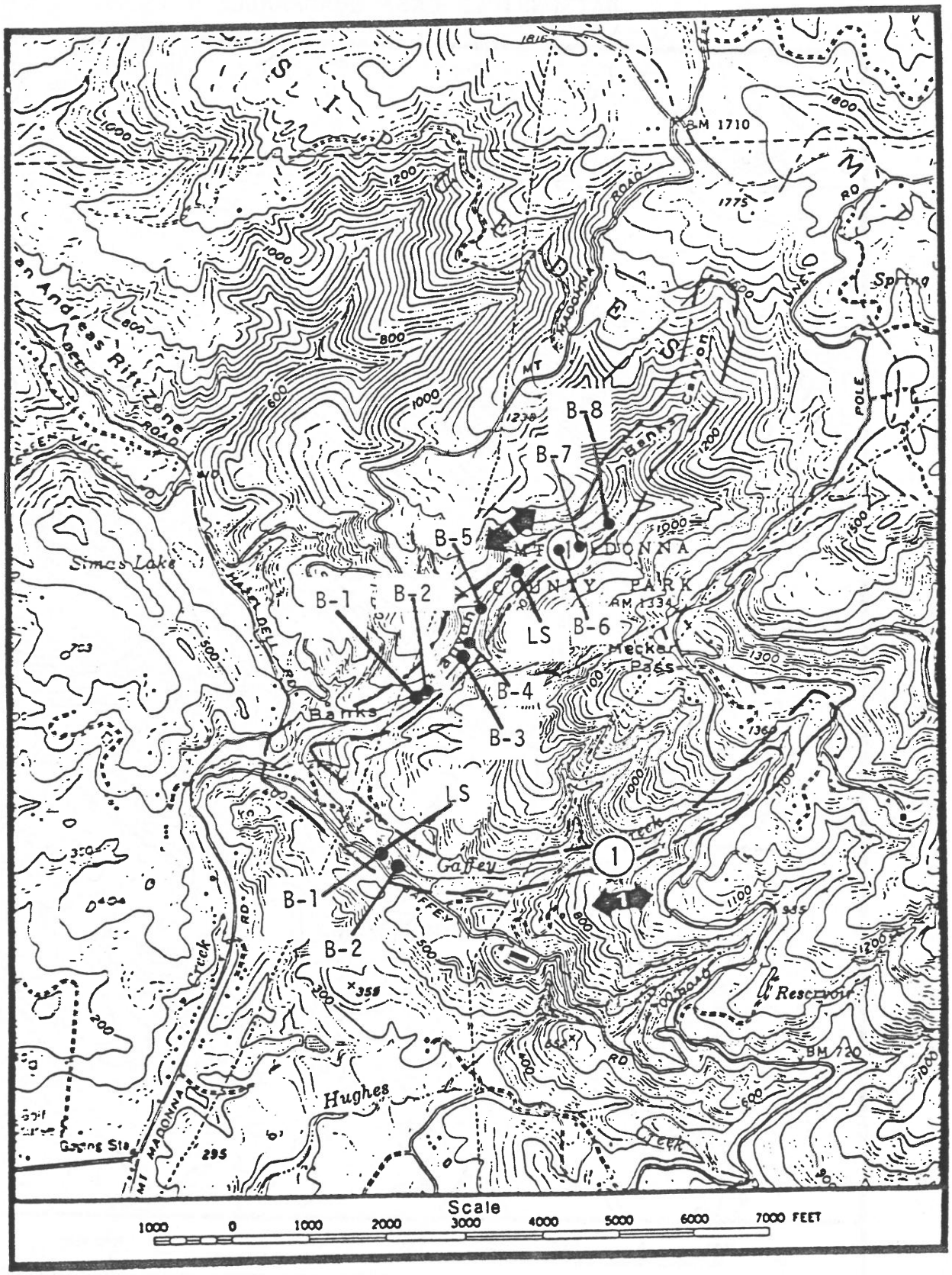


PLATE GB-1

Green Valley Creek

WATSONVILLE EAST QUADRANGLE

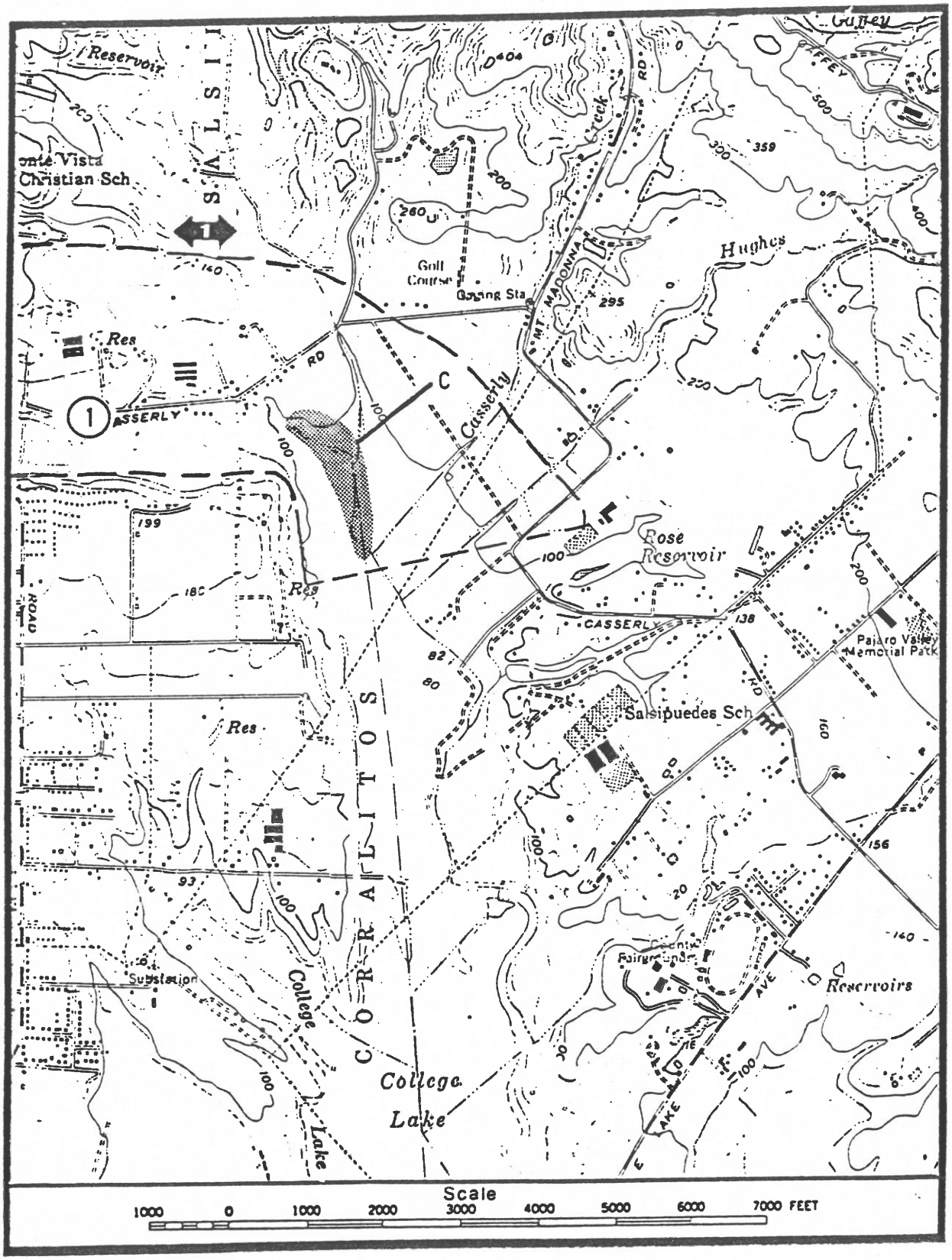


PLATE GV-1

Green Valley Creek

WATSONVILLE WEST QUADRANGLE

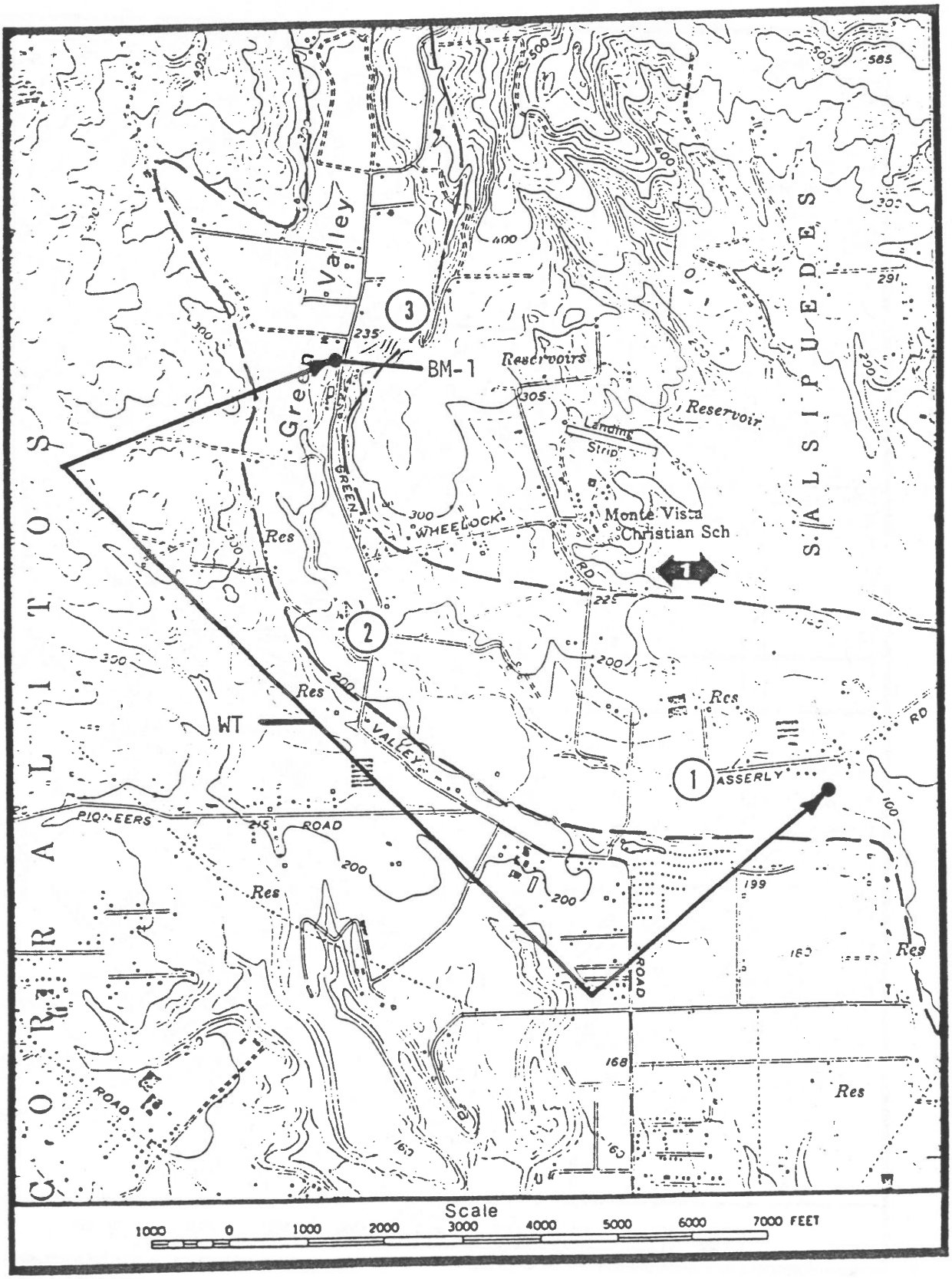


PLATE GV-2

Green Valley Creek

Loma Prieta Quadrangle

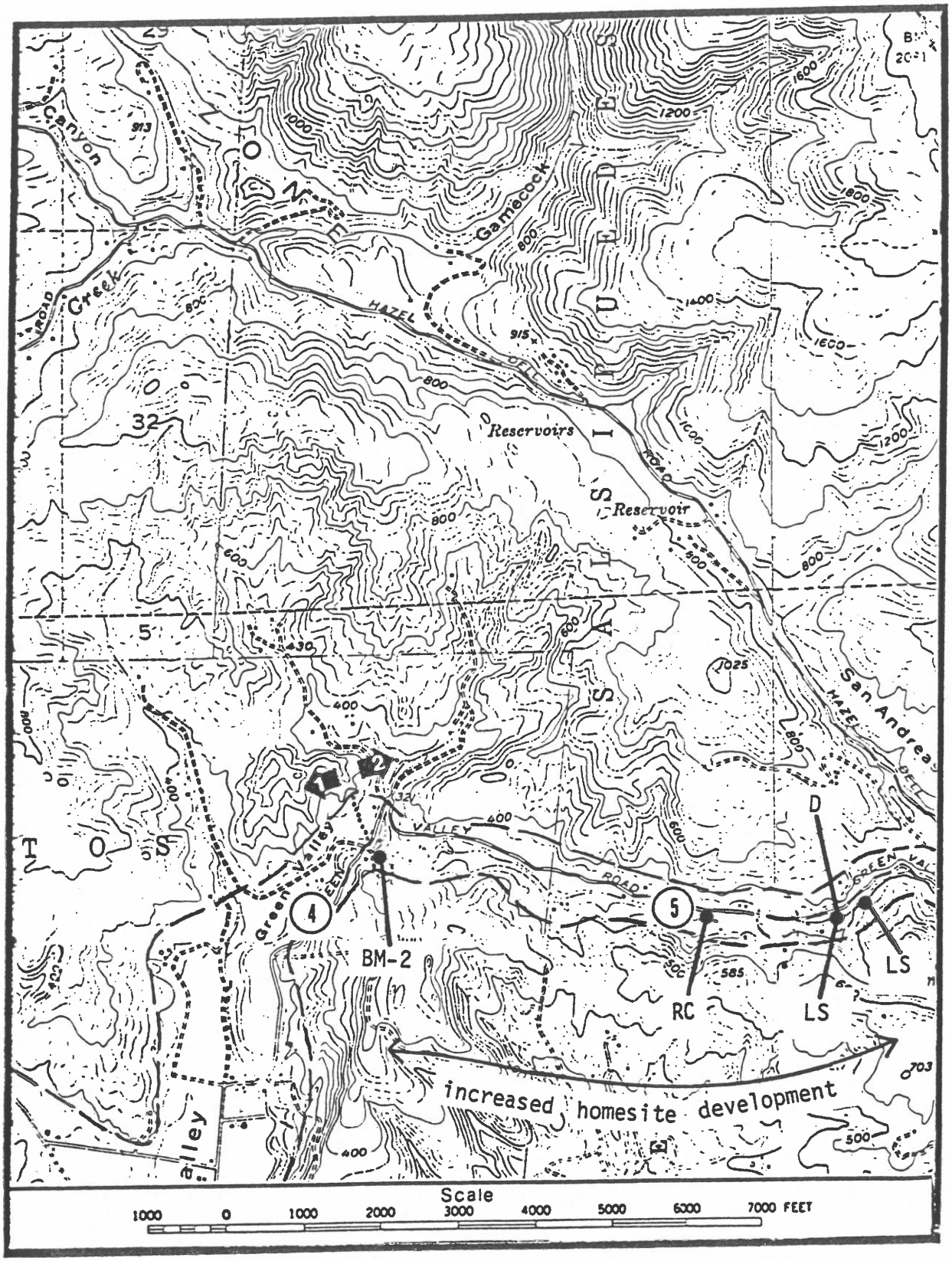


Plate GV-3

Green Valley Creek

Mount Madonna Quadrangle

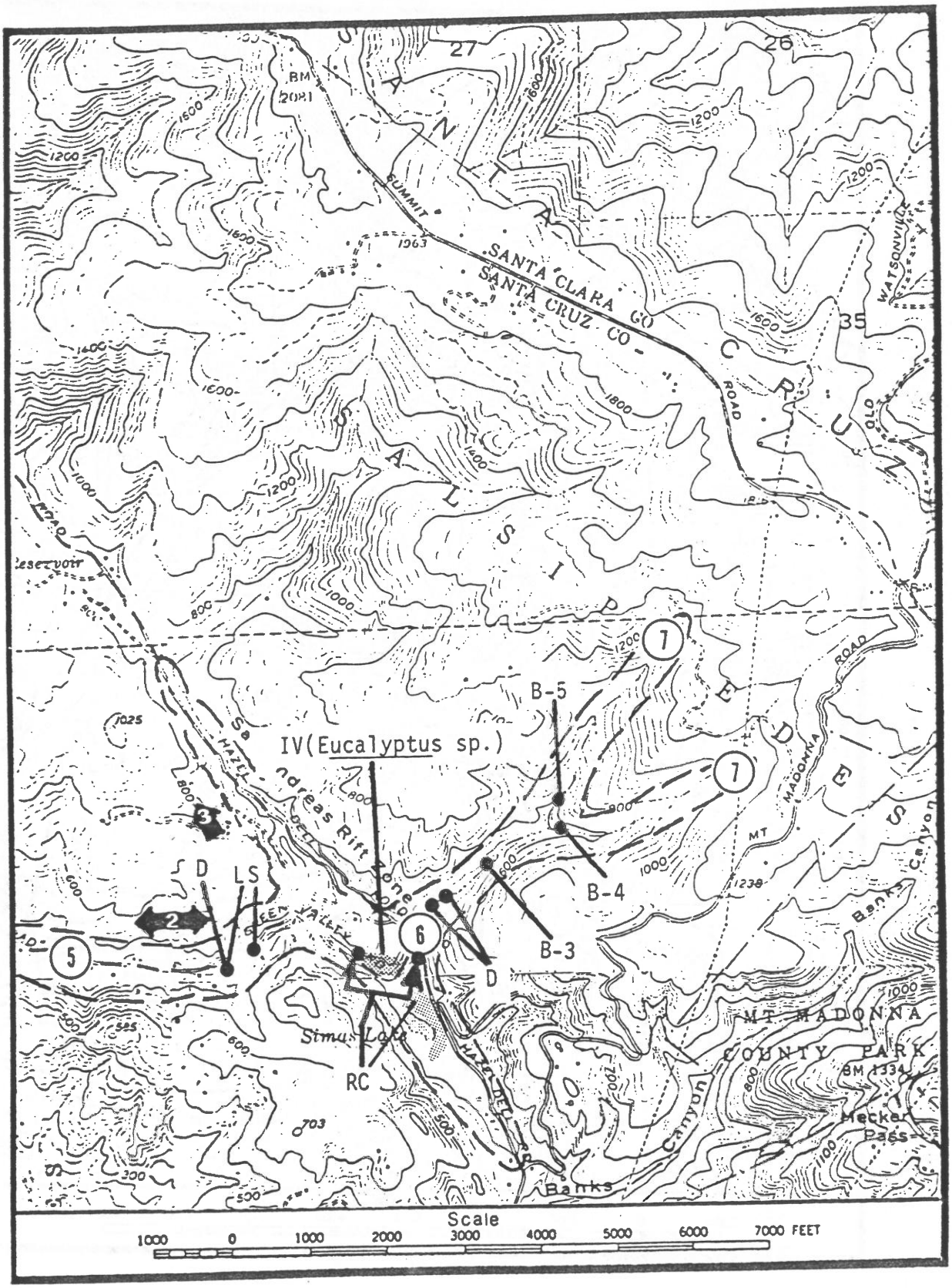


PLATE GV-4

Coward Creek

WATSONVILLE EAST QUADRANGLE

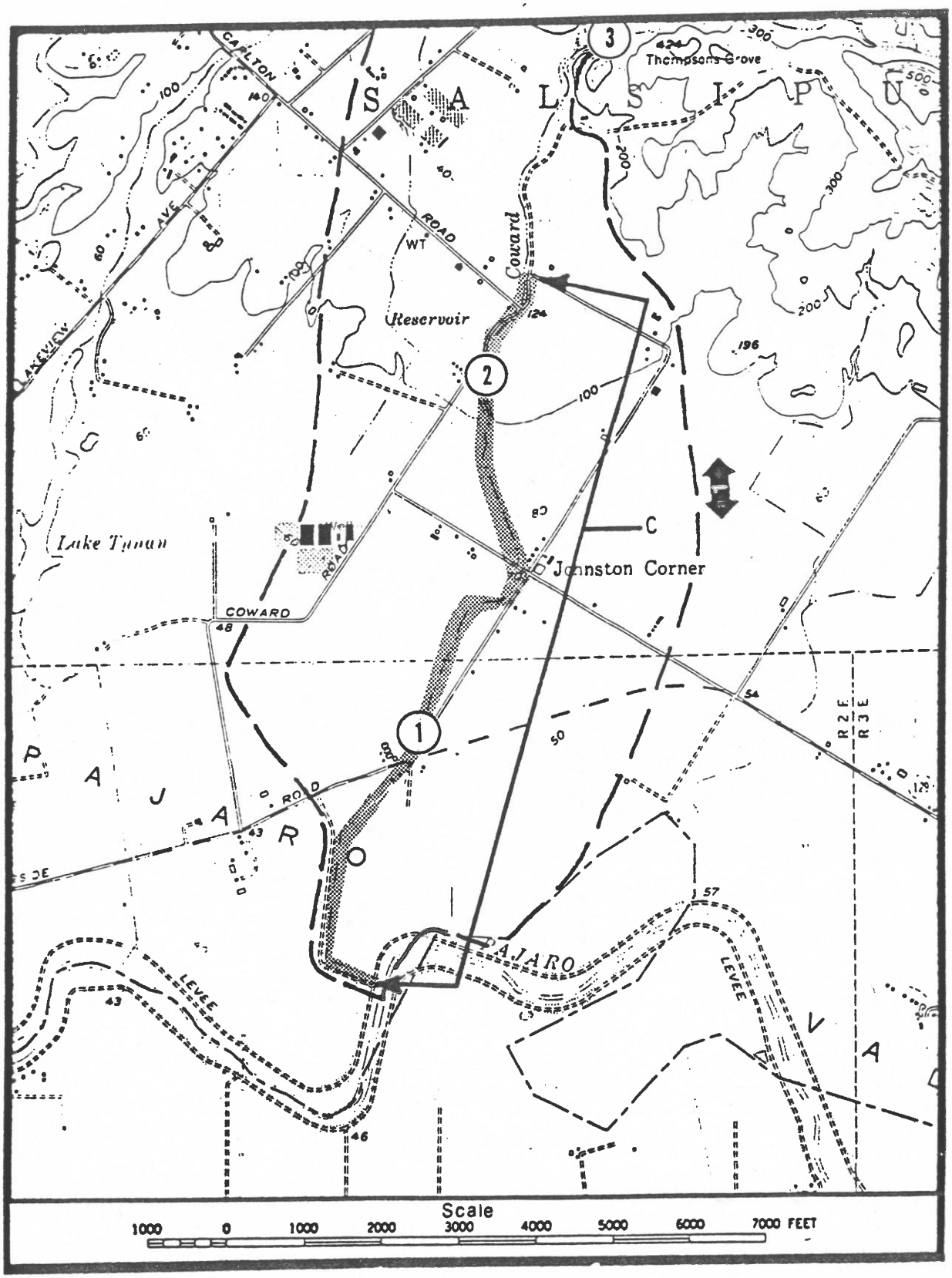


PLATE CW-1

Coward Creek

WATSONVILLE EAST QUADRANGLE

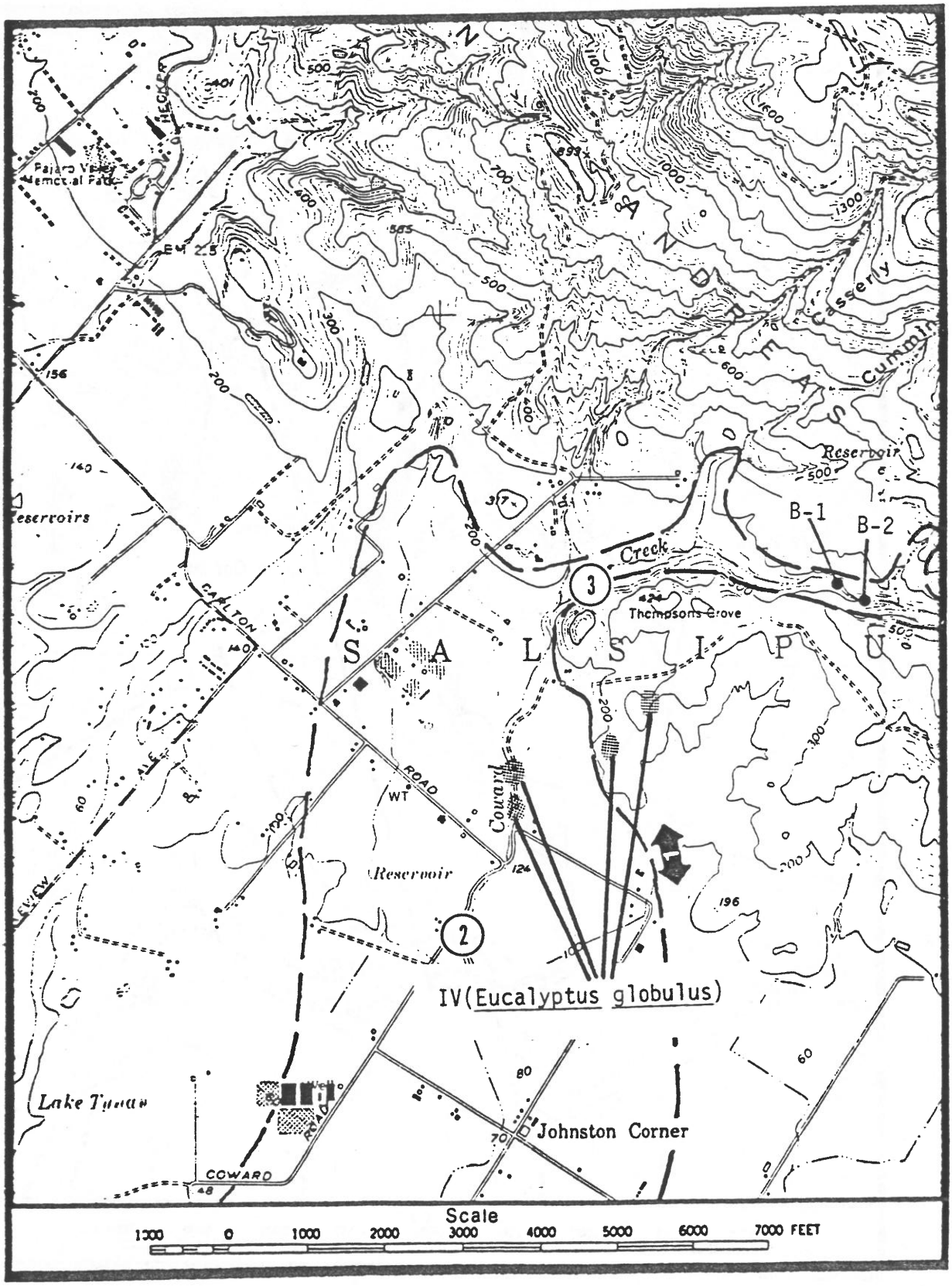


PLATE CW-2

Coward Creek

WATSONVILLE EAST QUADRANGLE

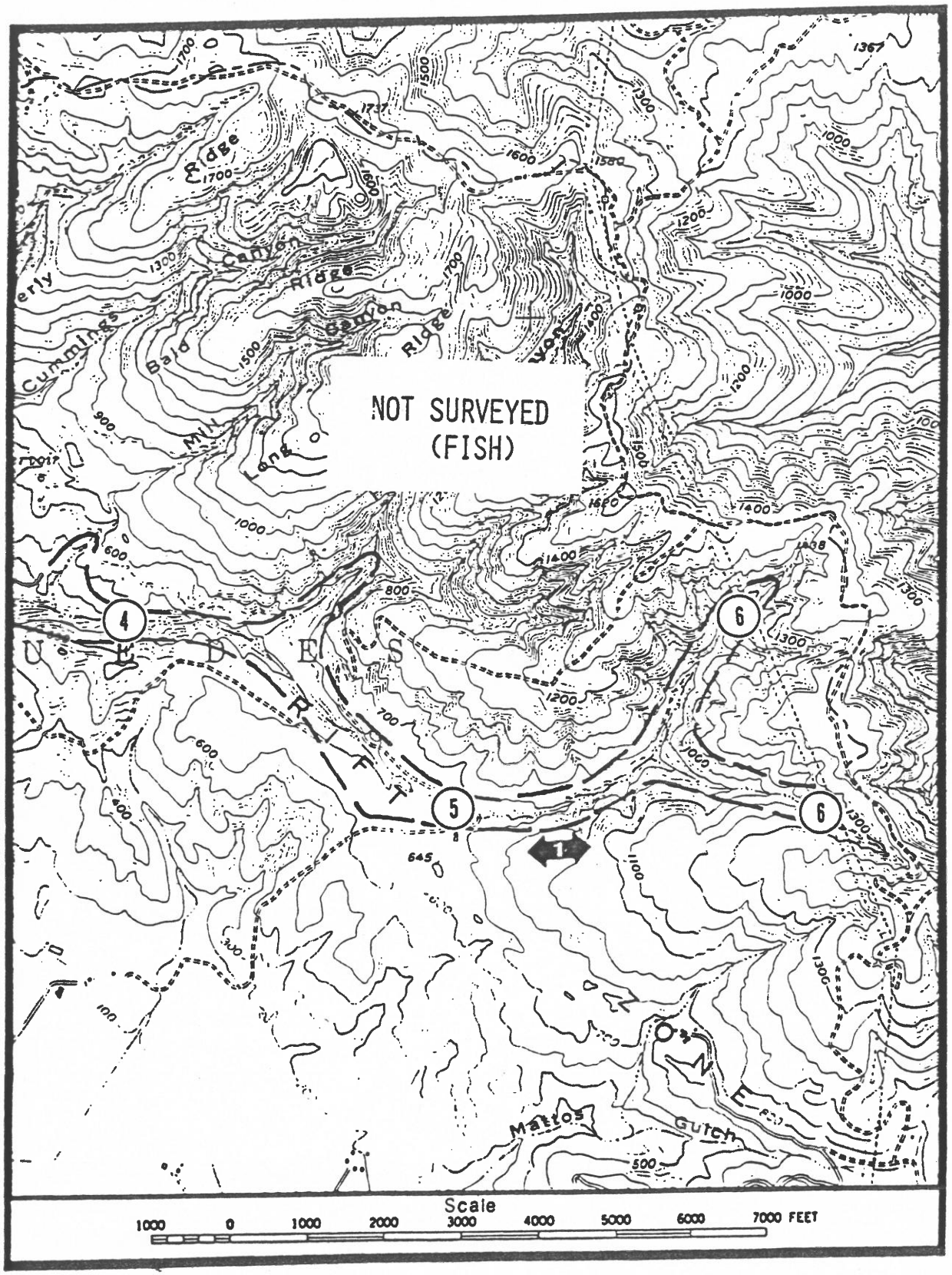


PLATE CW-3

Mattos Creek

WATSONVILLE EAST QUADRANGLE

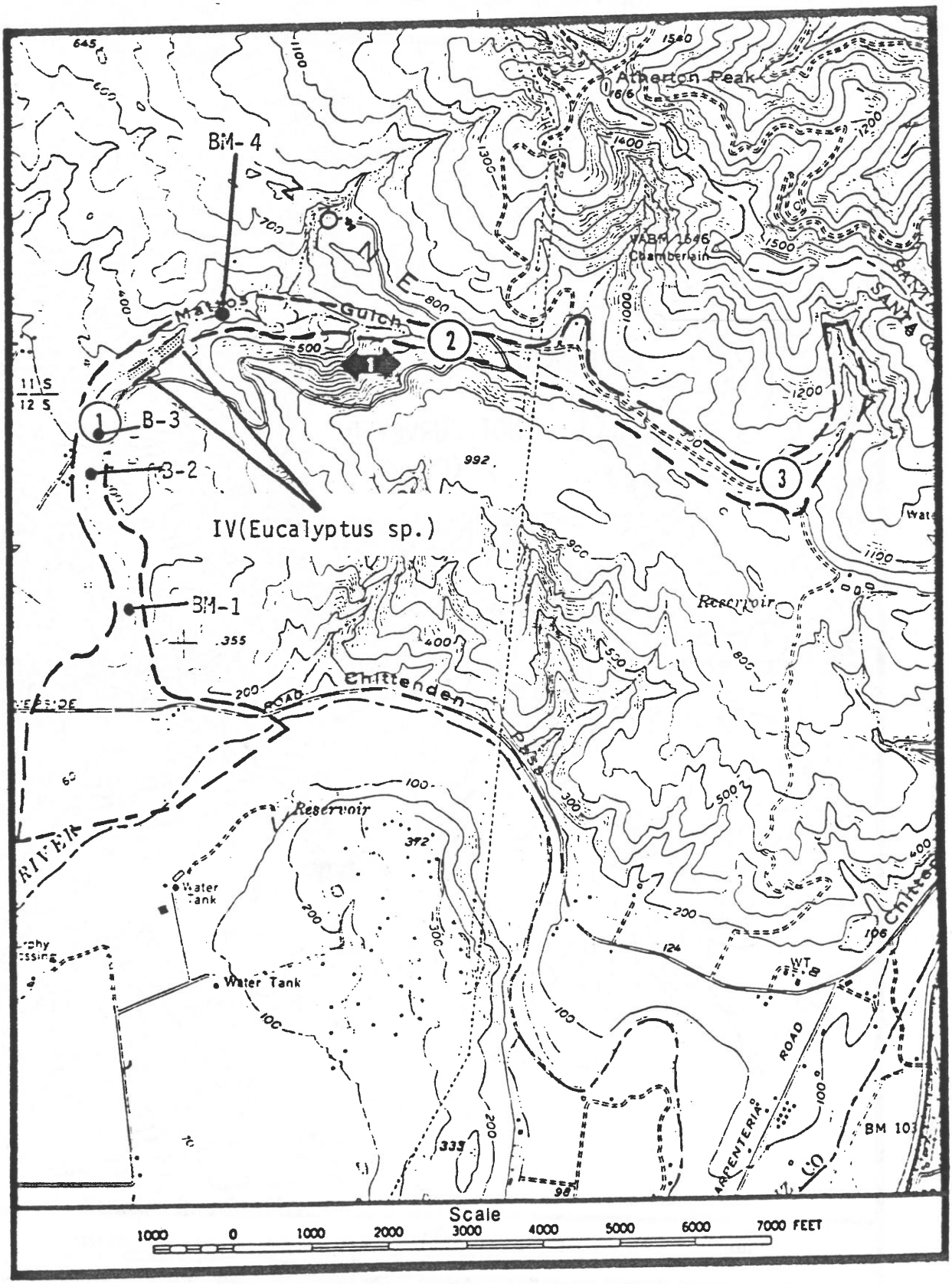


PLATE MG-1

Pescadero Creek

CHITTENDEN QUADRANGLE

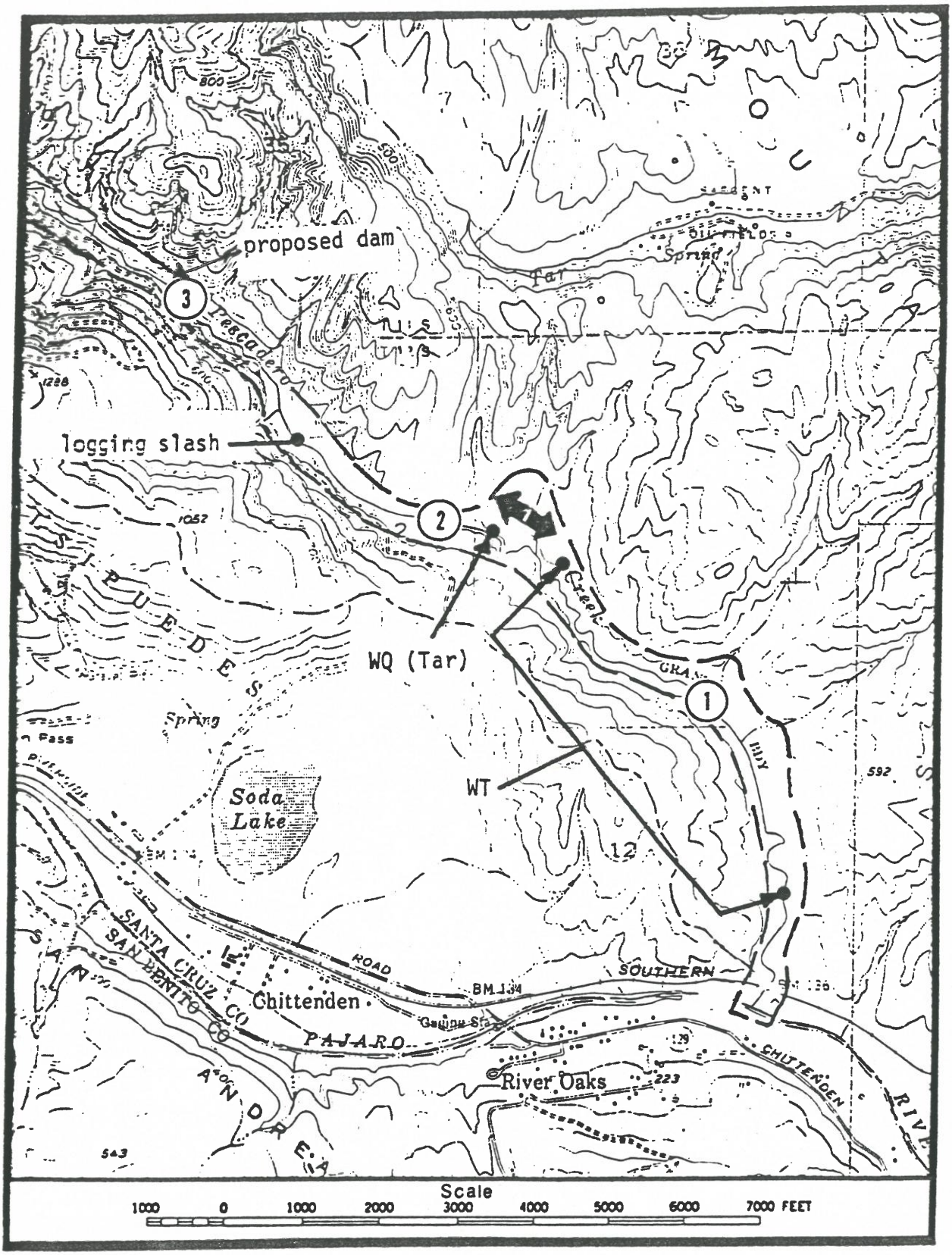


PLATE PE-1

Pescadero Creek

Watsonville East Quadrangle

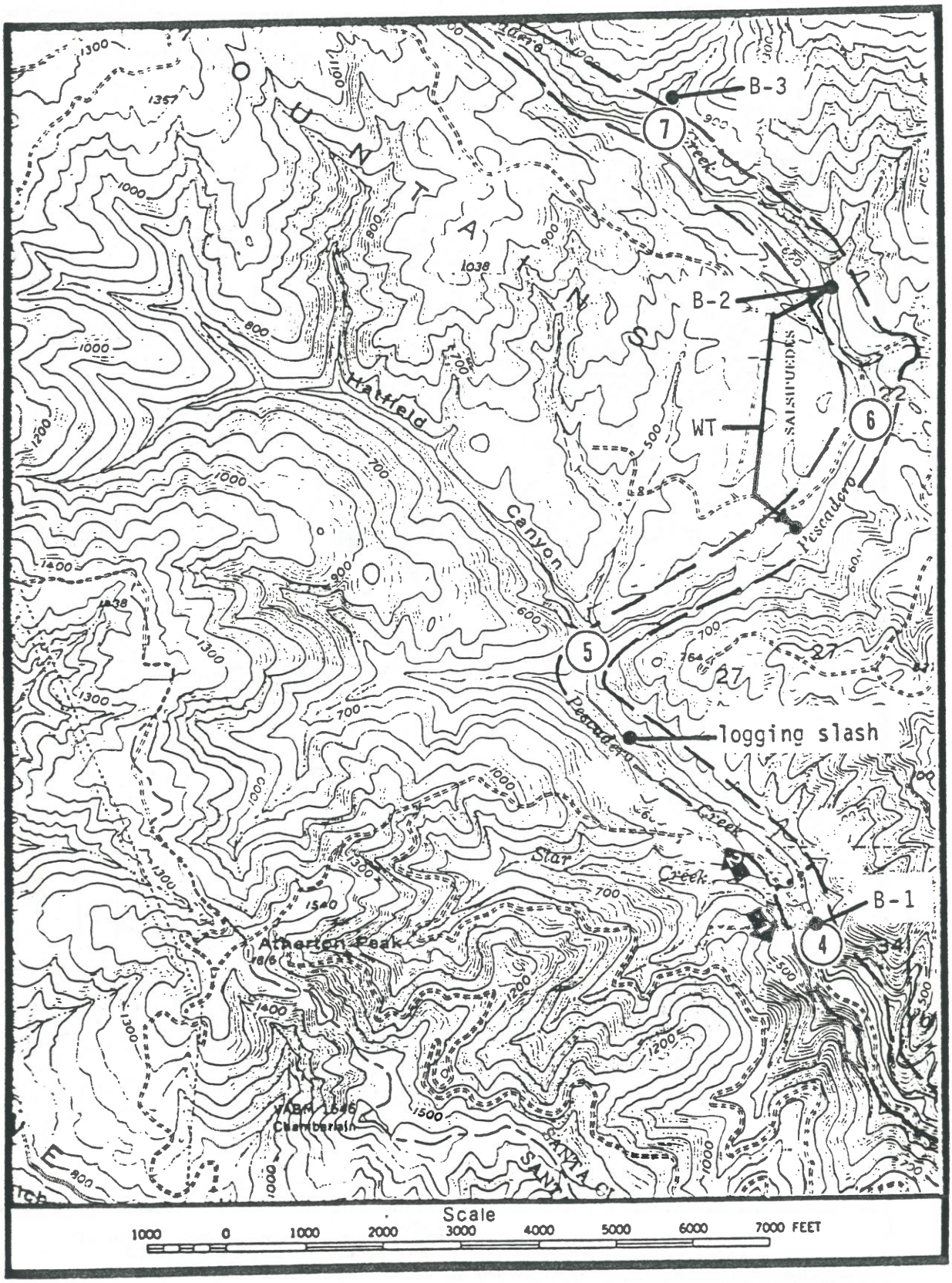


Plate PE-2

Pescadero Creek

WATSONVILLE EAST QUADRANGLE

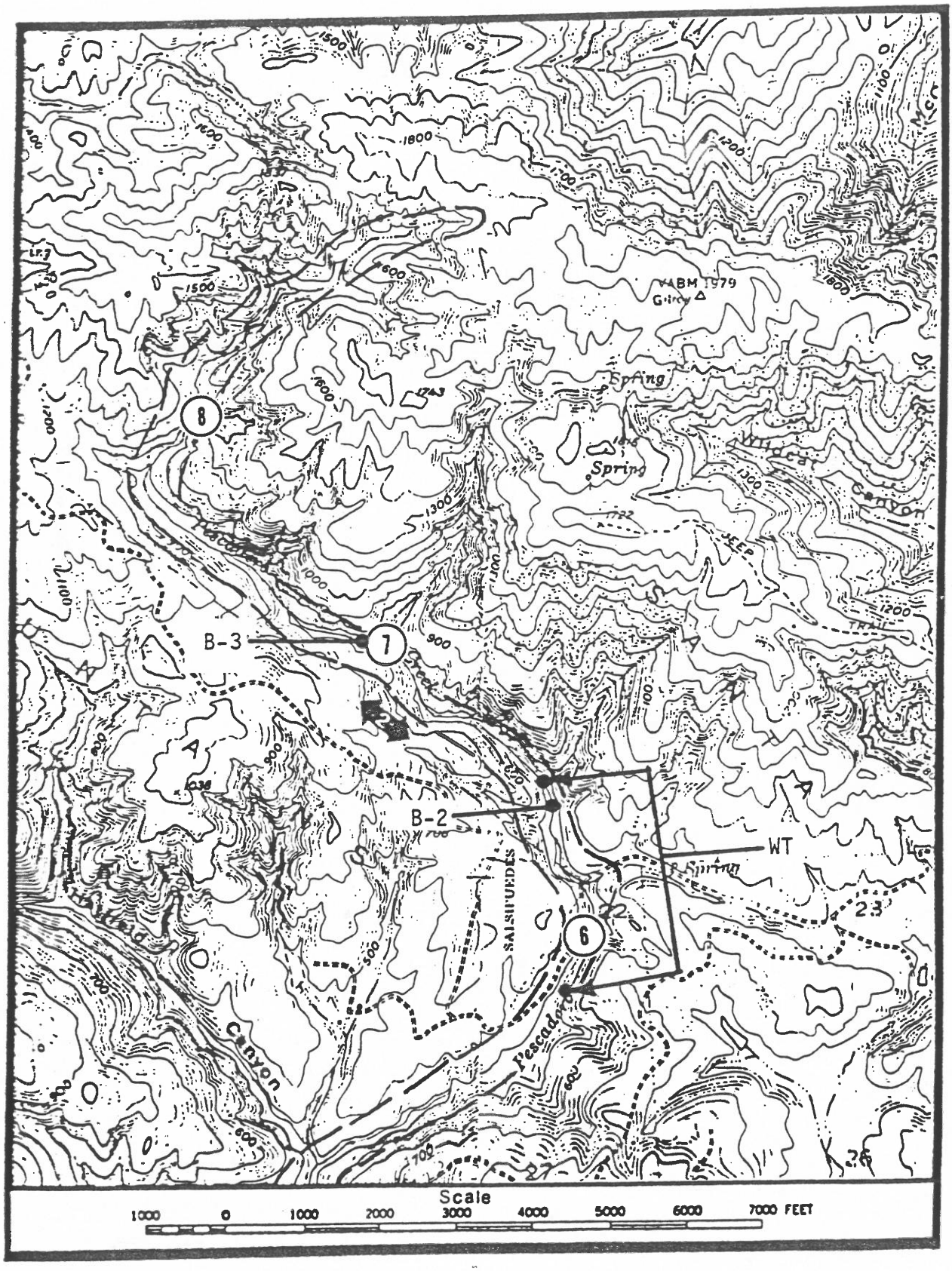


PLATE PE-3

Tar (La Brea) Creek

CHITTENDEN QUADRANGLE

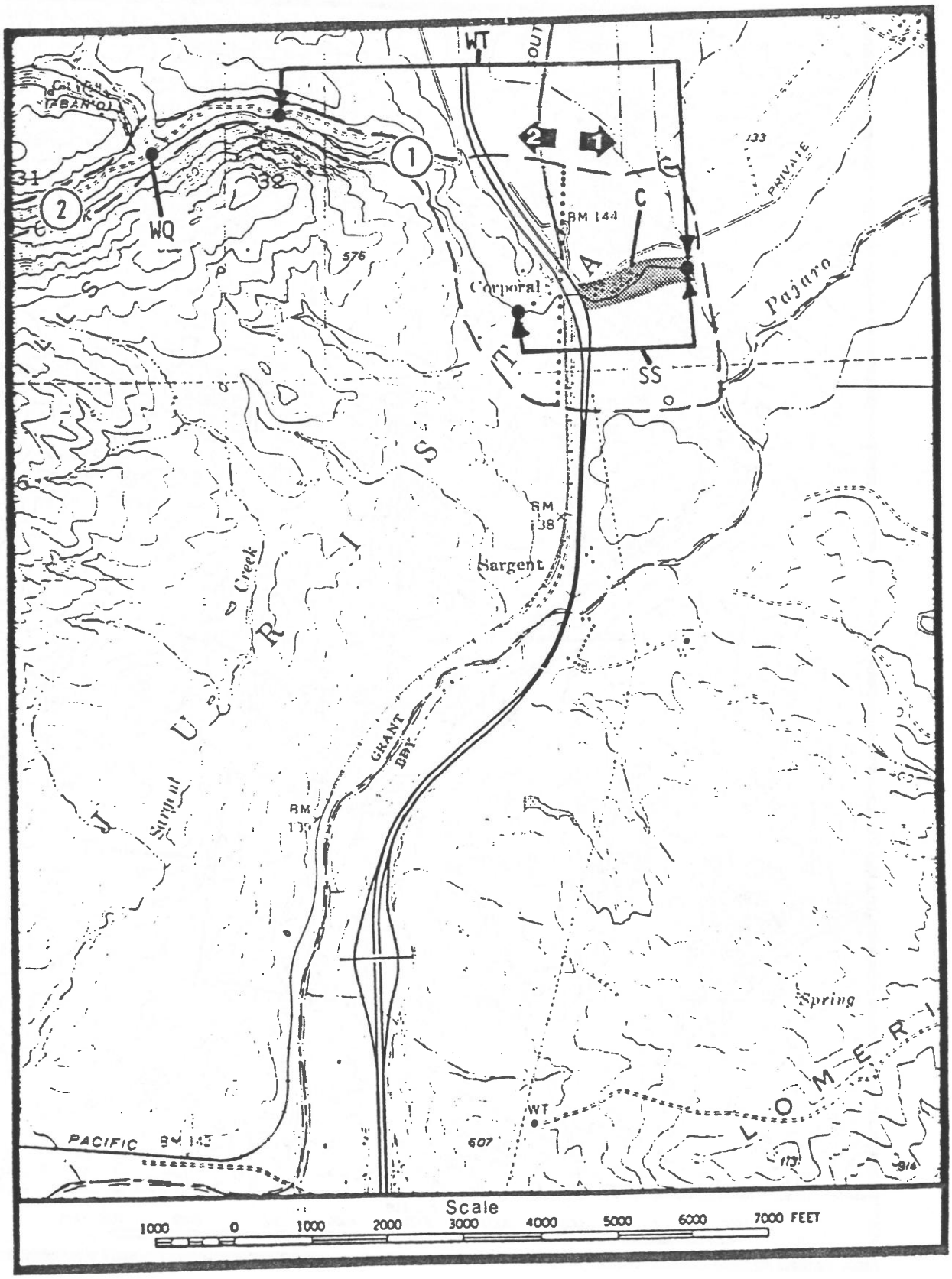


PLATE TC-1

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

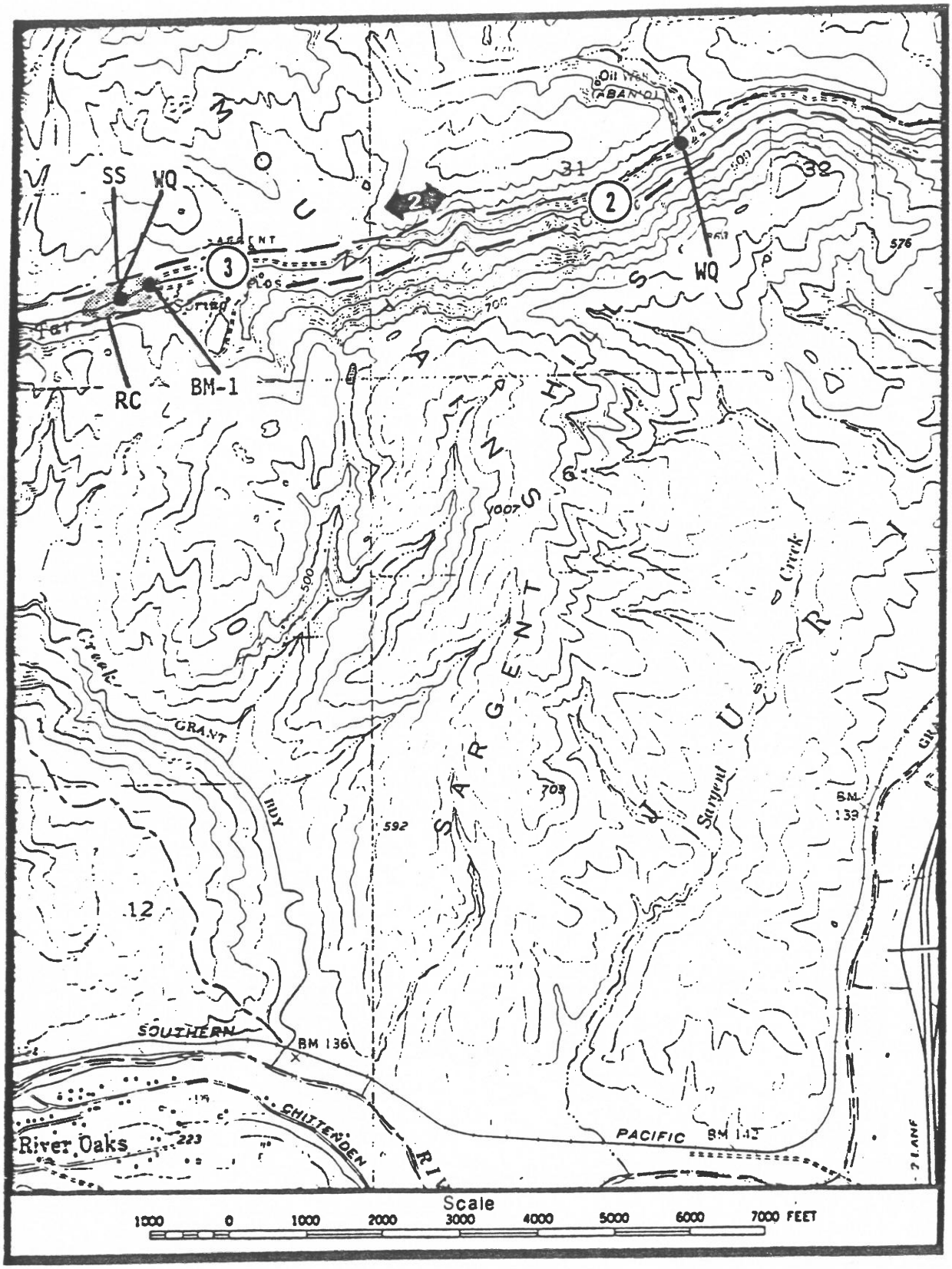


PLATE TC-2

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

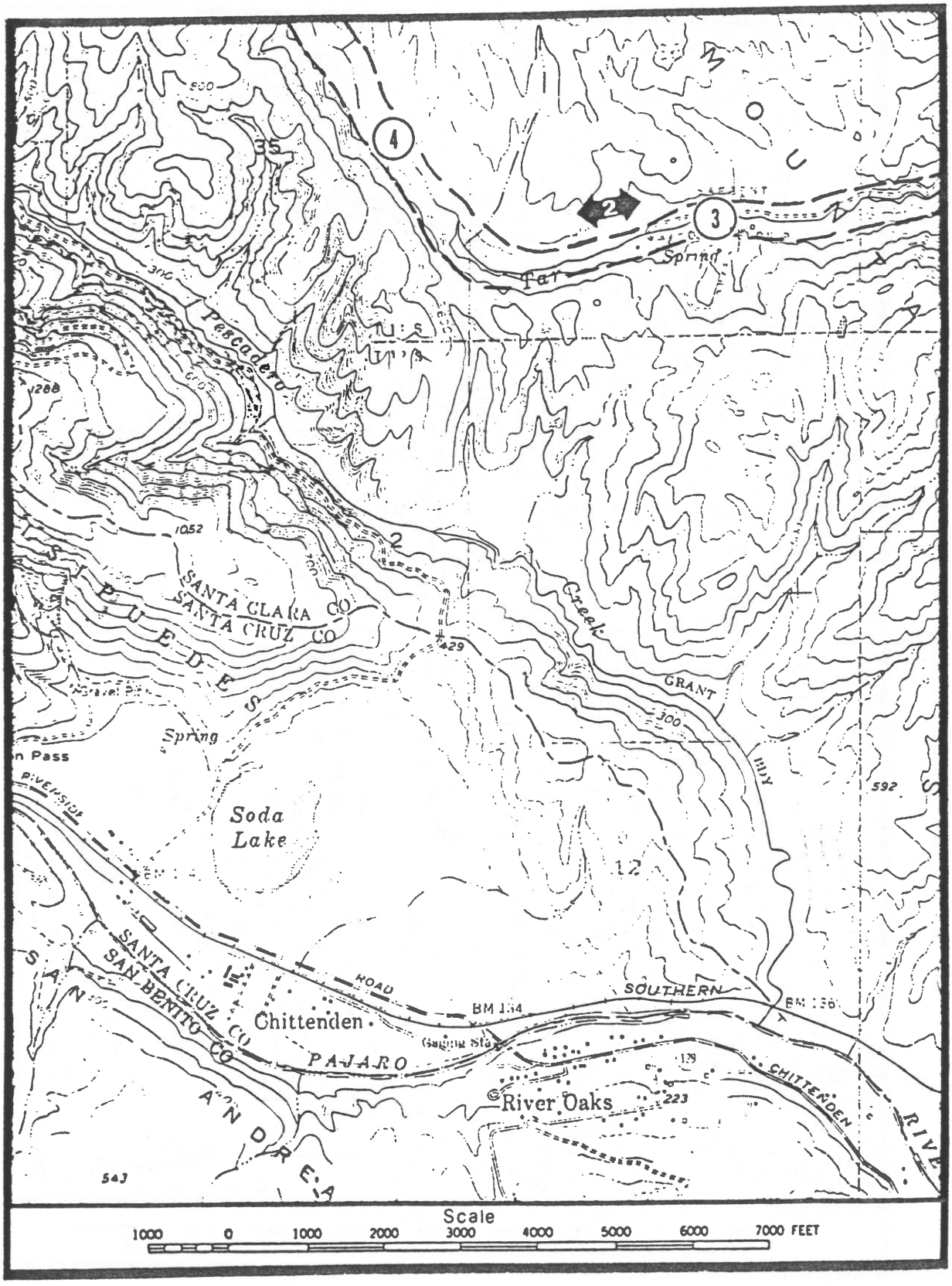


PLATE TC-3

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

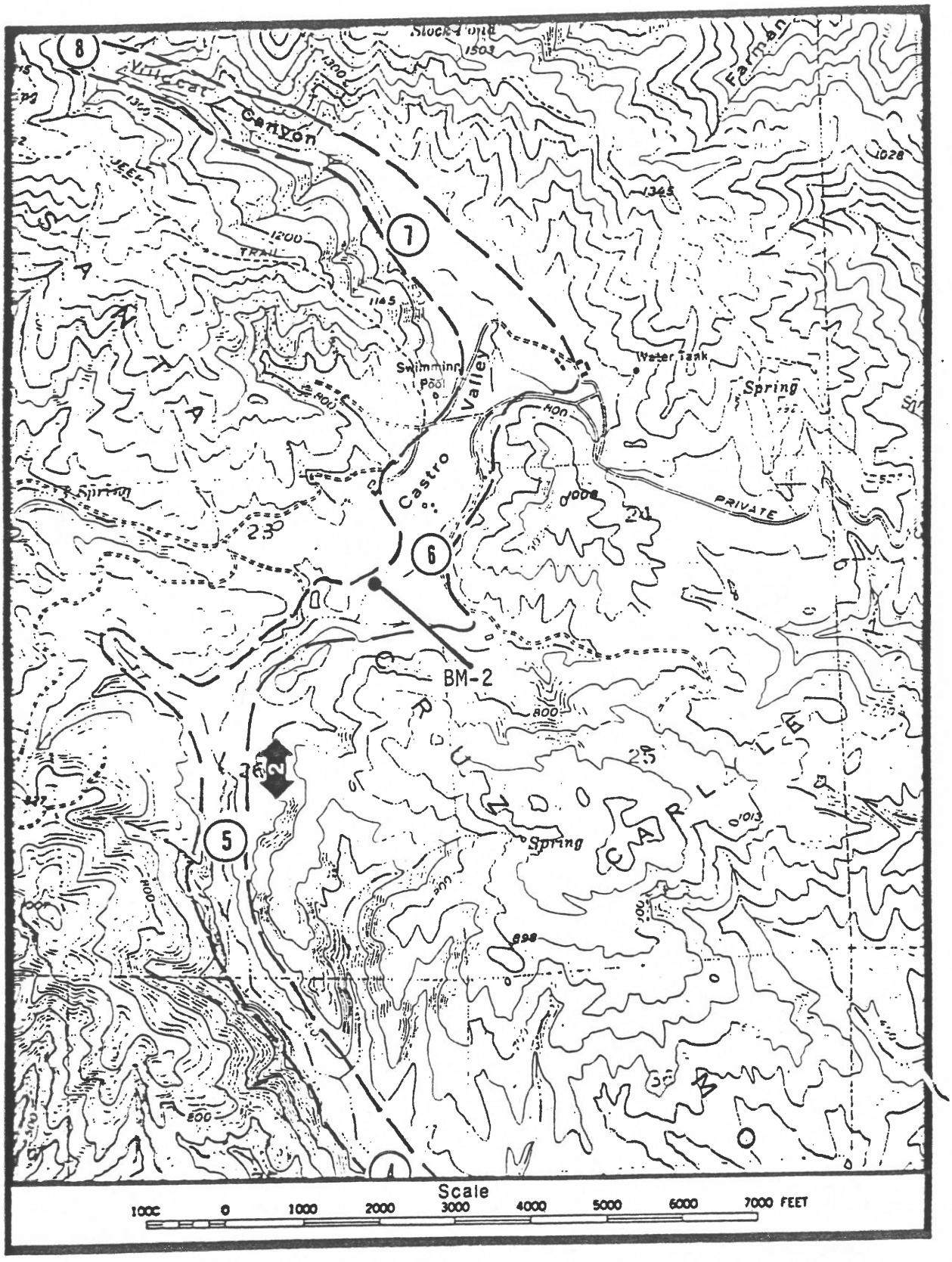


PLATE TC-4

Carnadero/ Uvas Creek

CHITTENDEN QUADRANGLE

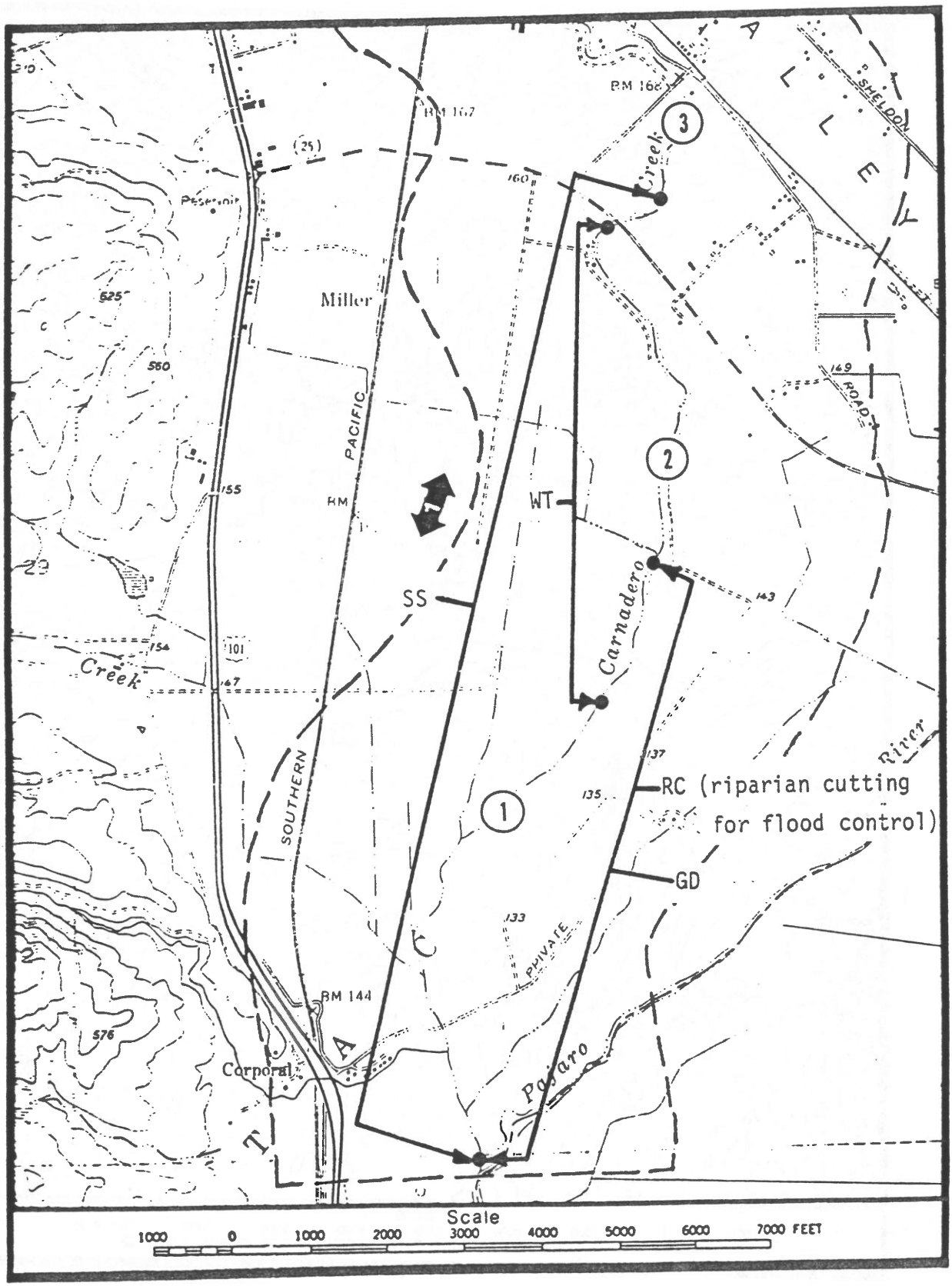


PLATE CU-1

Carnadero / Uvas Creek

CHITTENDEN QUADRANGLE

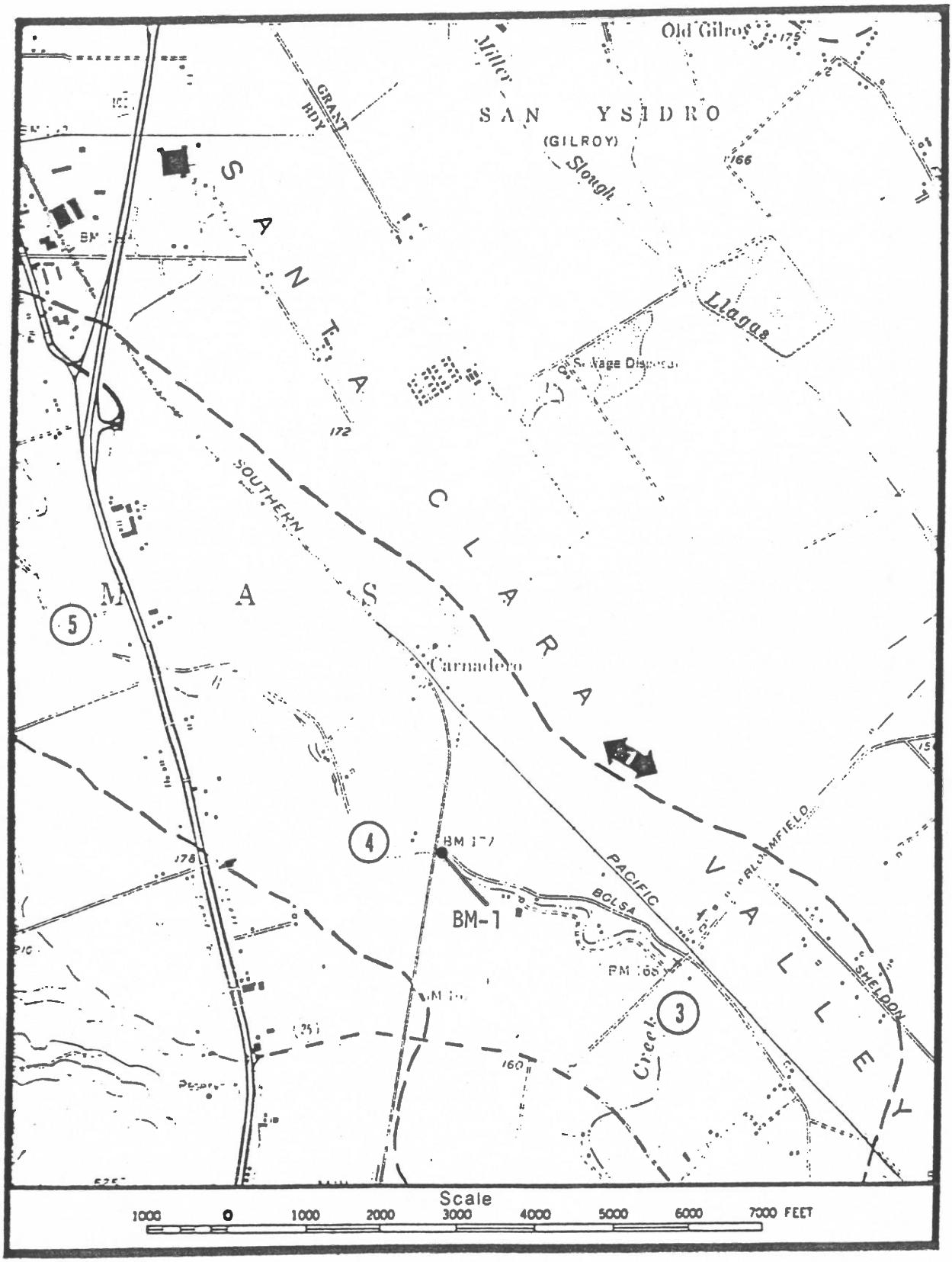


PLATE CU-2

Carnadero/Uvas Creek

CHITTENDEN QUADRANGLE

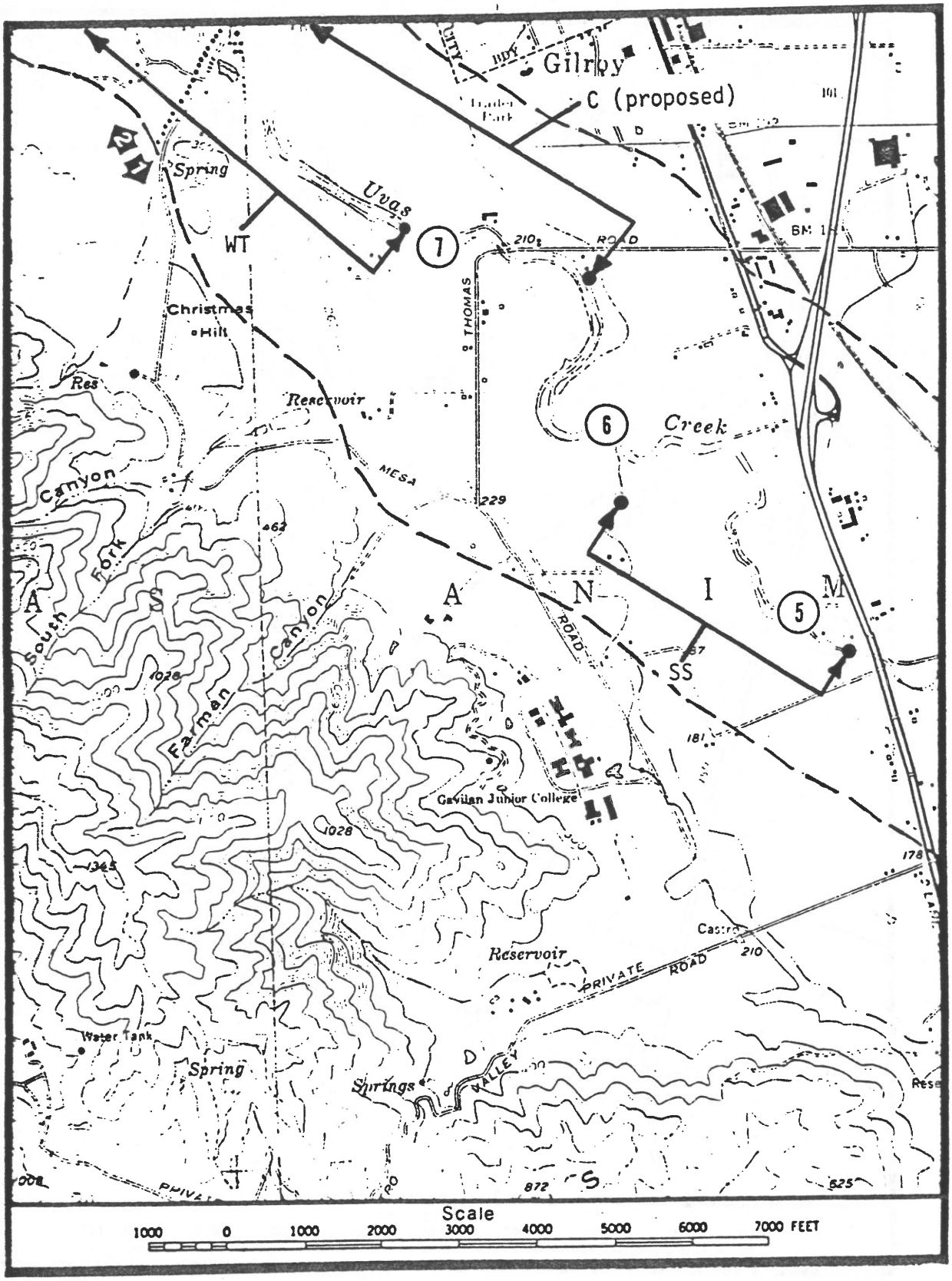


PLATE CU-3

Carnadero/ Uvas Creek

GILROY QUADRANGLE

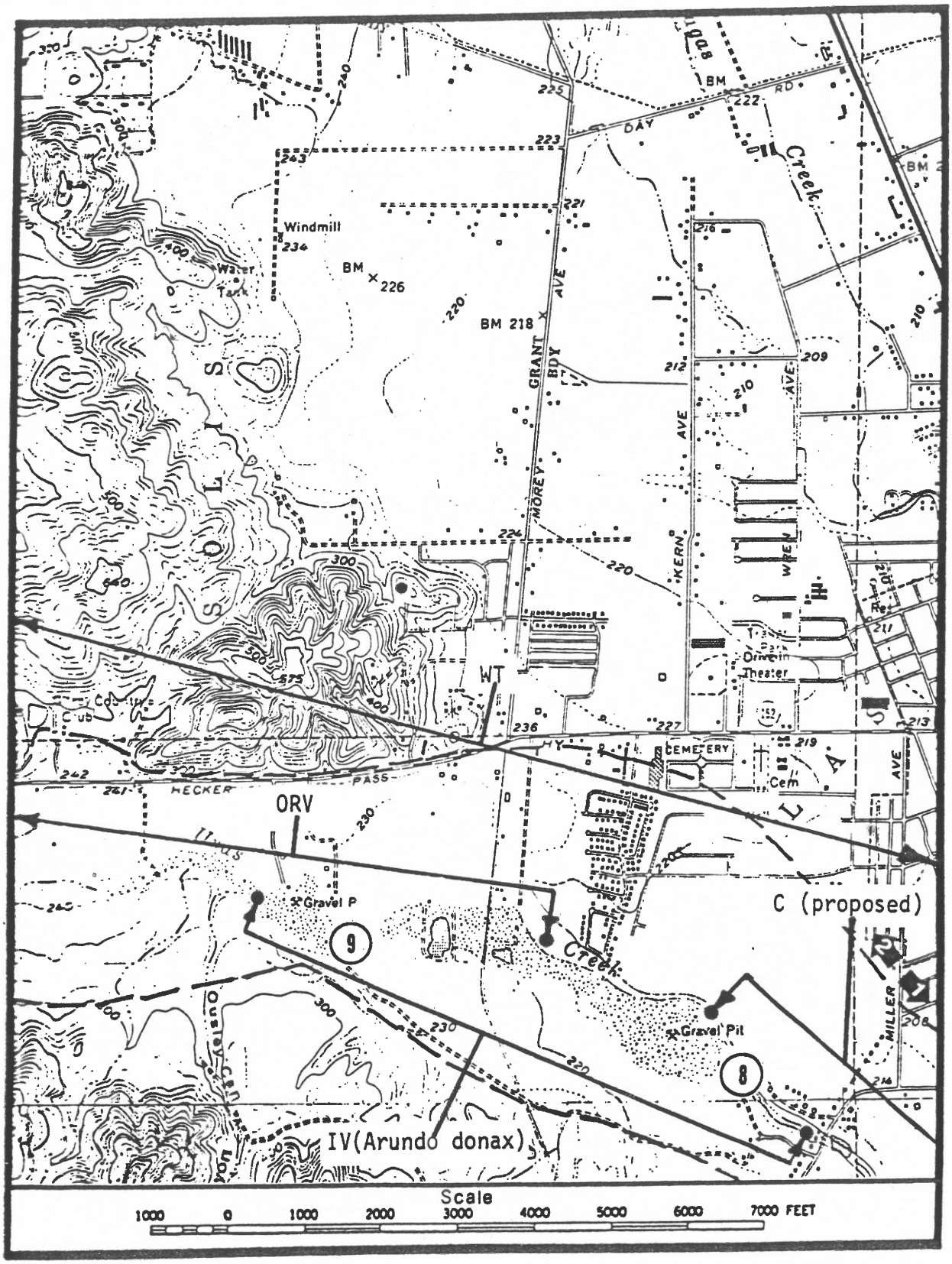


PLATE CU-4

Carnadero / Uvas Creek

Mount Madonna Quadrangle

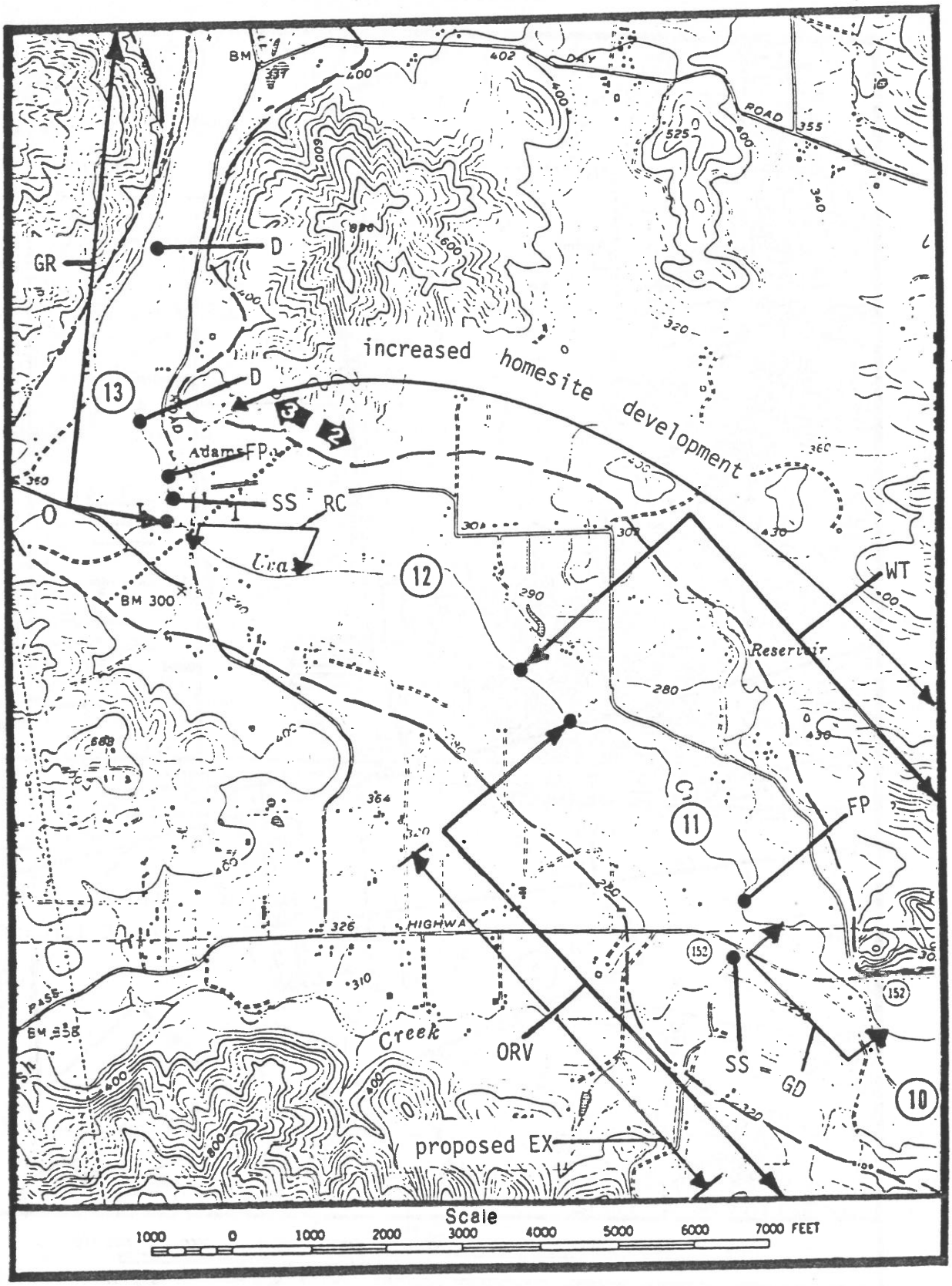


Plate CU-5

Carnadero/Uvas Creek

Mount Madonna Quadrangle

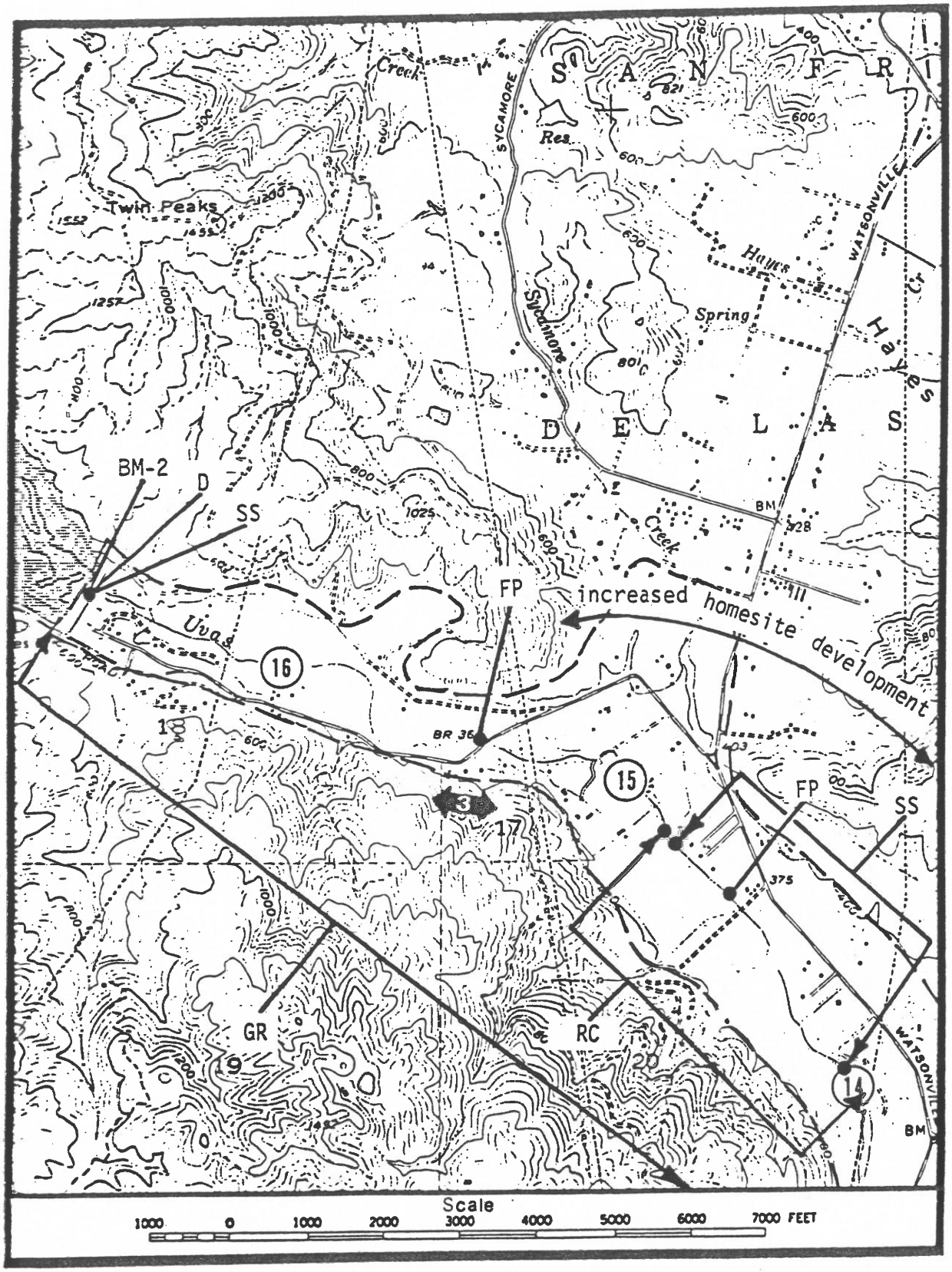


PLATE CU-6

Bodfish Creek

Mount Madonna Quadrangle

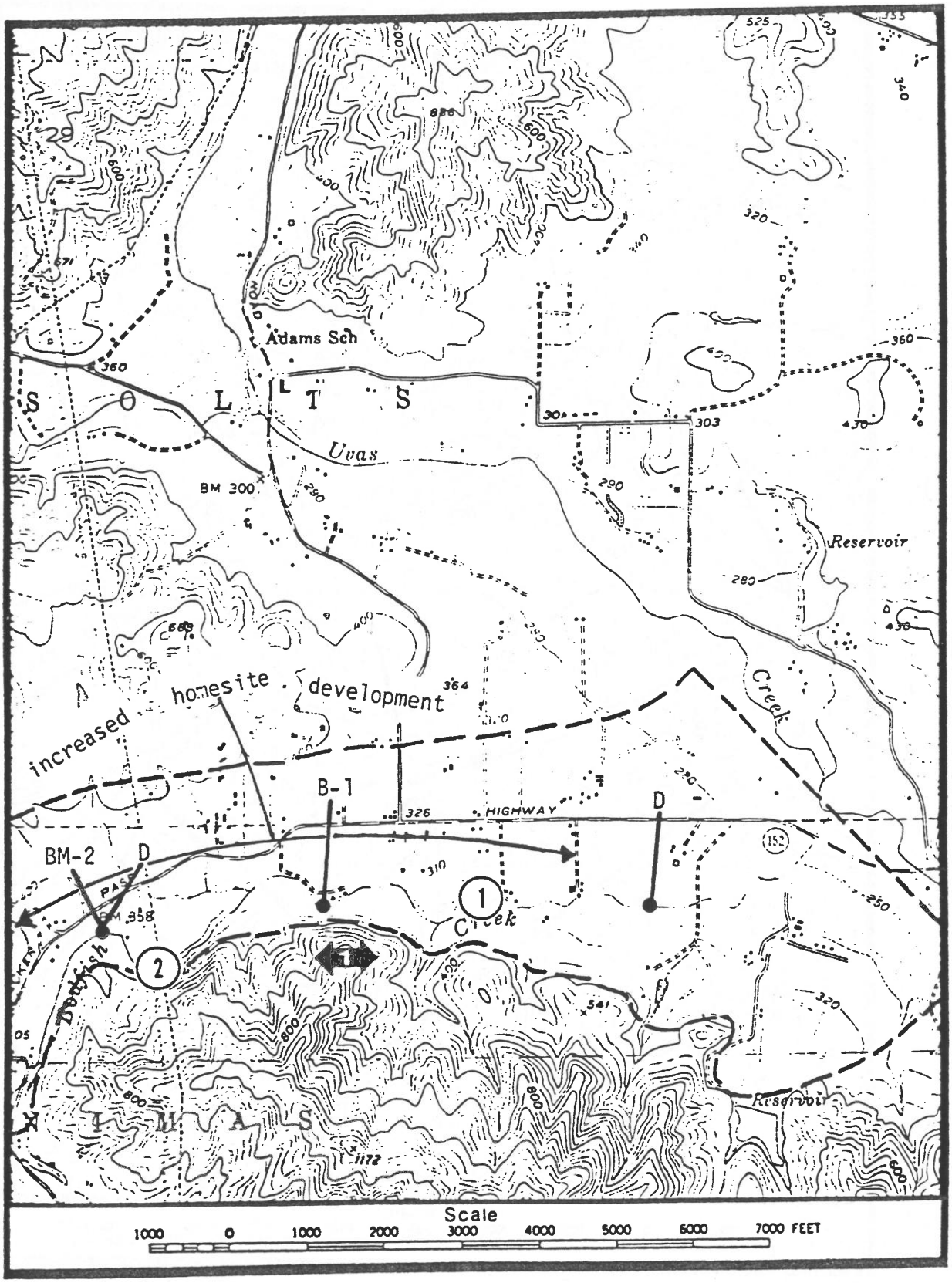


Plate BO-1

Bodfish Creek

Mount Madonna Quadrangle

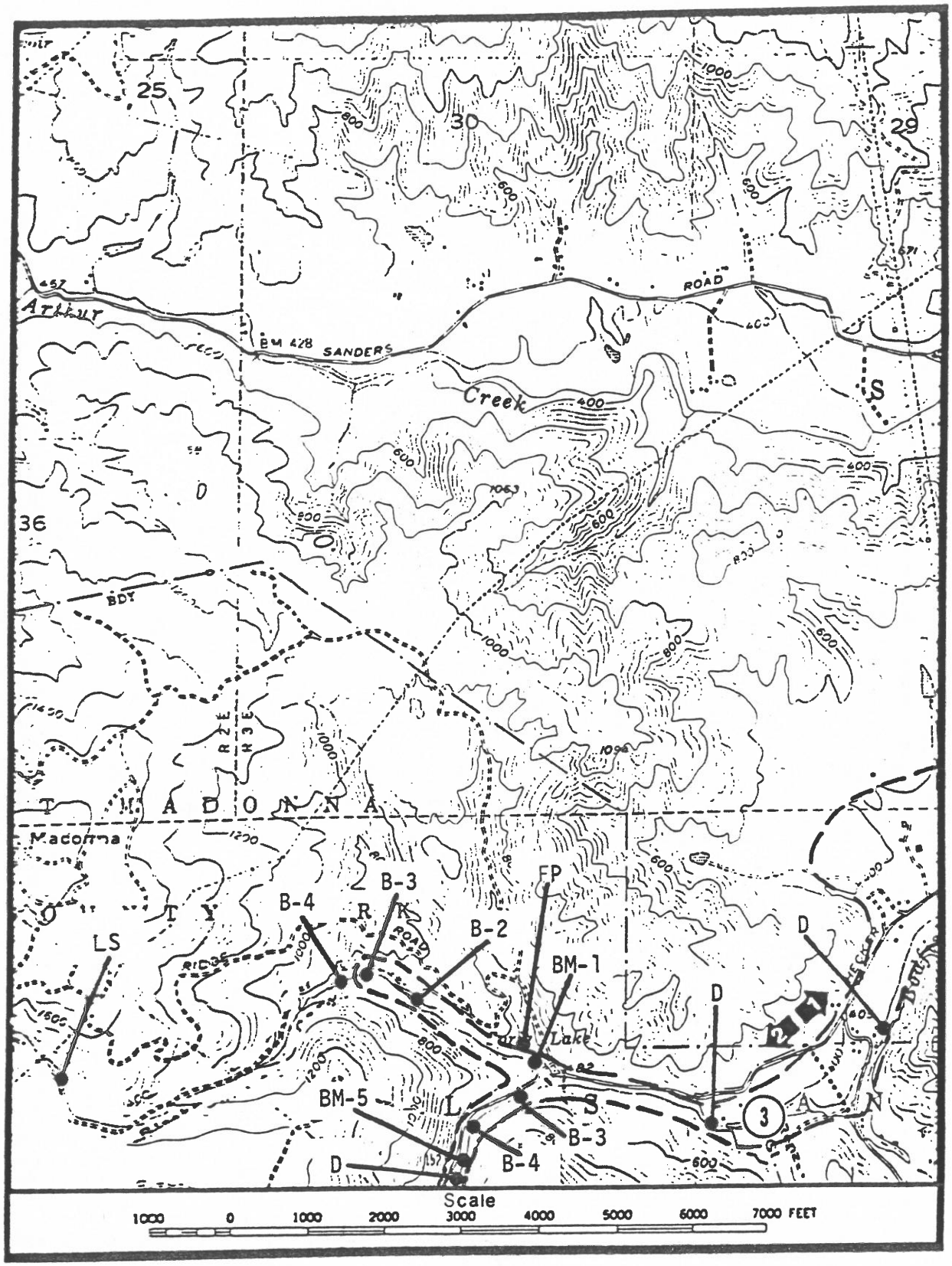


PLATE BC-2

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

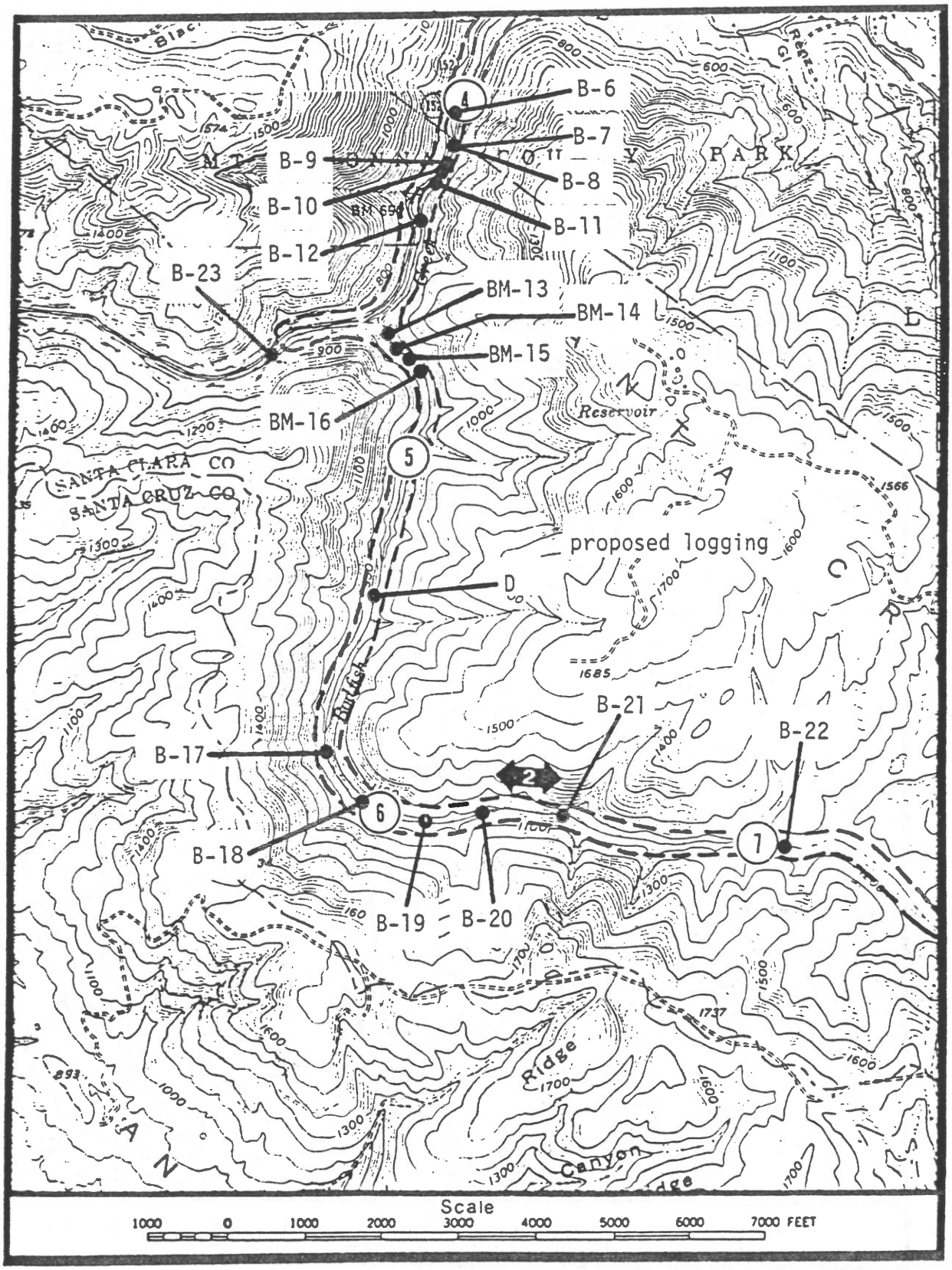


PLATE BO-3

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

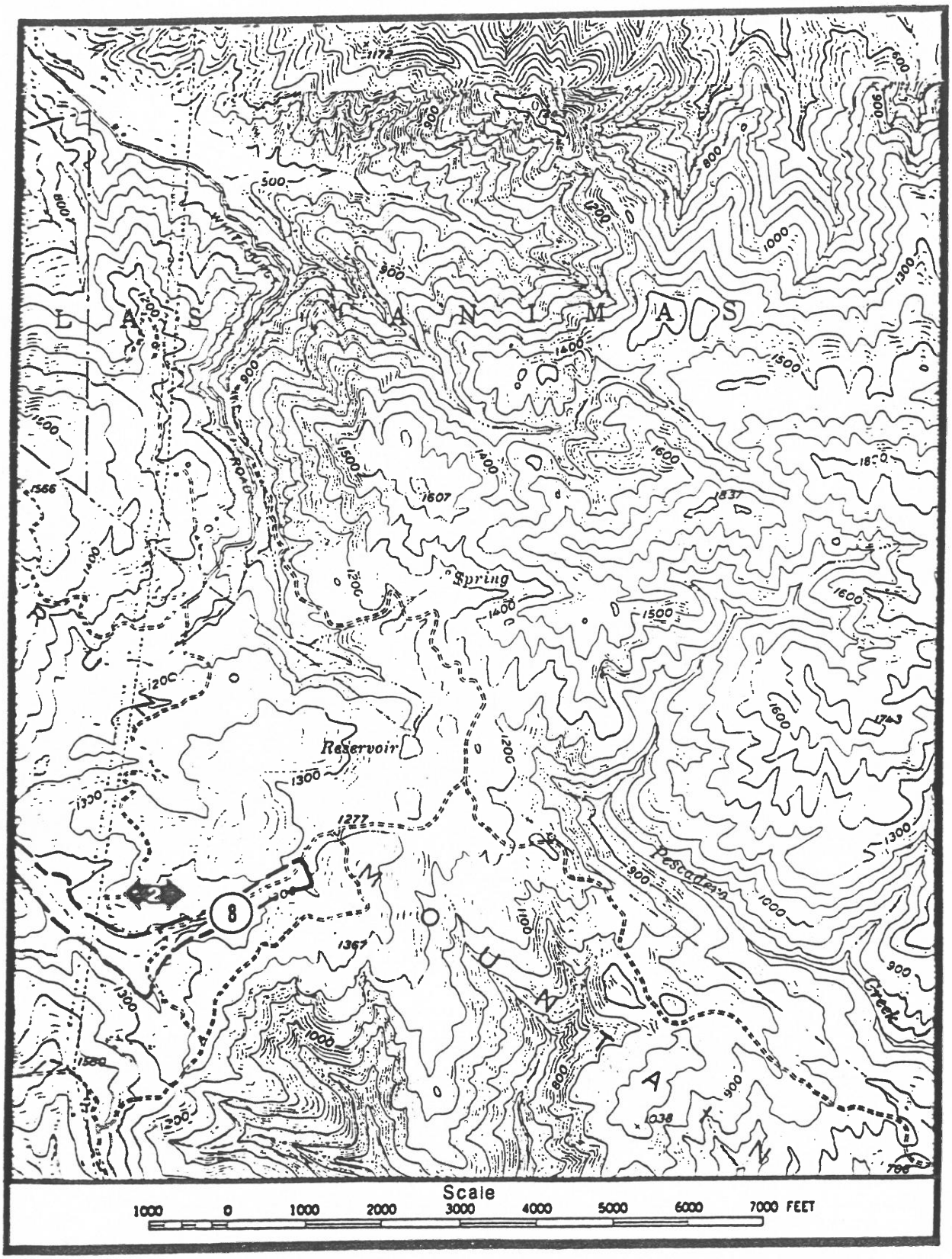


PLATE BO-4

Little Arthur Creek

Mount Madonna Quadrangle

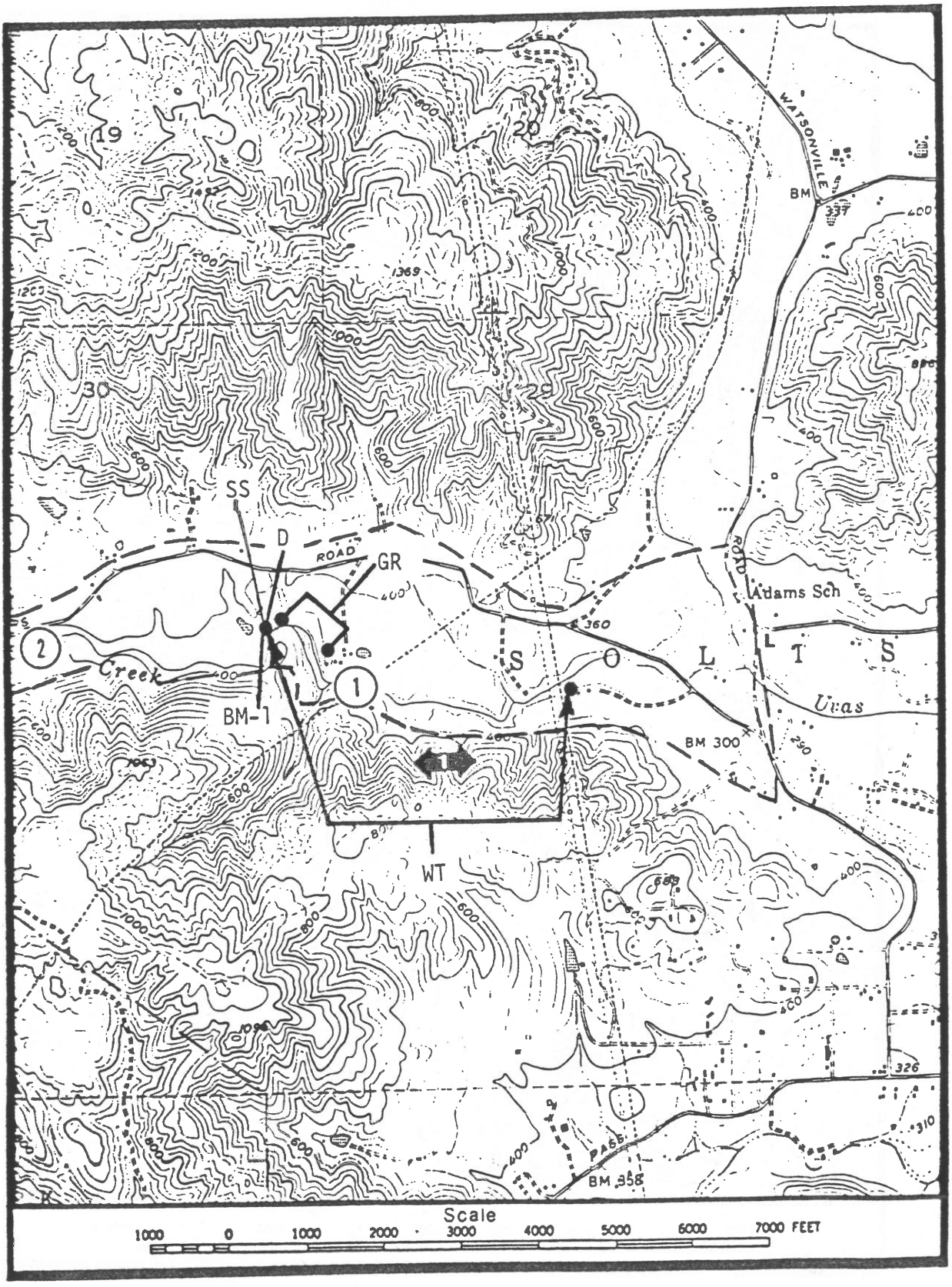


PLATE LA-1

Little Arthur Creek

Mount Madonna Quadrangle

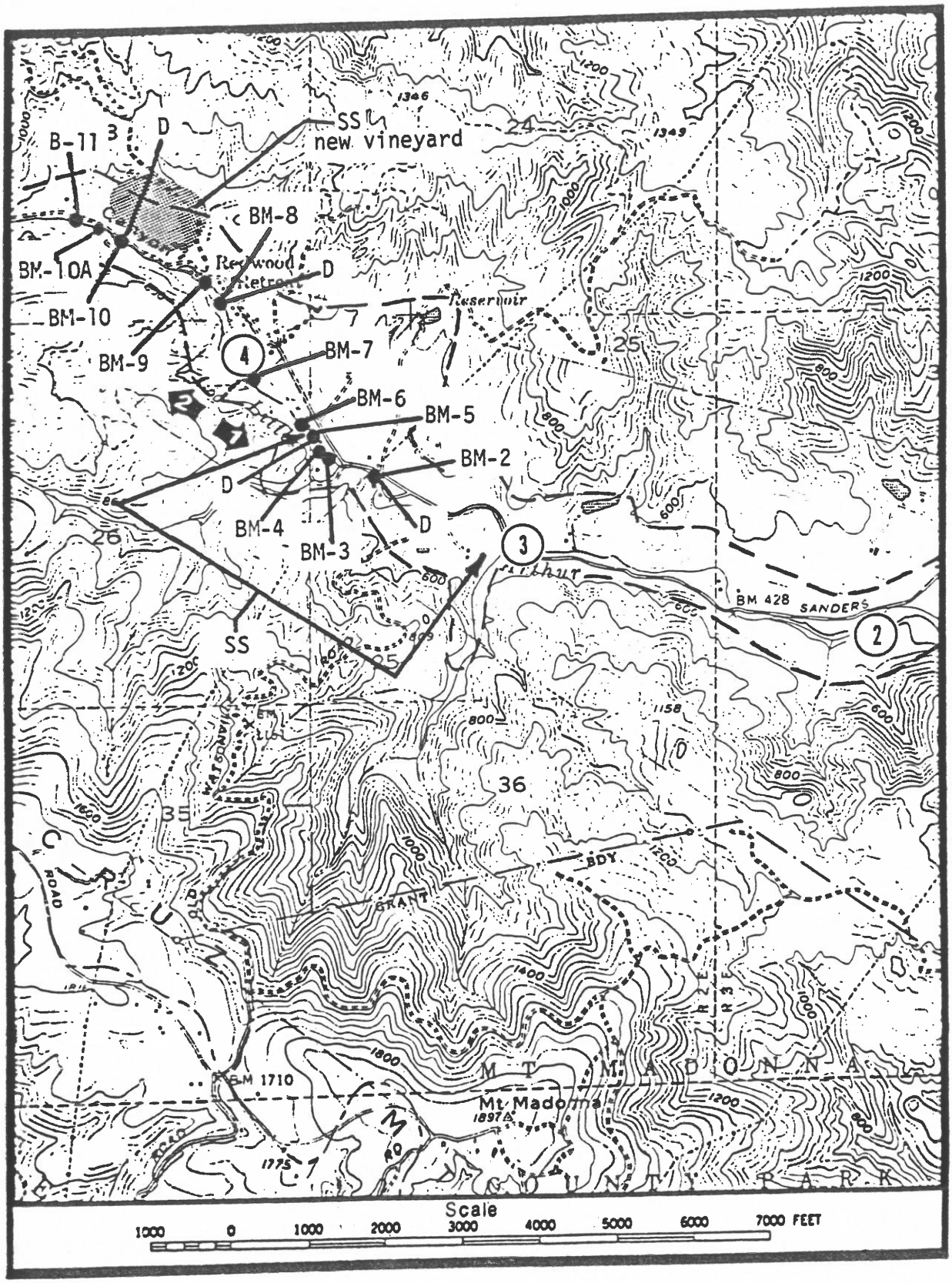


PLATE LA-2

Little Arthur Creek

Mount Madonna Quadrangle

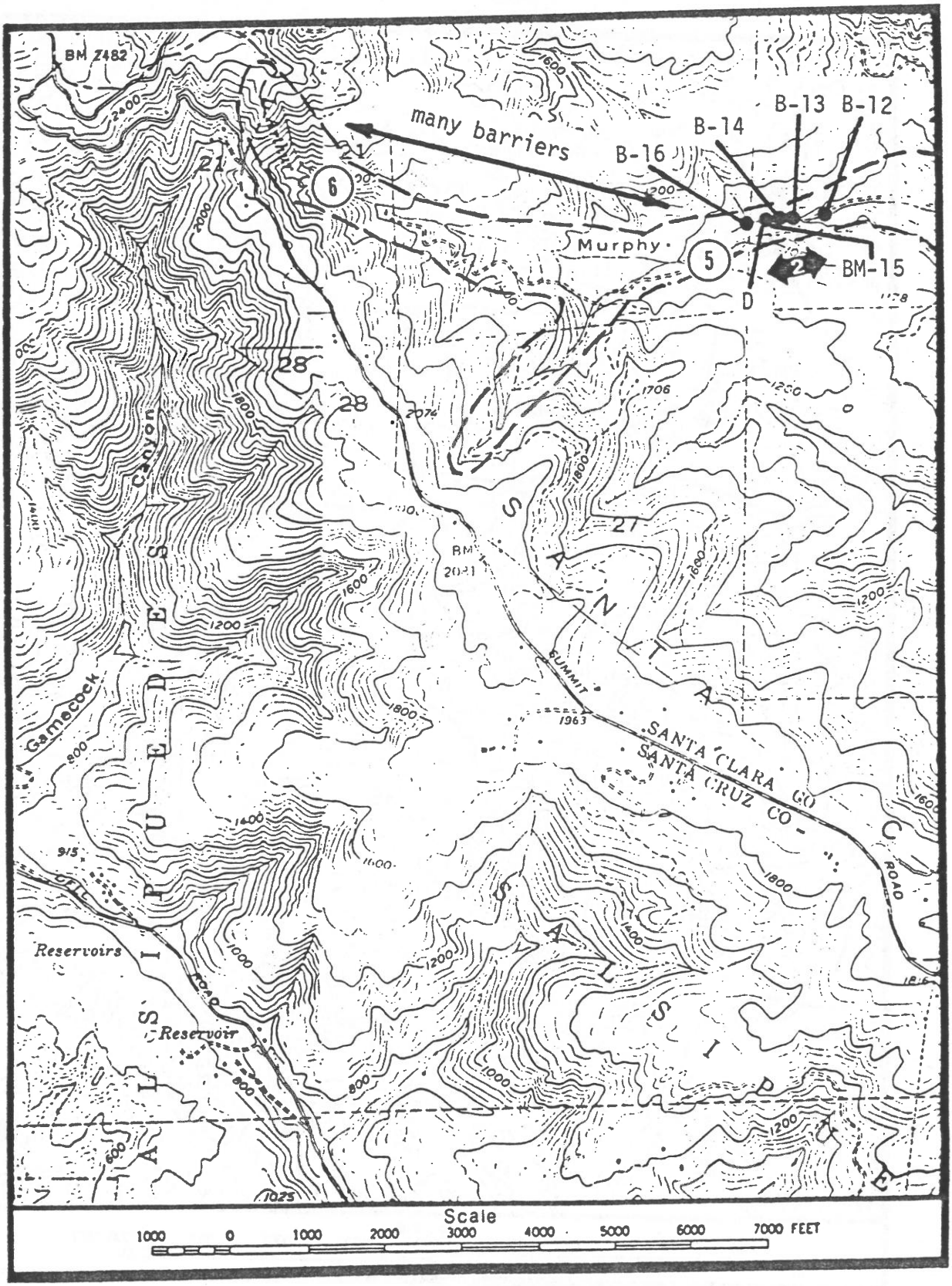


PLATE LA-3

Llagas Creek

CHITTENDEN QUADRANGLE

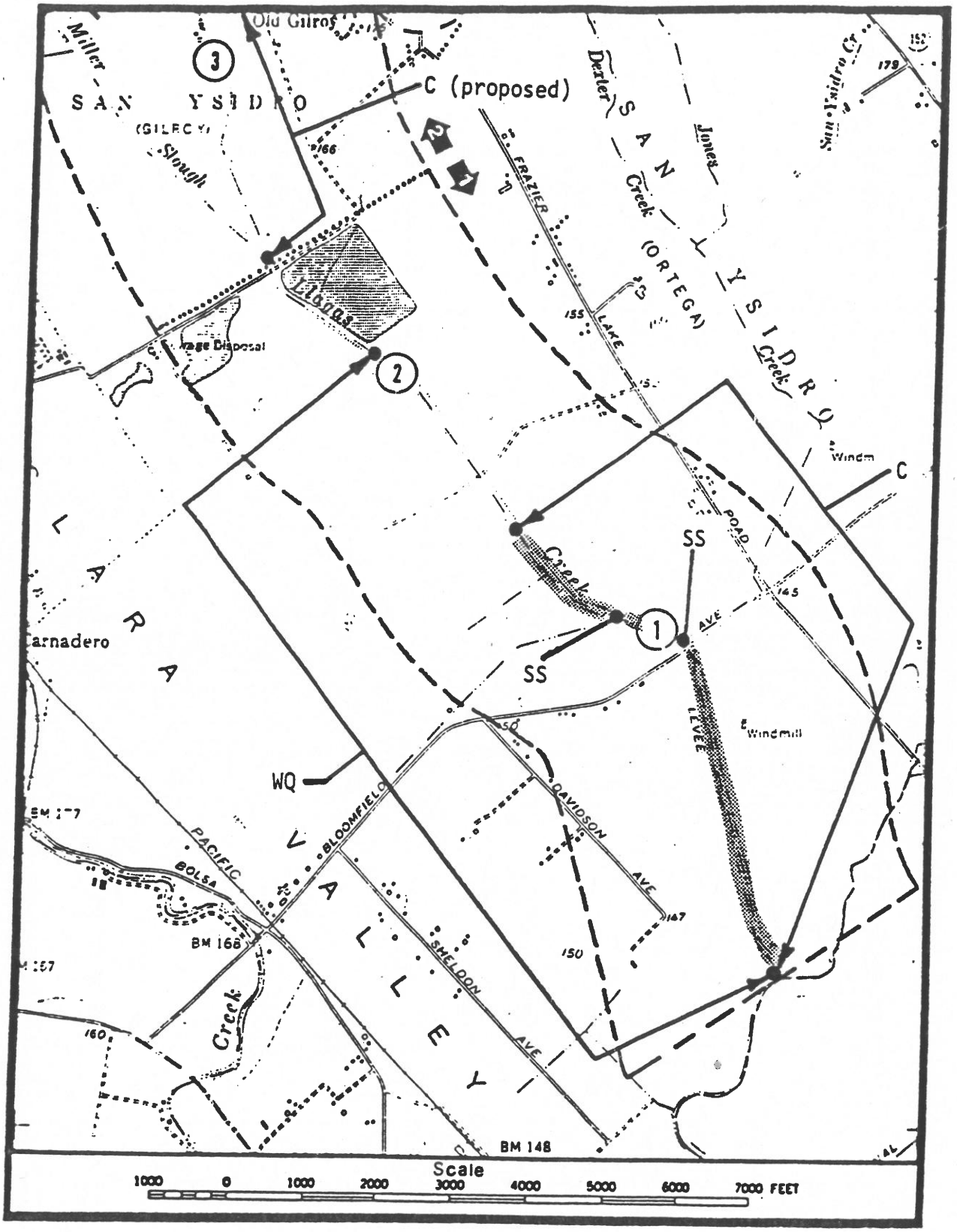


PLATE LC-1

GILROY QUADRANGLE

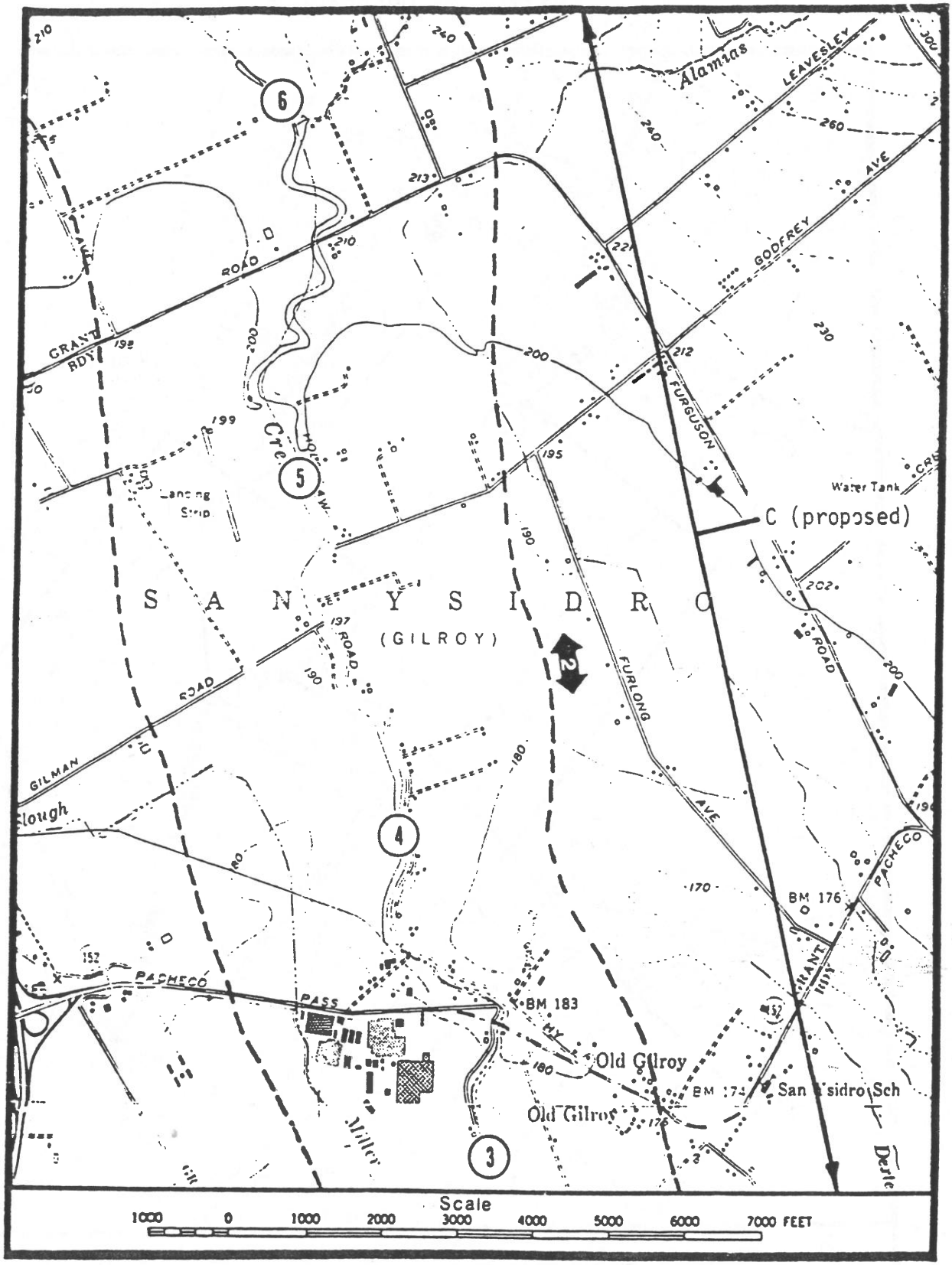


PLATE LC-2

Llagas Creek

Gilroy Quadrangle

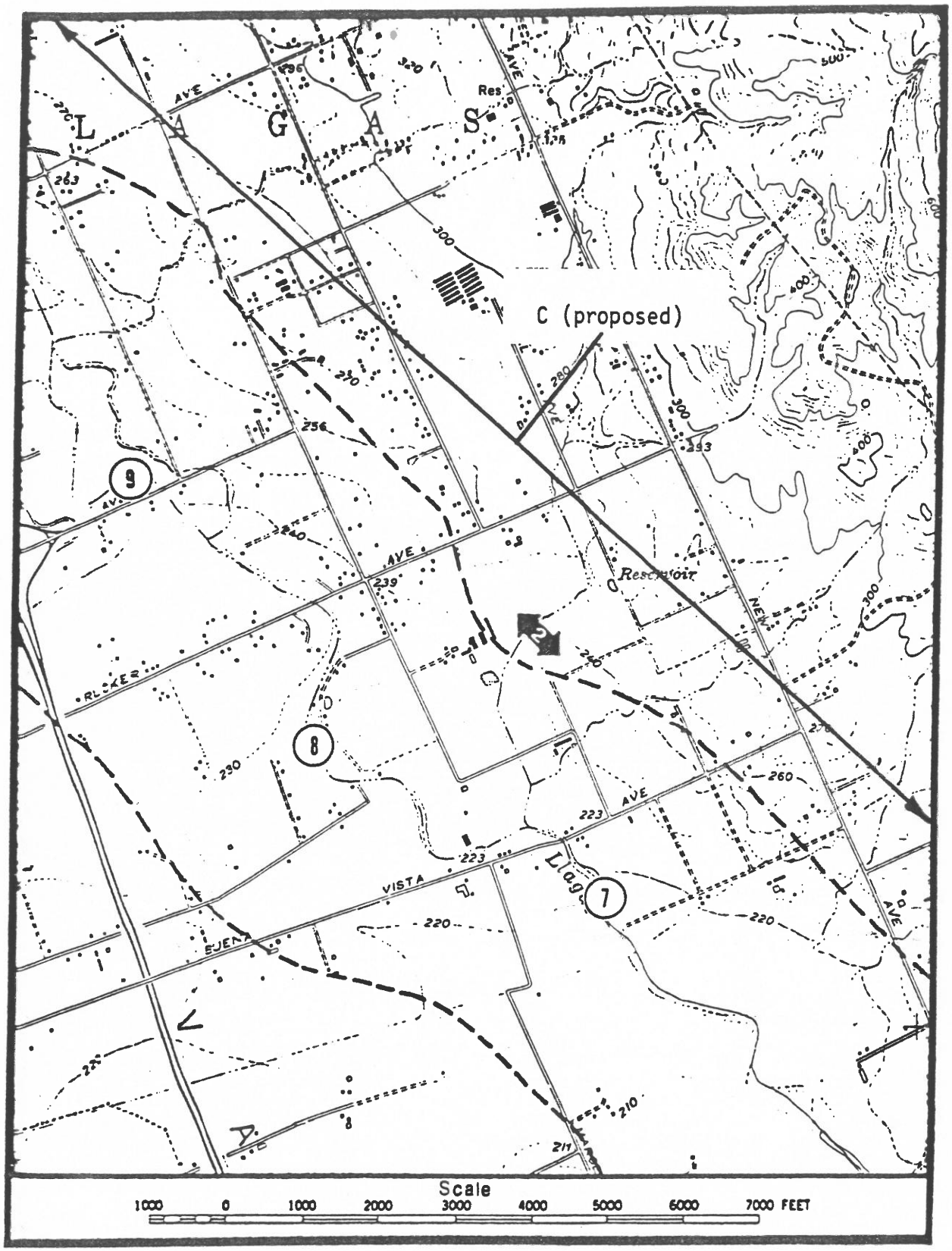


Plate LC-3

Llagas Creek

GILROY QUADRANGLE

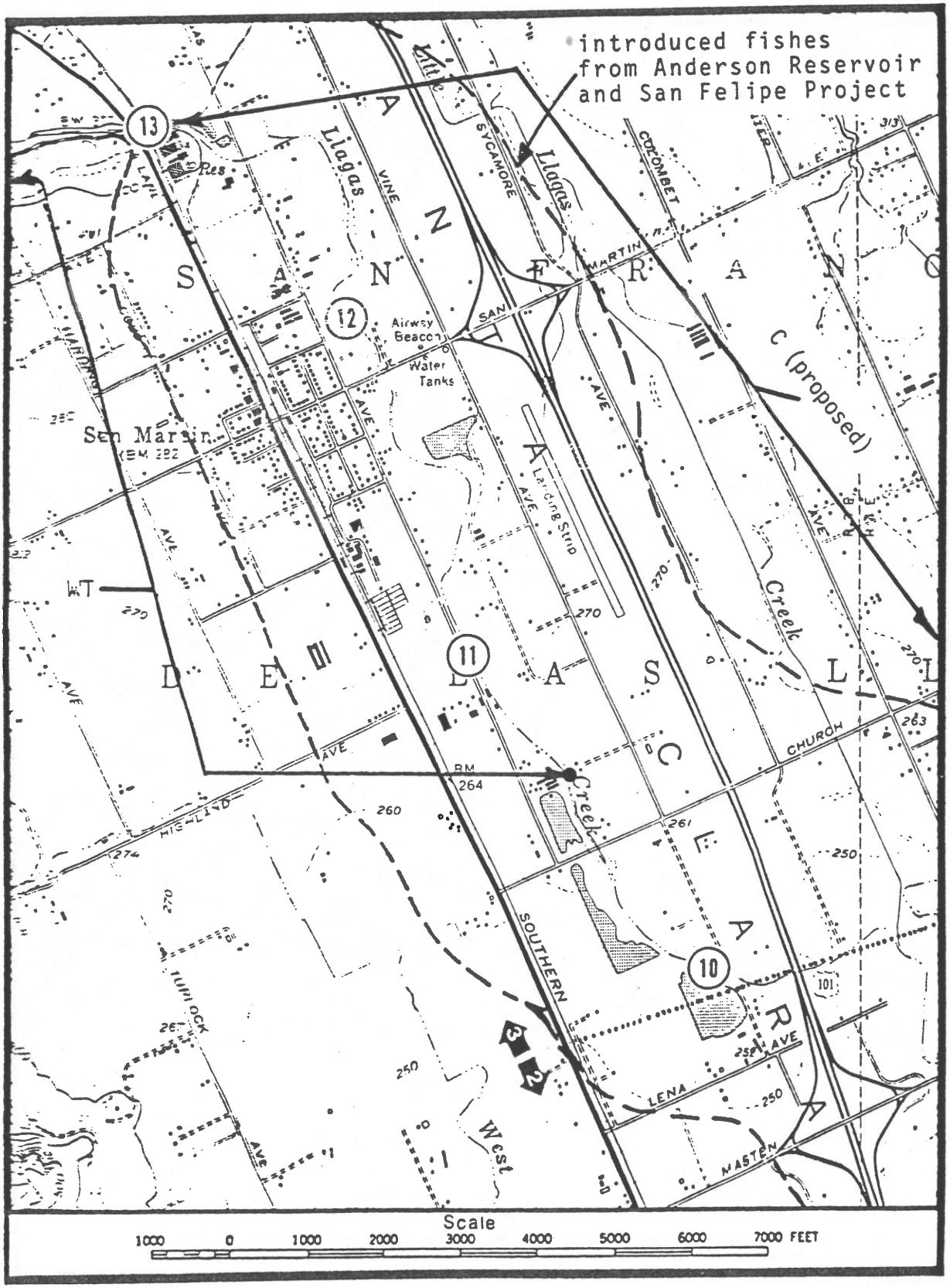


PLATE LC-4

Llagas Creek

Mount Madonna Quadrangle

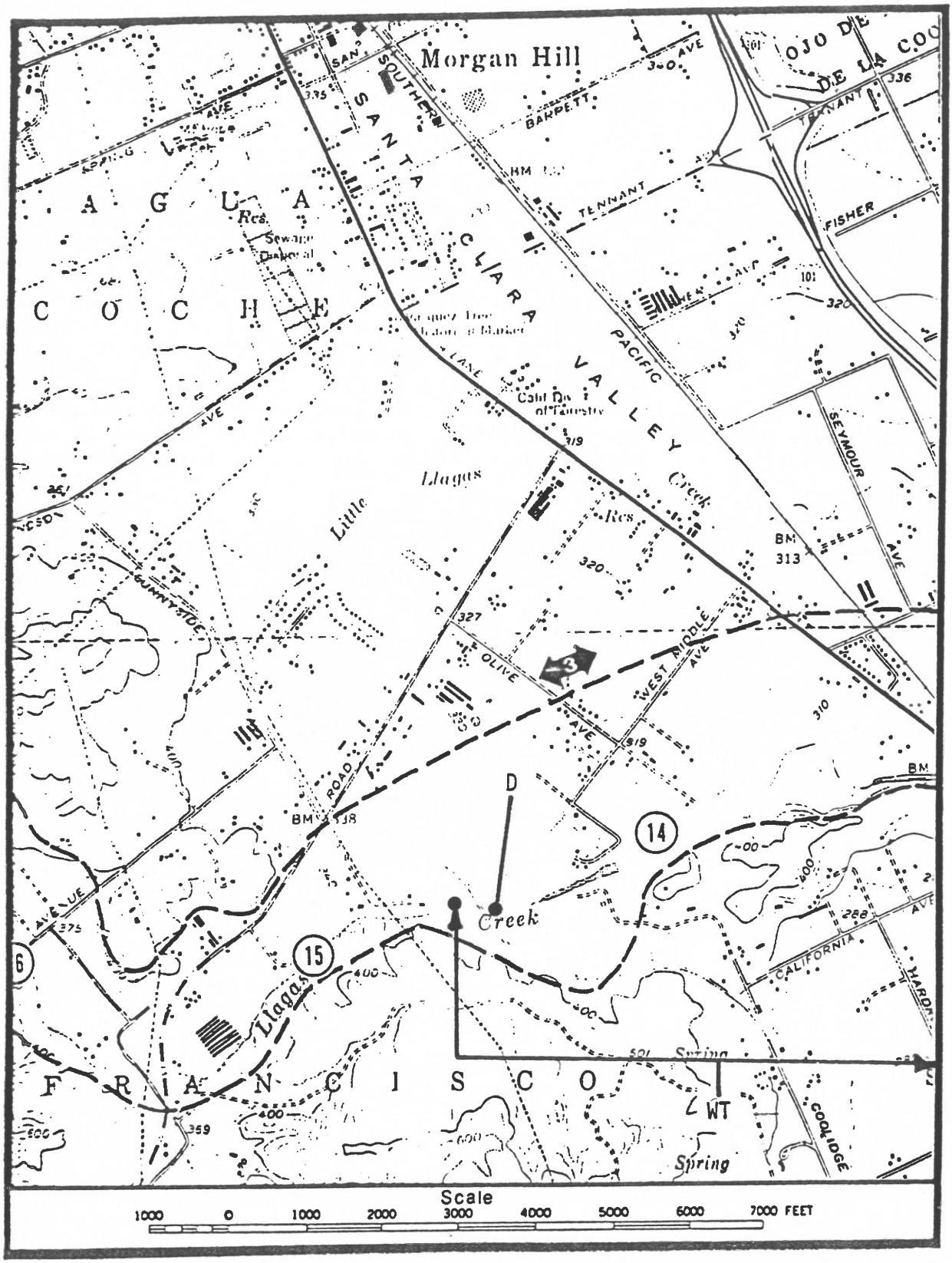


PLATE LC-5

MOUNT MADONNA QUADRANGLE

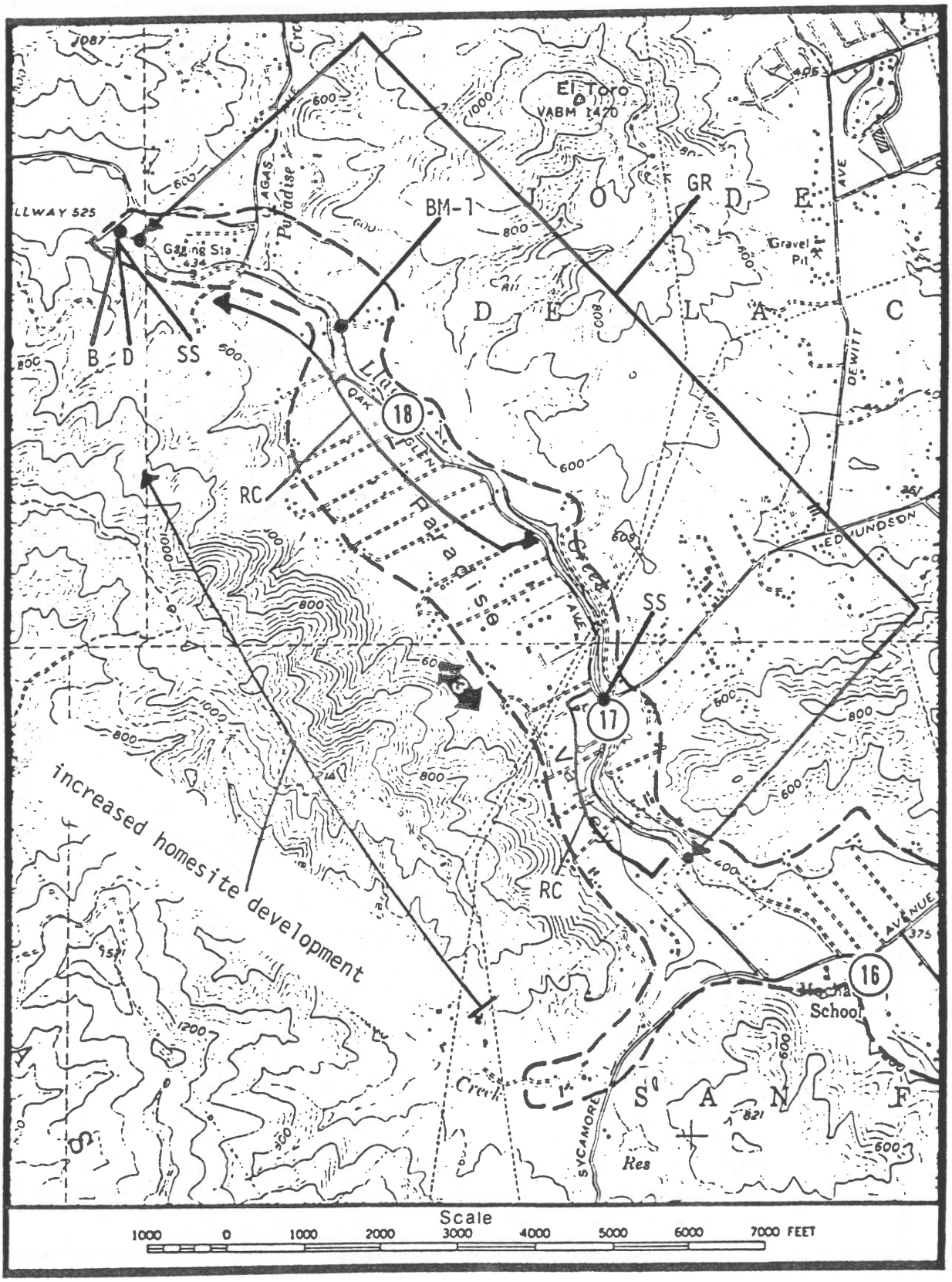


PLATE LC-6

Millers Canal

CHITTENDEN QUADRANGLE

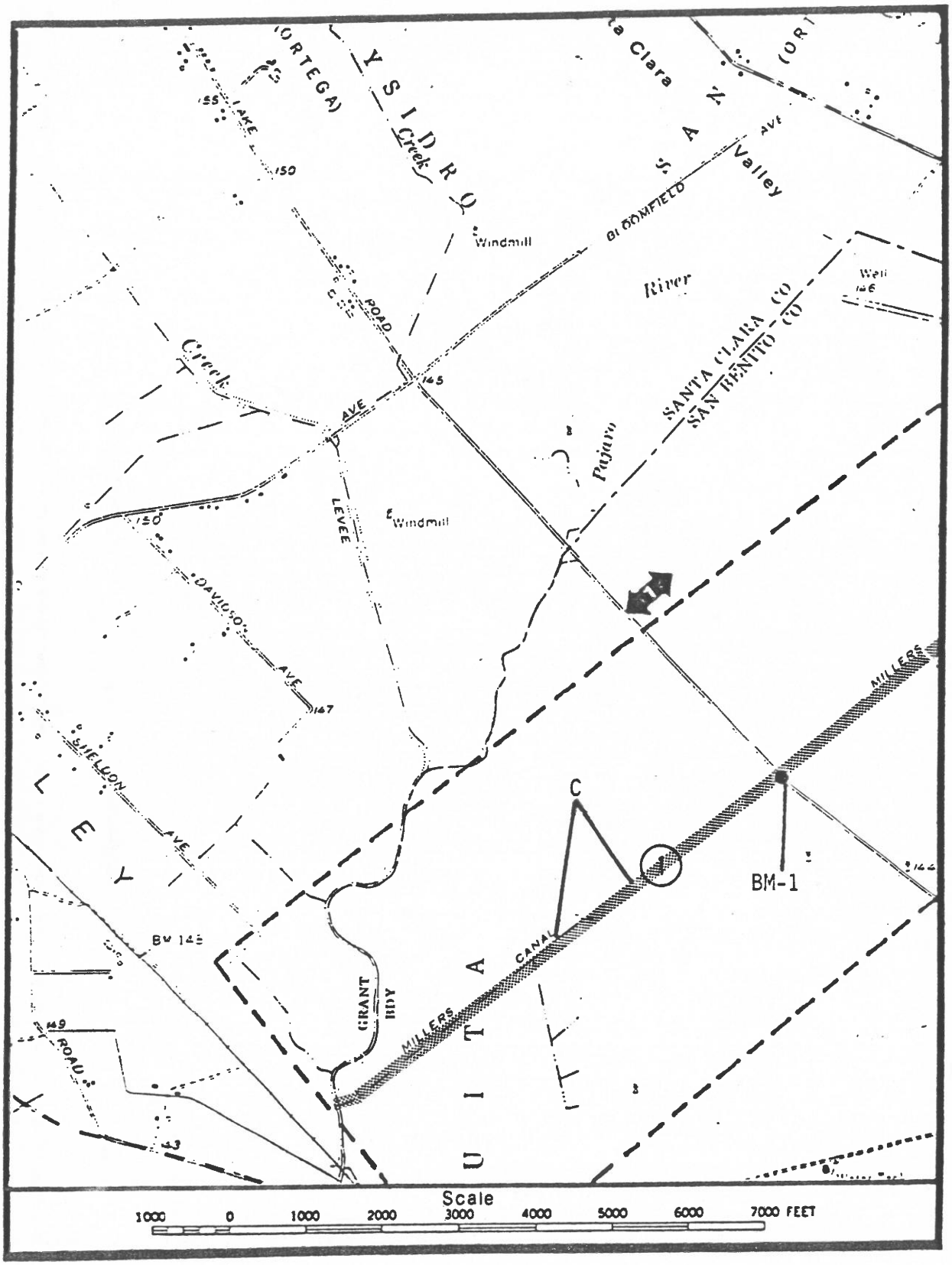


PLATE MC-1

Millers Canal

San Felipe Quadrangle

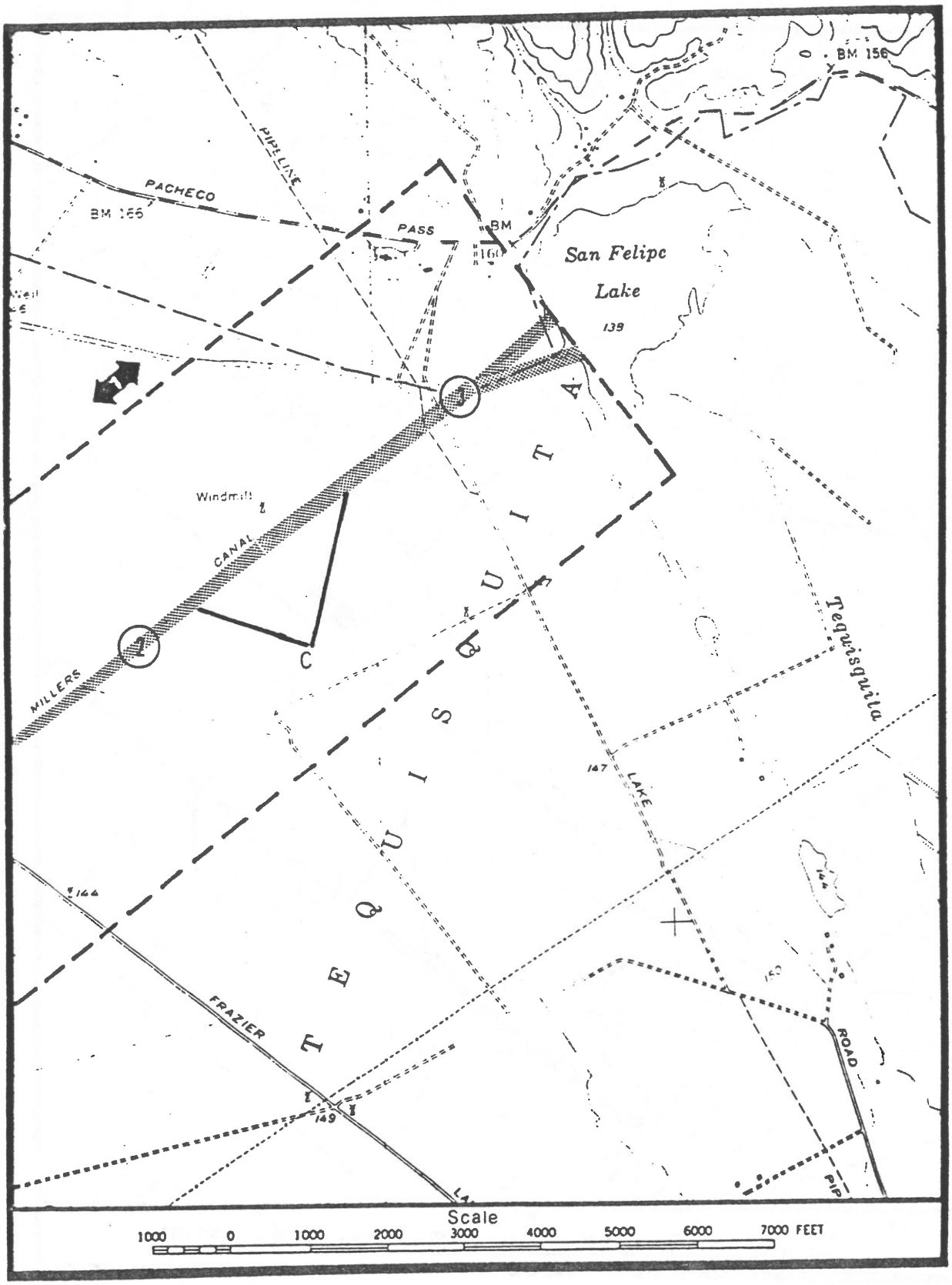


Plate MC-2

San Felipe Lake

San Felipe Quadrangle

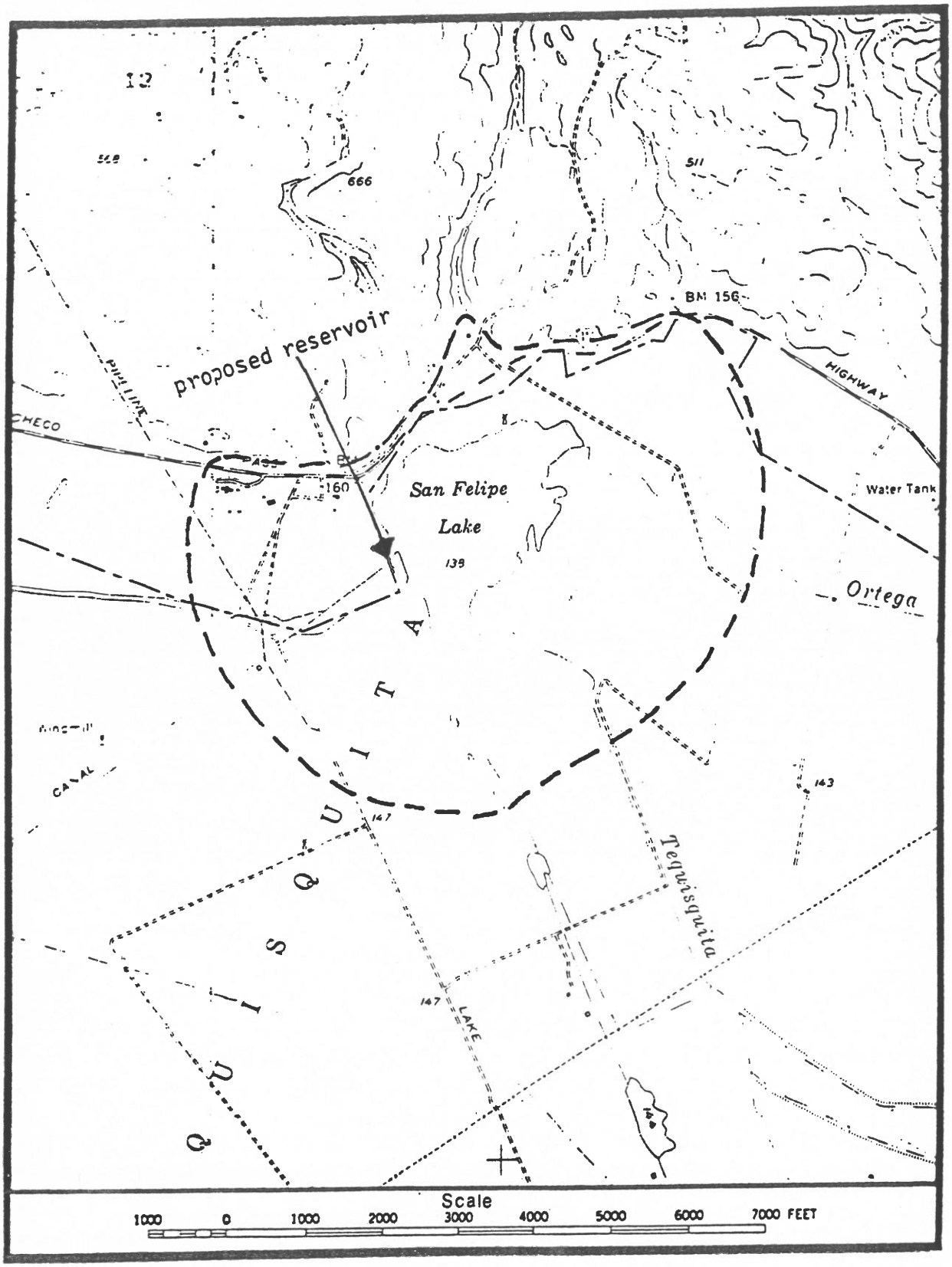


Plate SF-1

Pacheco Creek

San Felipe Quadrangle

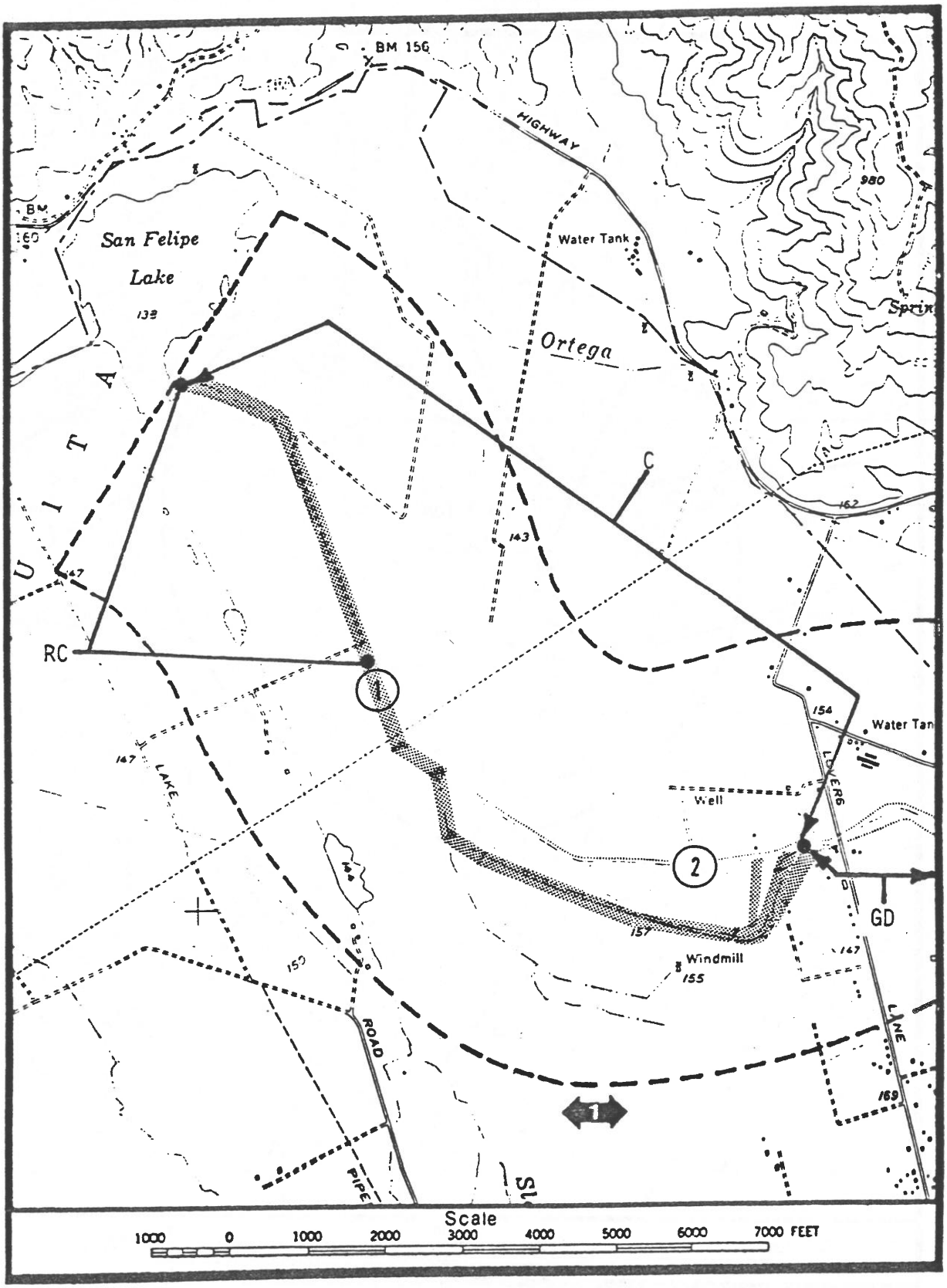


PLATE PA-1

Pacheco Creek
SAN FELIPE QUADRANGLE

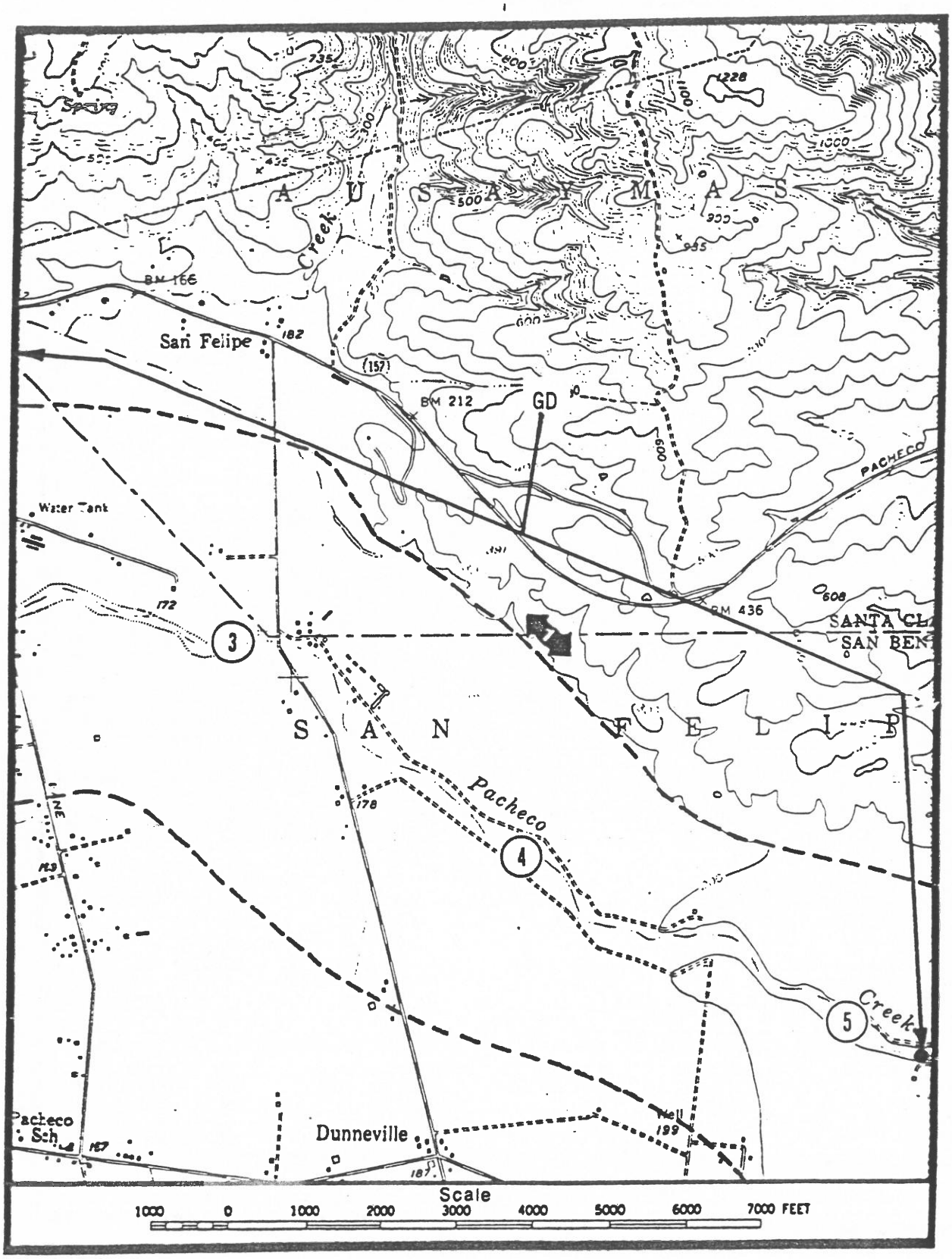


PLATE PA-2

Pacheco Creek

THREE SISTERS QUADRANGLE

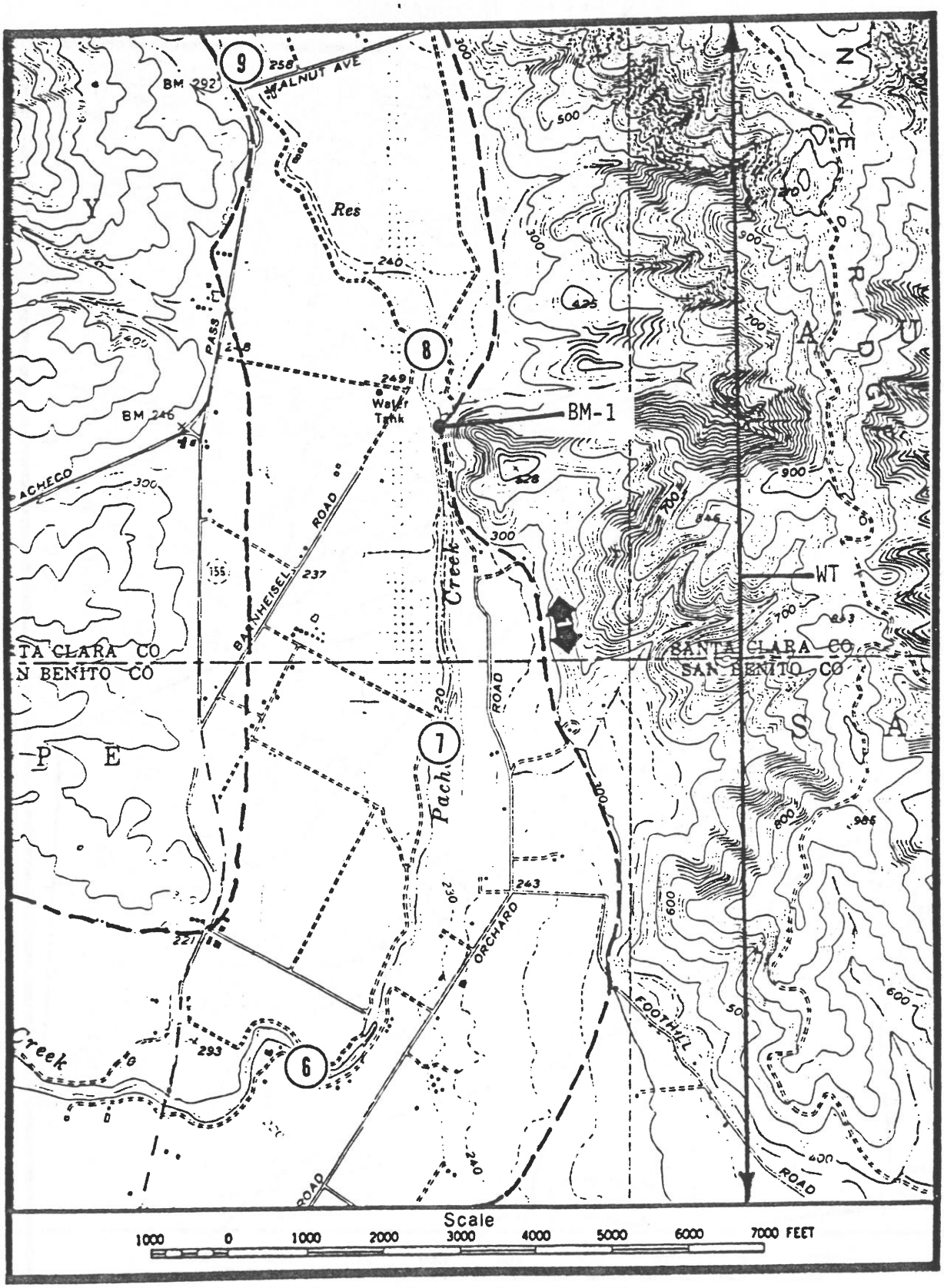


PLATE PA-3

Pacheco Creek

Pacheco Peak Quadrangle

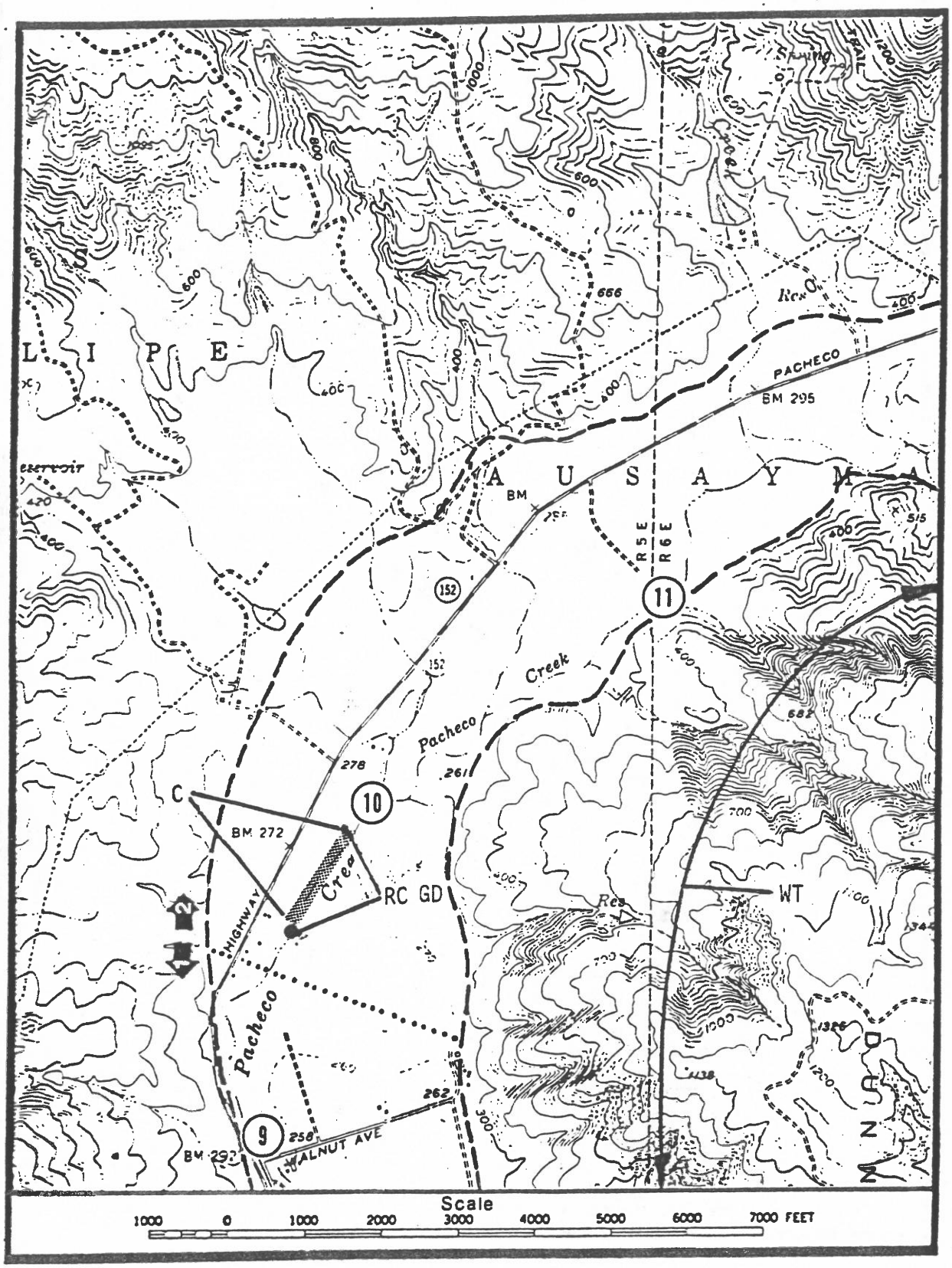


Plate PA-4

Pacheco Creek

Pacheco Peak Quadrangle

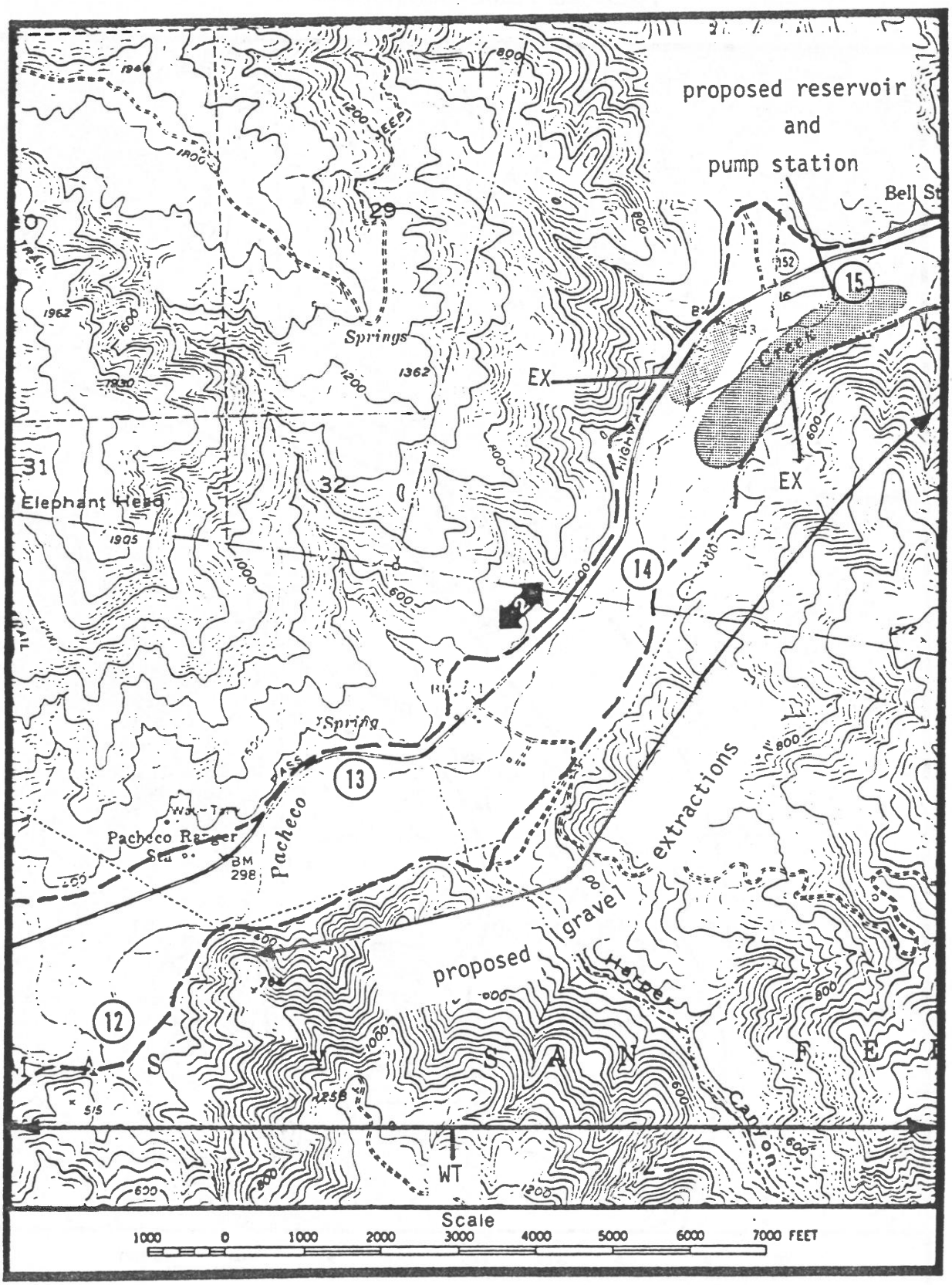


Plate PA-5

Pacheco Creek

Pacheco Peak Quadrangle

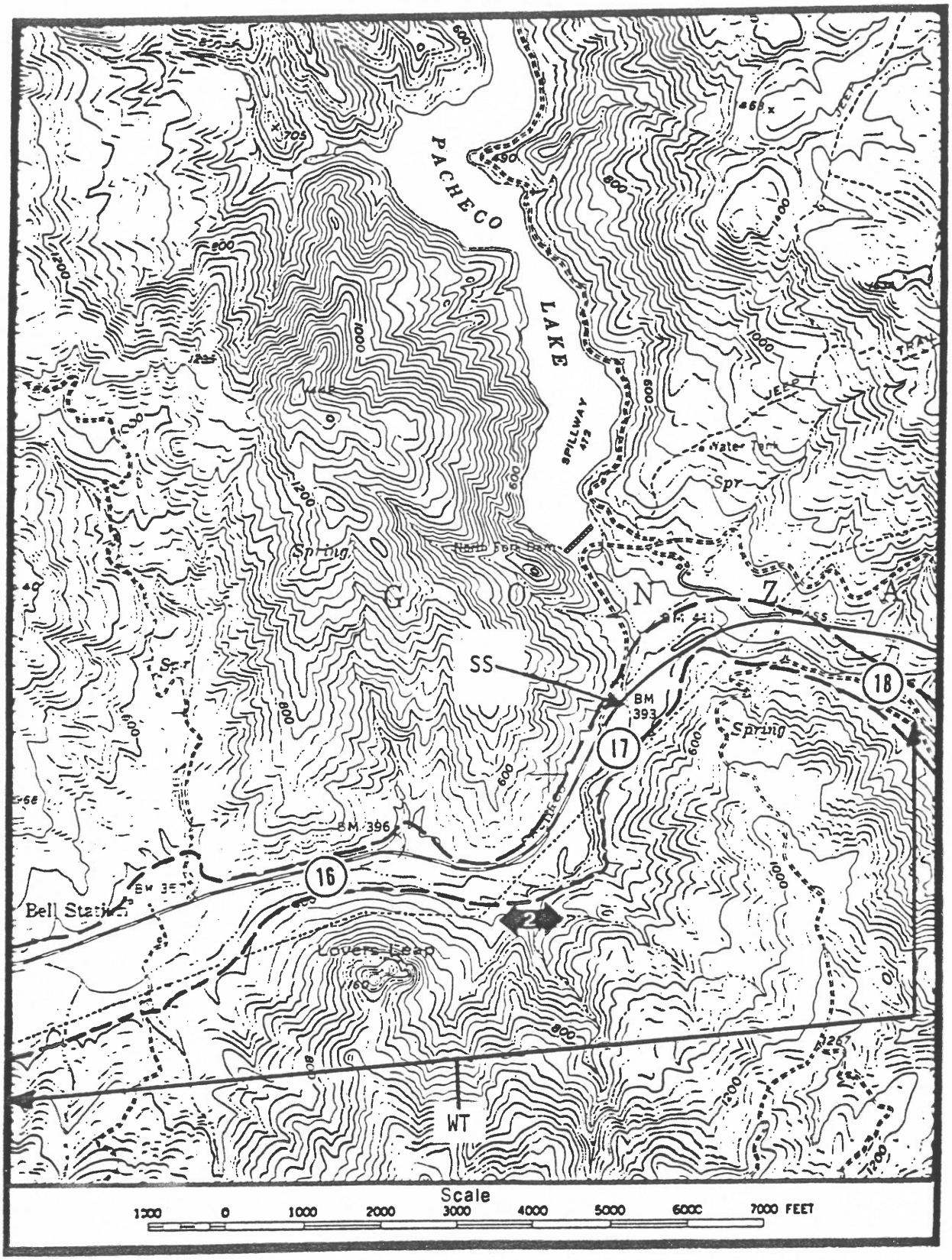


Plate PA-5

Pacheco Creek

Pacheco Peak Quadrangle

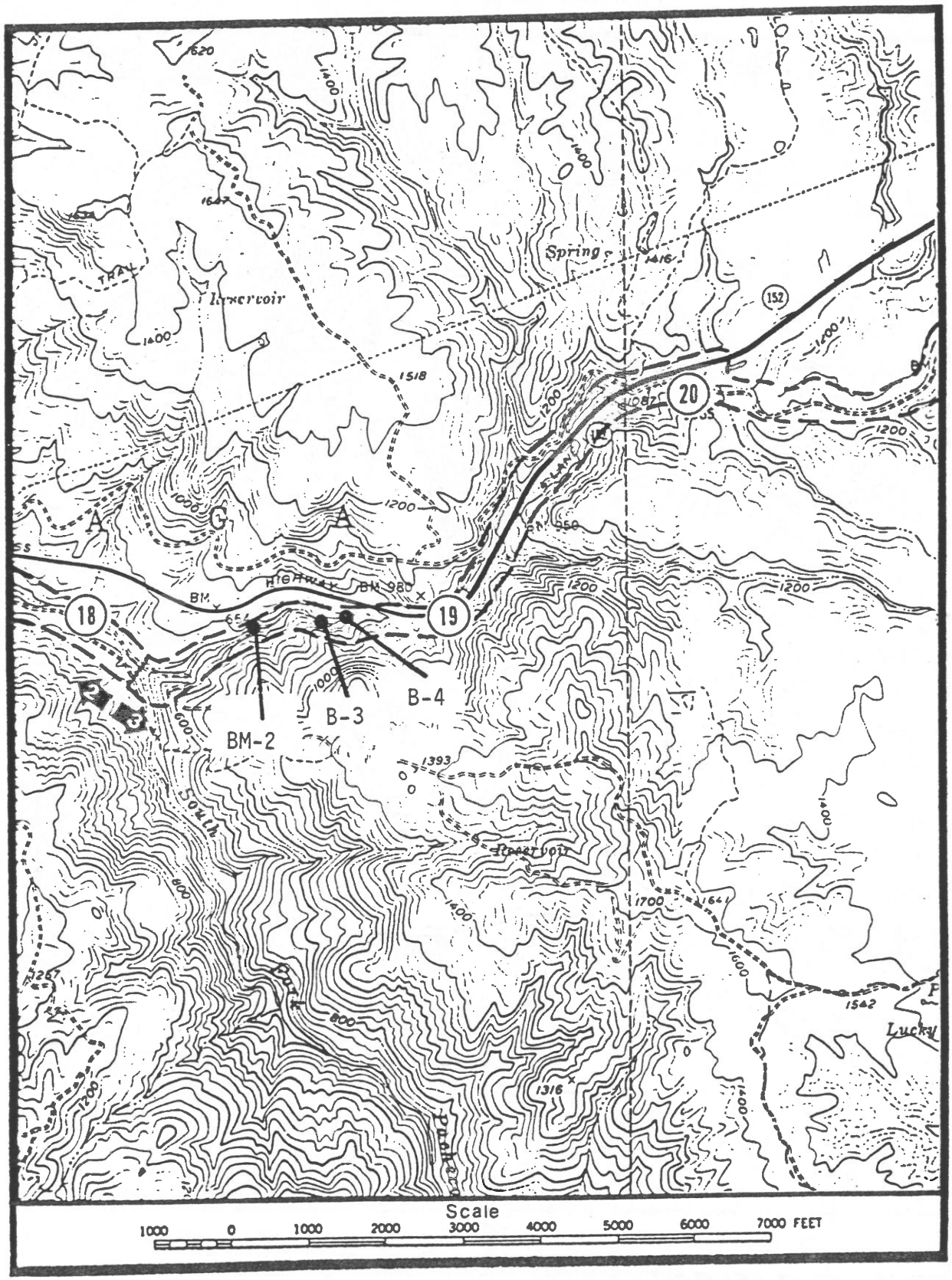


Plate PA-7

Pacheco Creek

Pacheco Pass Quadrangle

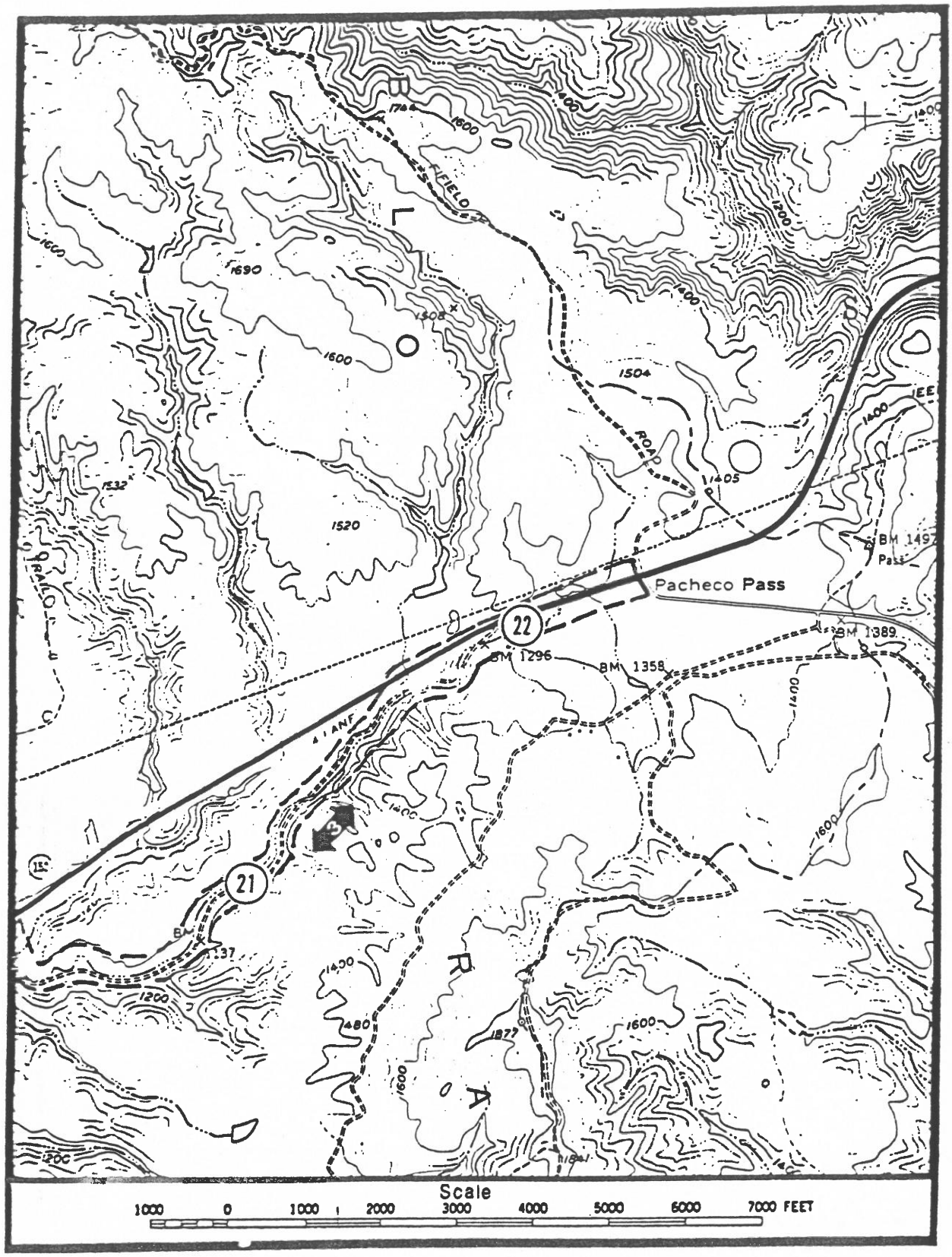


Plate PA-8

Cedar Creek

Pacheco Peak Quadrangle

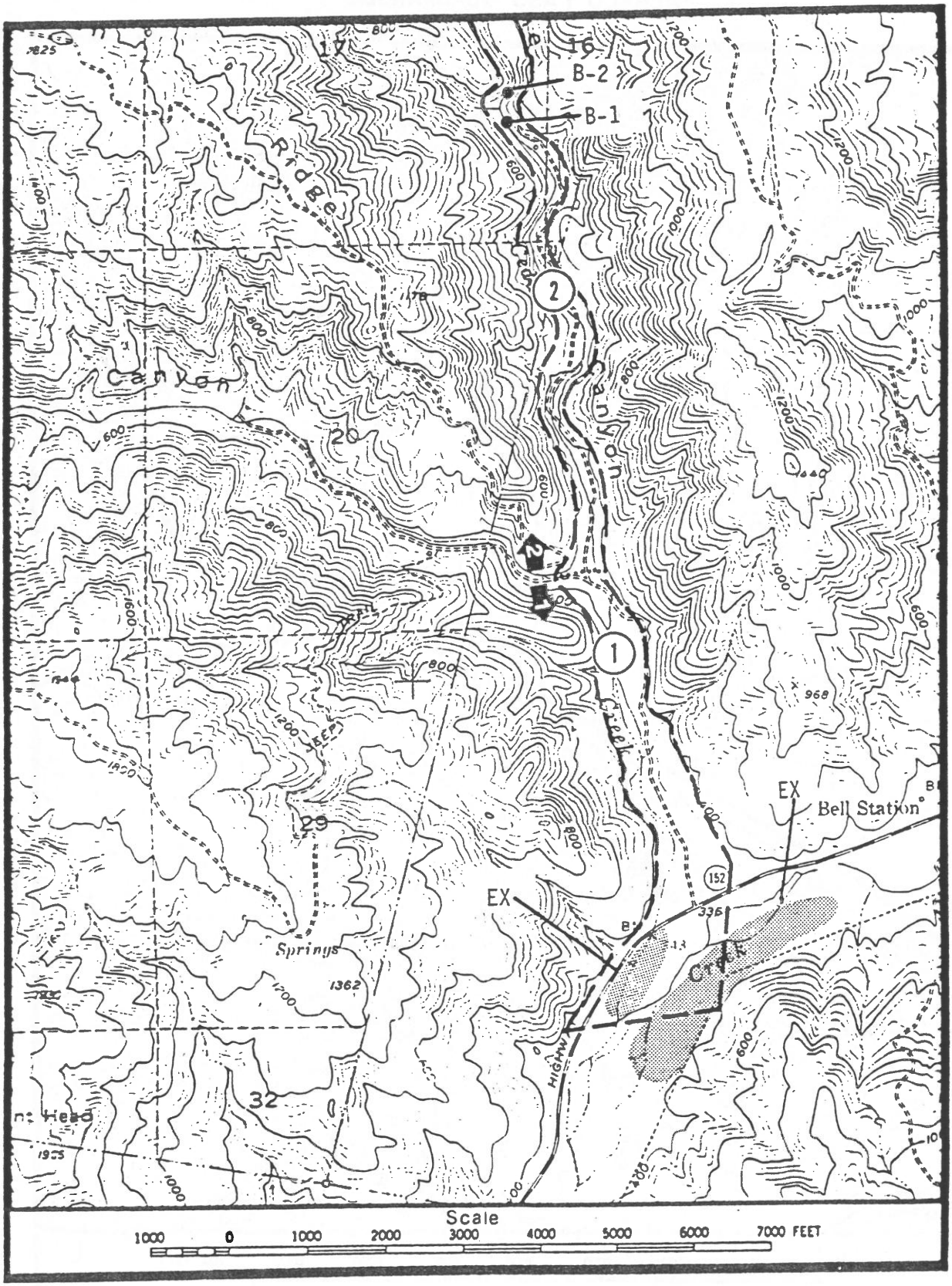


Plate CE-1

Cedar Creek

Pacheco Peak Quadrangle

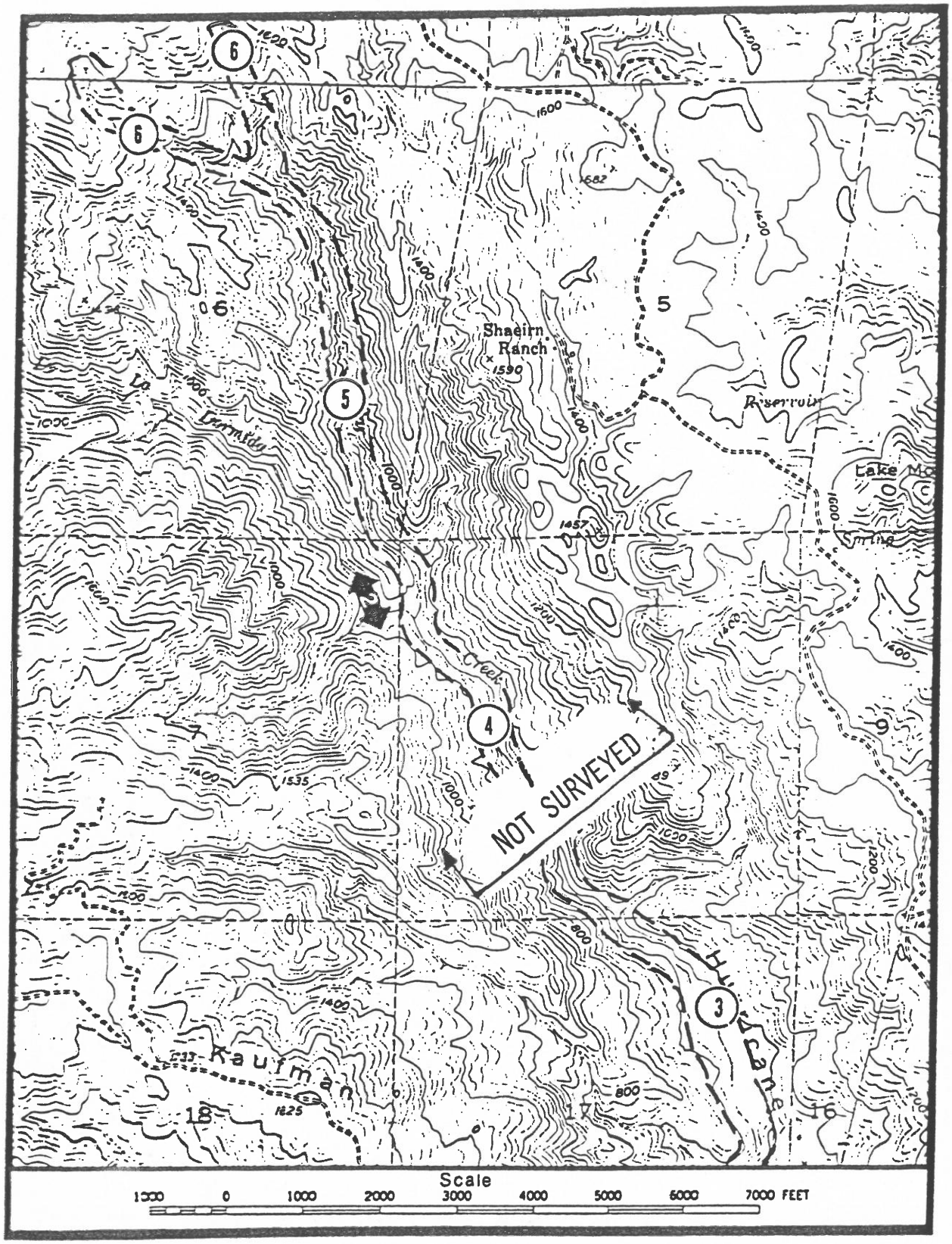


Plate CE-2

No. Fork Pacheco Creek

Pacheco Peak Quadrangle

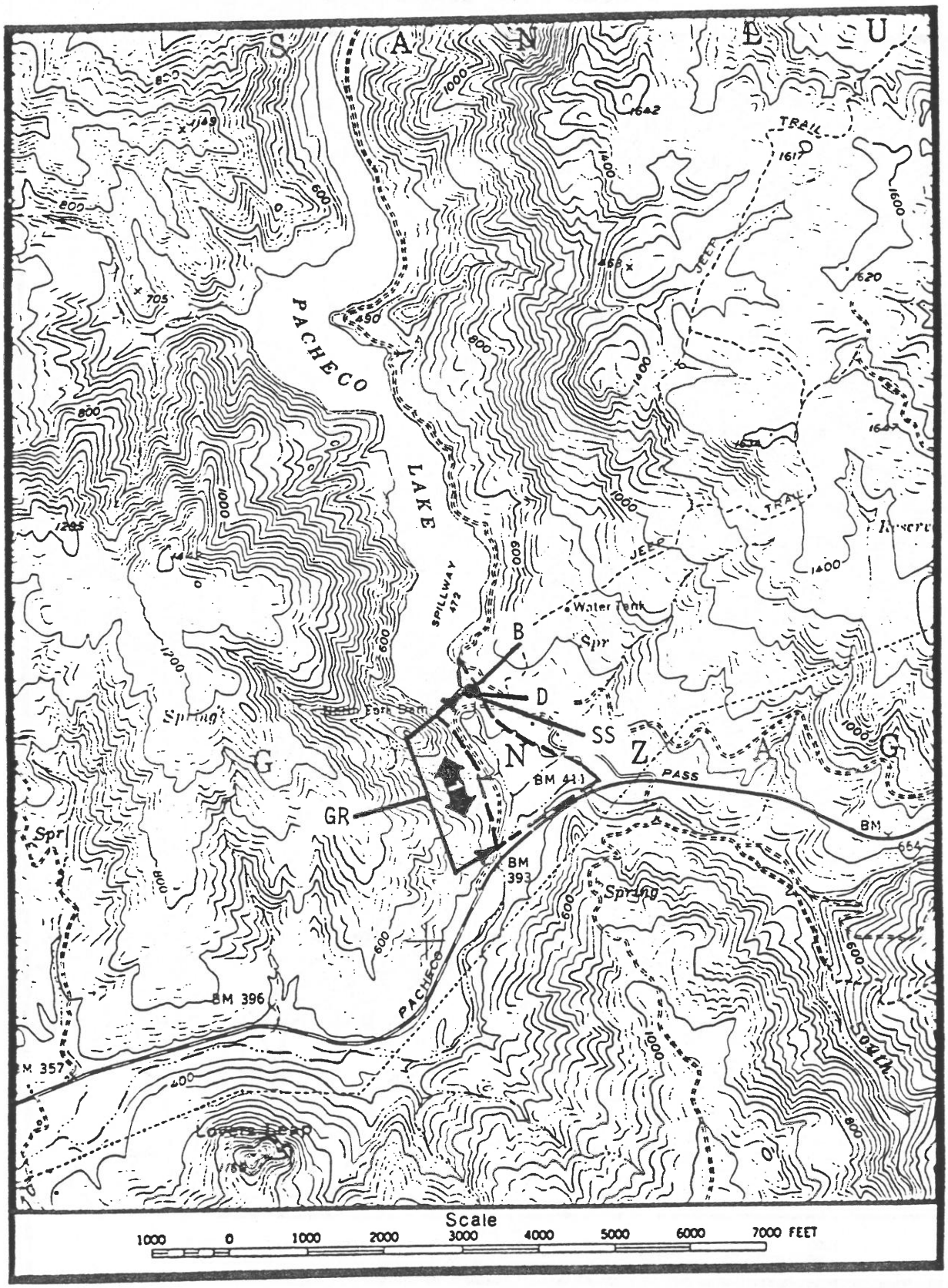


Plate NP-1

No. Fork Pacheco Creek

Pacheco Peak Quadrangle

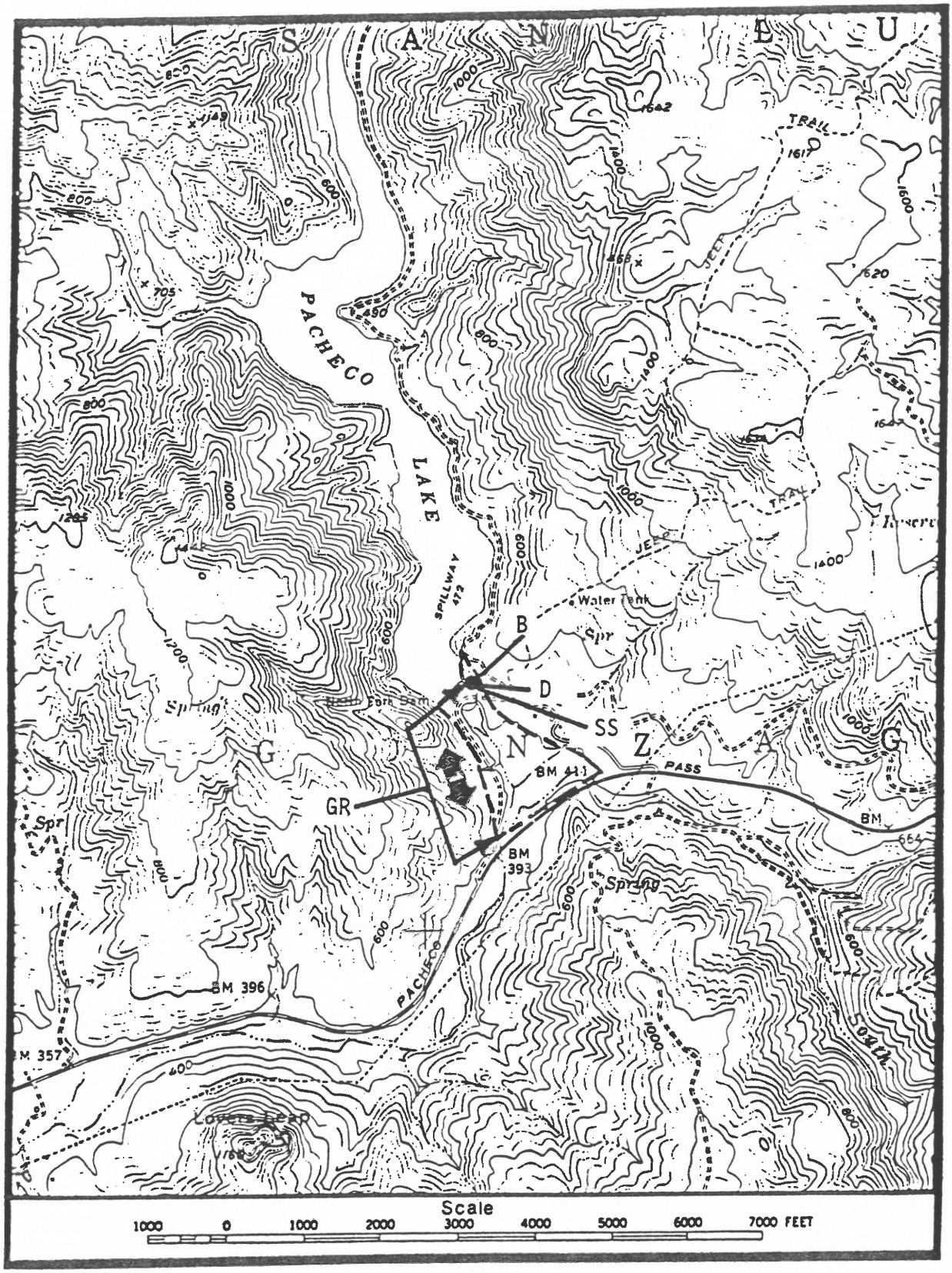


Plate NP-1

Cedar Creek

Pacheco Peak Quadrangle

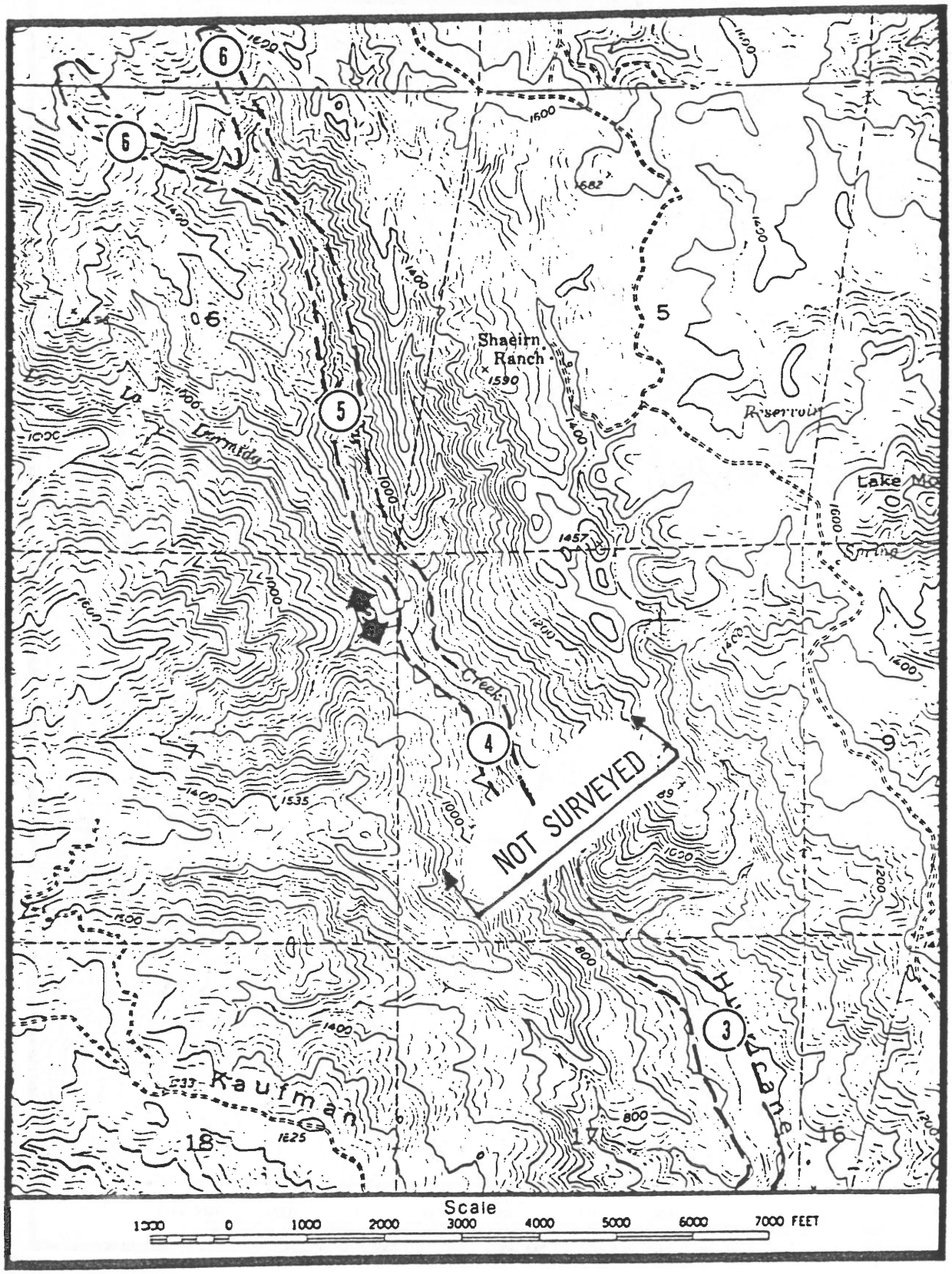


Plate CE-2

Cedar Creek

Pacheco Peak Quadrangle

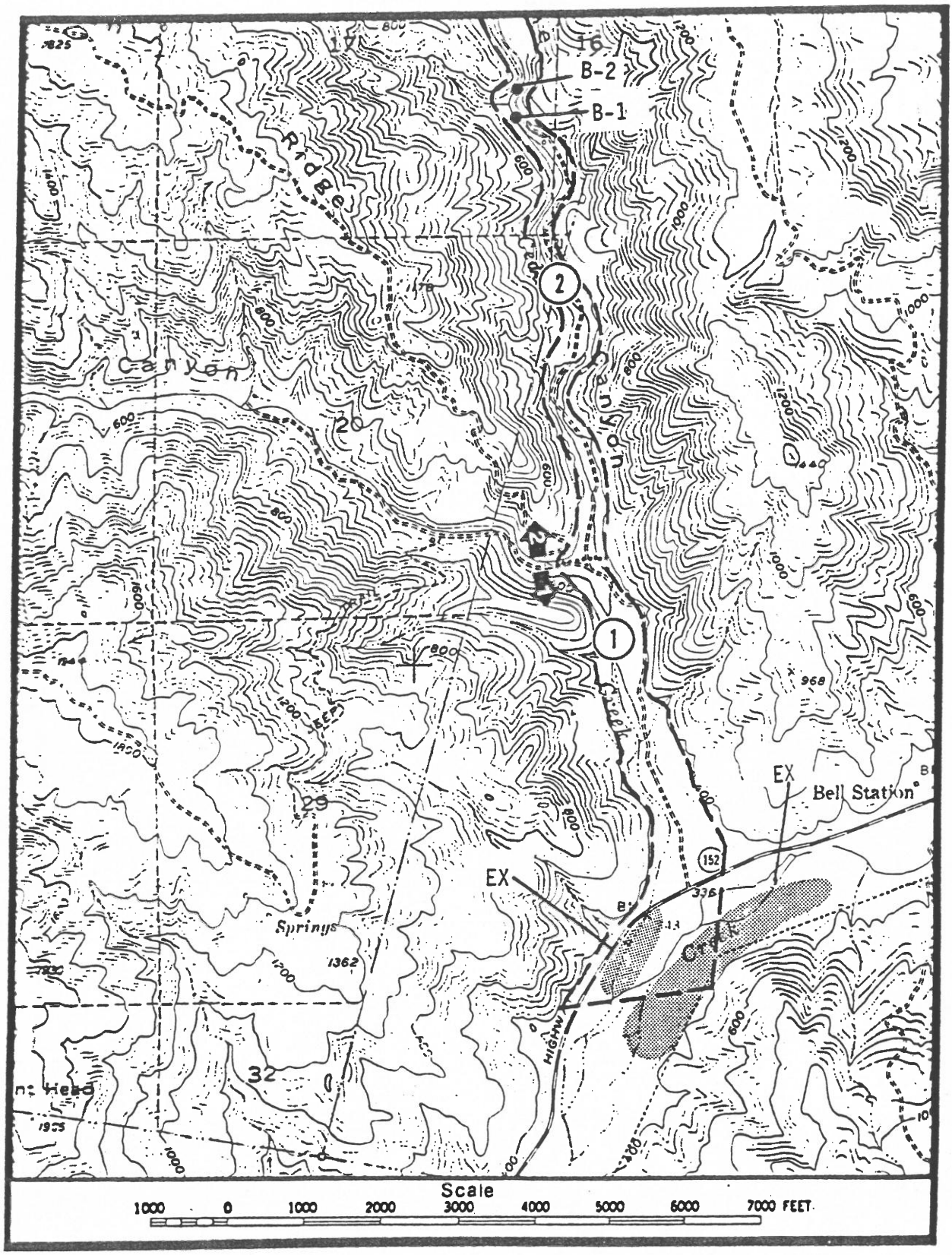


Plate CE-1

Pacheco Creek

Pacheco Pass Quadrangle

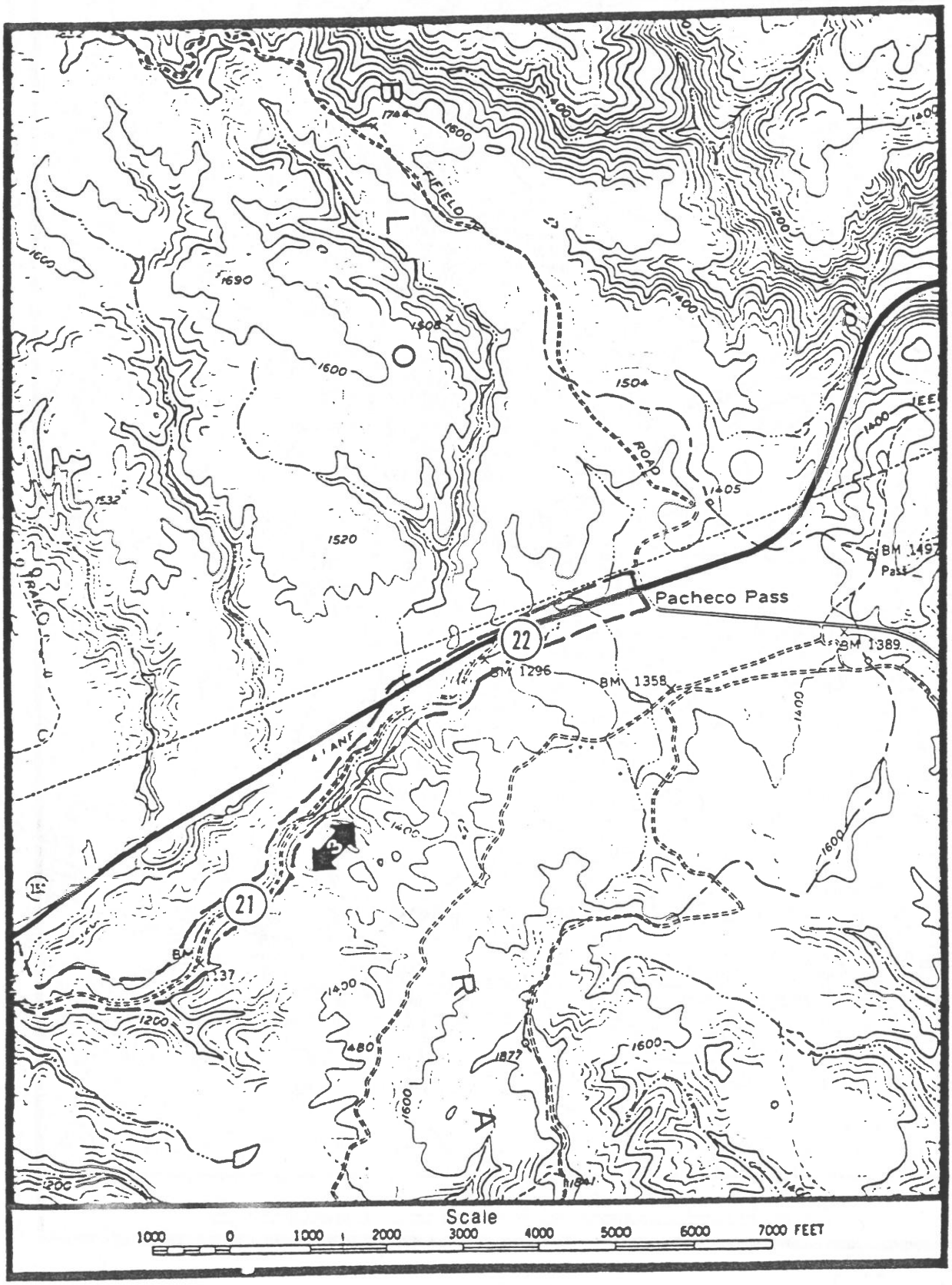


Plate PA-8

Pacheco Creek

Pacheco Peak Quadrangle

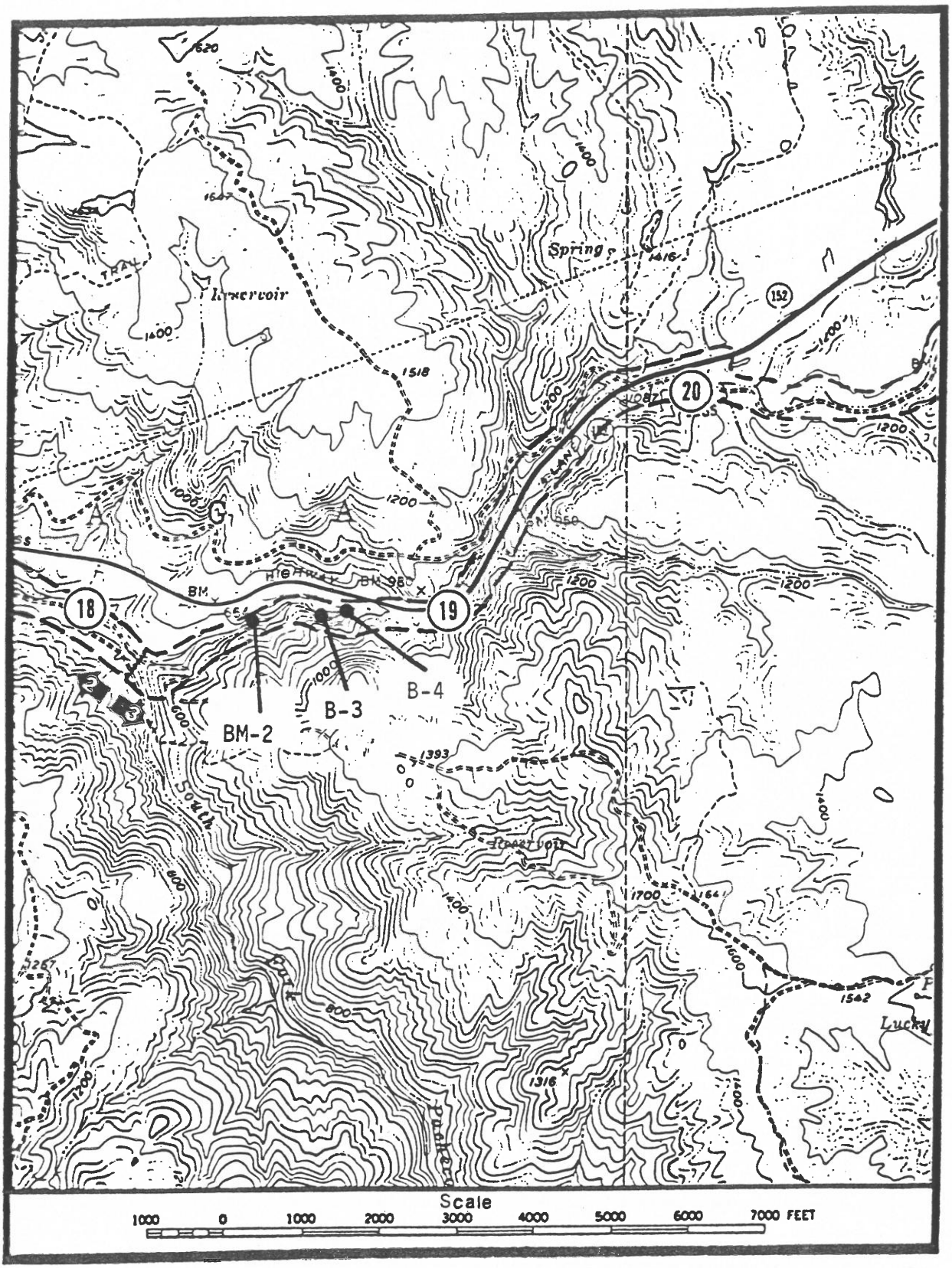


PLATE PA-7

Pacheco Creek

Pacheco Peak Quadrangle

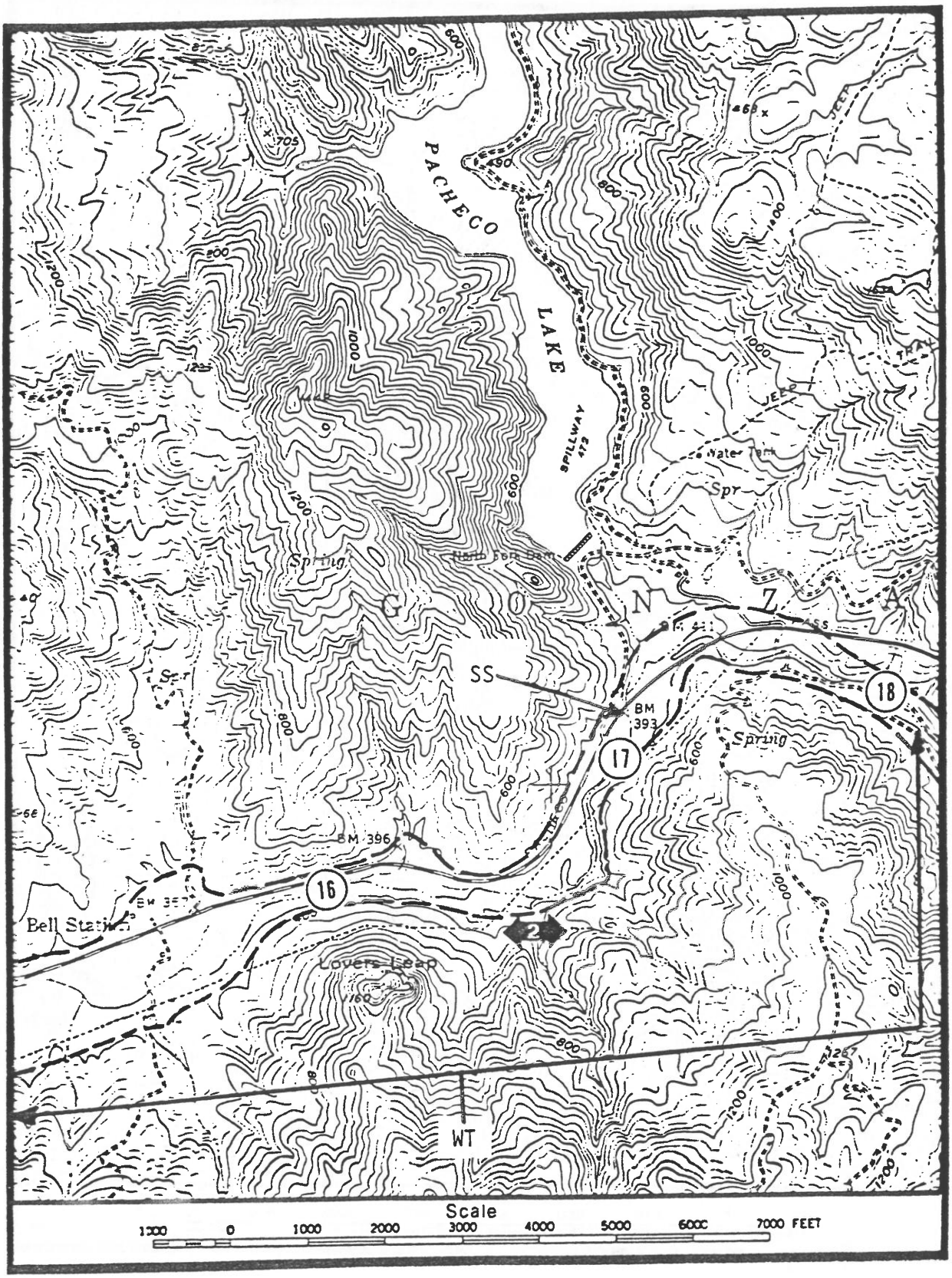


PLATE PA-5

Pacheco Creek

PACHECO PEAK QUADRANGLE

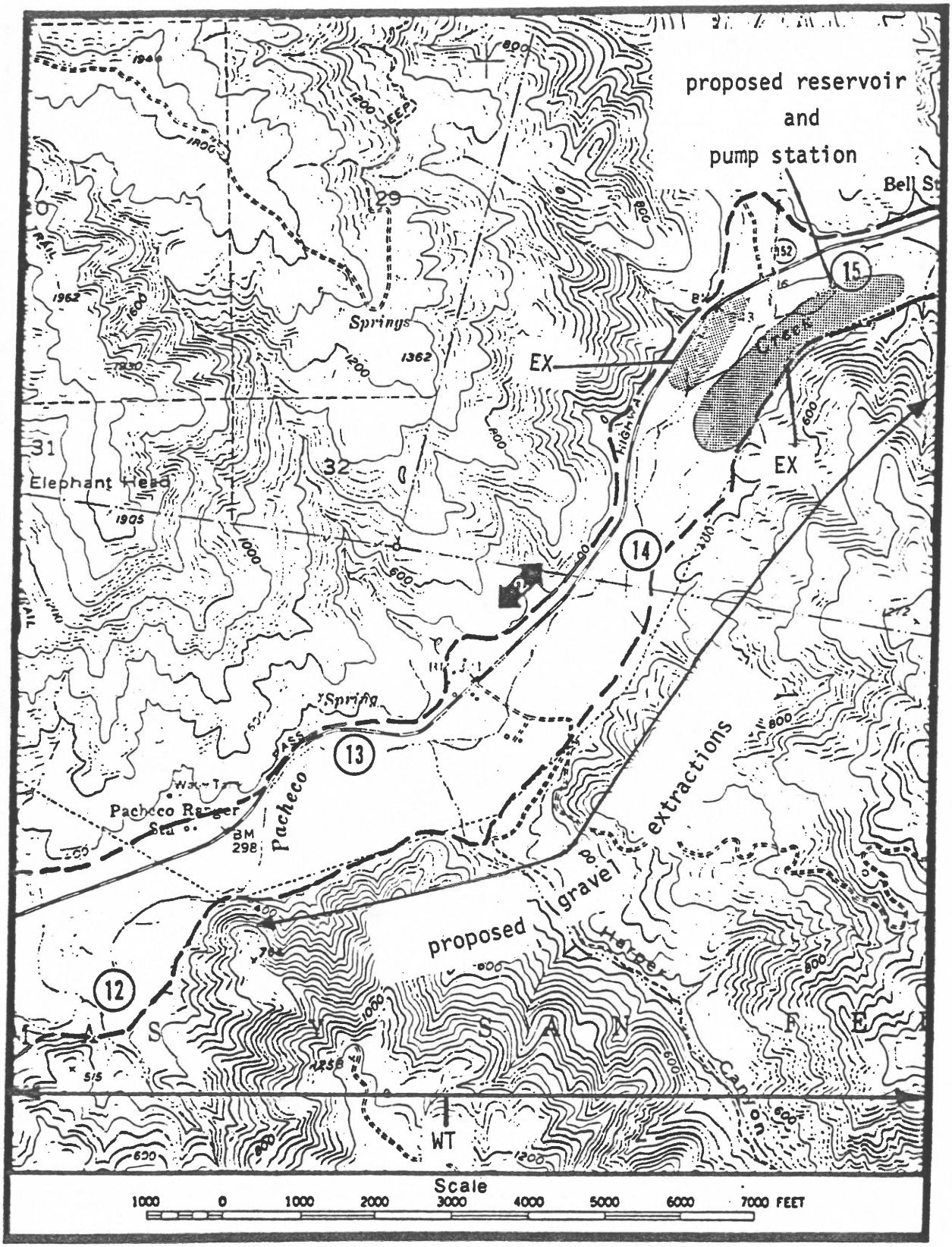


PLATE PA-5

Pacheco Creek

PACHECO PEAK QUADRANGLE

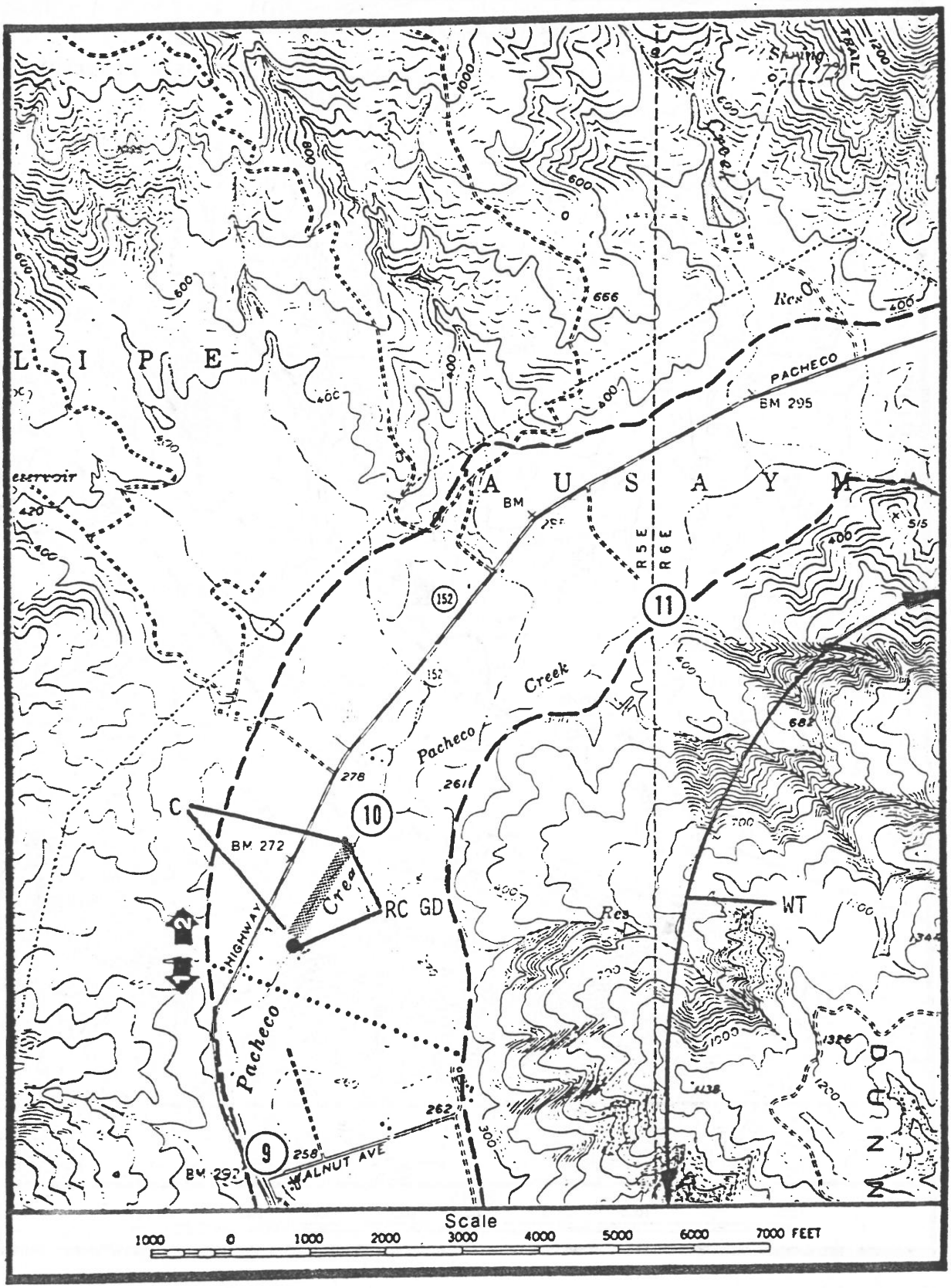


PLATE PA-4

Pacheco Creek

THREE SISTERS QUADRANGLE

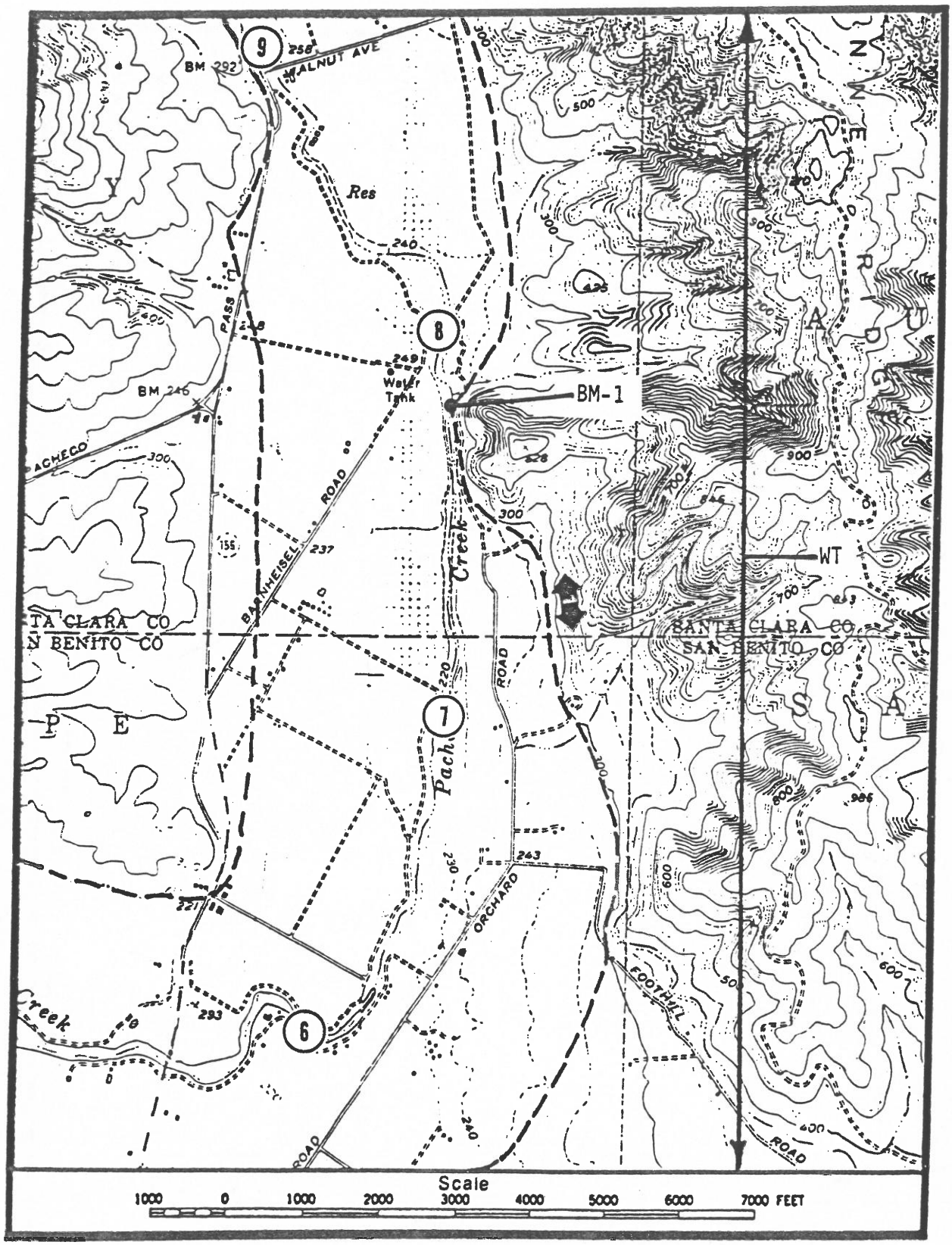


PLATE PA-3

Pacheco Creek

San Felipe Quadrangle

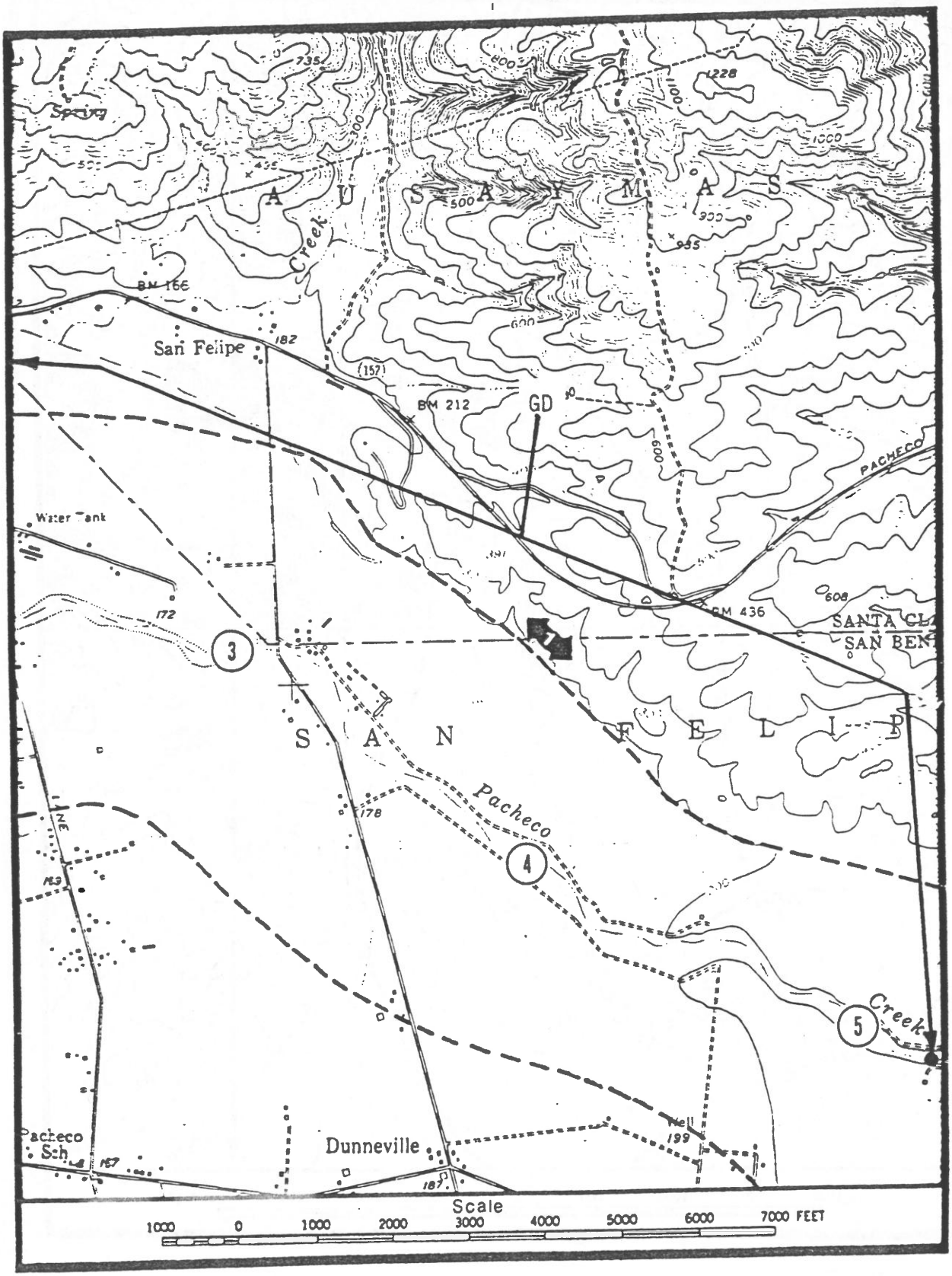


PLATE PA-2

Pacheco Creek

San Felipe Quadrangle

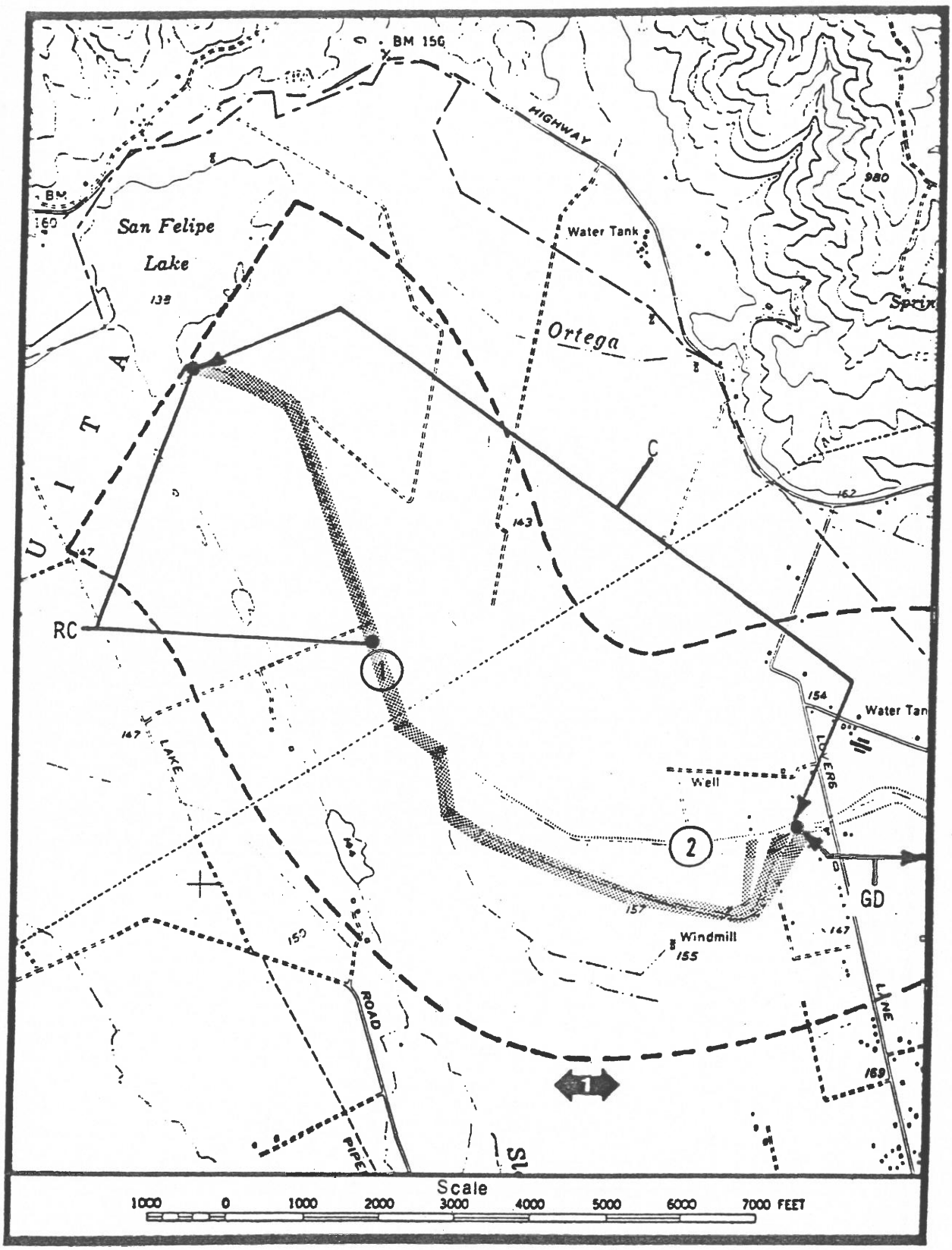


PLATE PA-1

San Felipe Lake

San Felipe Quadrangle

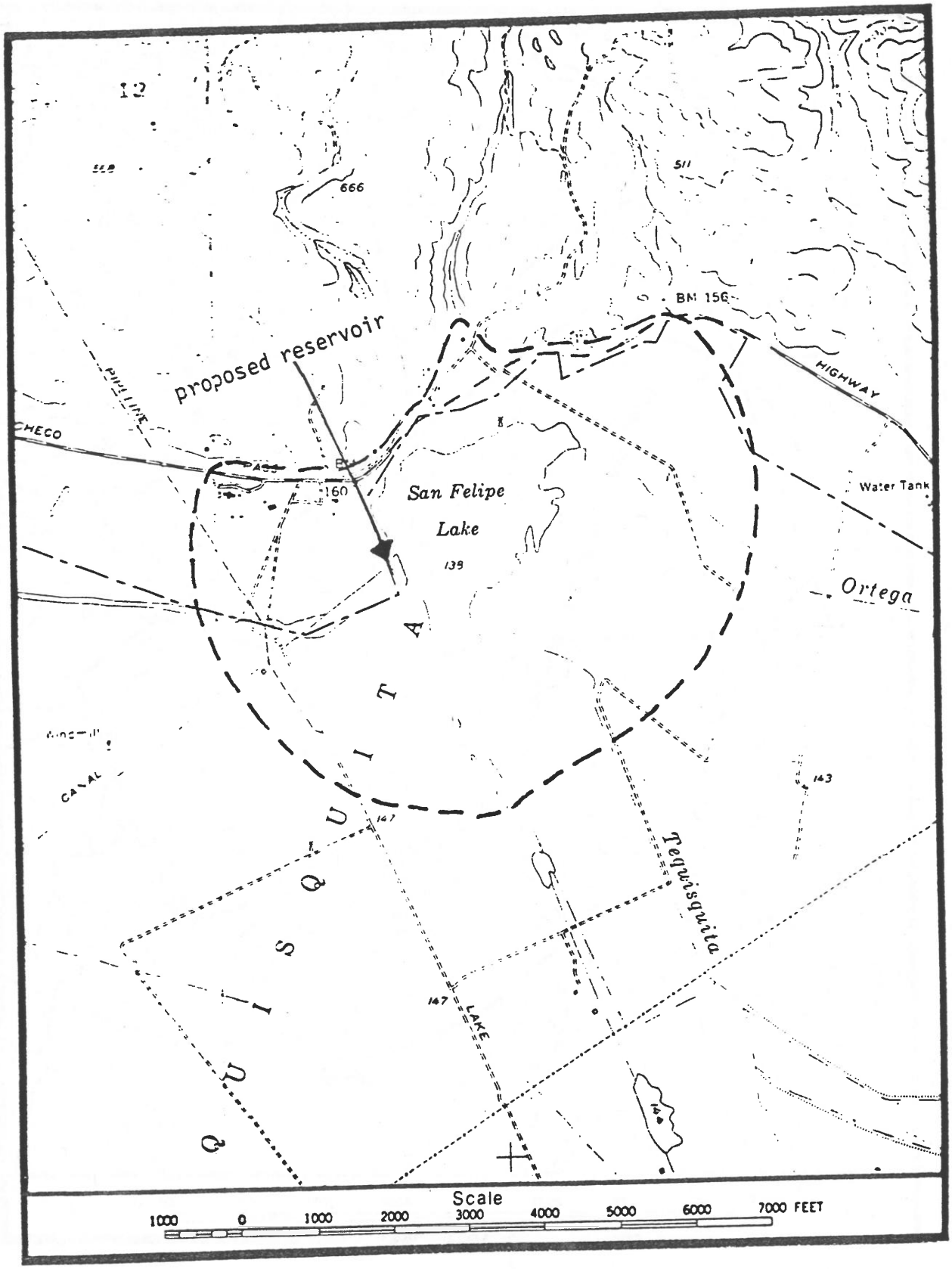


Plate SF-1

Millers Canal

San Felipe Quadrangle

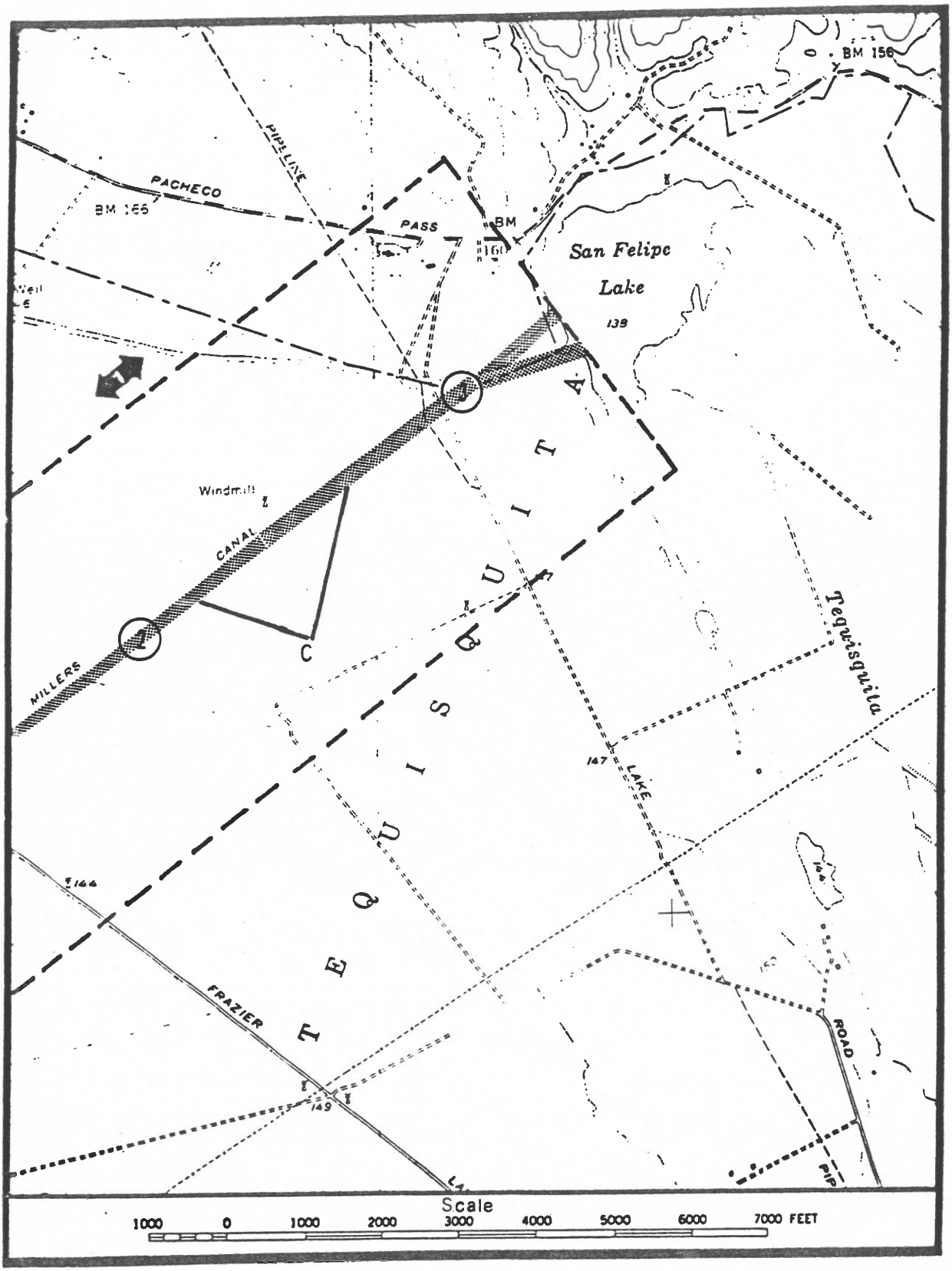


Plate MC-2

Millers Canal

CHITTENDEN QUADRANGLE

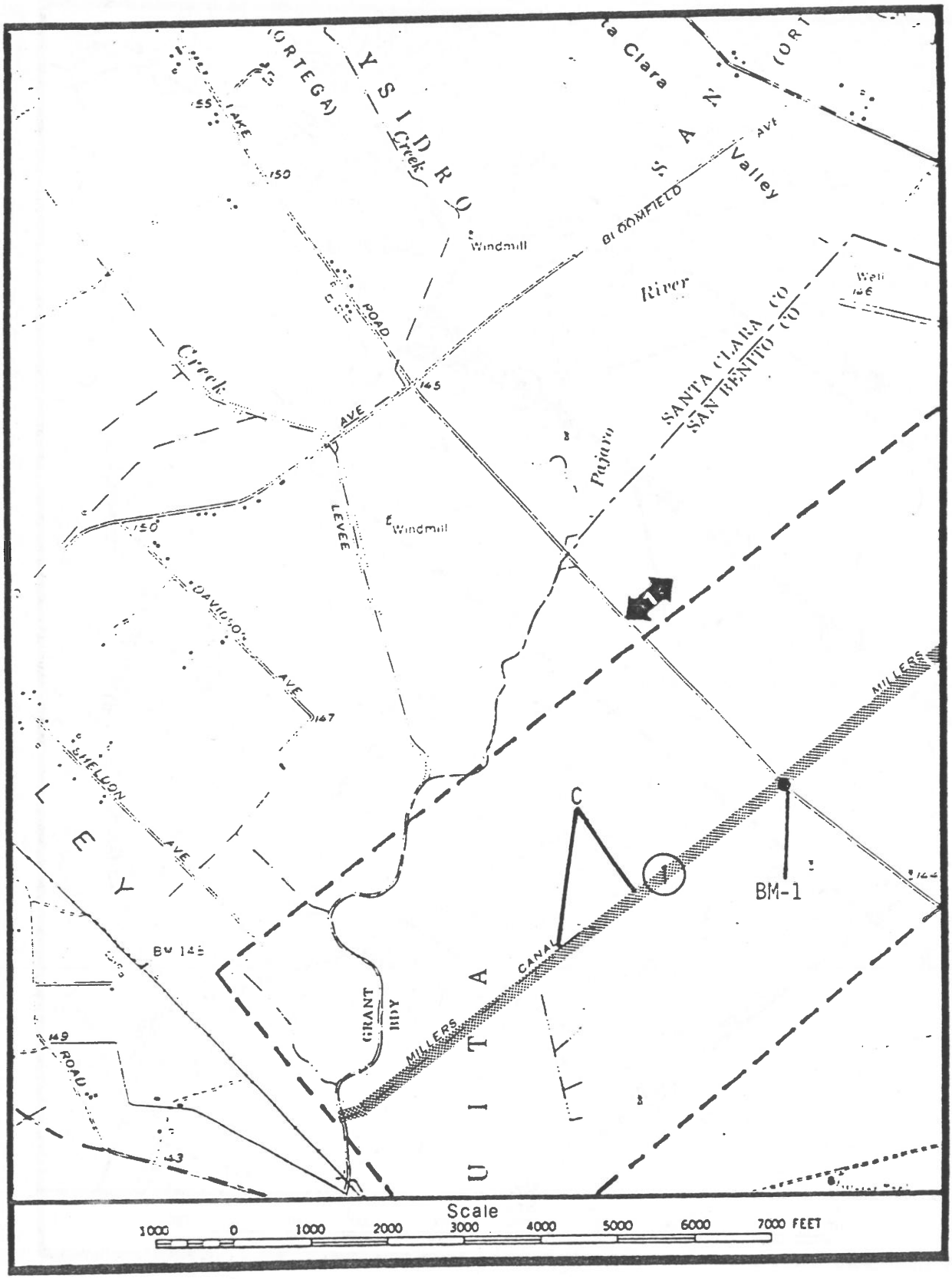


PLATE MC-1

Llagas Creek

Mount Madonna Quadrangle

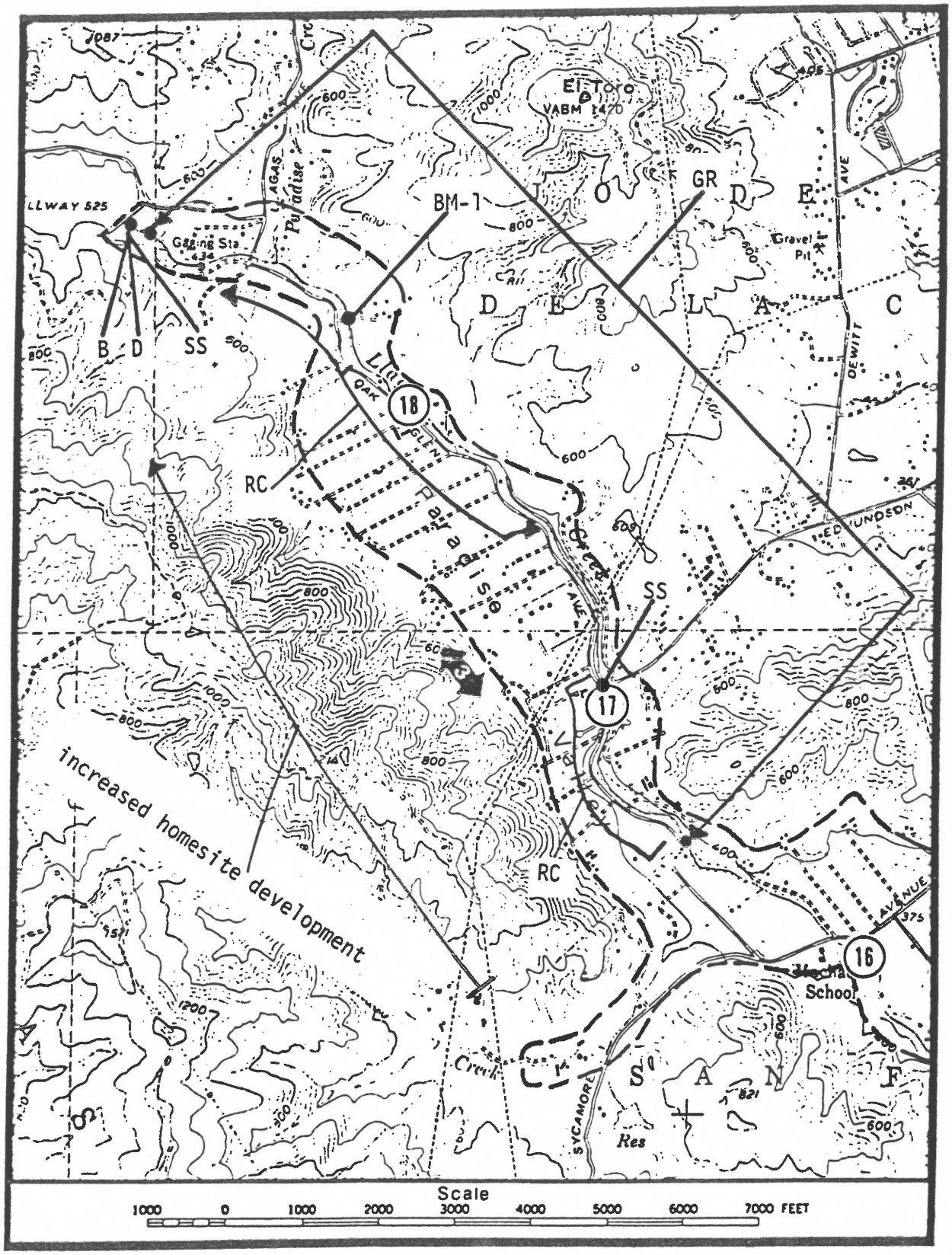


PLATE LC-6

Llagas Creek

Mount Madonna Quadrangle

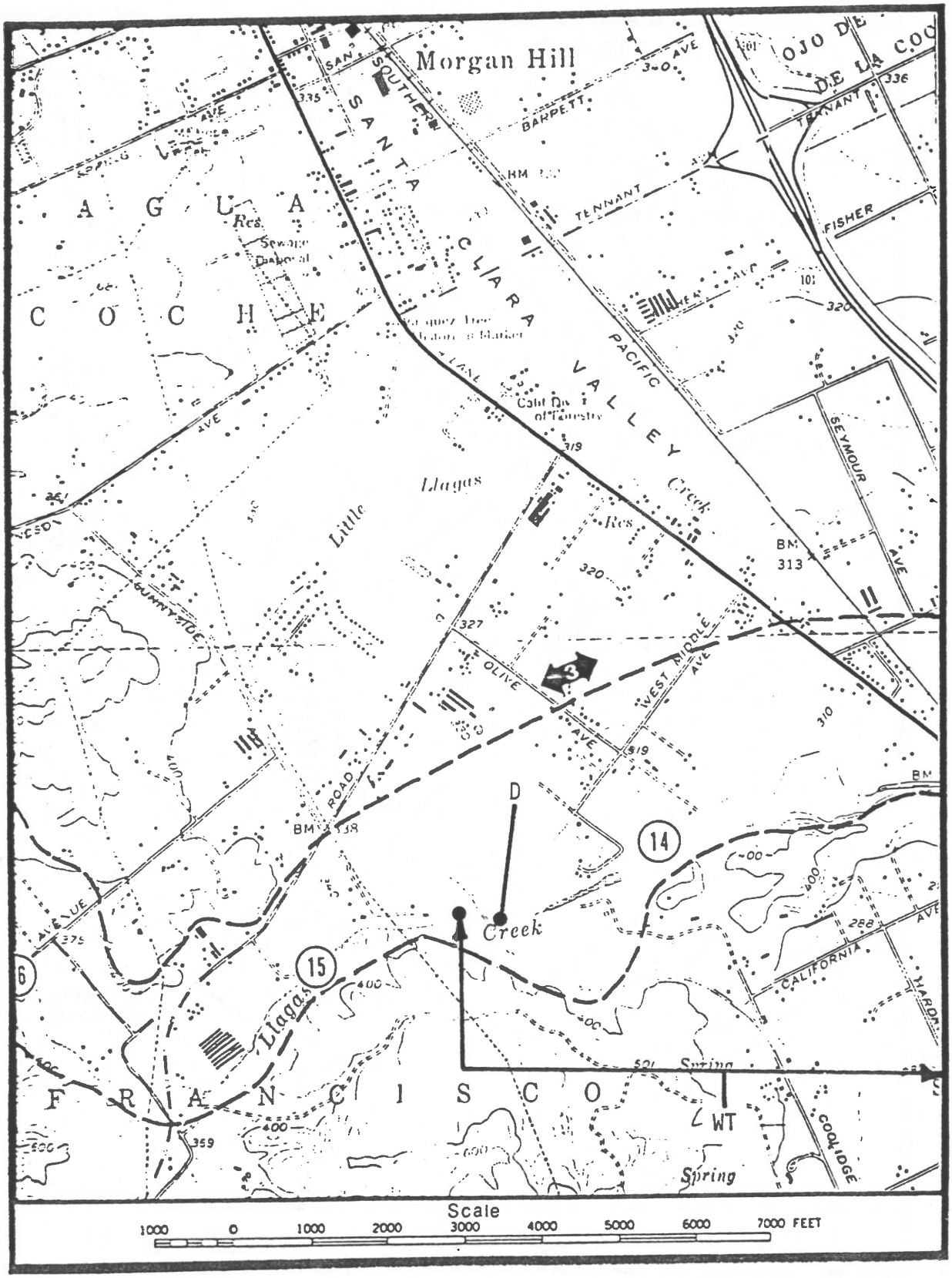


PLATE LC-5

Llagas Creek

GILROY QUADRANGLE

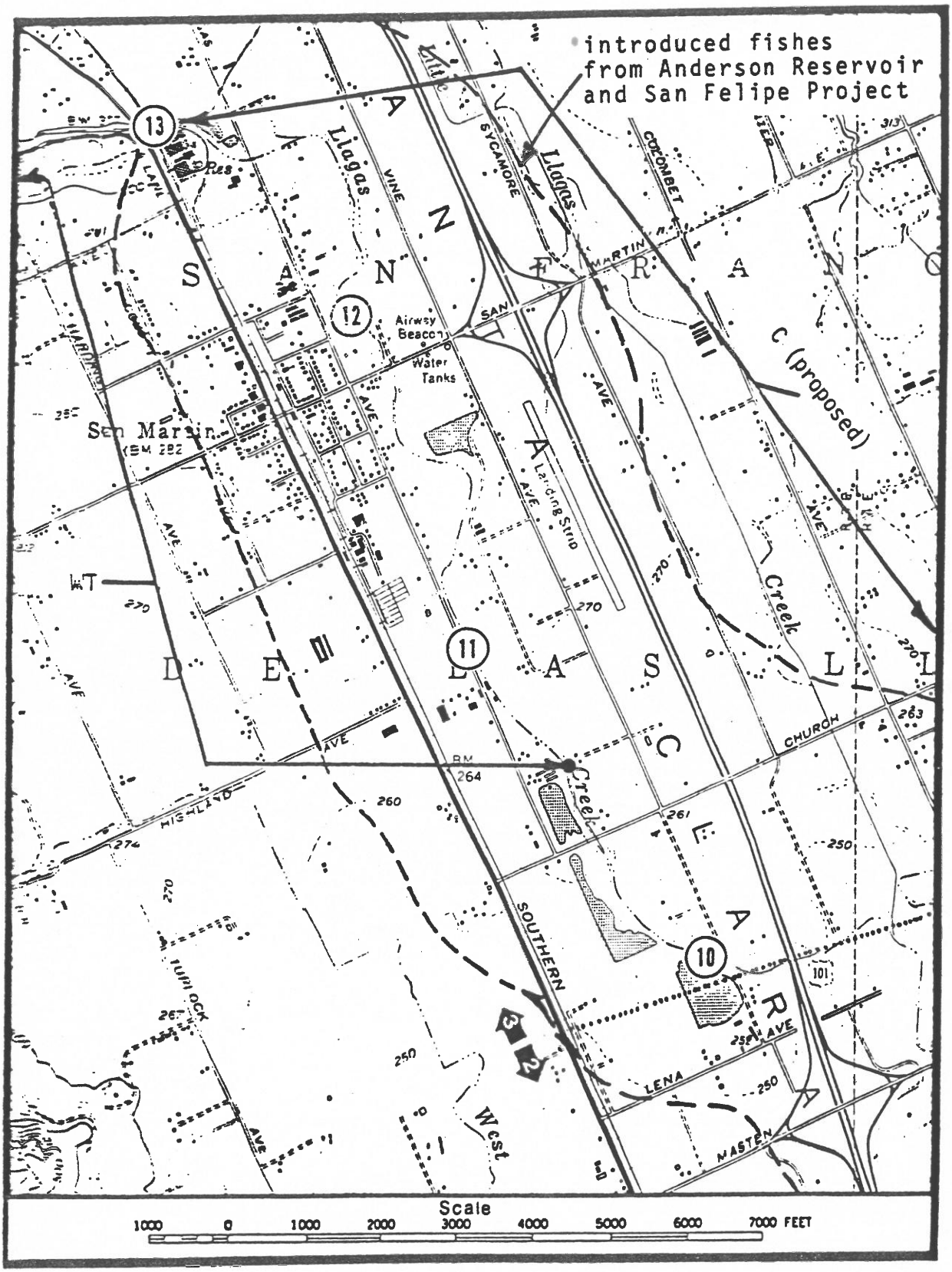


PLATE LC-4

Llagas Creek

GILROY QUADRANGLE

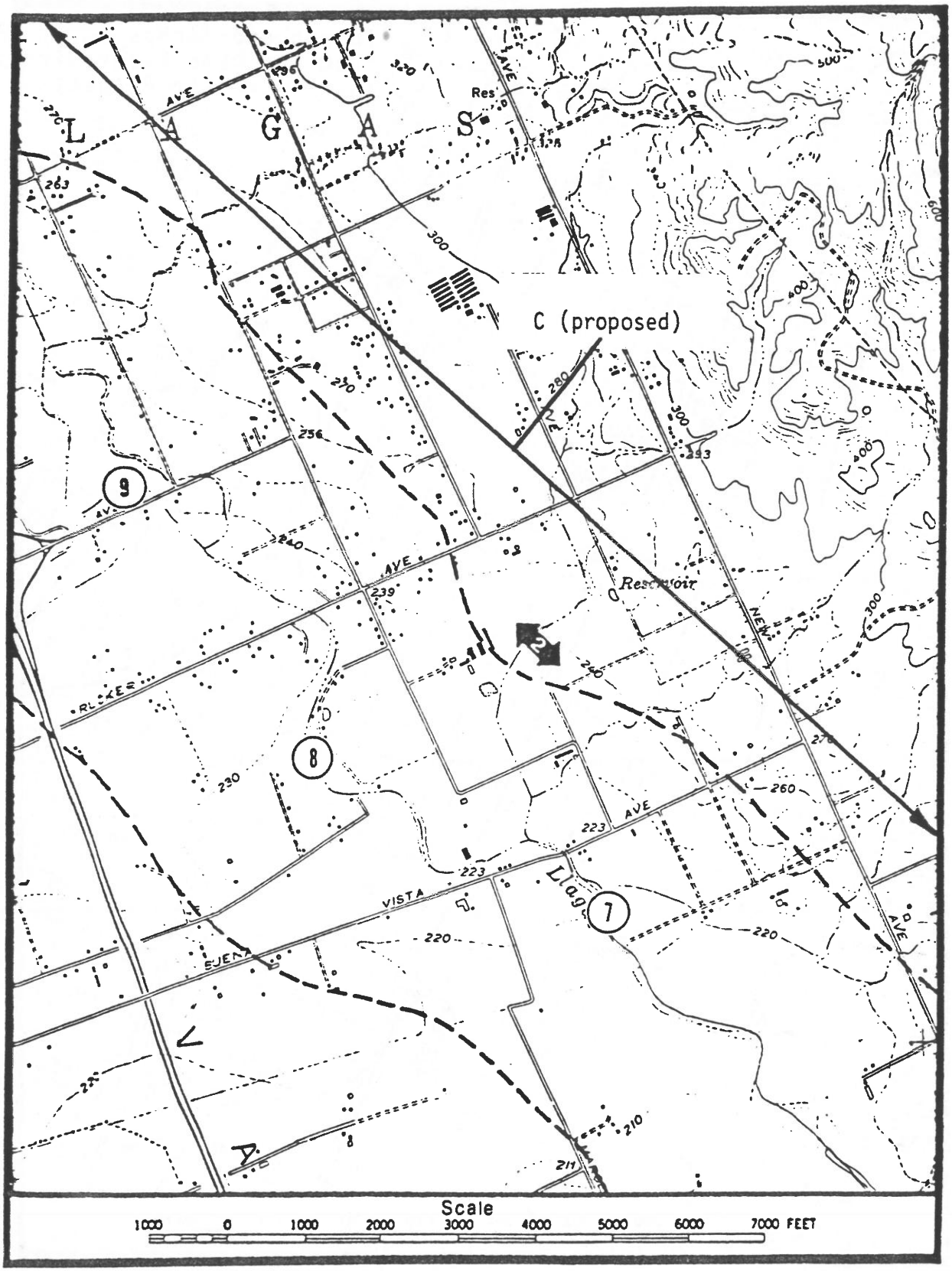


PLATE LC-3

Llagas Creek

GILROY QUADRANGLE

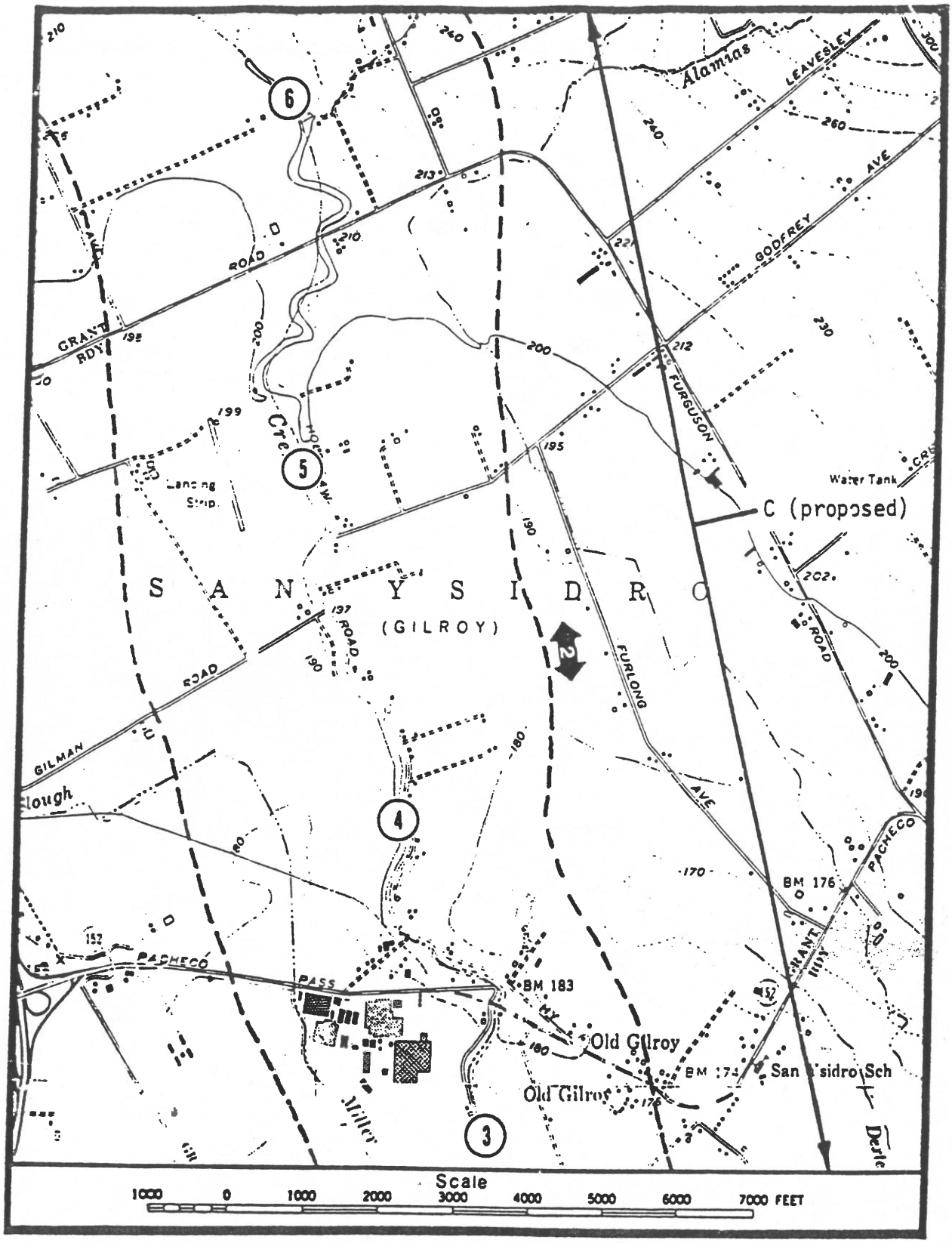


PLATE LC-2

Llagas Creek

CHITTENDEN QUADRANGLE

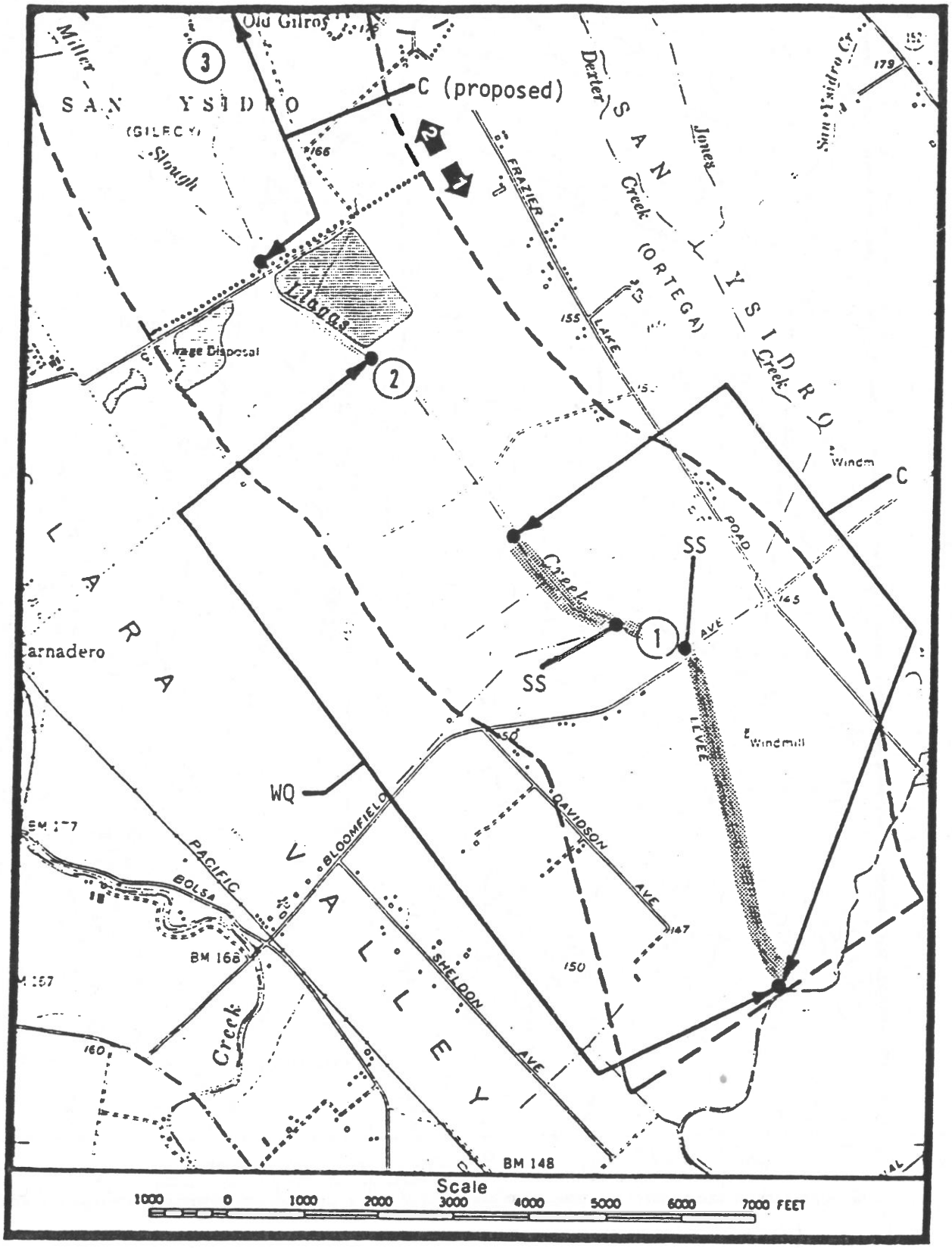


PLATE LC-1

Little Arthur Creek

Mount Madonna Quadrangle

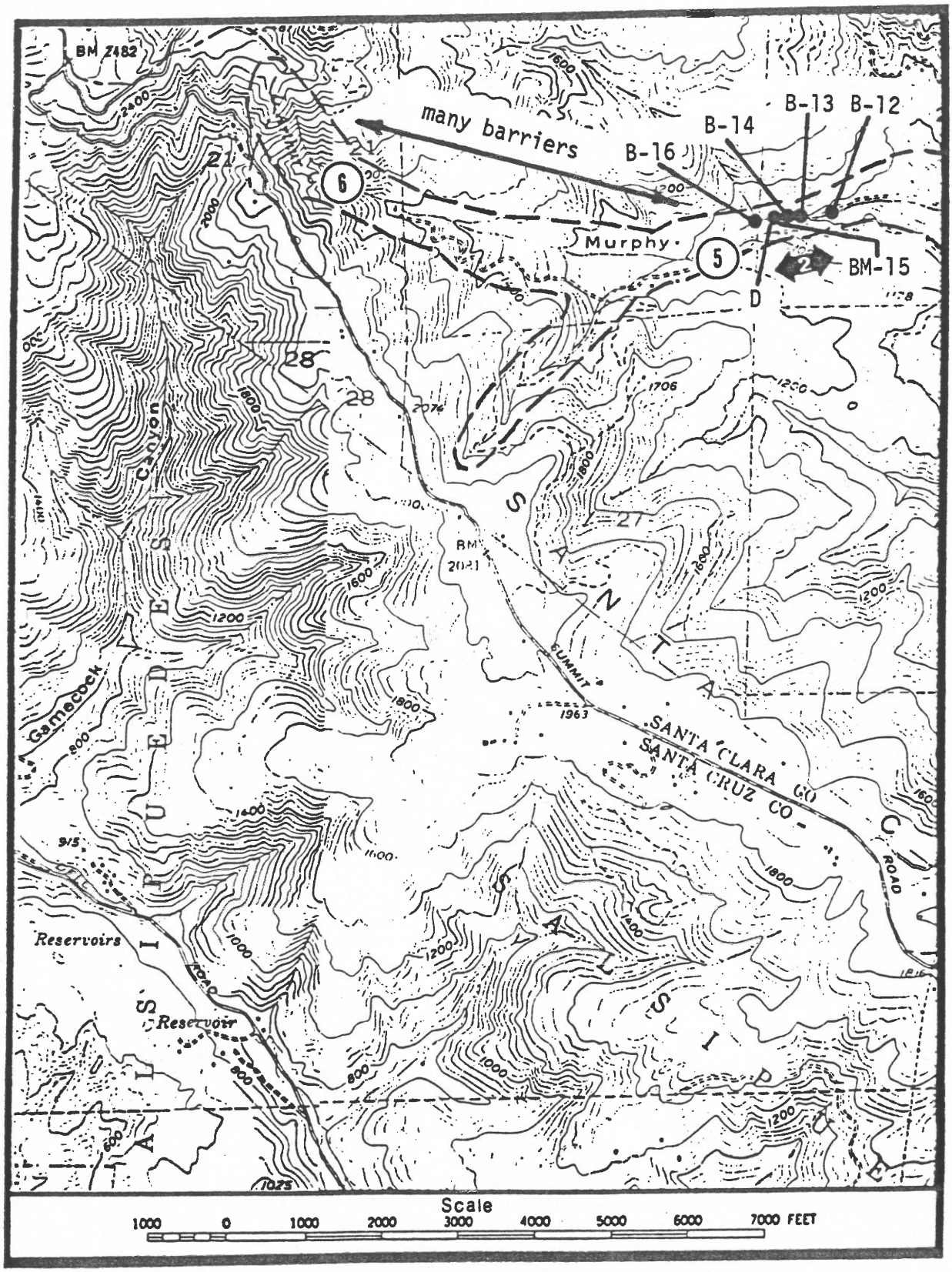


Plate LA-3

Little Arthur Creek

Mount Madonna Quadrangle

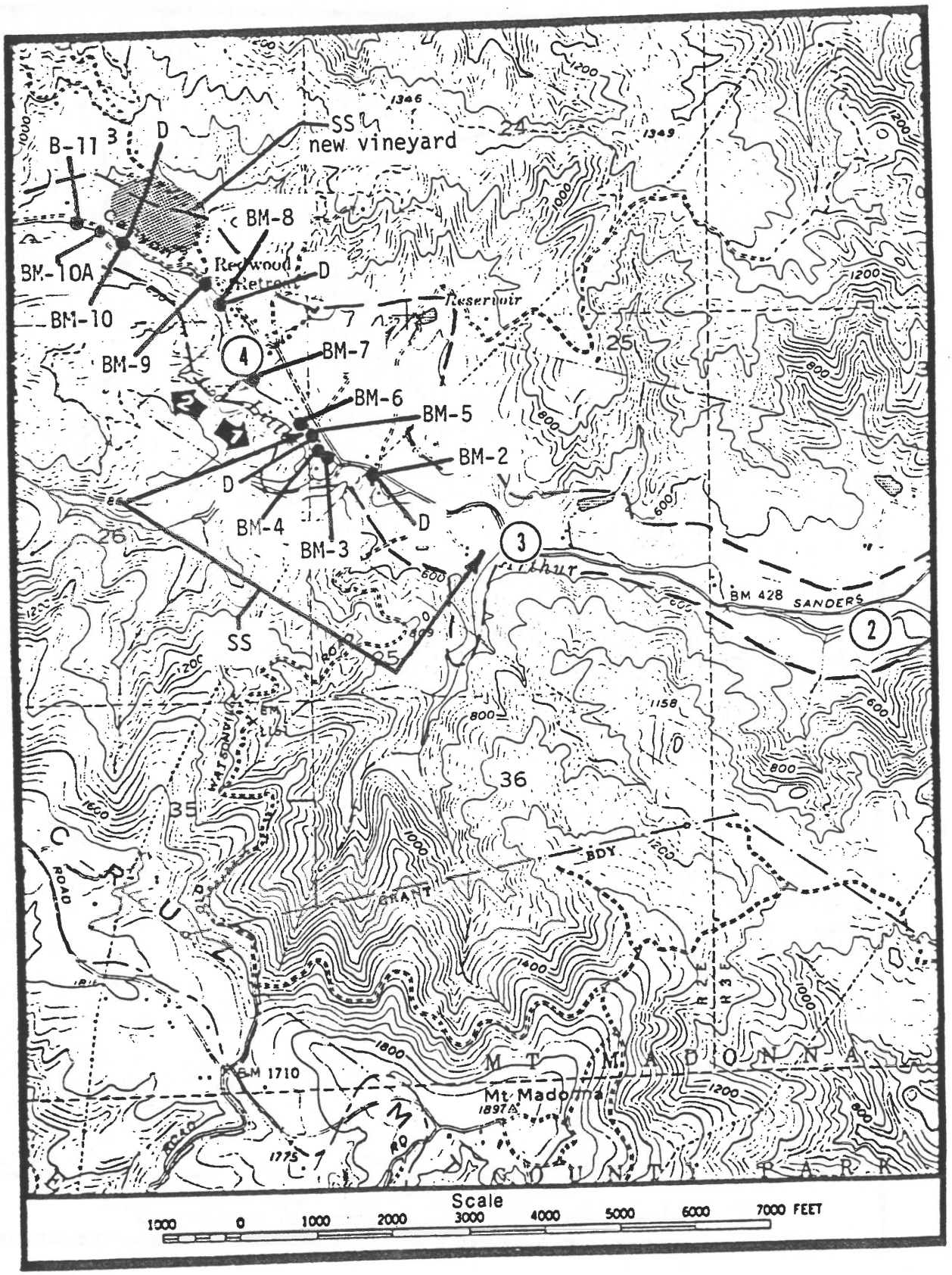


PLATE LA-2

Little Arthur Creek

Mount Madonna Quadrangle

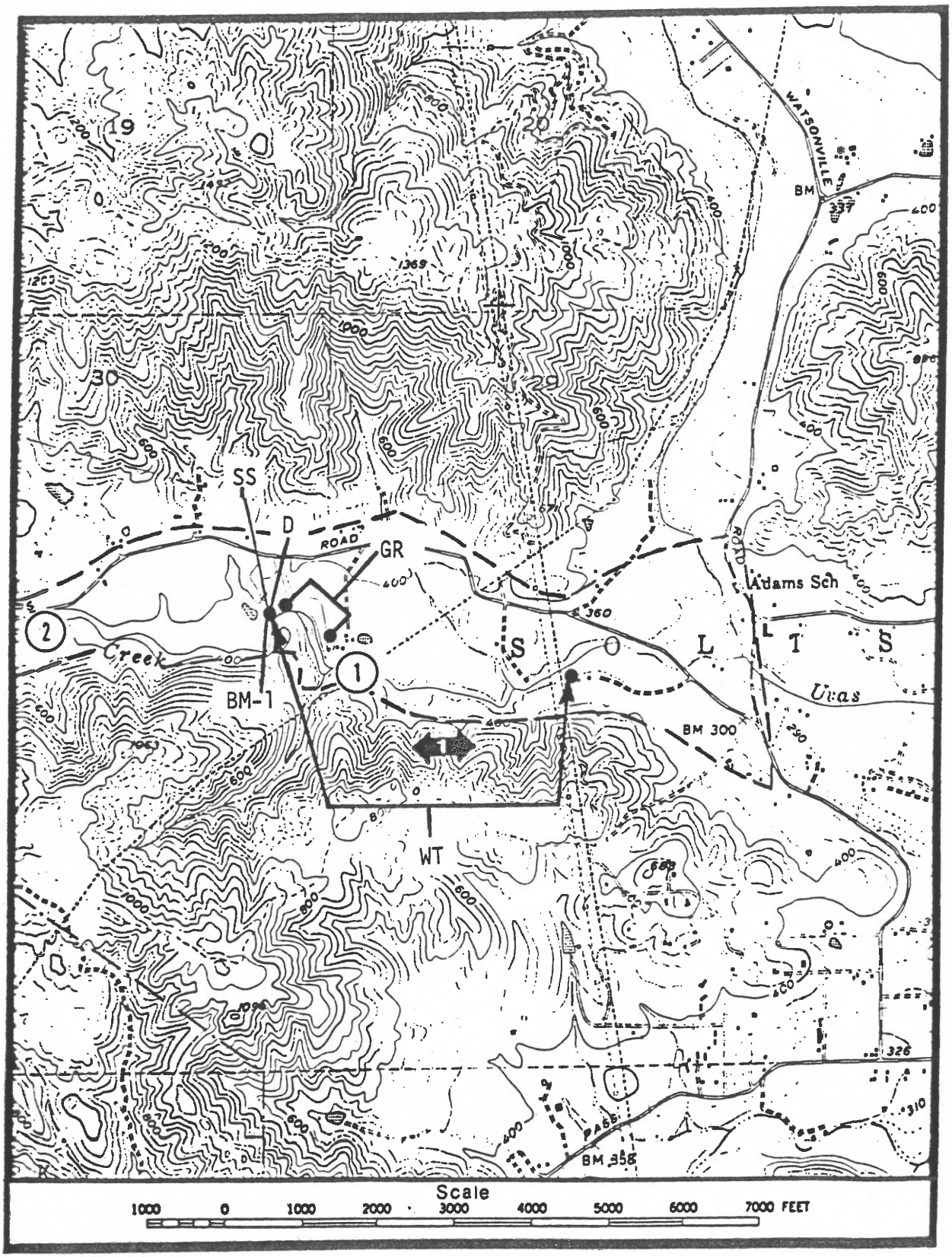


Plate LA-1

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

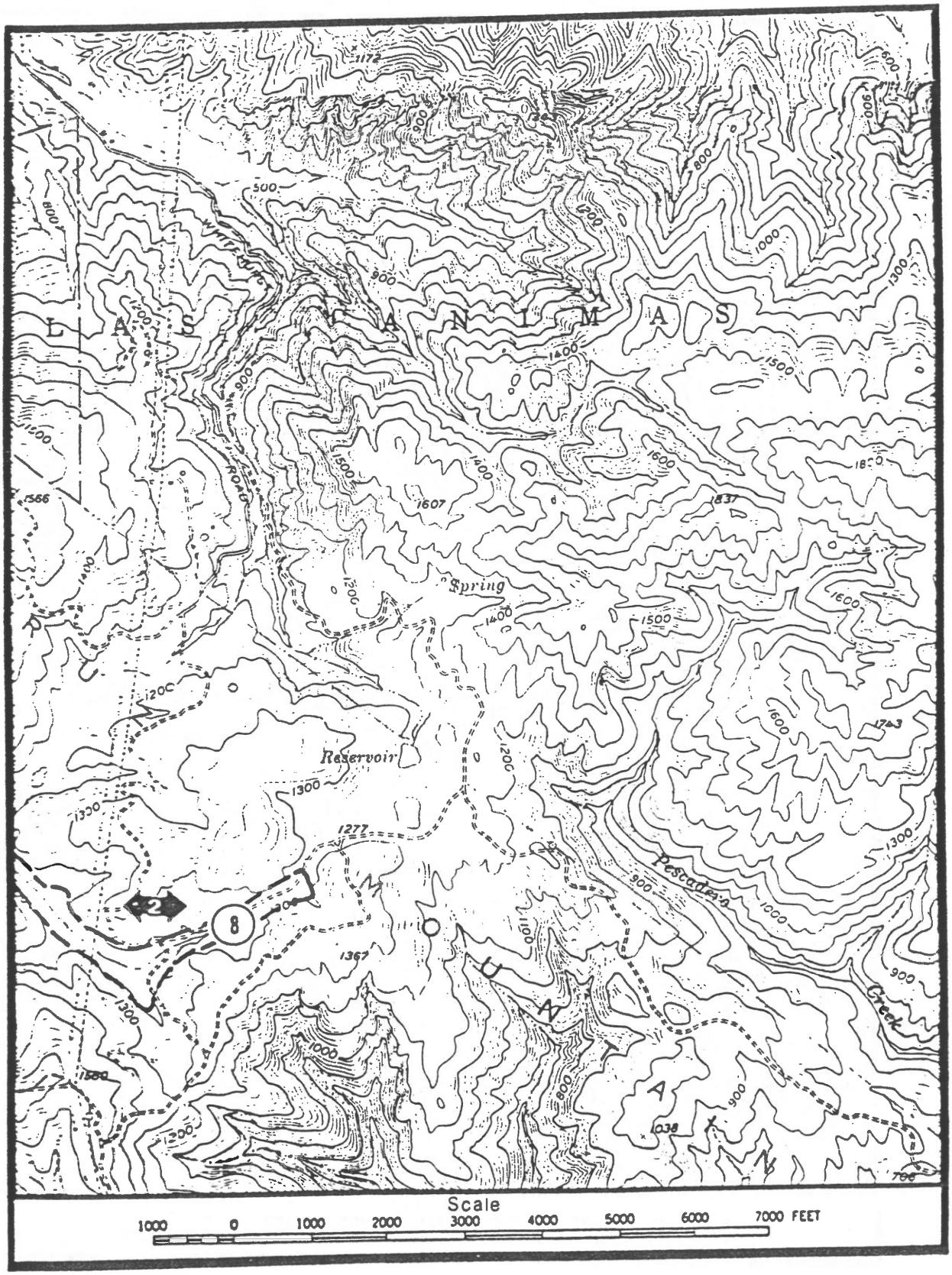


PLATE BO-4

Bodfish Creek

WATSONVILLE EAST QUADRANGLE

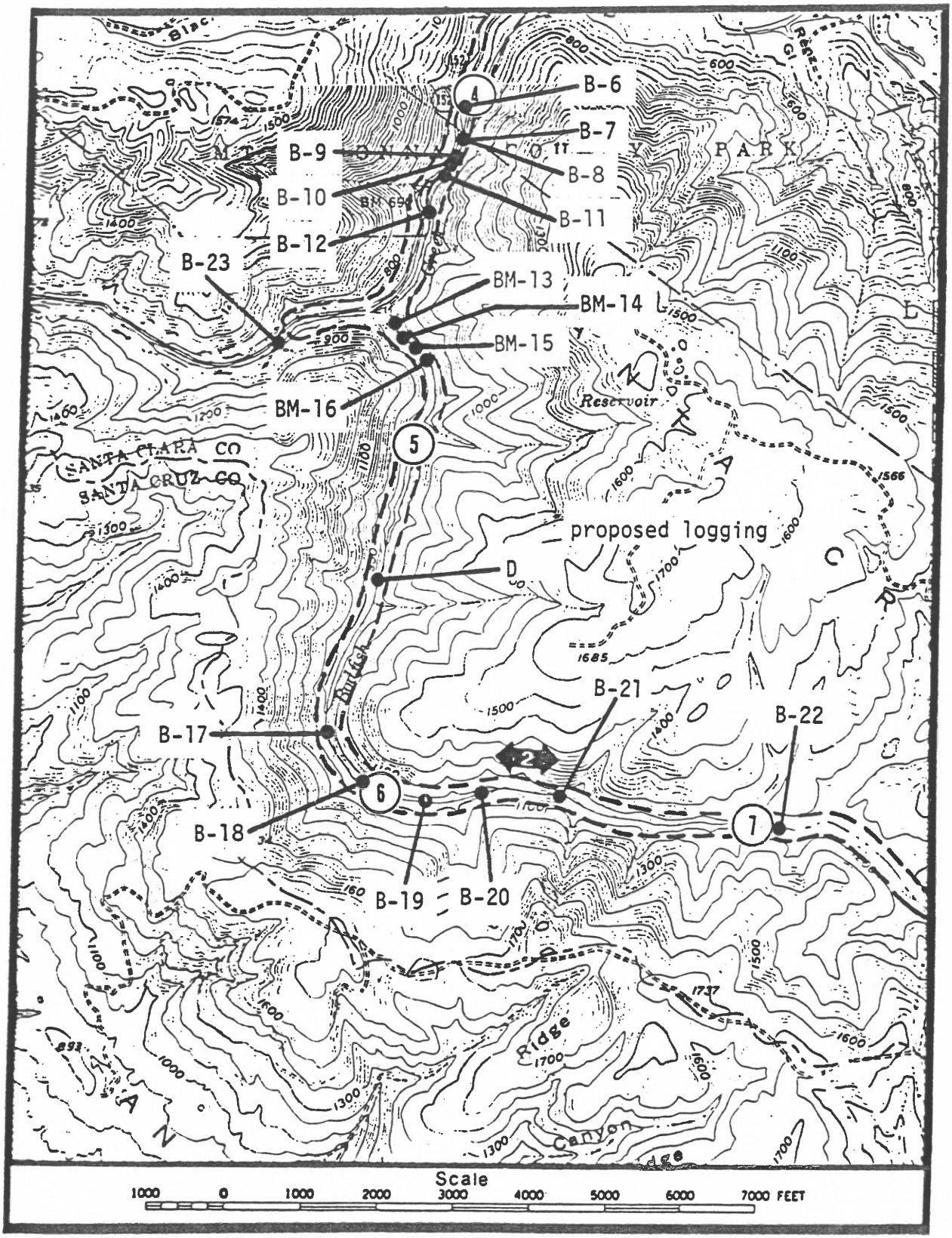


PLATE BO-3

Bodfish Creek

Mount Madonna Quadrangle

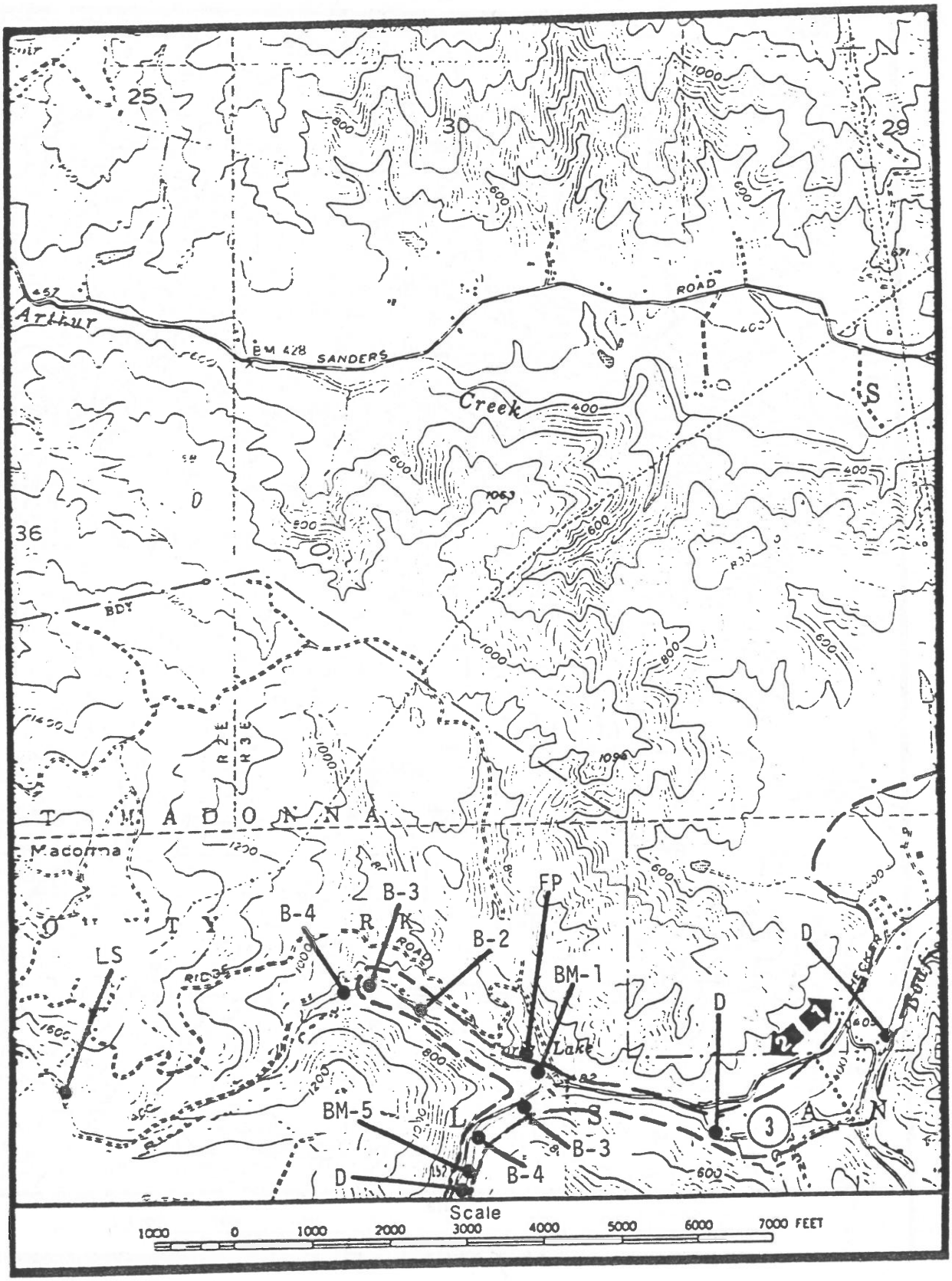


PLATE BC-2

Bodfish Creek

Mount Madonna Quadrangle

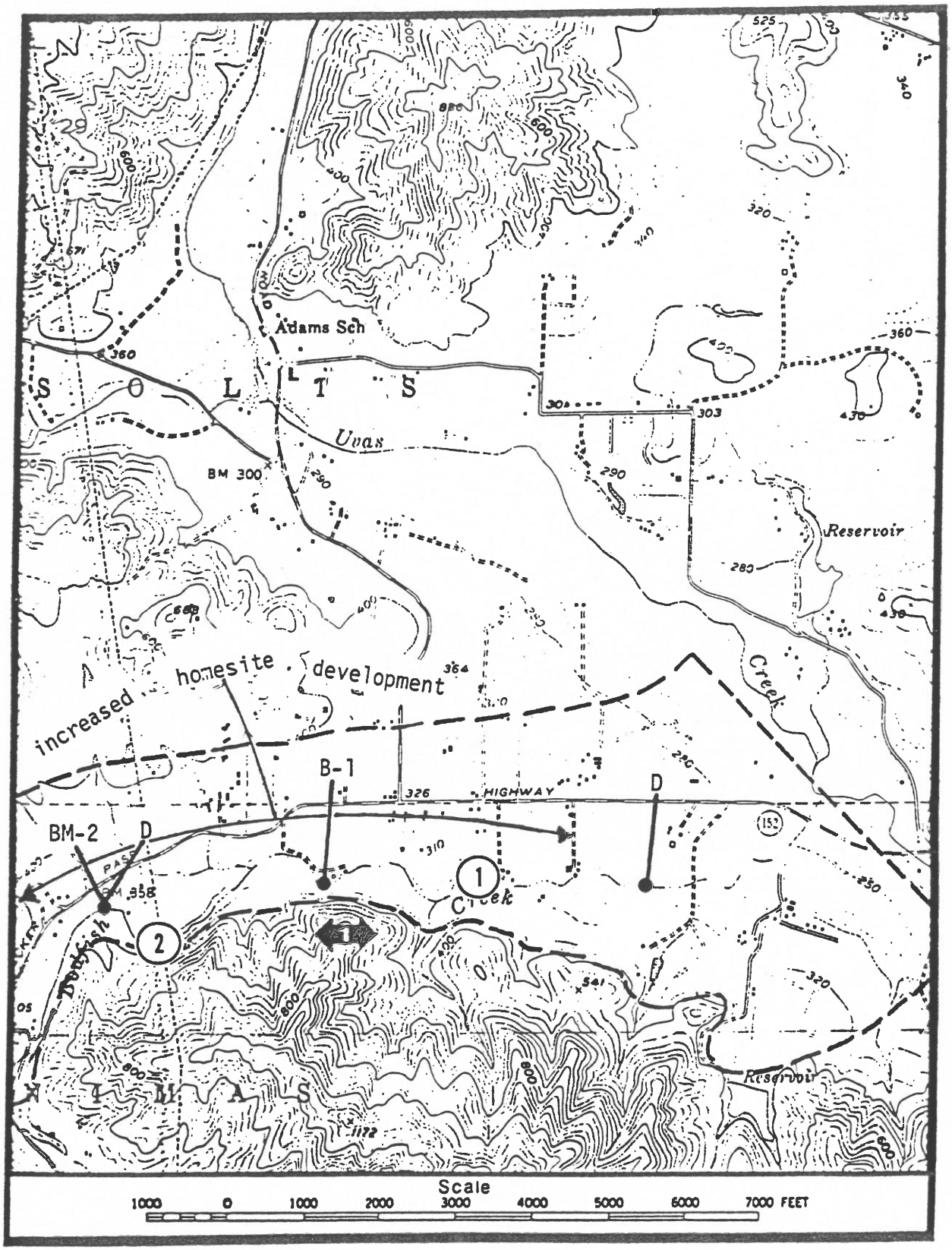


Plate BO-1

Carnadero/Uvas Creek

Mount Madonna Quadrangle

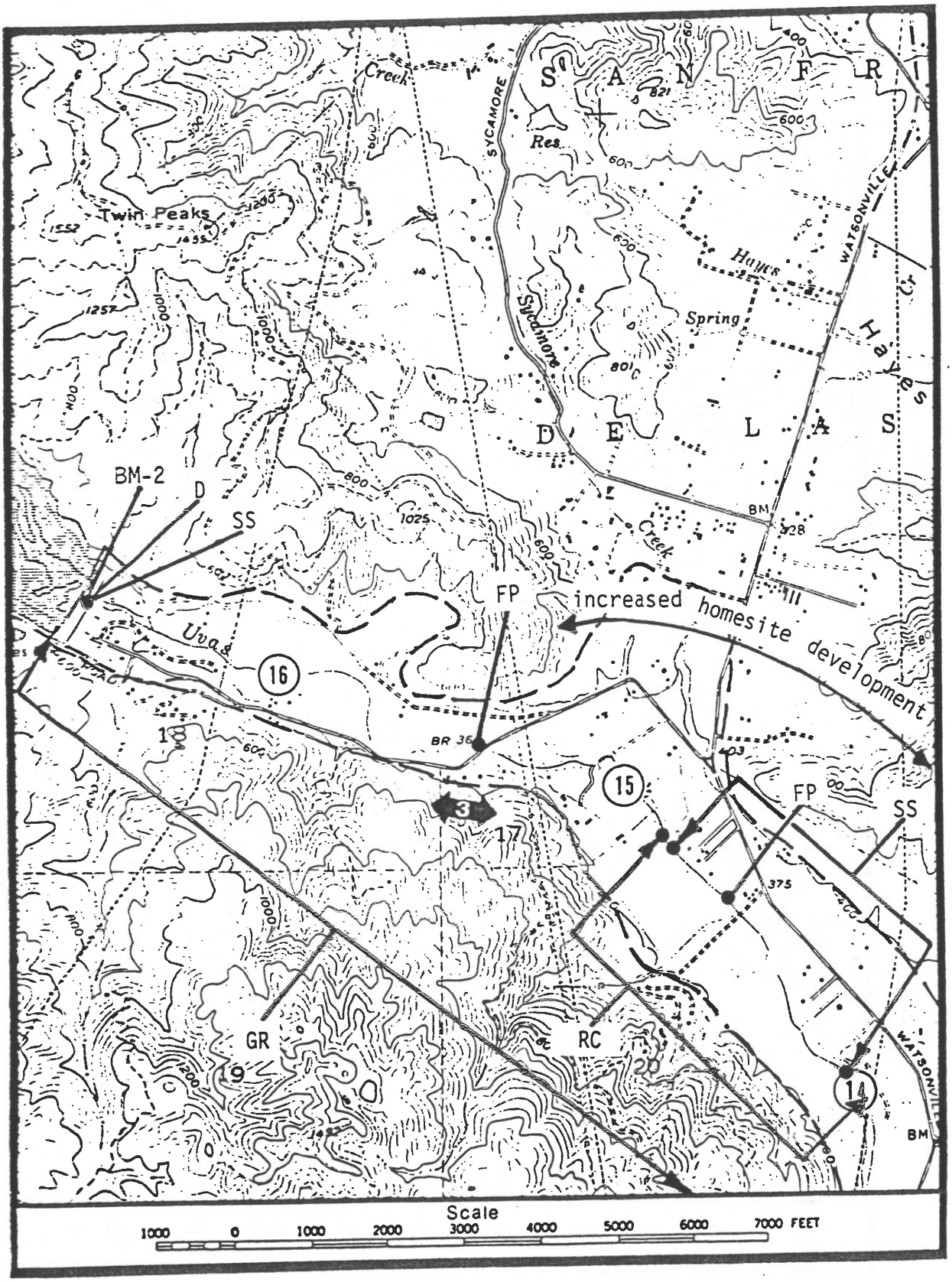


PLATE CU-6

Carnadero / Uvas Creek

Mount Madonna Quadrangle

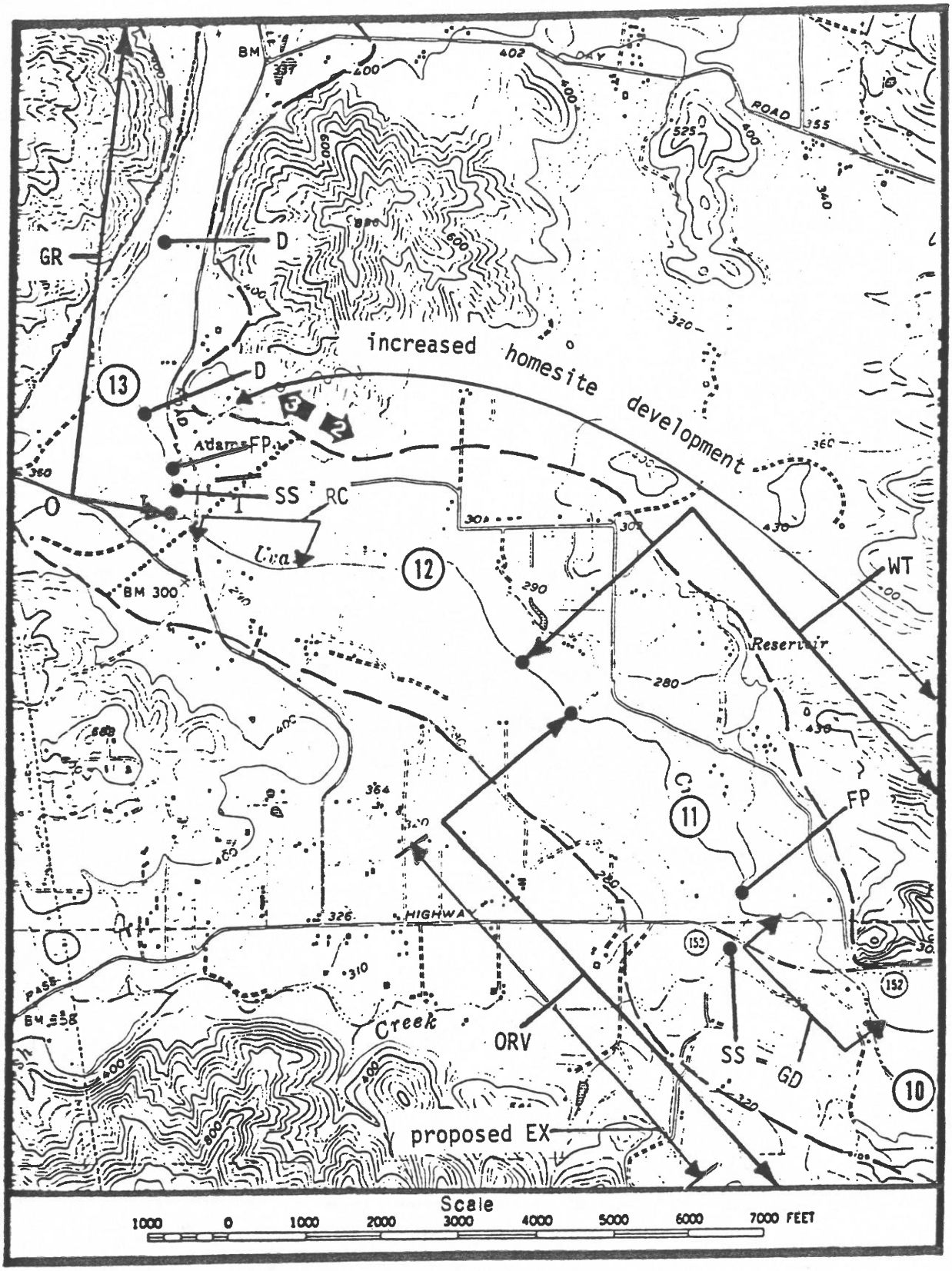


Plate CU-5

Carnadero/ Uvas Creek

GILROY QUADRANGLE

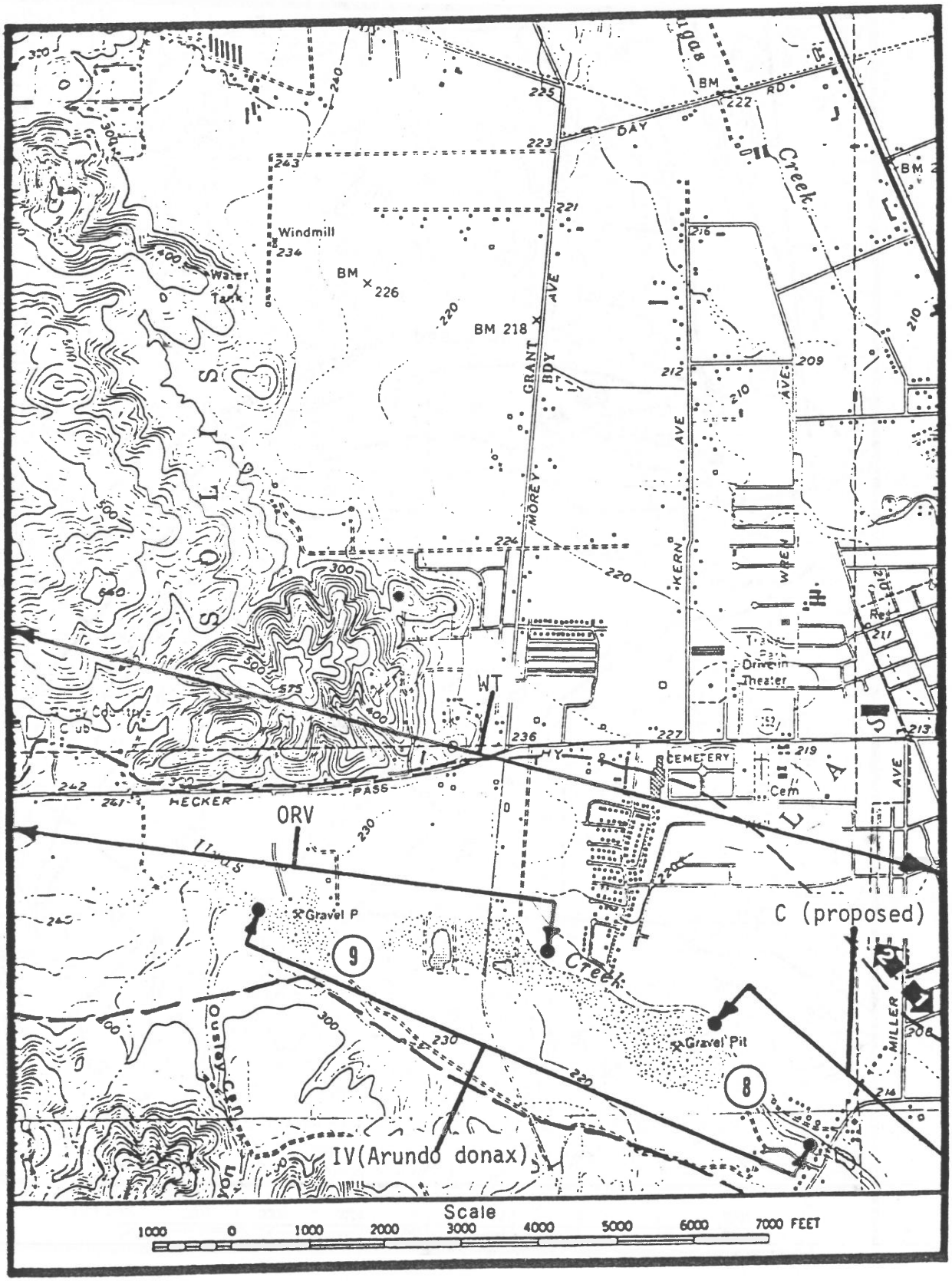


PLATE CU-4

Carnadero/Uvas Creek

CHITTENDEN QUADRANGLE

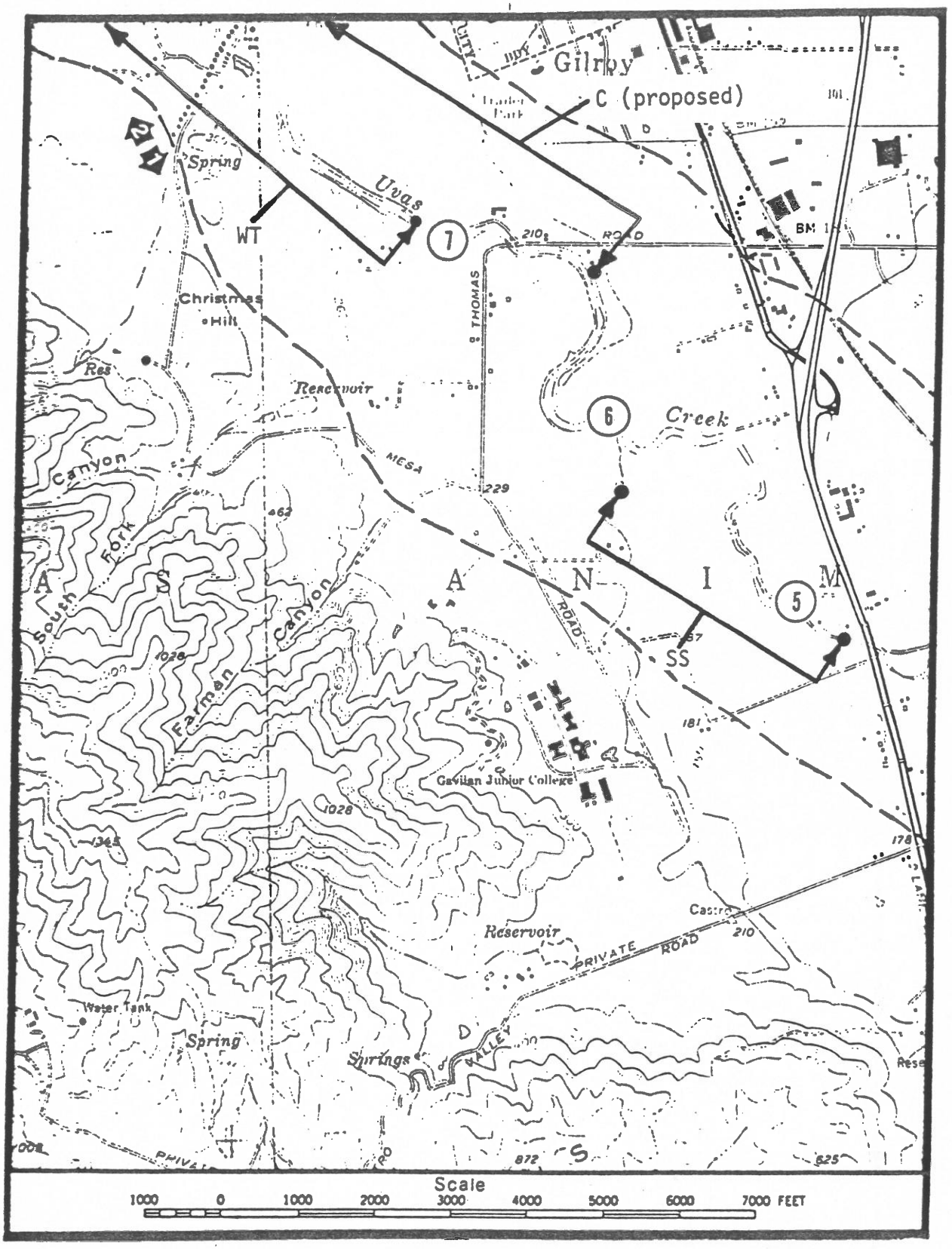


PLATE CU-3

Carnadero / Uvas Creek

CHITTENDEN QUADRANGLE

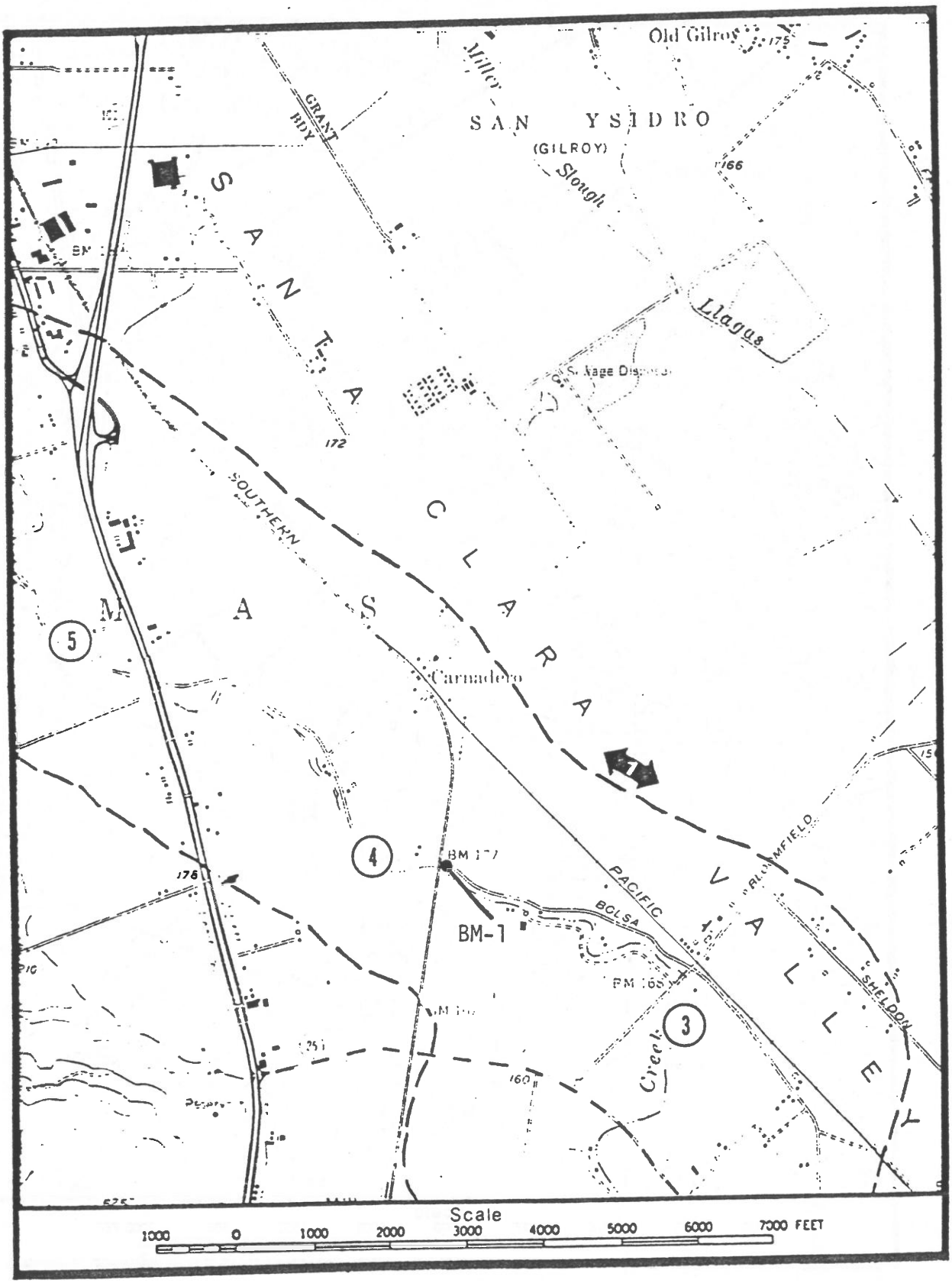


PLATE CU-2

Carnadero/ Uvas Creek

CHITTENDEN QUADRANGLE

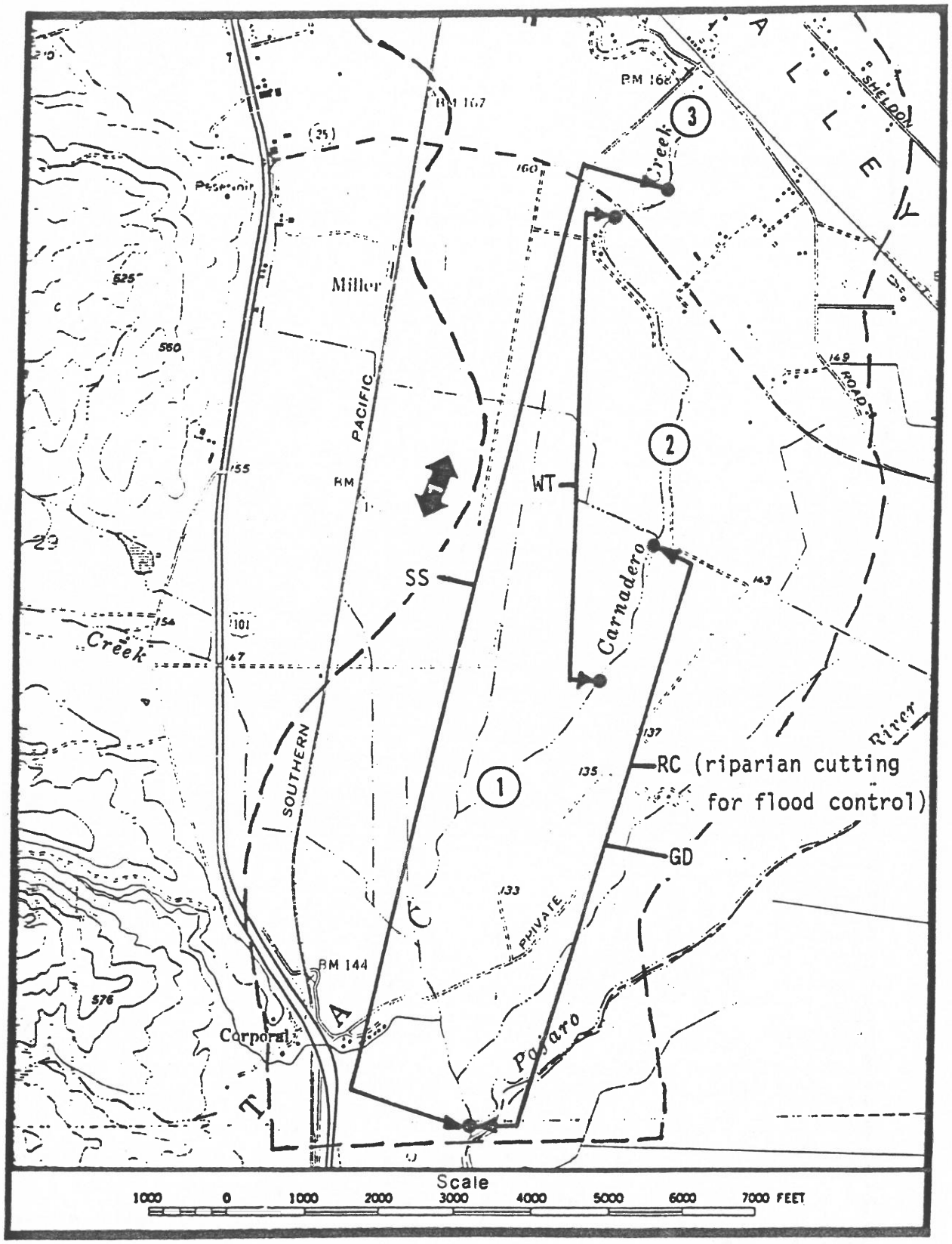


PLATE CU-1

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

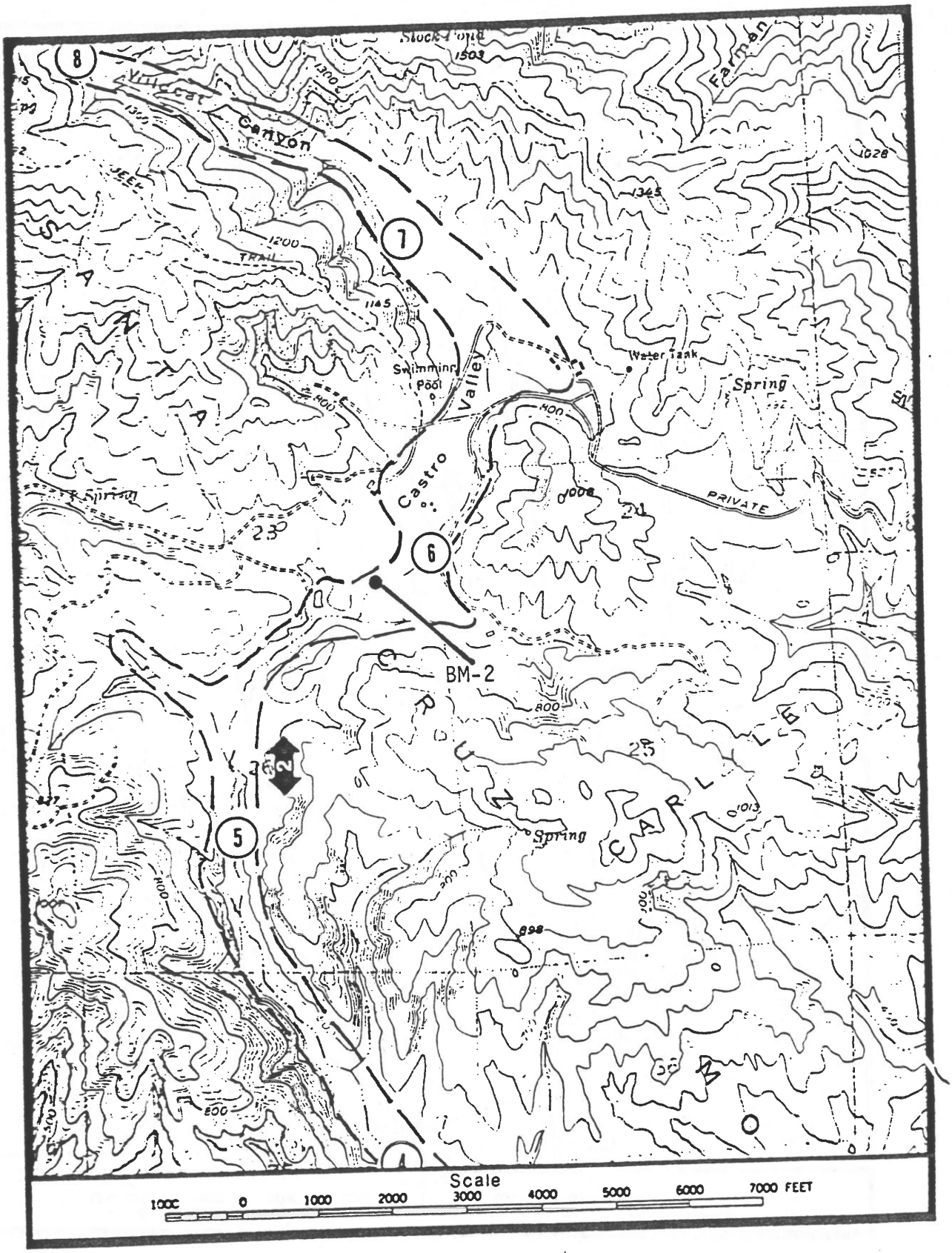


PLATE TC-4

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

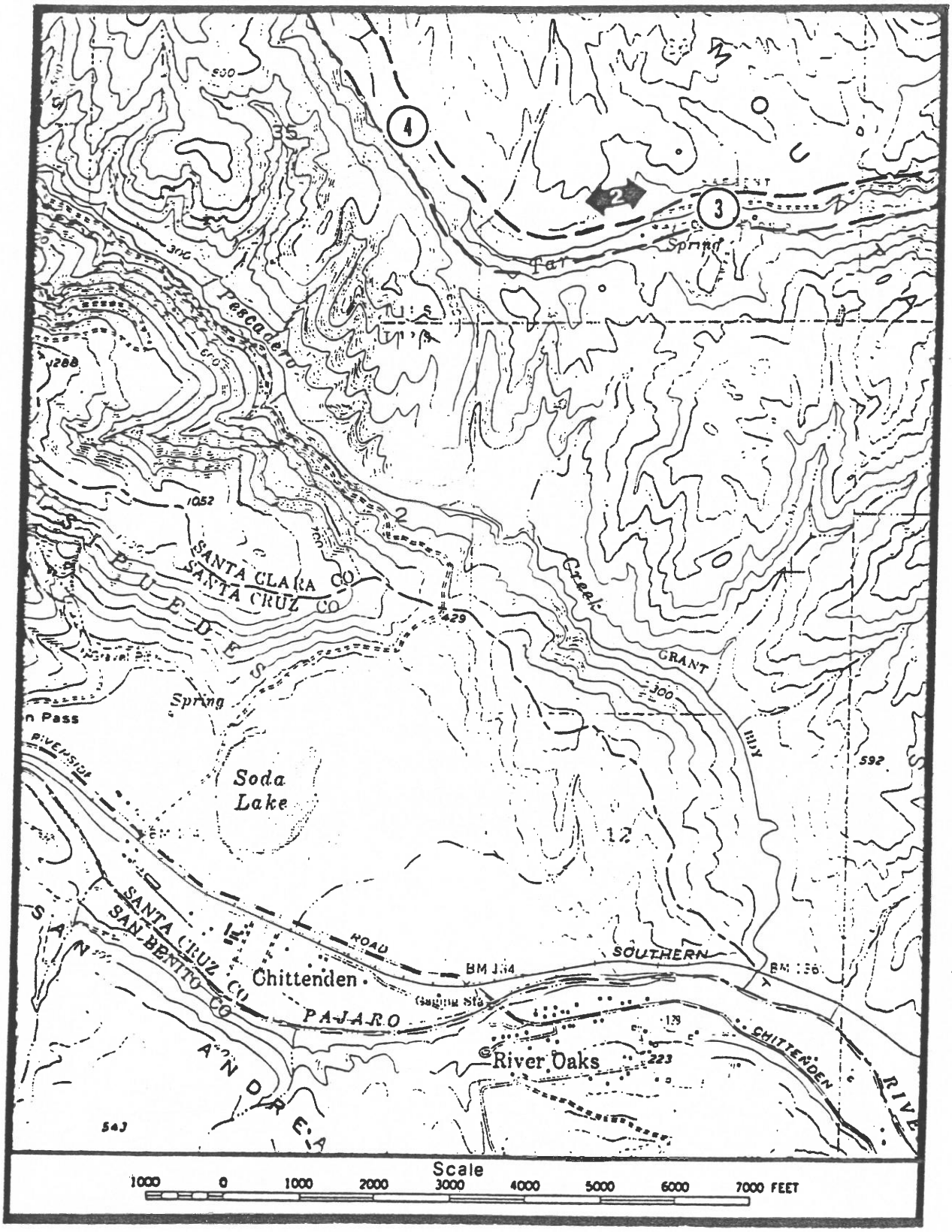


PLATE TC-3

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

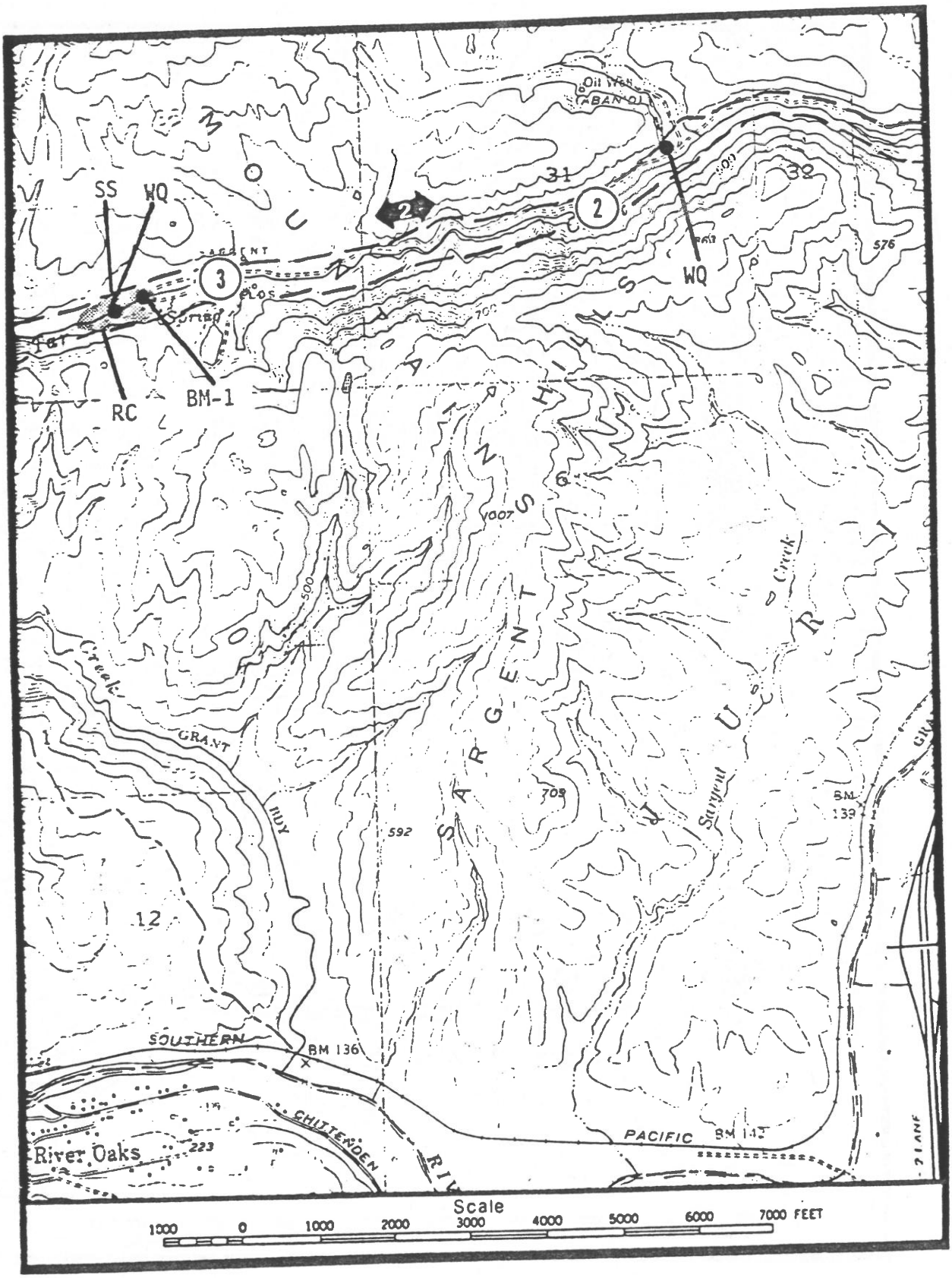


PLATE TC-2

Tar(La Brea) Creek

CHITTENDEN QUADRANGLE

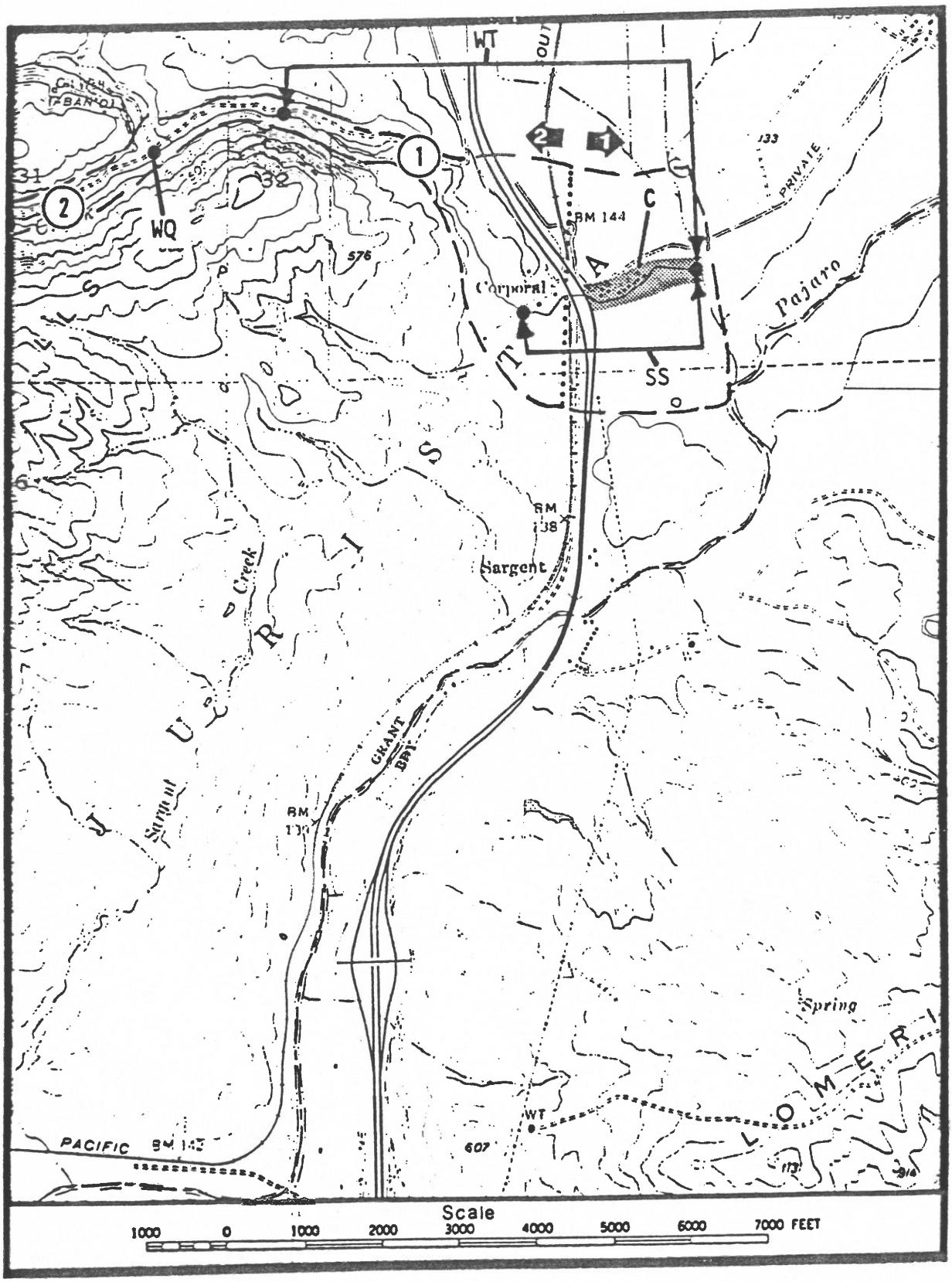


PLATE TC-1

Pescadero Creek

WATSONVILLE EAST QUADRANGLE

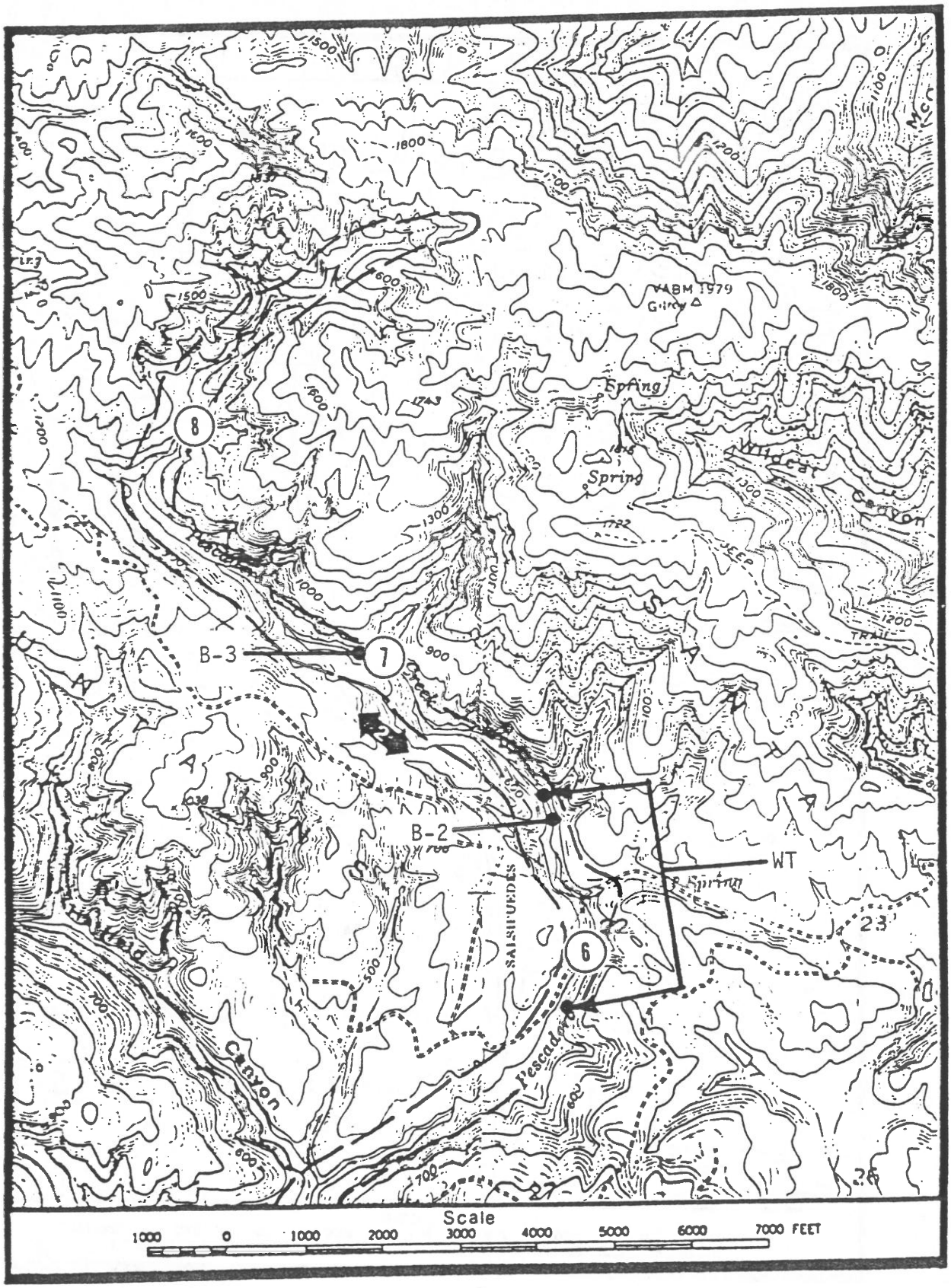


PLATE PE-3

Pescadero Creek

WATSONVILLE EAST QUADRANGLE

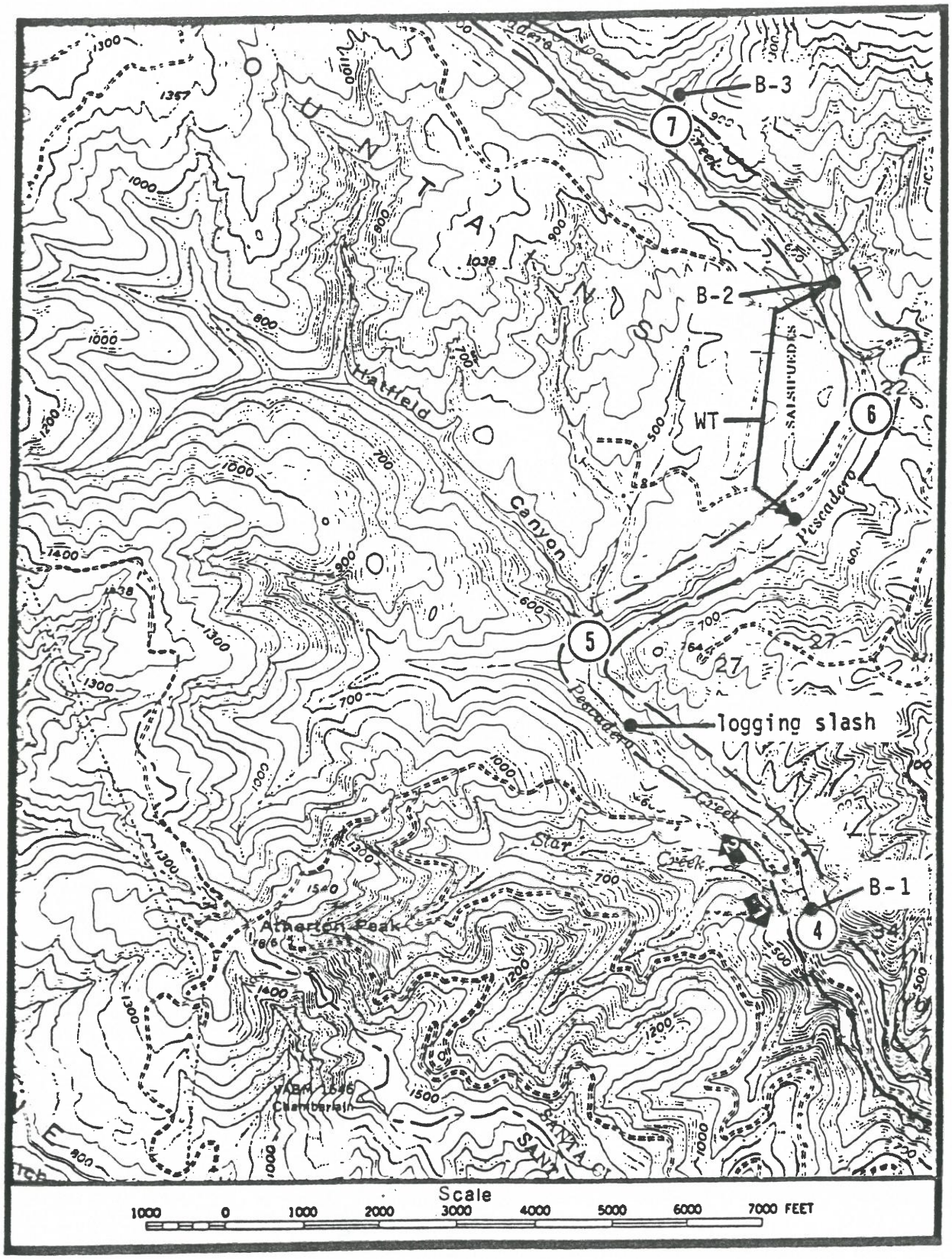


PLATE PE-2

Pescadero Creek

CHITTENDEN QUADRANGLE

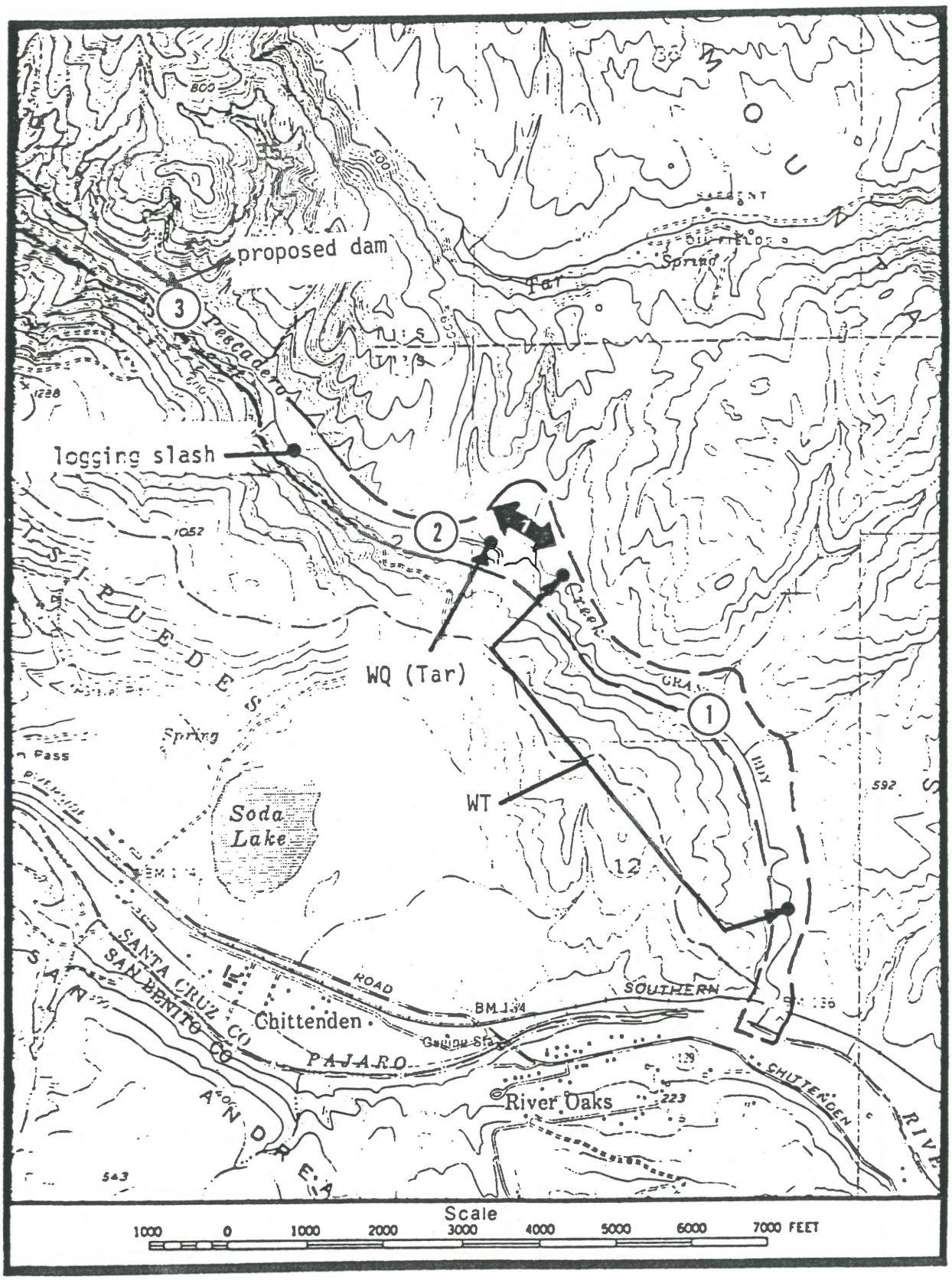


PLATE PE-1

Mattos Creek

WATSONVILLE EAST QUADRANGLE

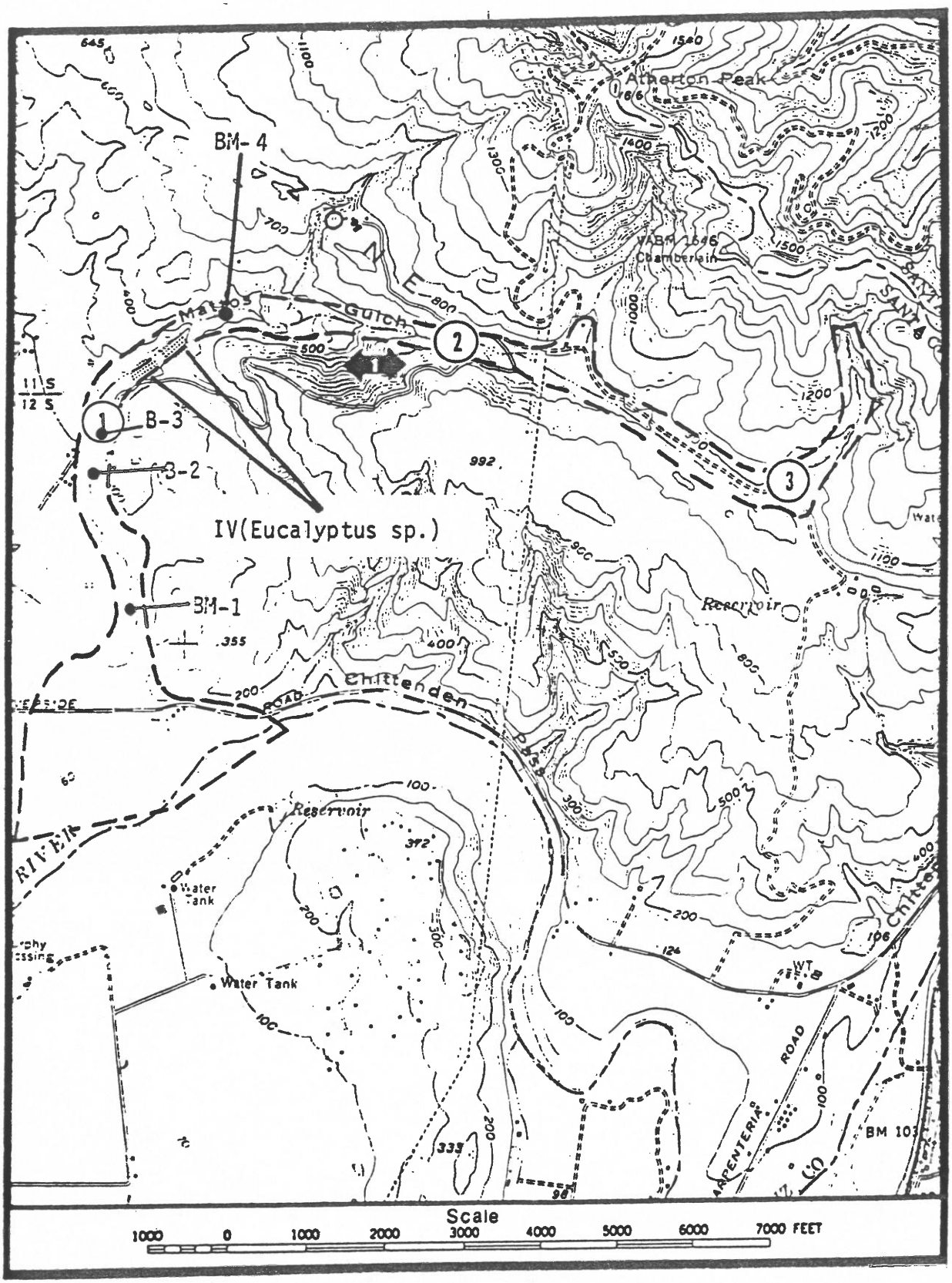


PLATE MG-1

Coward Creek

WATSONVILLE EAST QUADRANGLE

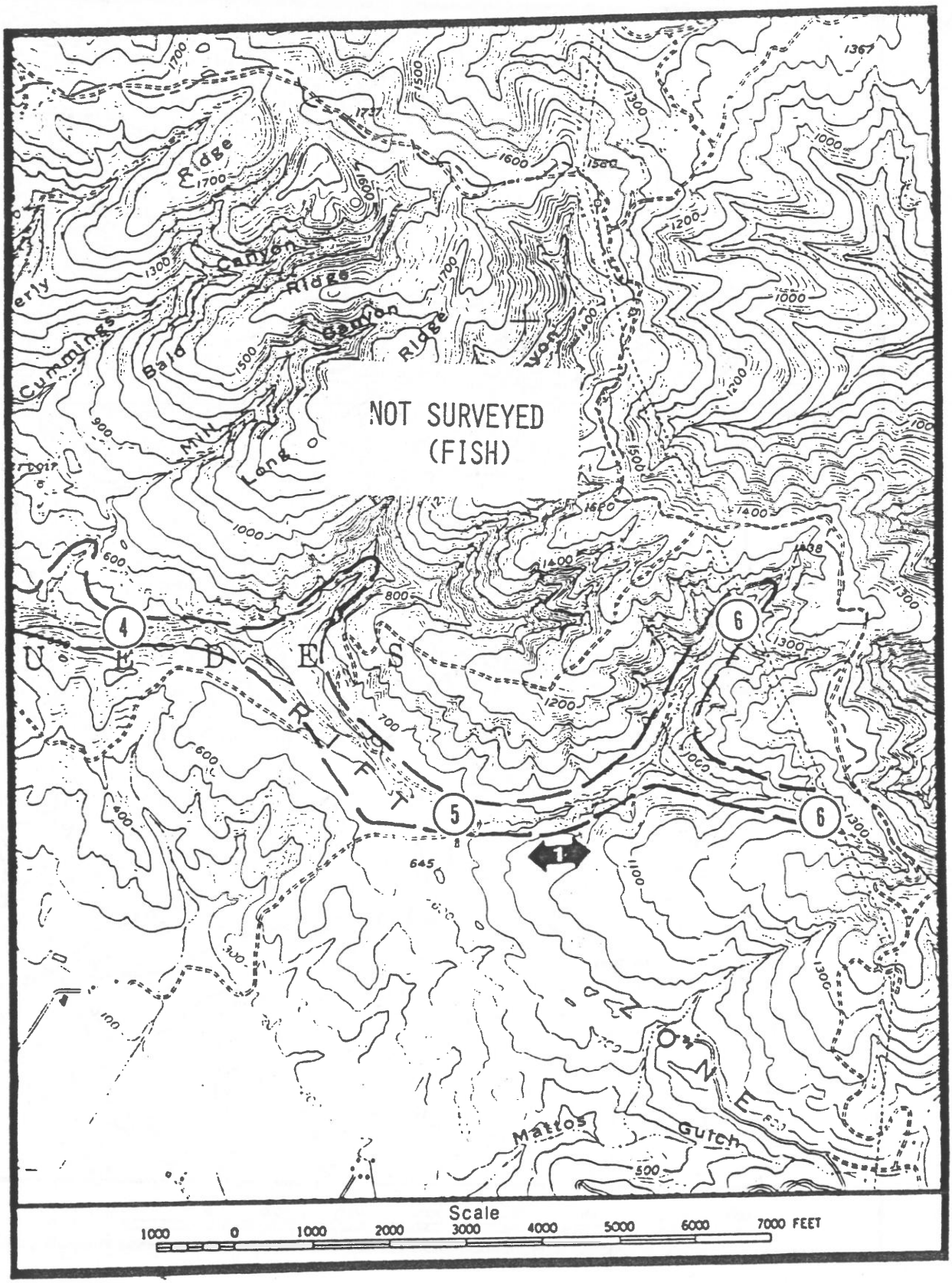


PLATE CW-3

Coward Creek

WATSONVILLE EAST QUADRANGLE

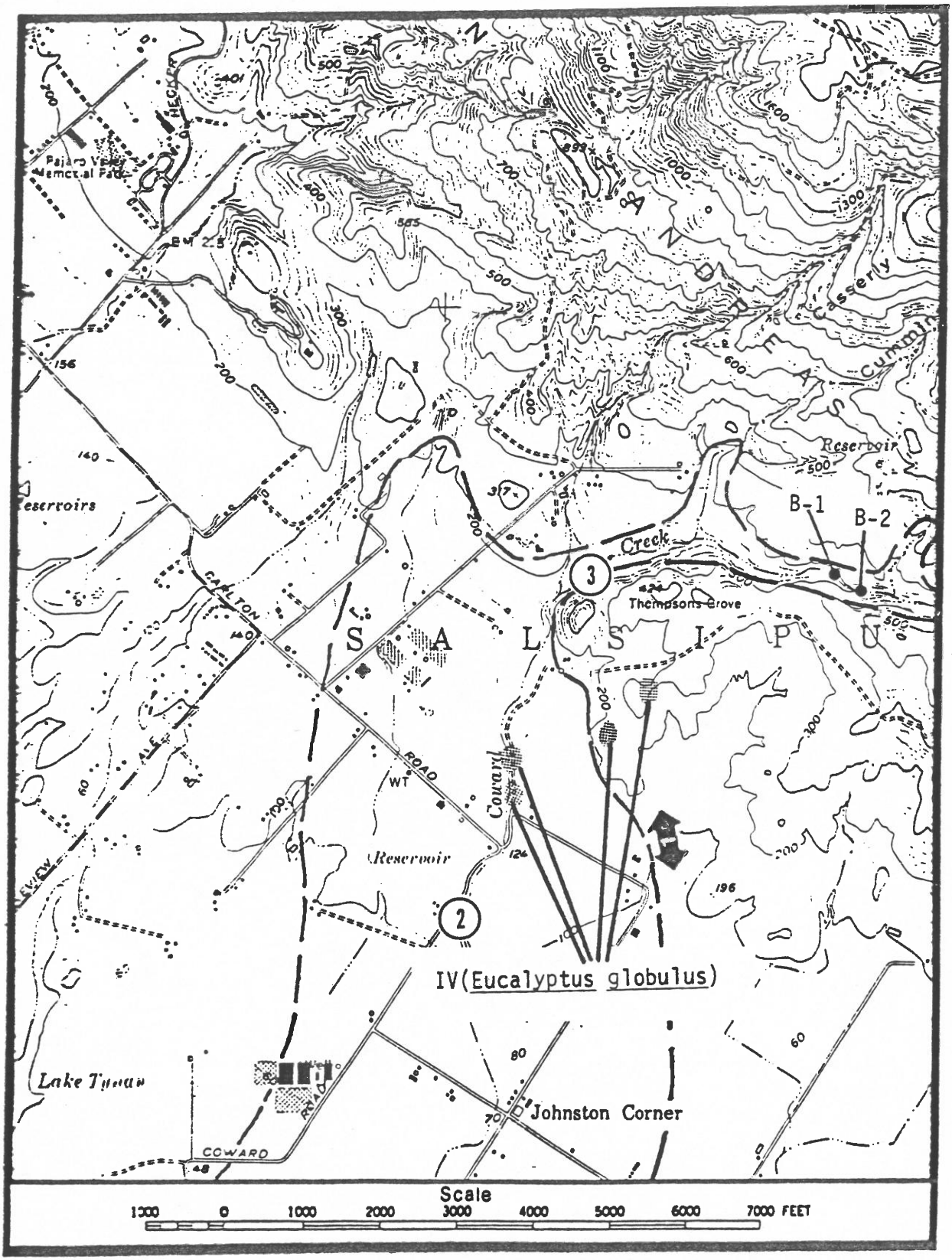


PLATE CW-2

Coward Creek

WATSONVILLE EAST QUADRANGLE

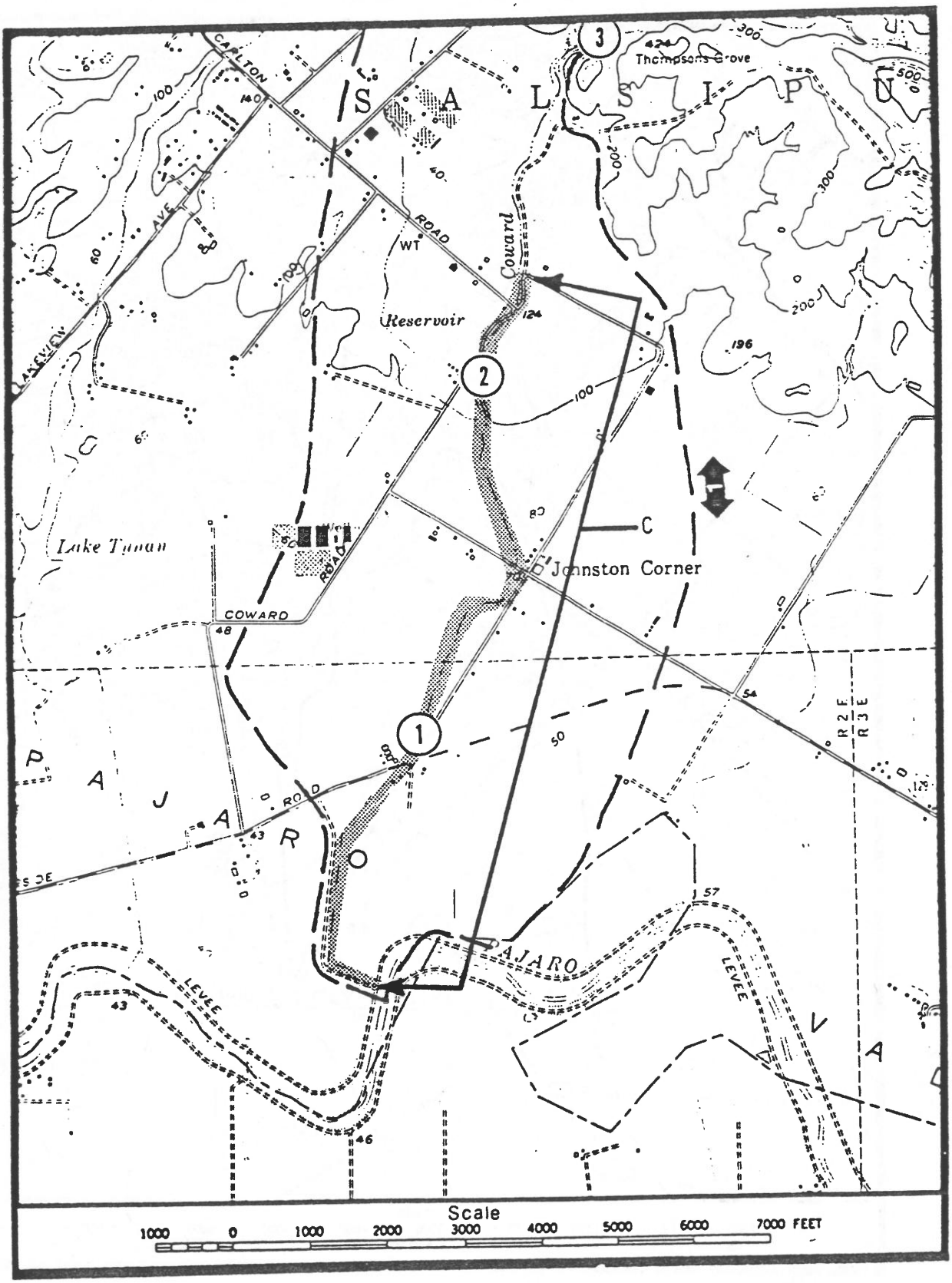


PLATE CW-1

Green Valley Creek

Mount Madonna Quadrangle

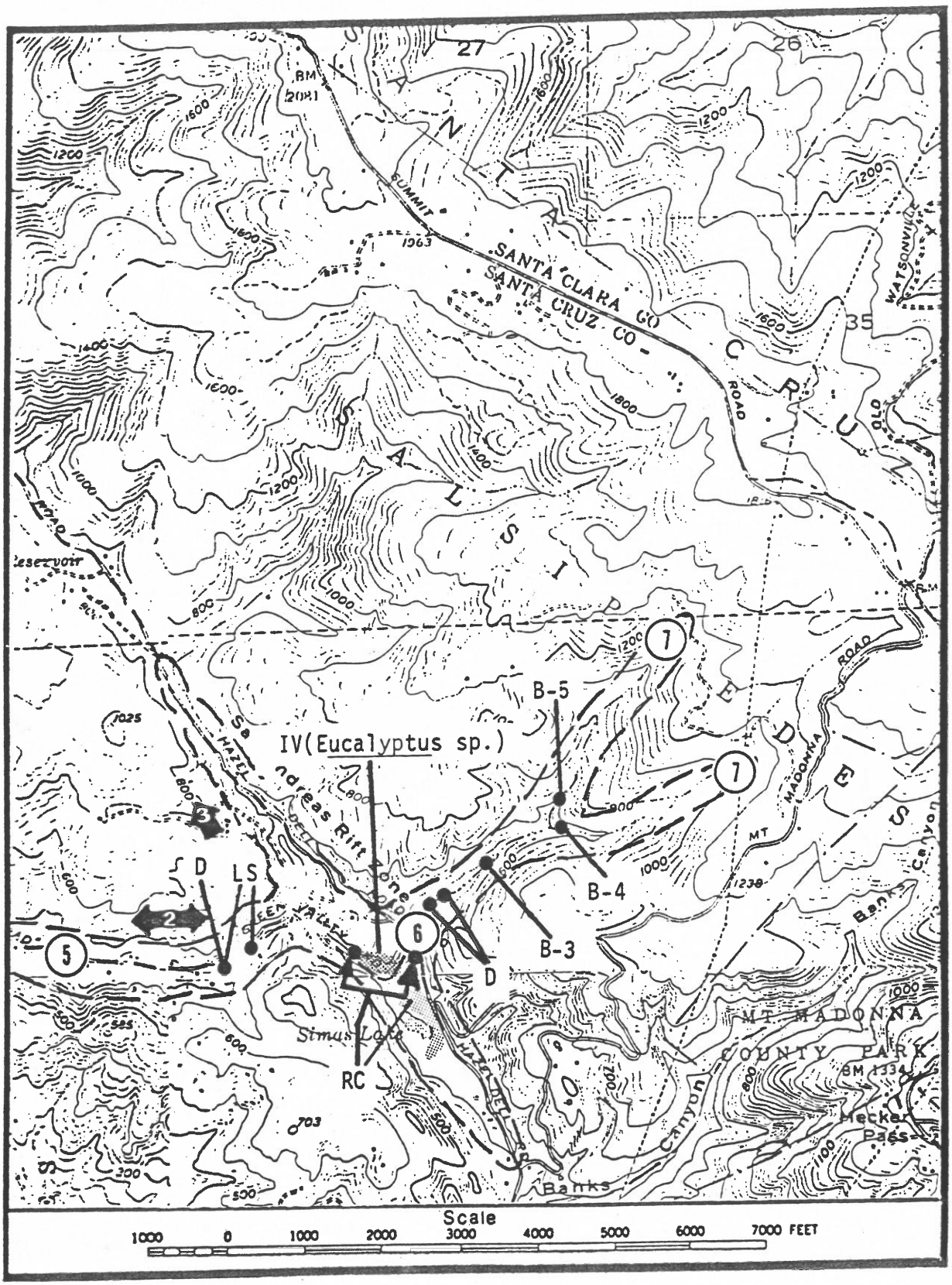


PLATE GV-4

Green Valley Creek

Loma Prieta Quadrangle

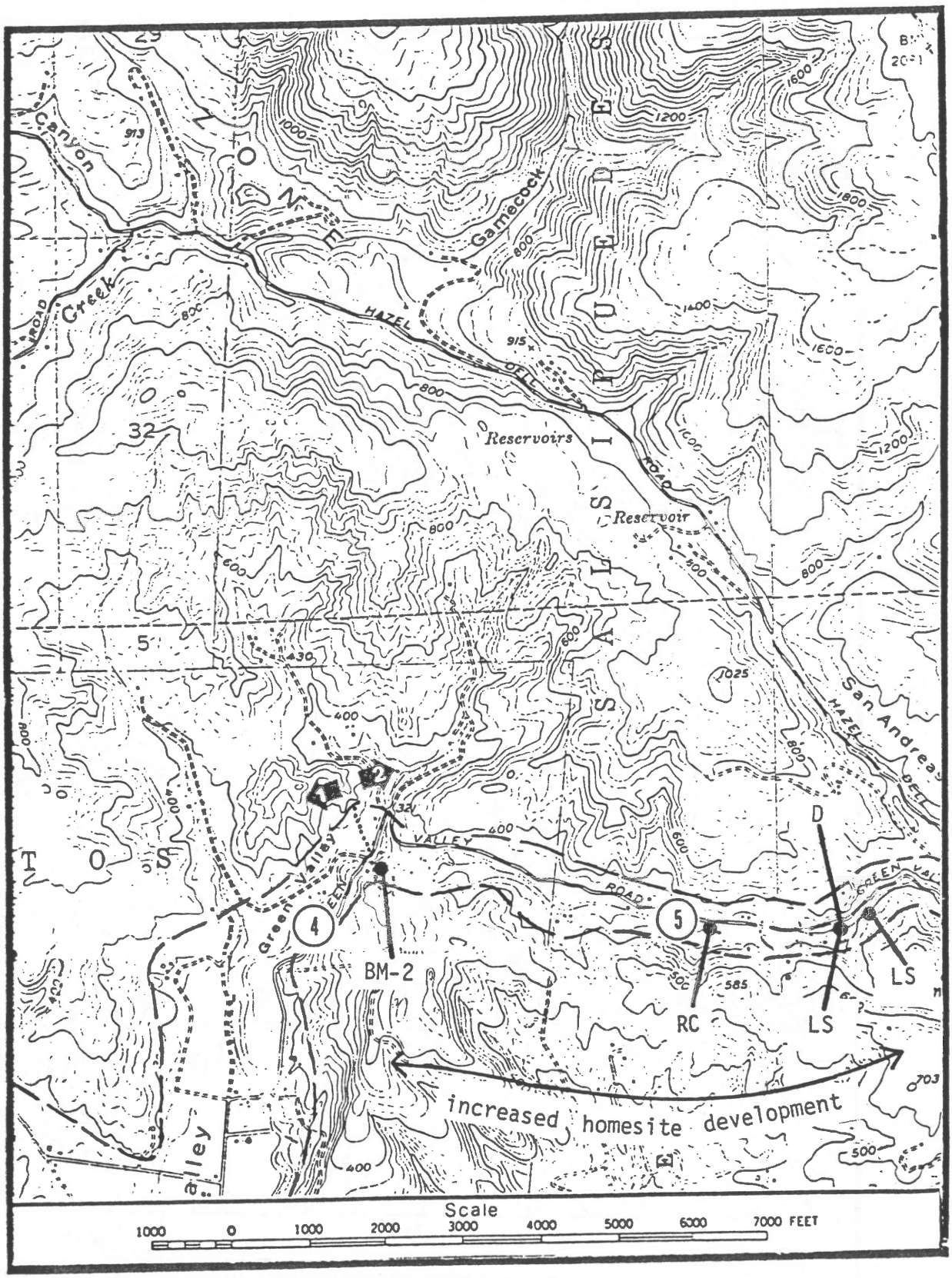


Plate GV-3

Green Valley Creek

WATSONVILLE WEST QUADRANGLE

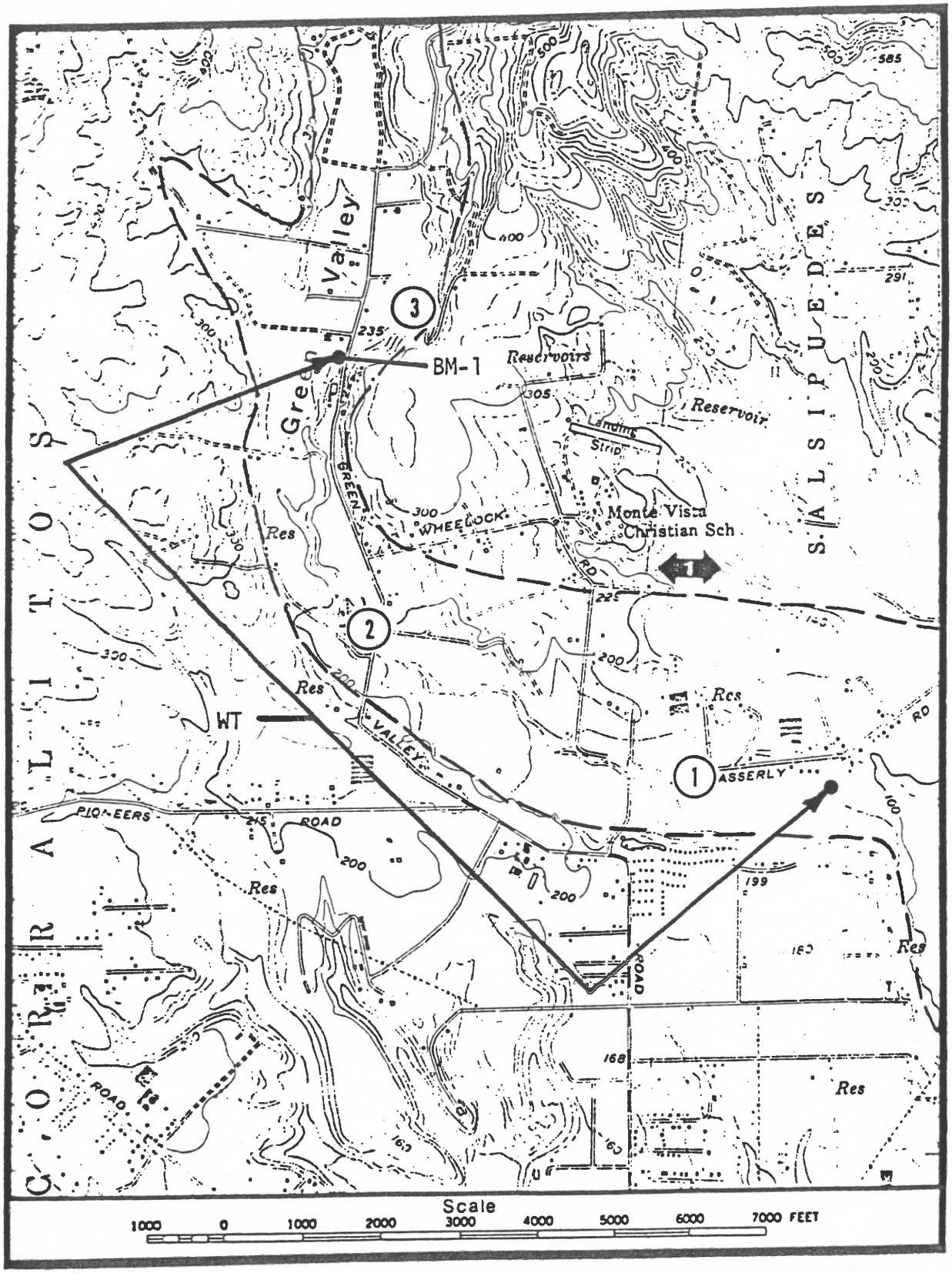


PLATE GV-2

Green Valley Creek

WATSONVILLE EAST QUADRANGLE

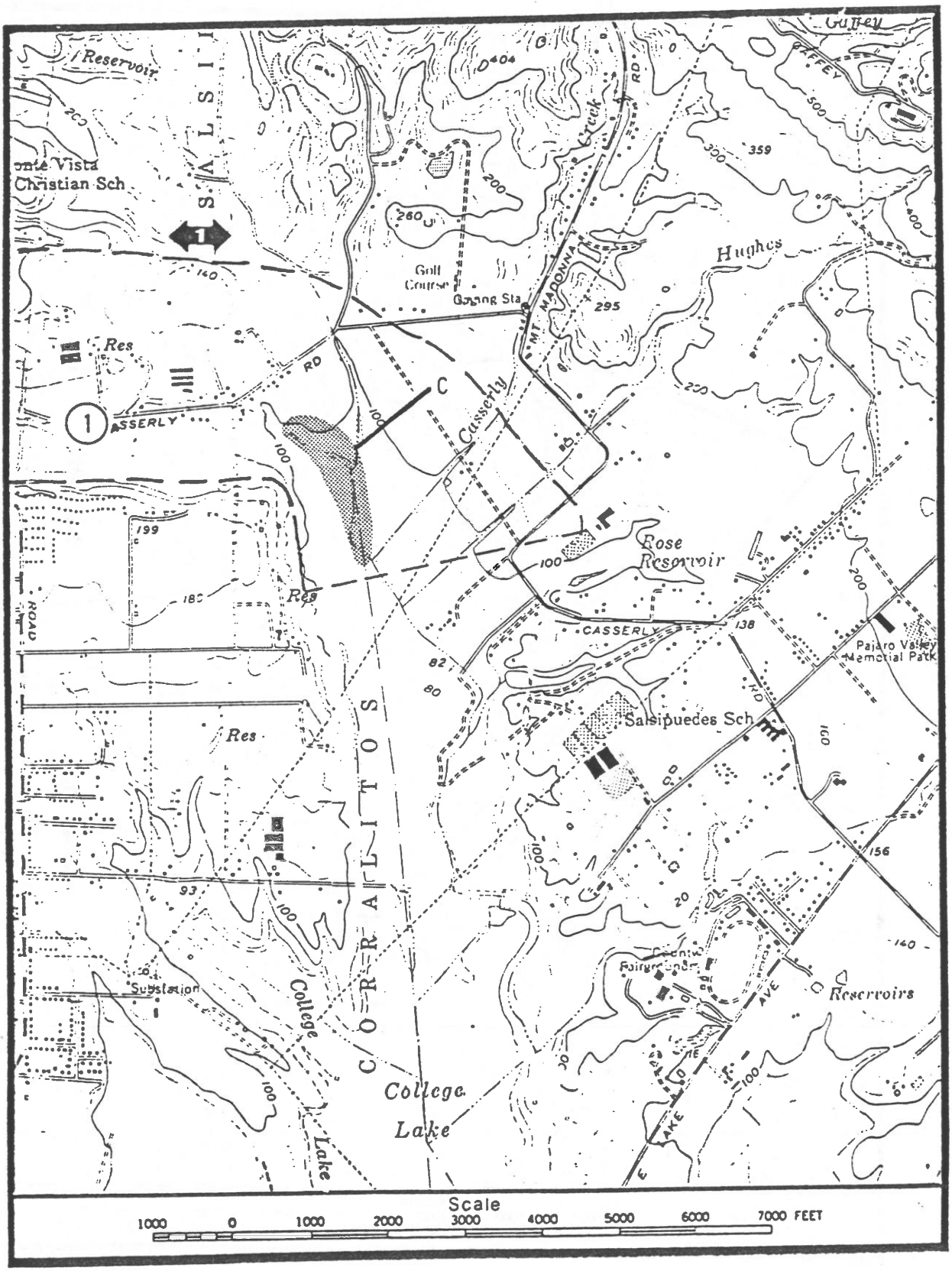


PLATE GV-1

Gaffey & Banks Canyon Creeks

WATSONVILLE EAST QUADRANGLE

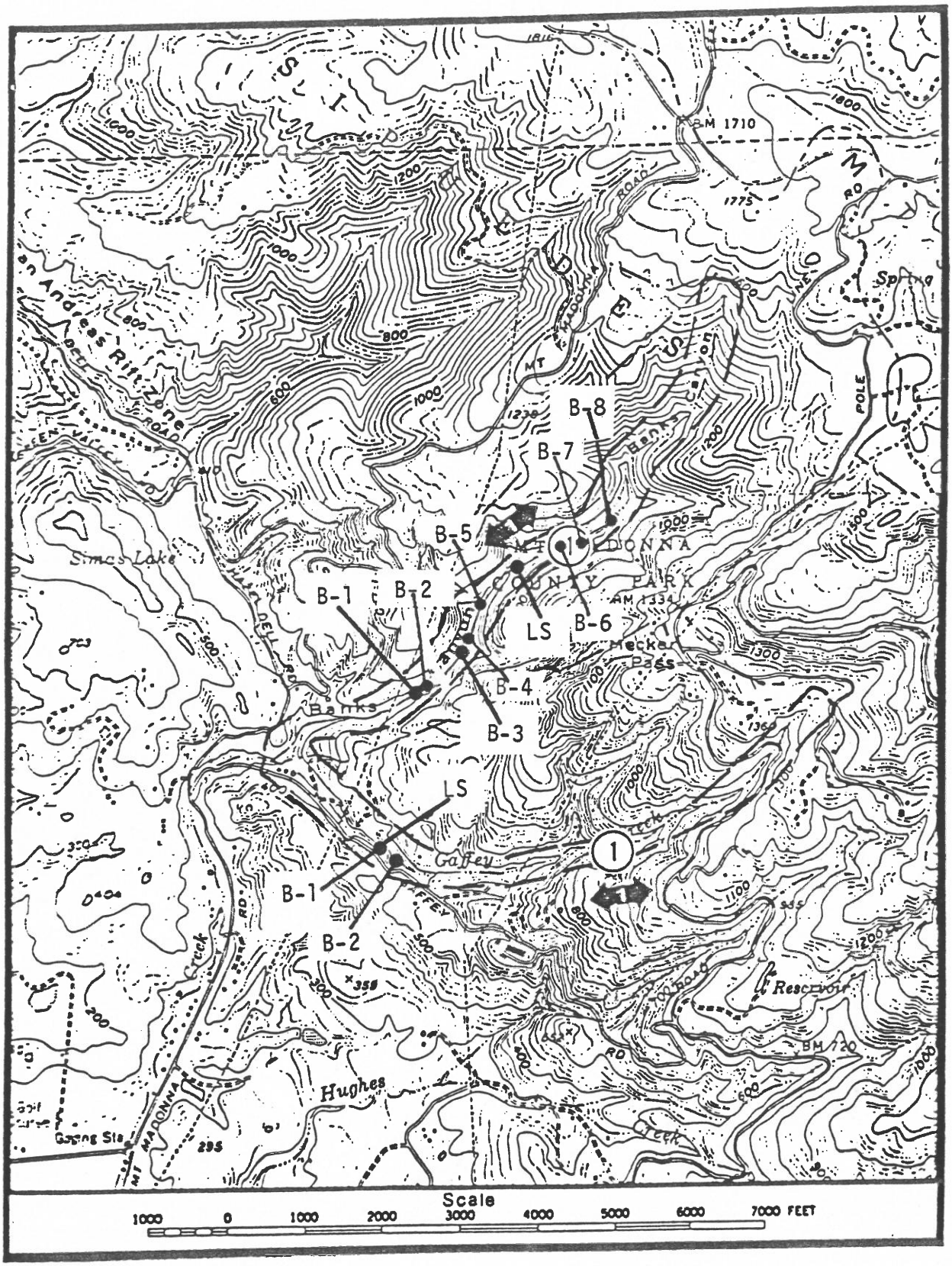


PLATE GB-1

Casserly Creek

WATSONVILLE EAST QUADRANGLE

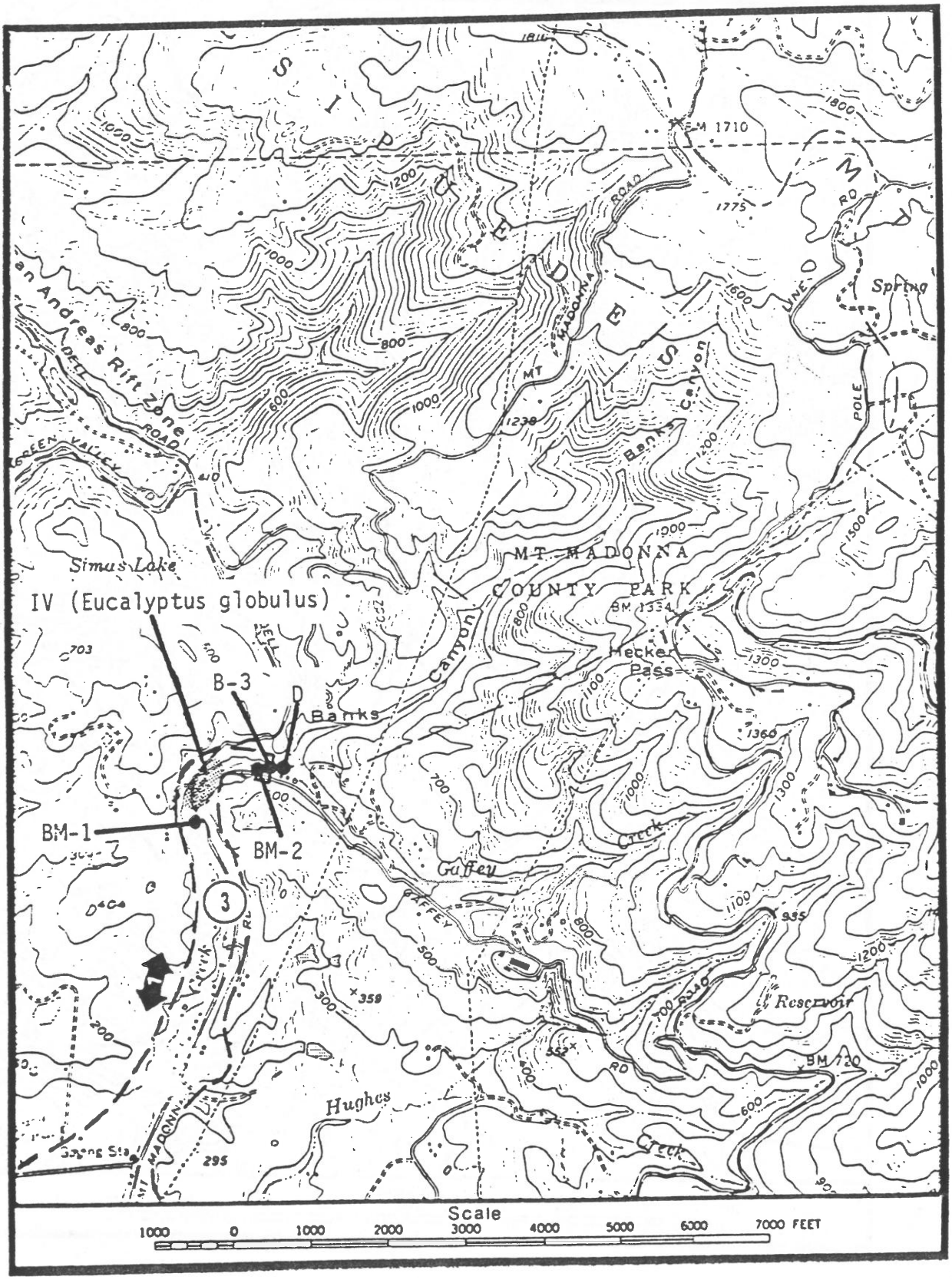


PLATE CC-2

Casserly Creek

WATSONVILLE EAST QUADRANGLE

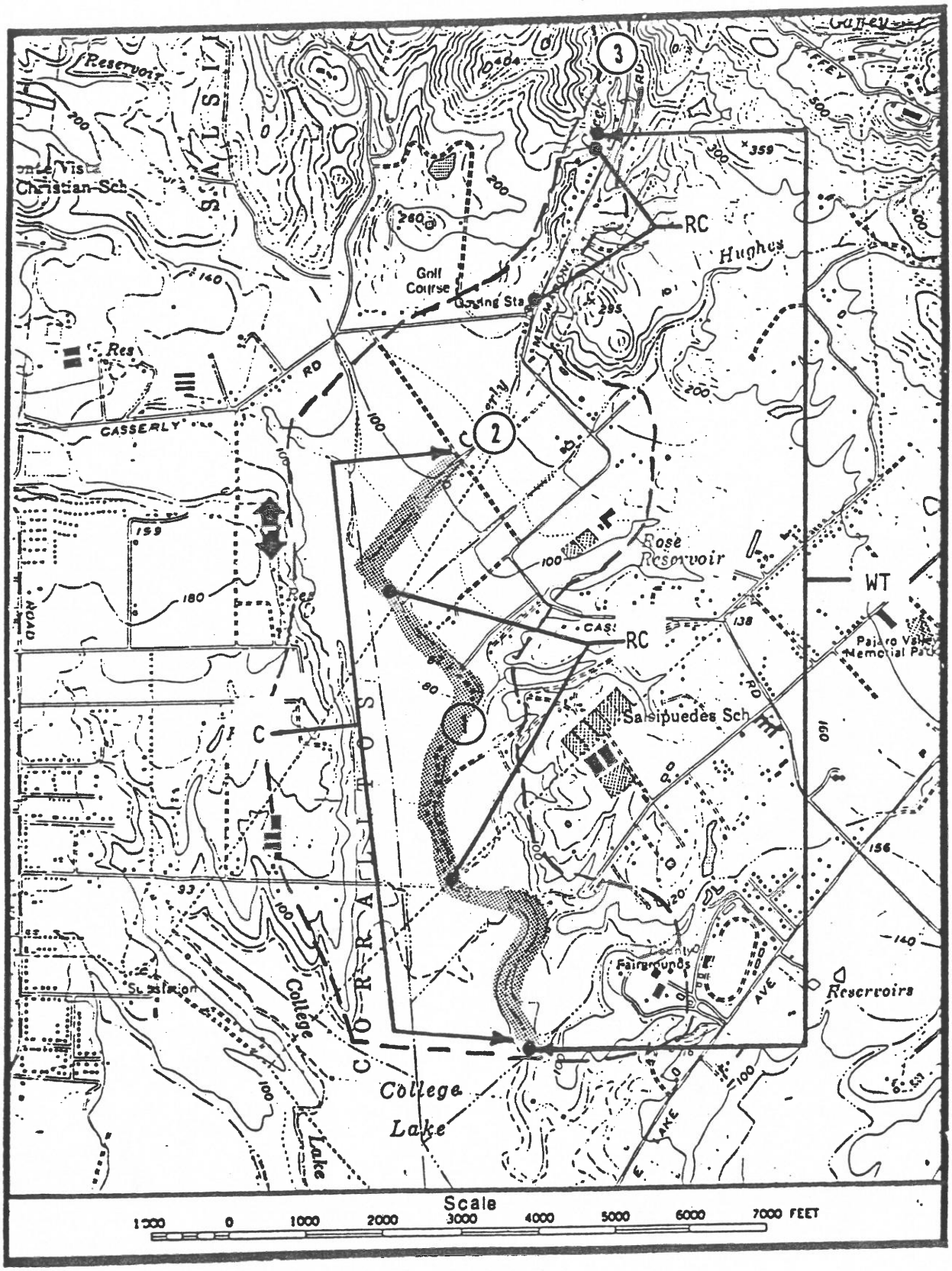


PLATE CC-1

College Lake

WATSONVILLE WEST QUADRANGLE

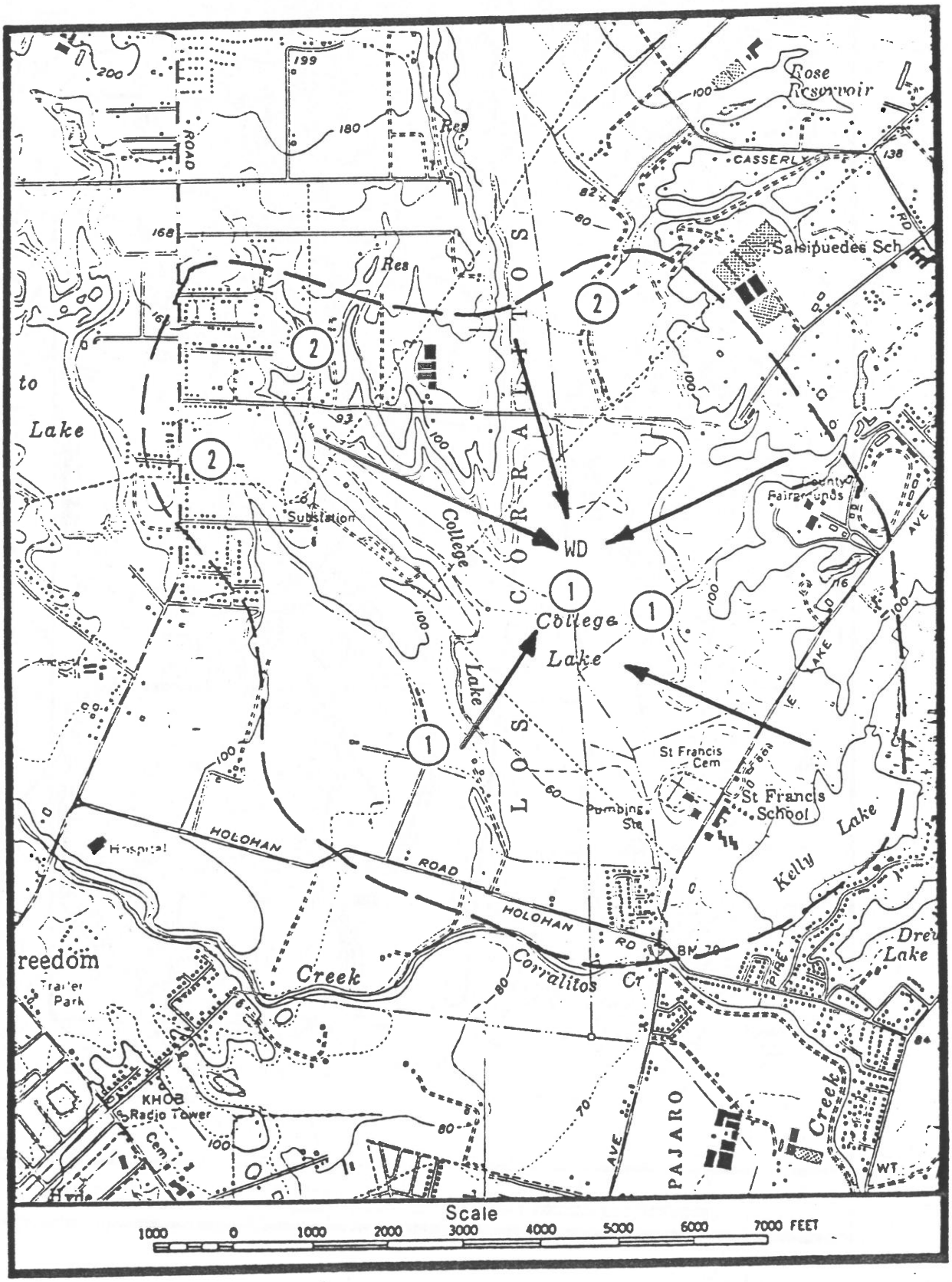


PLATE CL-1

Browns Creek

LOMA PRIETA QUADRANGLE

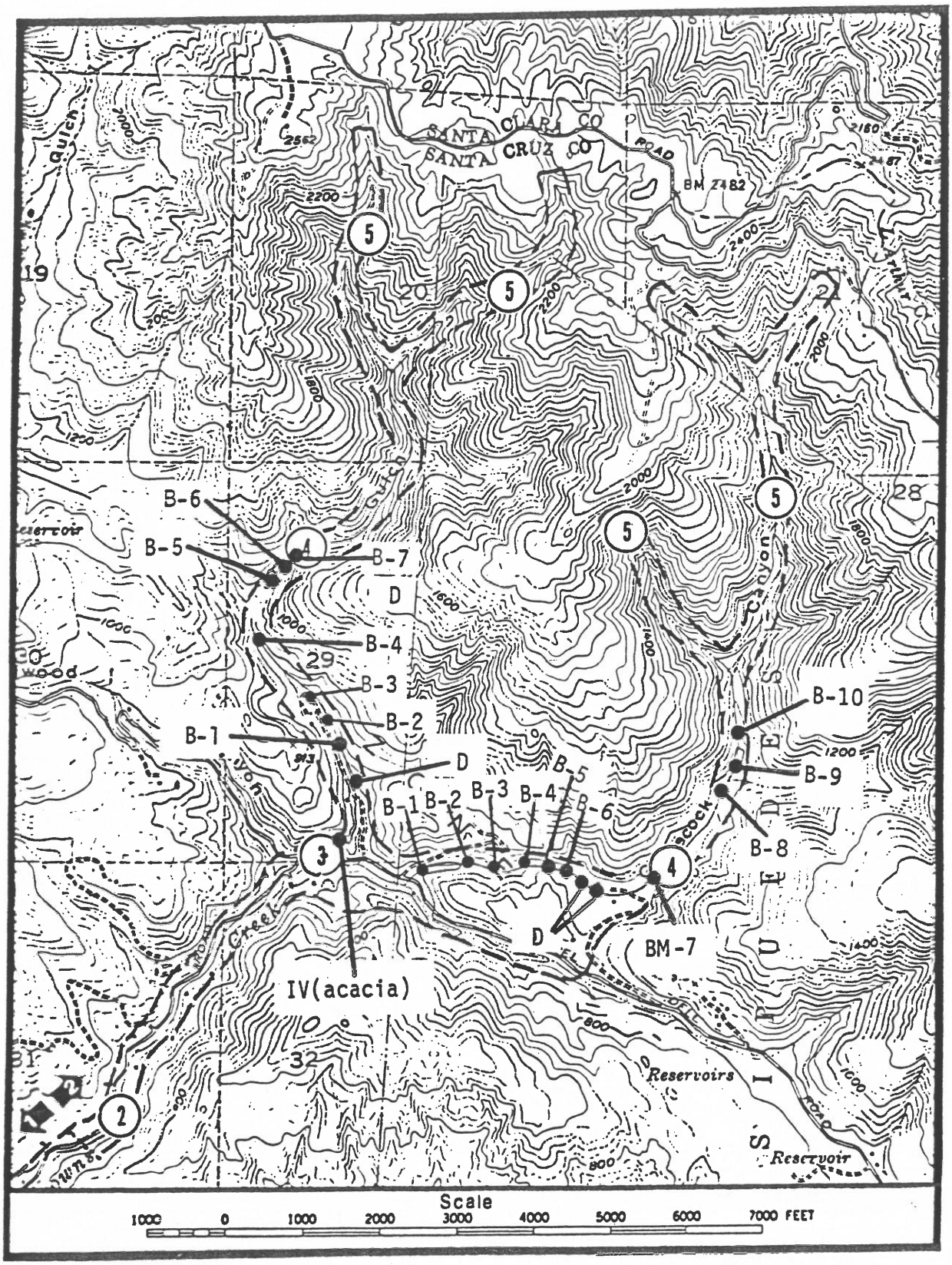


PLATE BR-3

Browns Creek

LOMA PRIETA QUADRANGLE

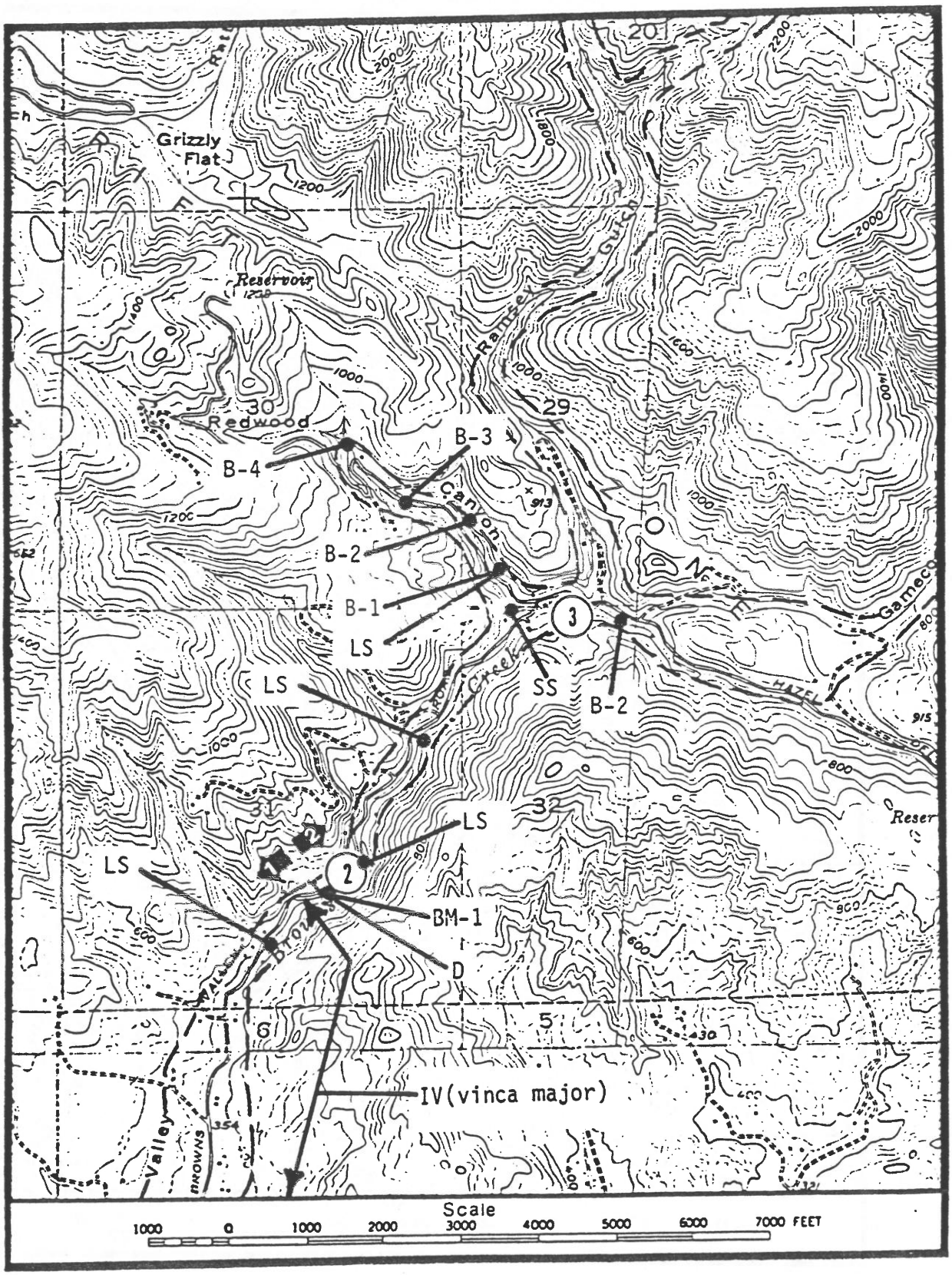


PLATE BR-2

Browns Creek

WATSONVILLE WEST QUADRANGLE

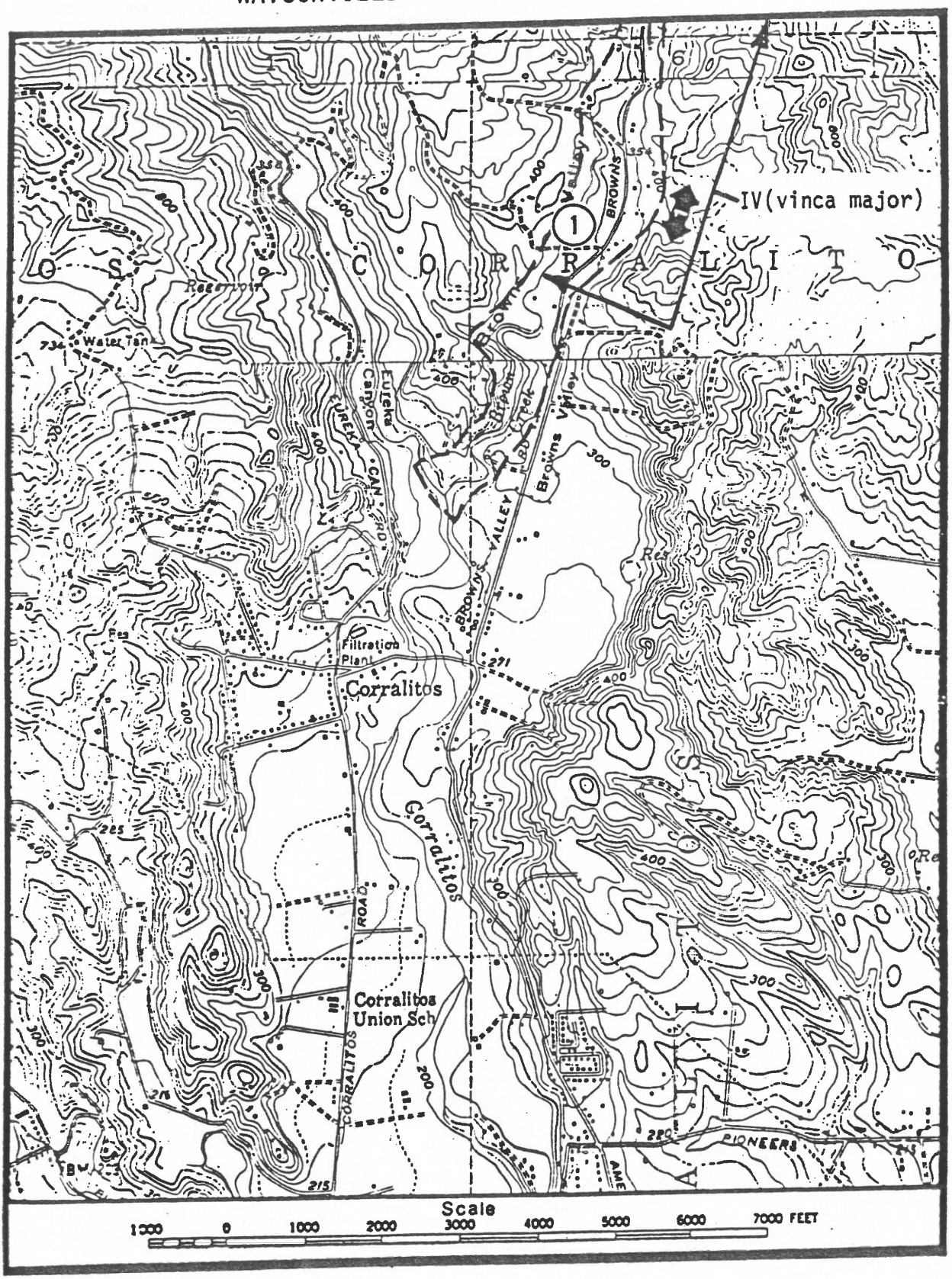


PLATE BR-1

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

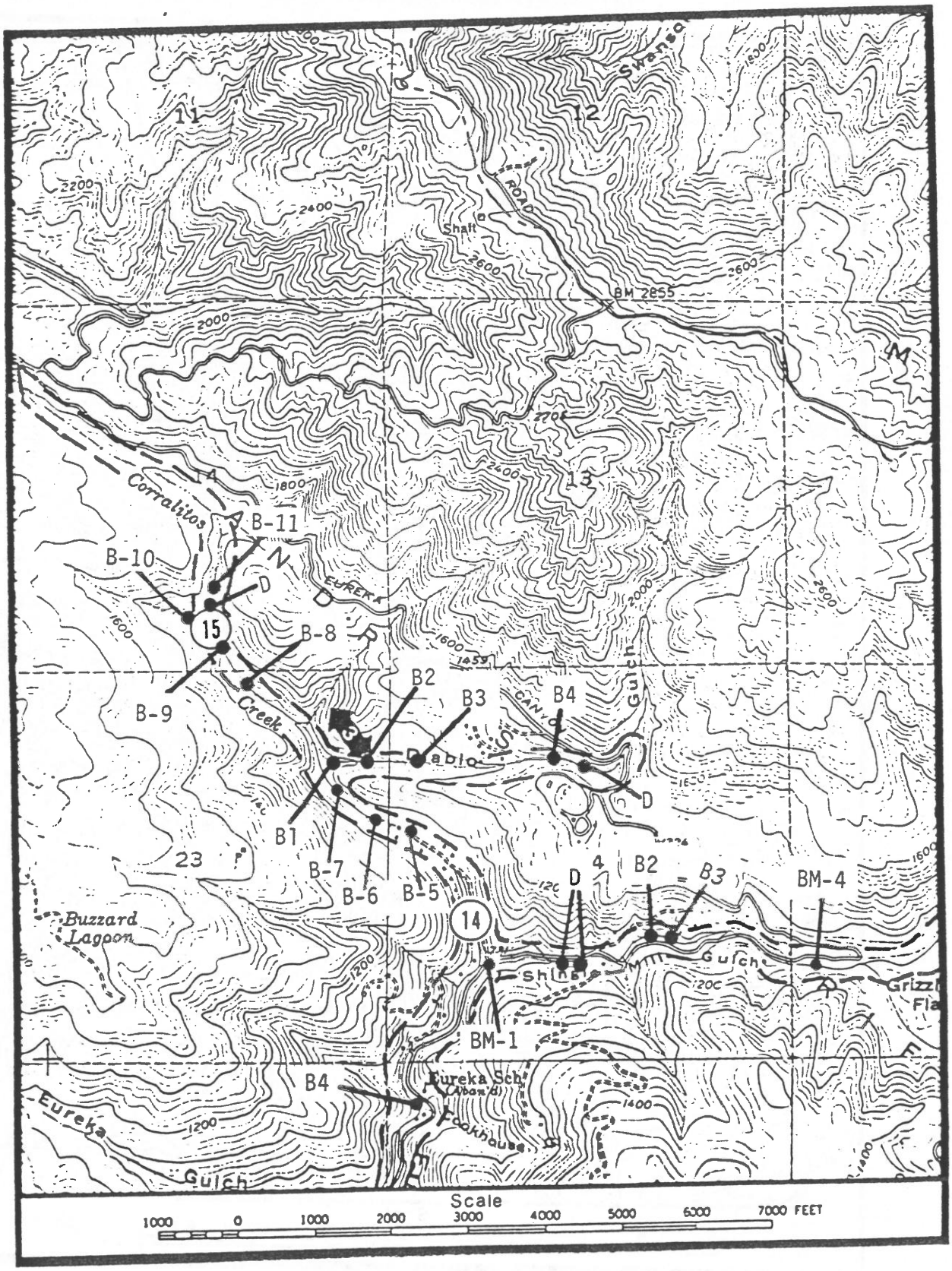


Plate SC-6

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

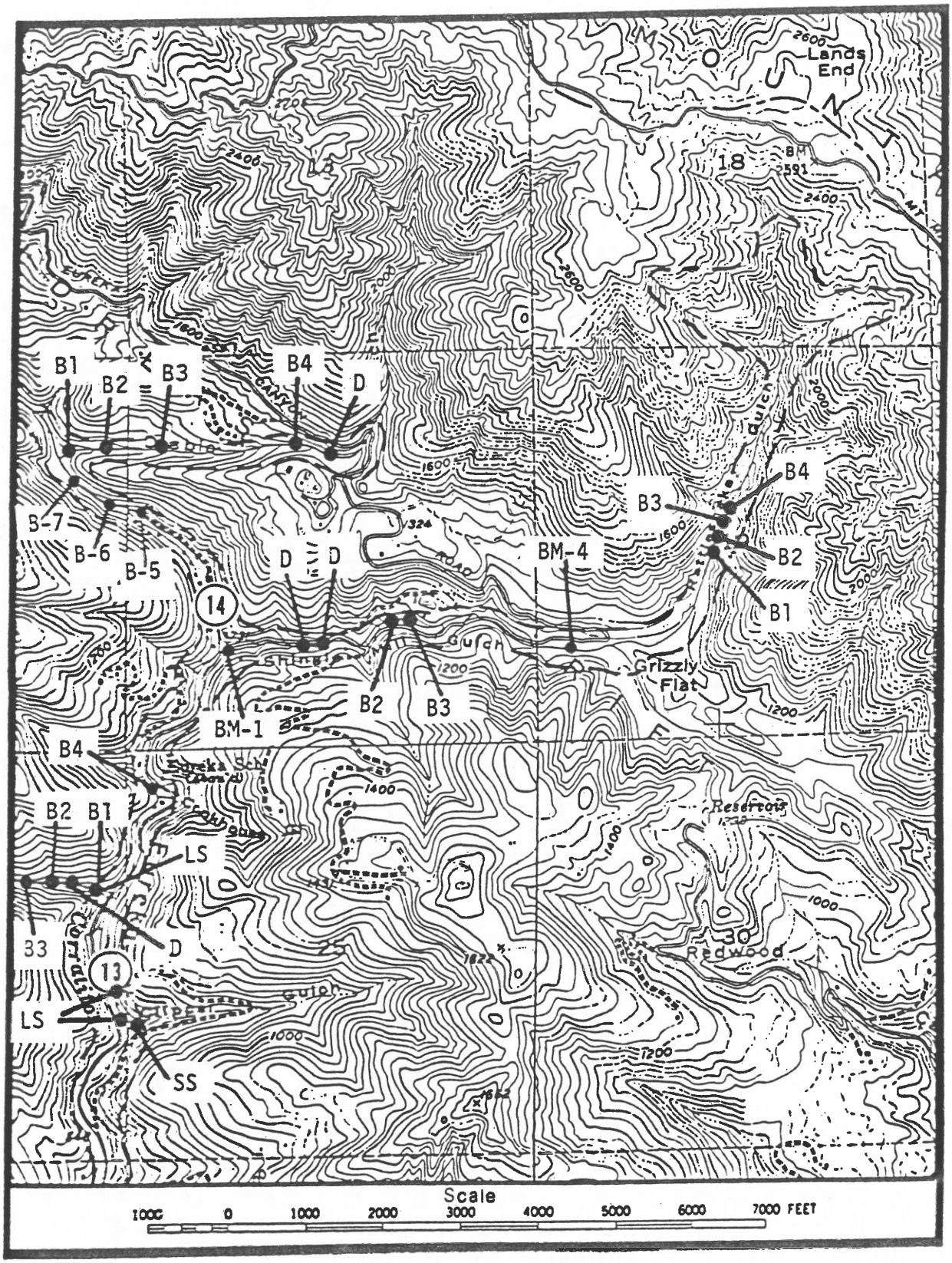


Plate SC-5

Salsipuedes / Corralitos Creek

Loma Prieta Quadrangle

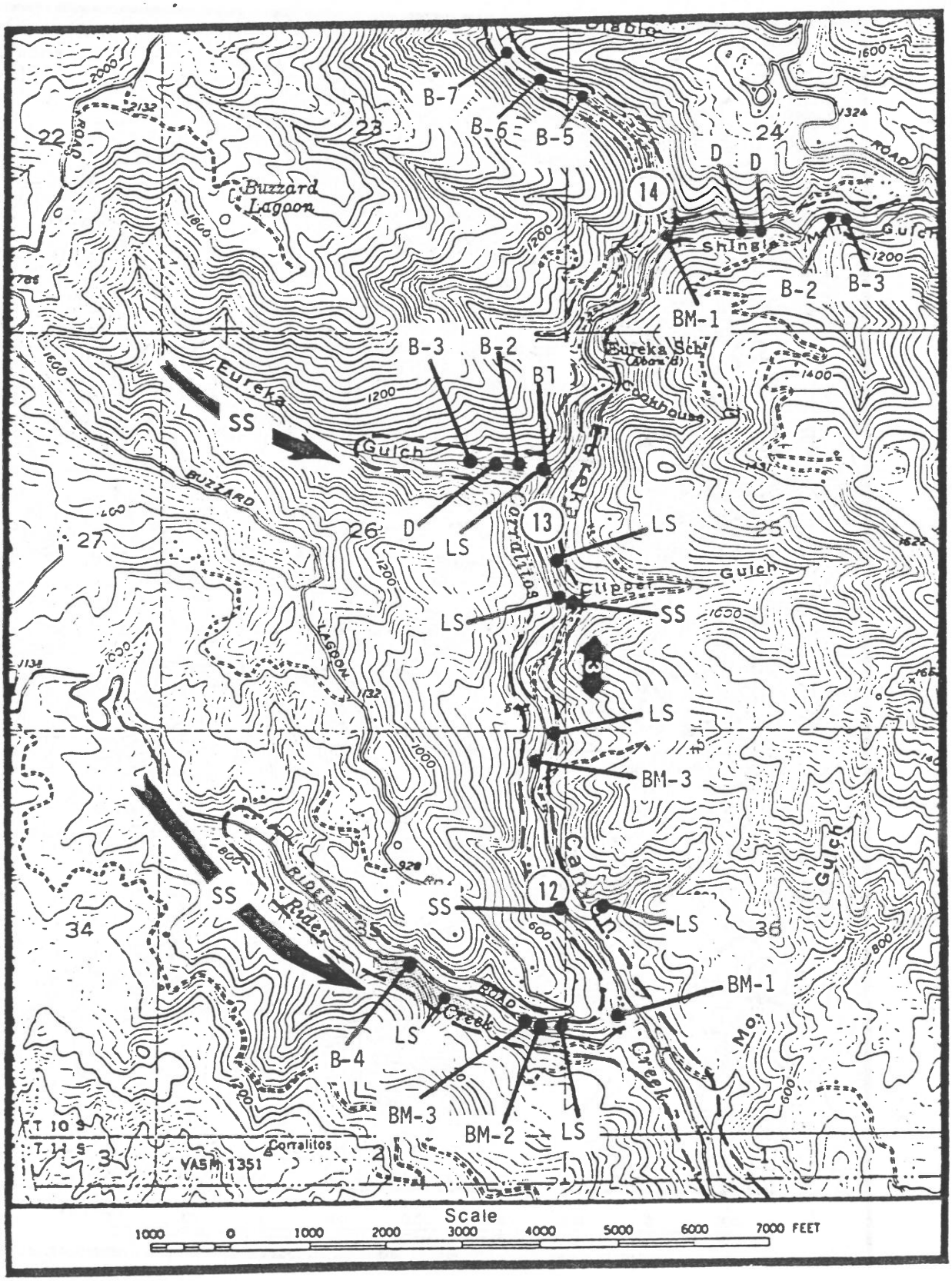


Plate SC-4

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

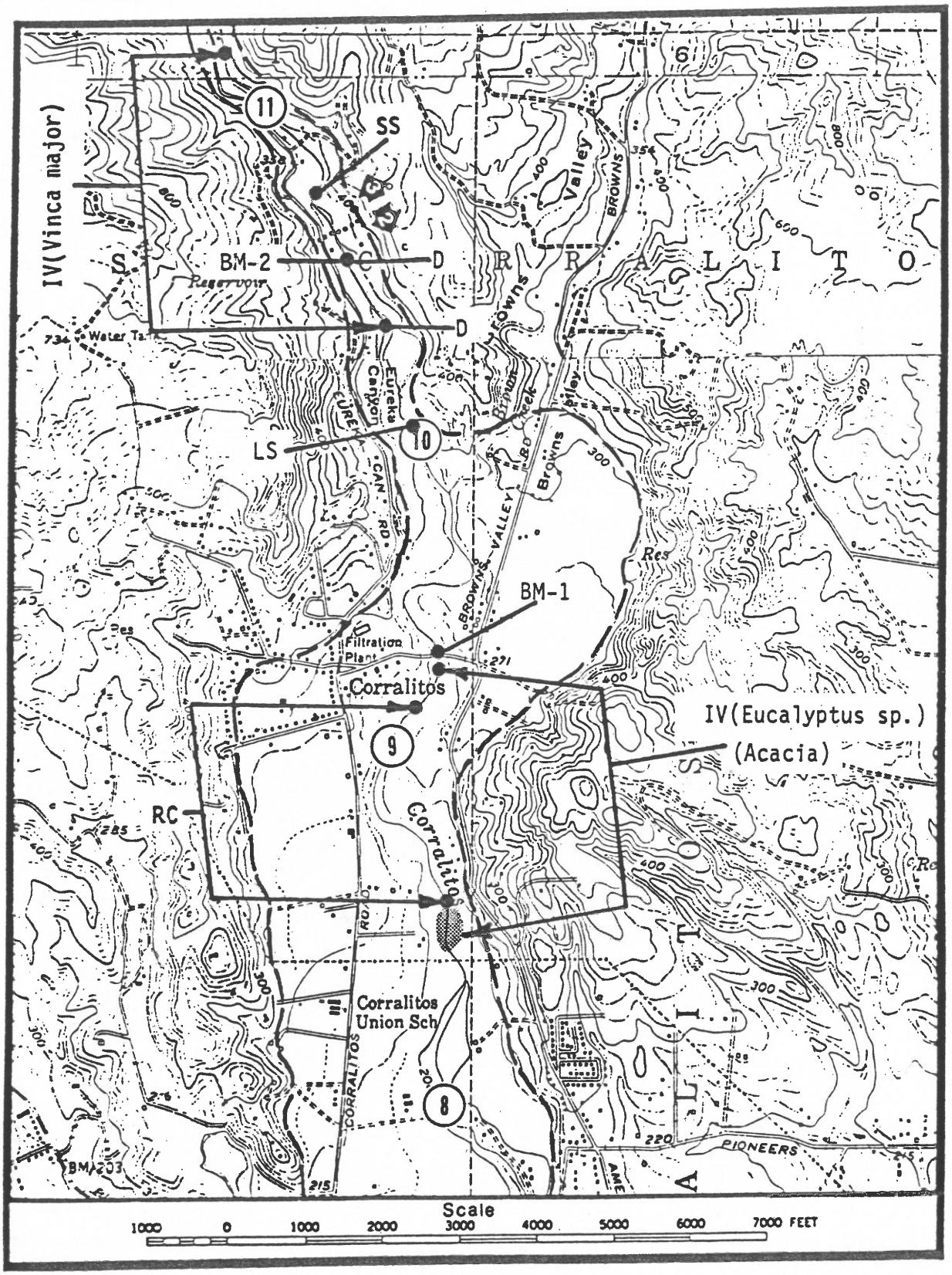


PLATE SC-3

Salsipuedes / Corralitos Creek

WATSONVILLE WEST QUADRANGLE

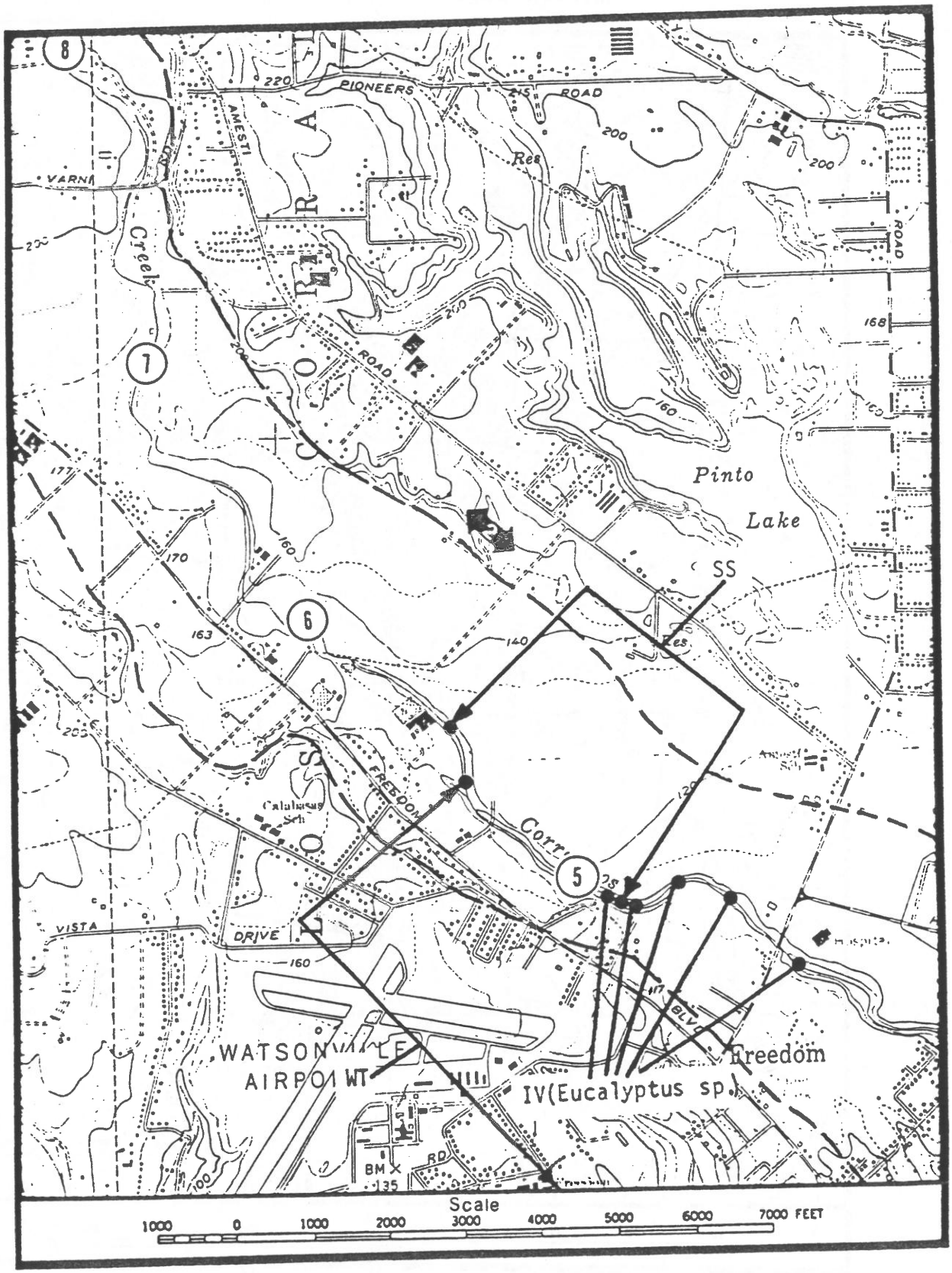


PLATE SC-2

Salsipuedes / Corralitos Creek

WATSONVILLE EAST / WEST QUADRANGLE

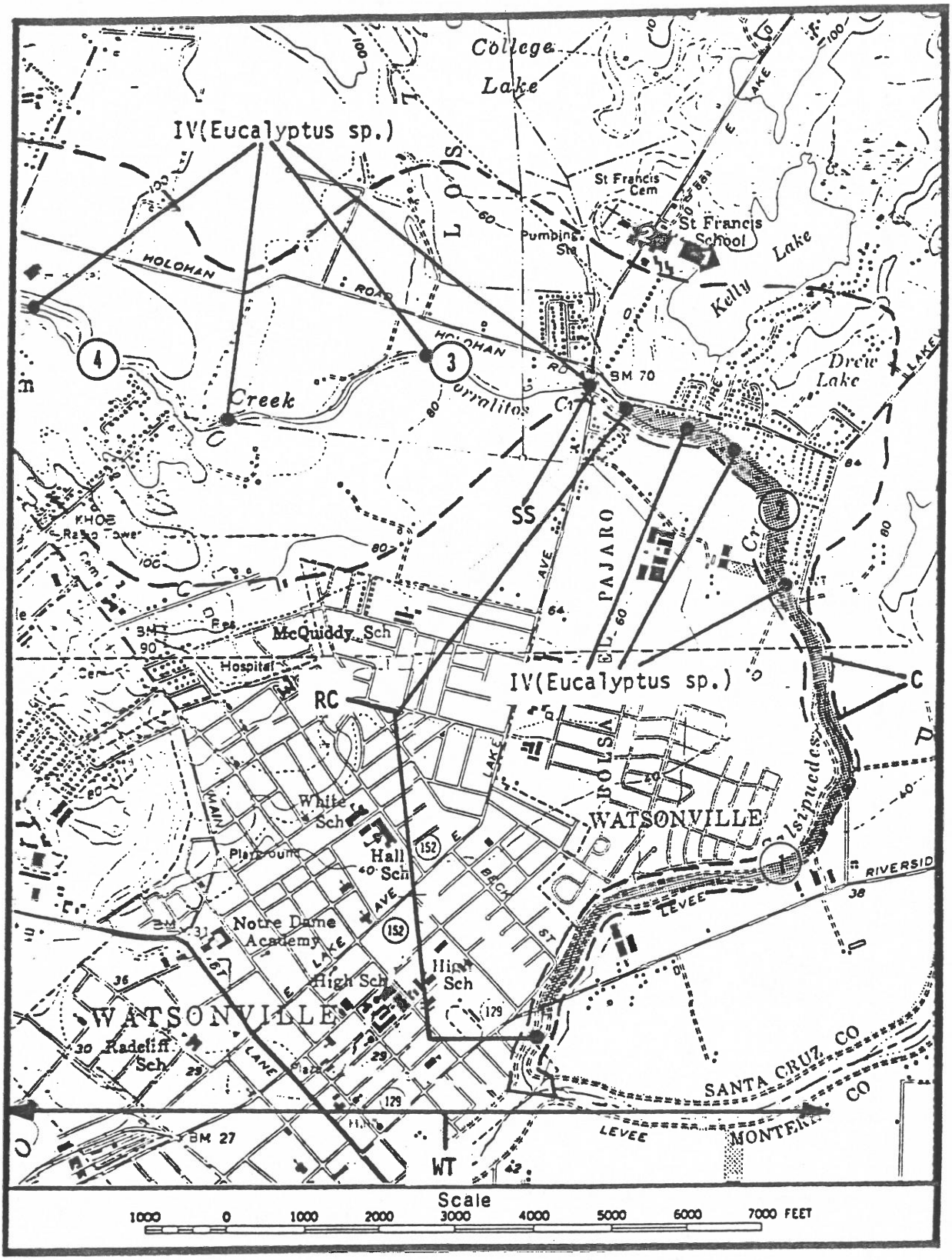


PLATE SC-1

Pajaro River

San Felipe Quadrangle

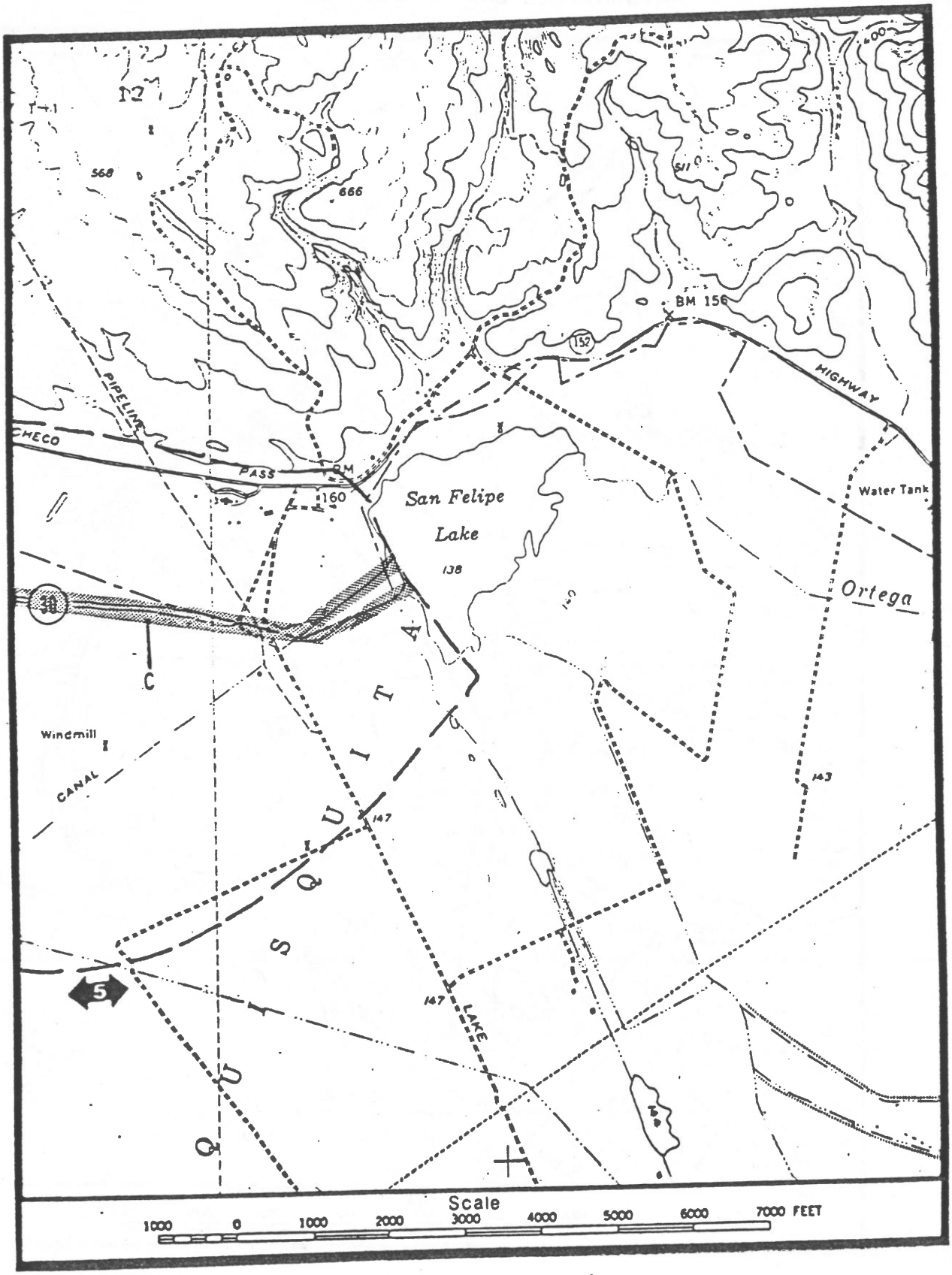


Plate PR-11

BARRIERS

STREAM: ARROYO DOS PICACHOS
OBSERVER: Smith SECTION: Mouth to Lone Tree Road

LOCATION: Immediately downstream from Fallon Road
ID #: BM1 TYPE OF BARRIER: Flashboard dam

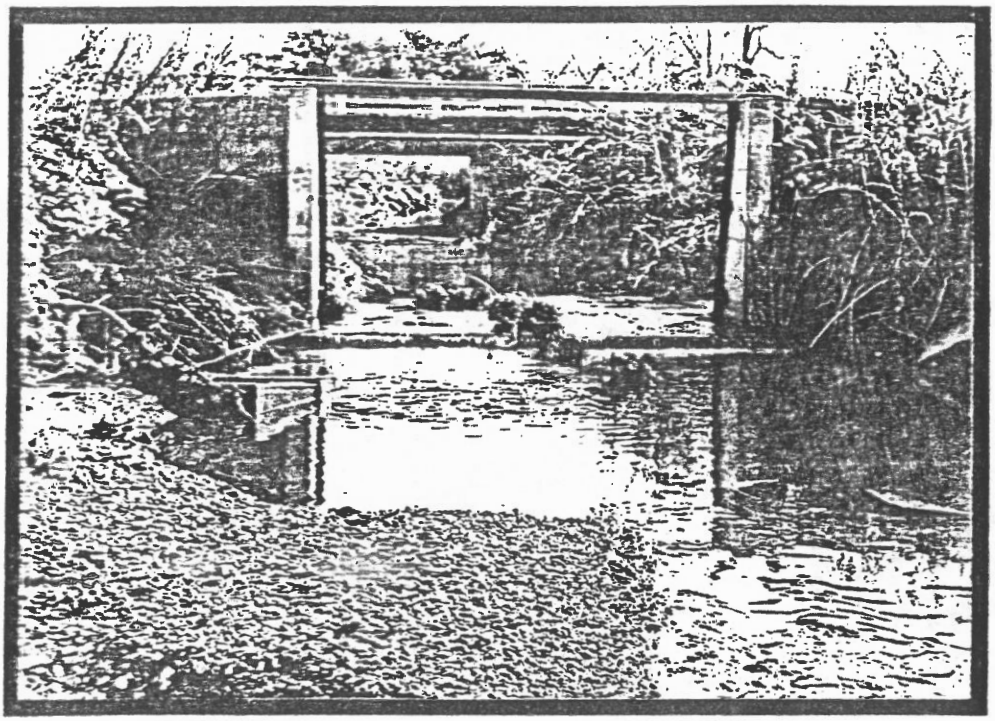
OWNER:
PURPOSE AND OPERATION: Seasonal dam - not in use in winter.

DESCRIPTION (type, height, pool development, permanence, etc): Concrete base with 6' hinged frame. Base only 6-8" above the stream.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not in use in winter.

Estimated flow volume or conditions required for downstream passage:

COMMENTS:



13 JAN 82

1 CFS

BARRIERS

STREAM: ARROYO DOS PICACHOS
OBSERVER: Smith SECTION: Mouth to Lone Tree Road

LOCATION: 0.2 miles below Lone Tree Road Crossing
ID #: BM2 TYPE OF BARRIER: Flashboard dam

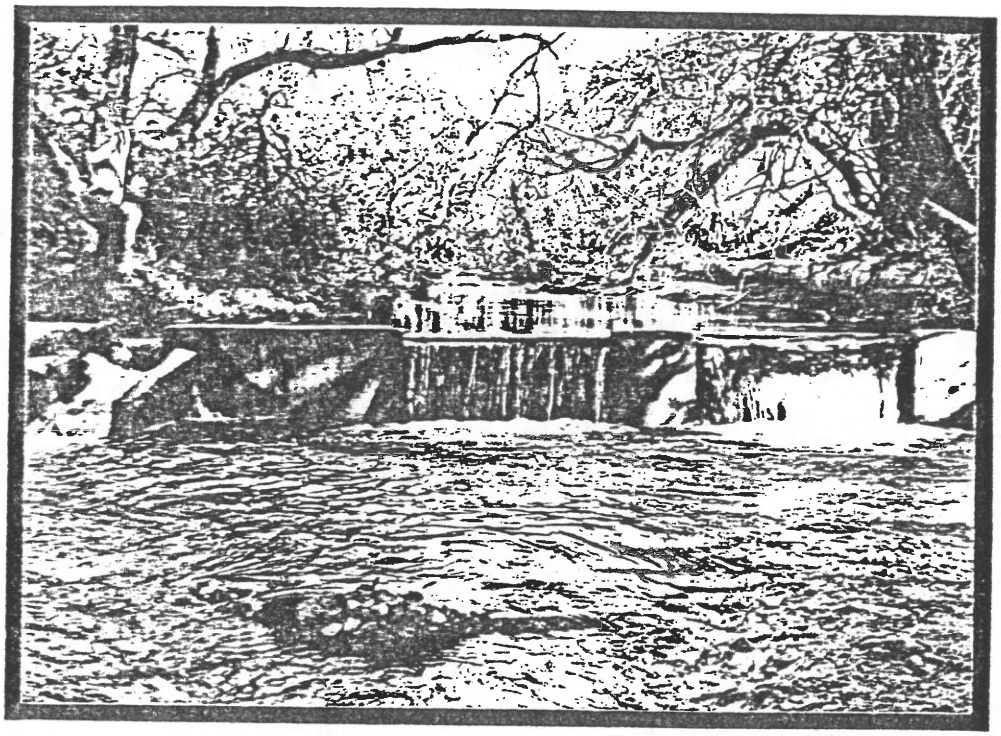
OWNER:
PURPOSE AND OPERATION: No pool behind it - silted in.

DESCRIPTION (type, height, pool development, permanence, etc):
2' high with a good pool beneath (2 to 3 1/2' deep).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 2-3 cfs with easy passage. There is no barrier at winter flows. At least 4-5 cfs required to pass riffles at and above Fairview Road.

Estimated flow volume or conditions required for downstream passage: No barrier.

COMMENTS: Near downstream limit of perennial flow - provides summer refuge pool.



13 JAN 82

5 CFS

BARRIERS

STREAM: ARROYO DOS PICACHOS
OBSERVER: Turner, Logan SECTION: 0.2 miles below Lone Tree Road upstream 1 mile

LOCATION: 1/2 mile above Lone Tree Road
ID #: BM-3 TYPE OF BARRIER: Concrete Dam

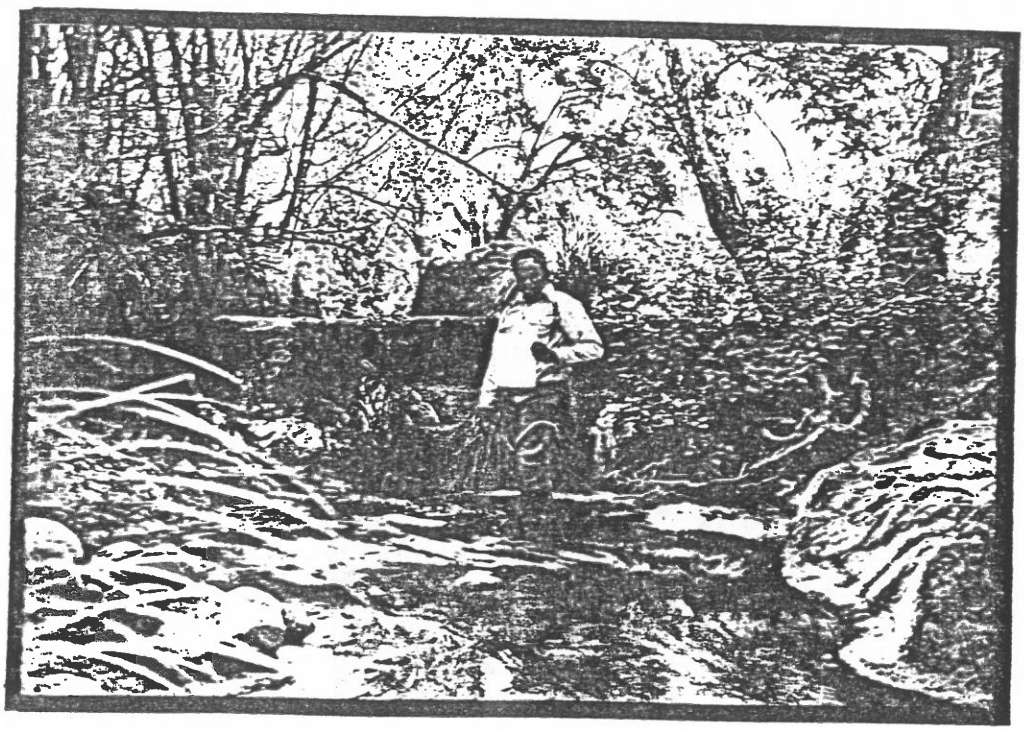
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 20 ft. long, 4 ft. in height. Open at one end to allow flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 2 cfs.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: Only a low-flow barrier.



8 JUL 82

BARRIERS

STREAM: ARROYO DOS PICACHOS
OBSERVER: Turner, Logan SECTION: 1 Mile Above Lone Tree Road upstream to mile 2.5

LOCATION: 0.1 miles above Lone Tree Creek
ID #: B4 TYPE OF BARRIER: Bedrock/falls

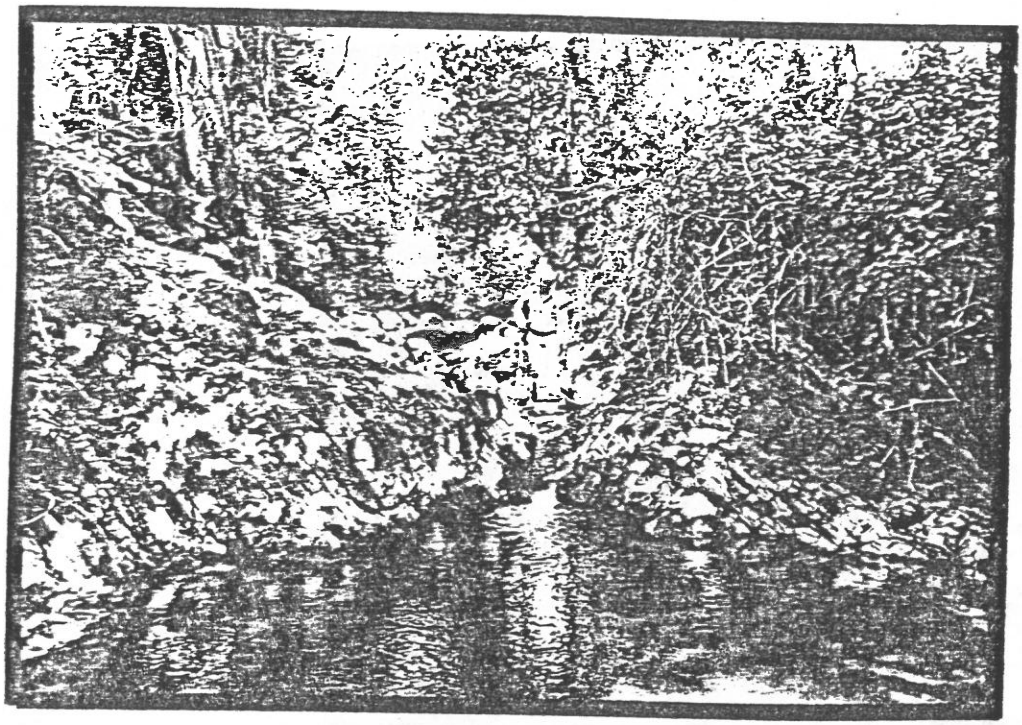
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4 feet in height, 1 foot wide. 80° slope. Pool at base is 10'x20'x5'. Bedrock.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 2 1/2 cfs.

Estimated flow volume or conditions required for downstream passage: 3/4 cfs.

COMMENTS: Only a low flow barrier.



8 JUL 82

BARRIERS

STREAM: ARROYO DOS PICACHOS
OBSERVER: Turner, Logan SECTION: 1 mile above Lone Tree Road upstream to mile 2.5

LOCATION: 2 1/2 miles above Lone Tree Road crossing
ID #: B5 TYPE OF BARRIER: Falls

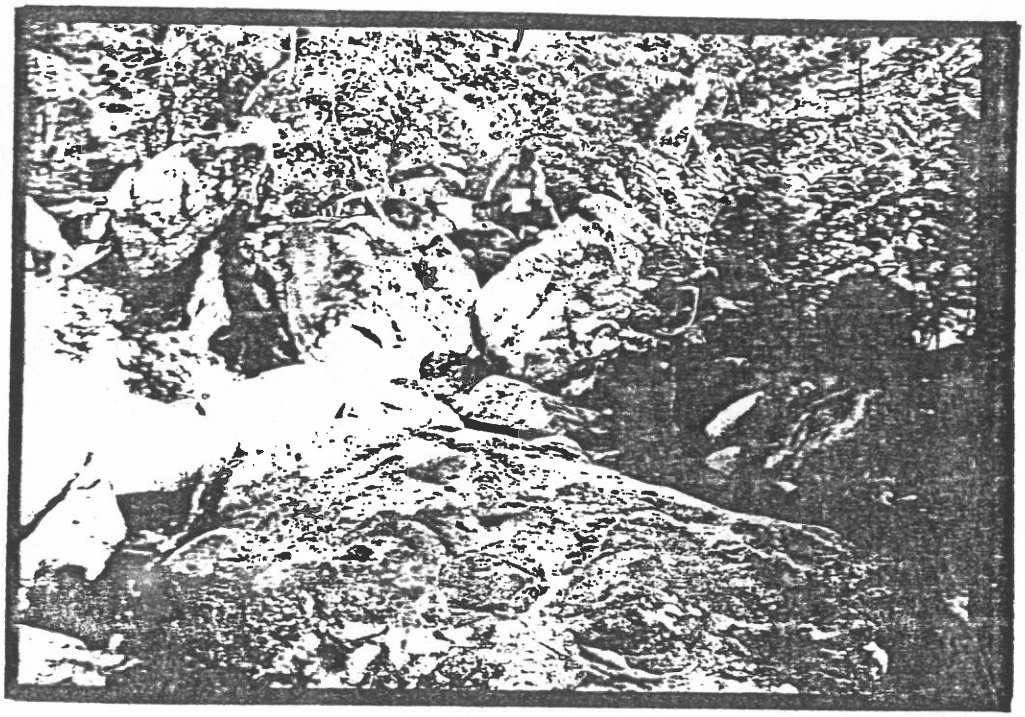
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Many-tiered falls totalling 10 ft. in height. 1 foot in width. No jumping pool at base. Resting pools very small. Bedrock and boulders.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably total barrier.

Estimated flow volume or conditions required for downstream passage: 3/4 cfs.

COMMENTS: No fish seen above; gradient becomes very steep.



8 JUL 82

BARRIERS

STREAM: ARROYO DE LAS VIBORAS
OBSERVER: Smith SECTION: Mouth to beginning of perennial flow

LOCATION: Immediately downstream of Fairview Road
ID #: BM1 TYPE OF BARRIER: Concrete base for flashboard dam

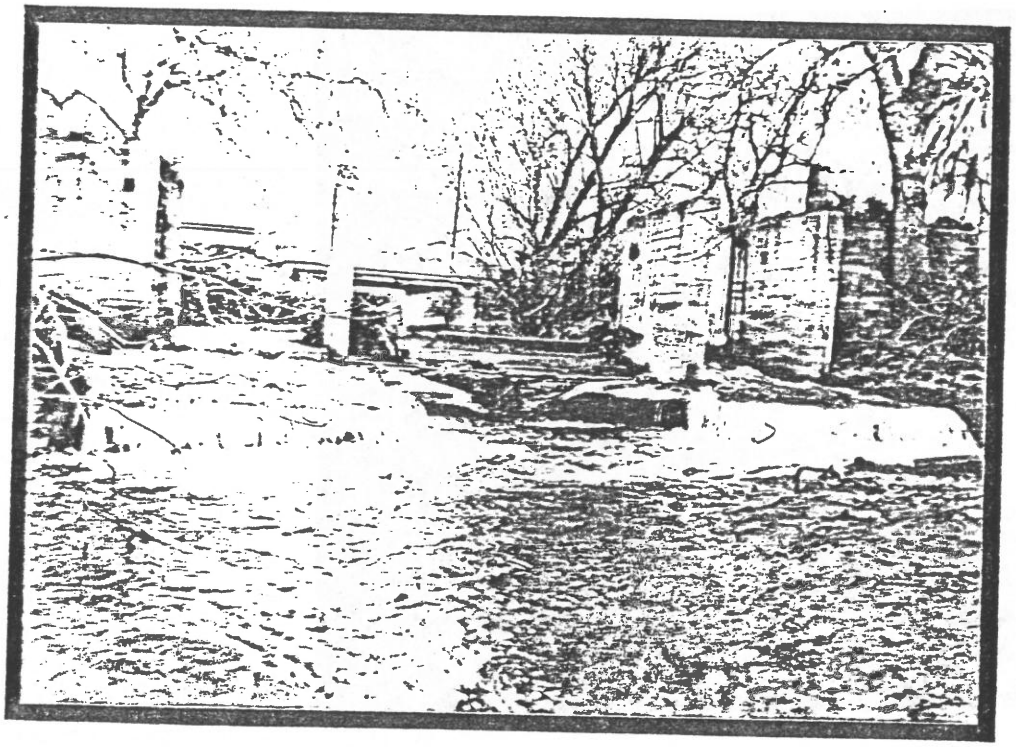
OWNER:
PURPOSE AND OPERATION: Diversion for agriculture. Former bridge.

DESCRIPTION (type, height, pool development, permanence, etc): Base blocks migration at low flows. North side lip 1 1/2' high. Pool below is 1 1/2-2' deep - easiest passage. South side lip has shallower pool - more difficult passage. Height and pool depth vary with stream bed transport and pool cutting.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 3-5 cfs allows passage on north side.

Estimated flow volume or conditions required for downstream passage: 1 cfs if left open.

COMMENTS: May be modified in spring to divert entire flow, but would then hinder down-migration success.



27 JAN 82

6 CFS

BARRIERS

STREAM: ARROYO DE LAS VIBORAS
OBSERVER: Smith SECTION: Mouth to beginning of perennial flow

LOCATION: 0.6 miles above Fairview Road
ID #: BM2 TYPE OF BARRIER: Concrete road ford

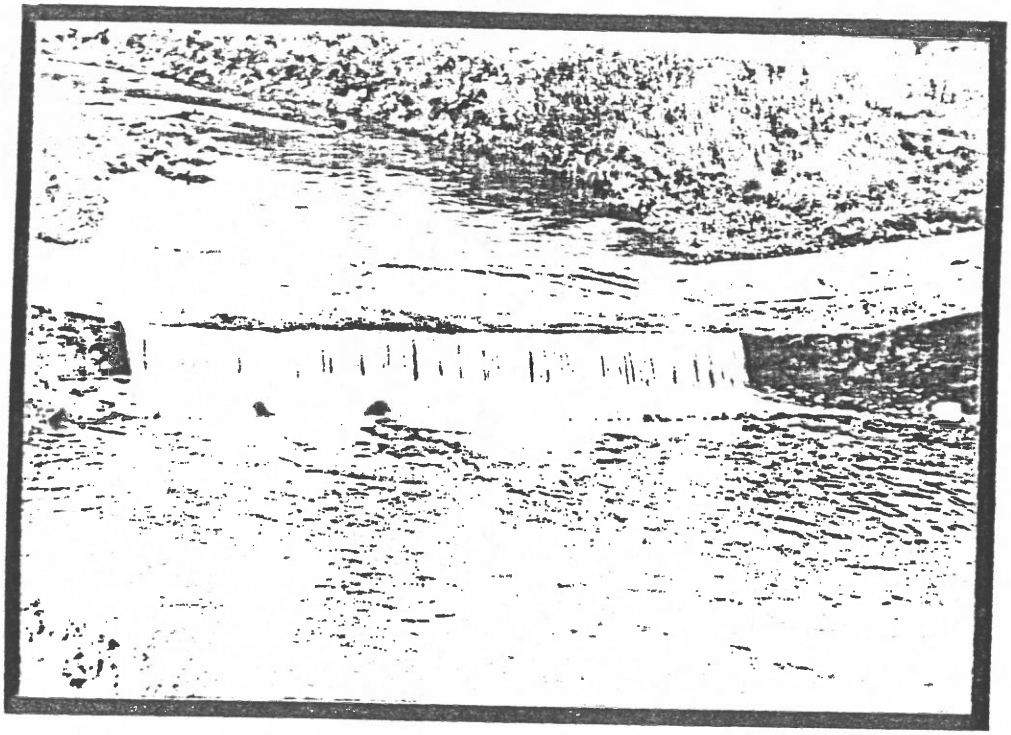
OWNER:
PURPOSE AND OPERATION: Ford.

DESCRIPTION (type, height, pool development, permanence, etc): 2' high. Ledge below is 1' deep and restricts jumping. Good, deep holding pool downstream.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 6 cfs to raise pool level and provide flow across apron.

Estimated flow volume or conditions required for downstream passage: 1/2-1 cfs.

COMMENTS:



27 JAN 82

6^{+} CFS

BARRIERS

STREAM: ARROYO DE LAS VIBORAS
OBSERVER: Smith SECTION: Mouth to beginning of perennial flow

LOCATION: 0.65 miles upstream of Fairview Road
cD #: BM3 TYPE OF BARRIER: Concrete road crossing

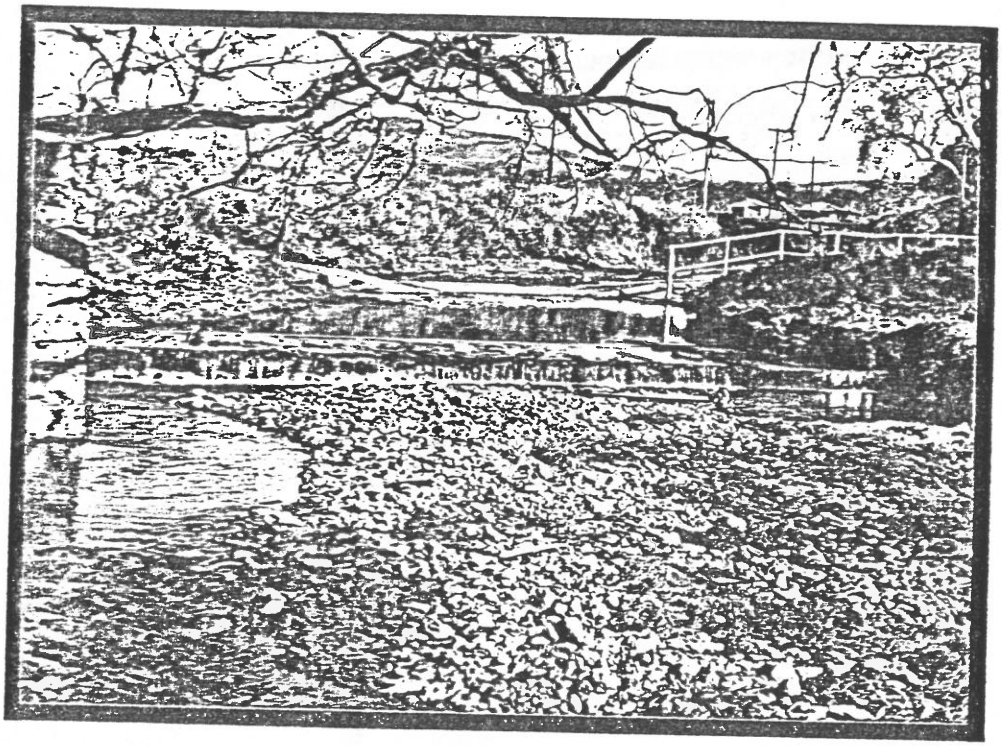
OWNER:
PURPOSE AND OPERATION: Ford.

DESCRIPTION (type, height, pool development, permanence, etc): 15" height, but with no real pool below. 18' wide, 8' long.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 5-10 cfs to raise water level for jump.

Estimated flow volume or conditions required for downstream passage: 1-1 1/2 cfs.

COMMENTS: Another ford immediately (BM4) above is easily passable at 2-3 cfs.



13 JAN 82

2 CFS

BARRIERS

STREAM: ARROYO DE LAS VIBORAS
OBSERVER: Turner, Logan SECTION: 1 mile above Fairview Road upstream to mile 2

LOCATION: 2 miles above mouth
ID #: BM5 TYPE OF BARRIER: Concrete Dam

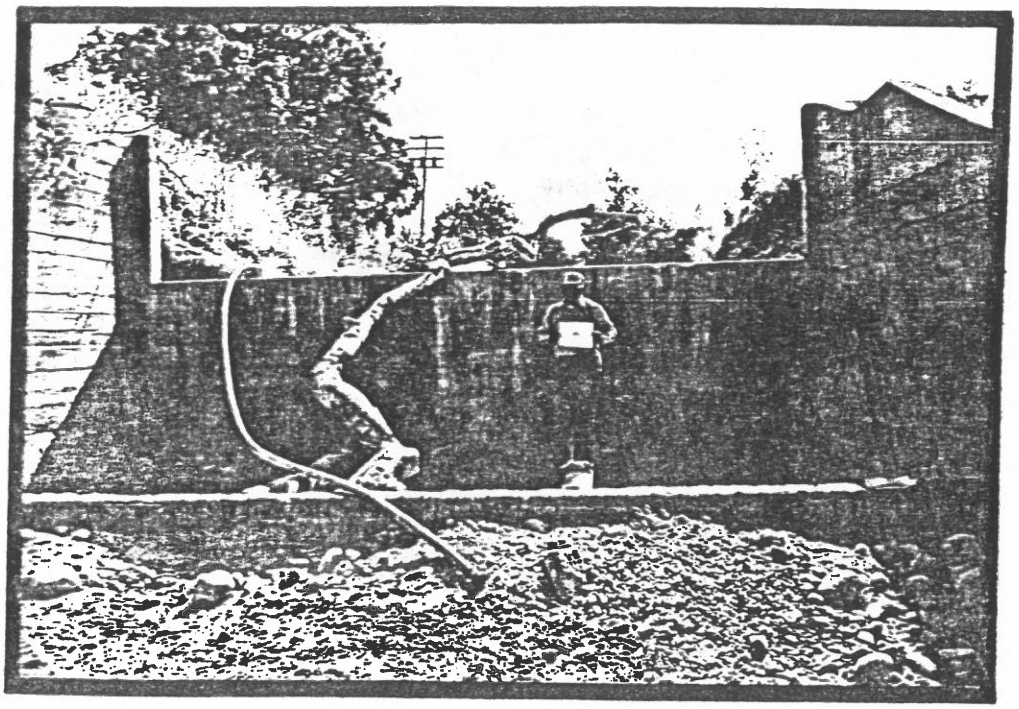
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 30 feet long, 7 feet in height, vertical. Cement pool at base is 15'x30'x1'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passable only at extremely high flows.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Completely silted in above.



9 JUL 82

BARRIERS

STREAM: ARROYO DE LAS VIBORAS
OBSERVER: Turner, Logan SECTION: Mile 2 to mile 4

LOCATION: Mile 2.3
ID #: BM6 TYPE OF BARRIER: Concrete flashboard dam

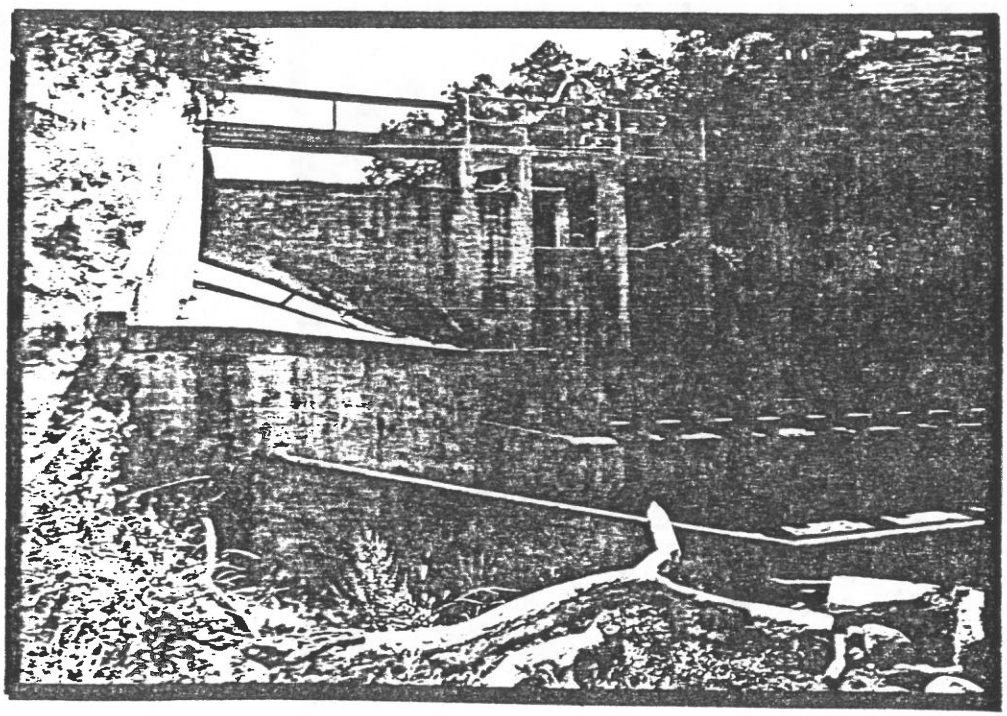
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 60 feet ong, 20 feet in height. Vertical. Concrete pool at base is 1 foot in depth.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Total barrier.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: There is no fishway and flashboards have been silted in and are not easily removable.



9 JUL 82

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Alley, Turner SECTION: From channel mile 0.4 upstream

LOCATION: .42 miles above Casserly confluence
ID #: B1 TYPE OF BARRIER: Log jam

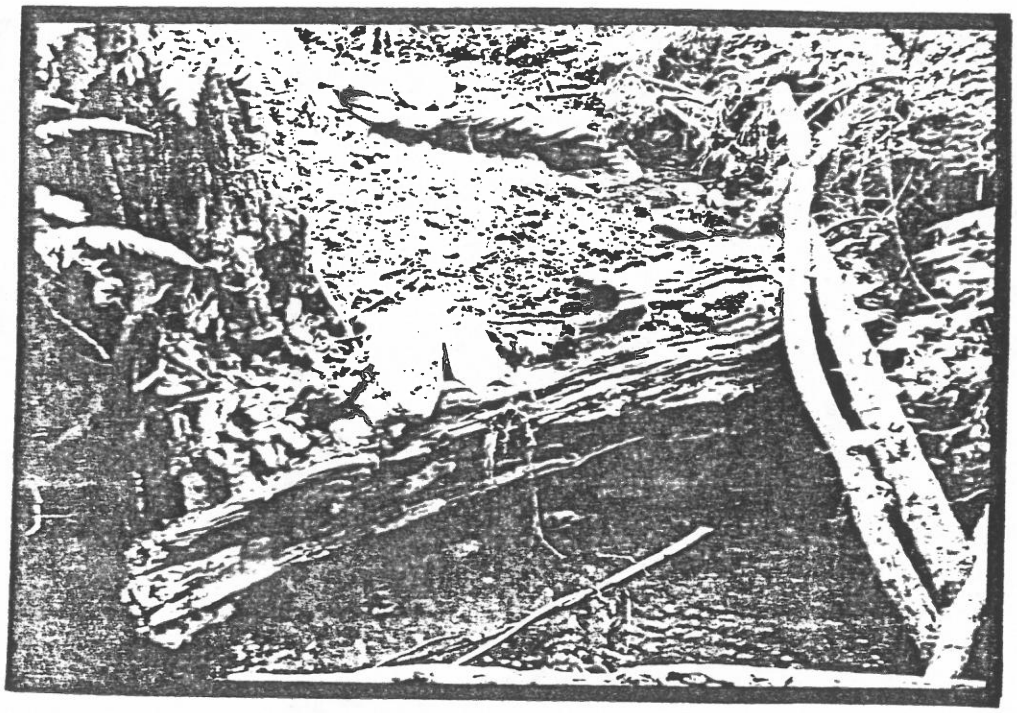
OWNER: Santa Clara County - Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Redwood log across stream - 2.5' high. The pool averages .8' deep at low flow, with 1 1/2' maximum and is 6' in diameter. Barrier is old and apparently permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5+ cfs.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS:



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: From channel mile 0.4 upstream

LOCATION: .45 miles above Casserly confluence
ID #: B2 TYPE OF BARRIER: Log jam

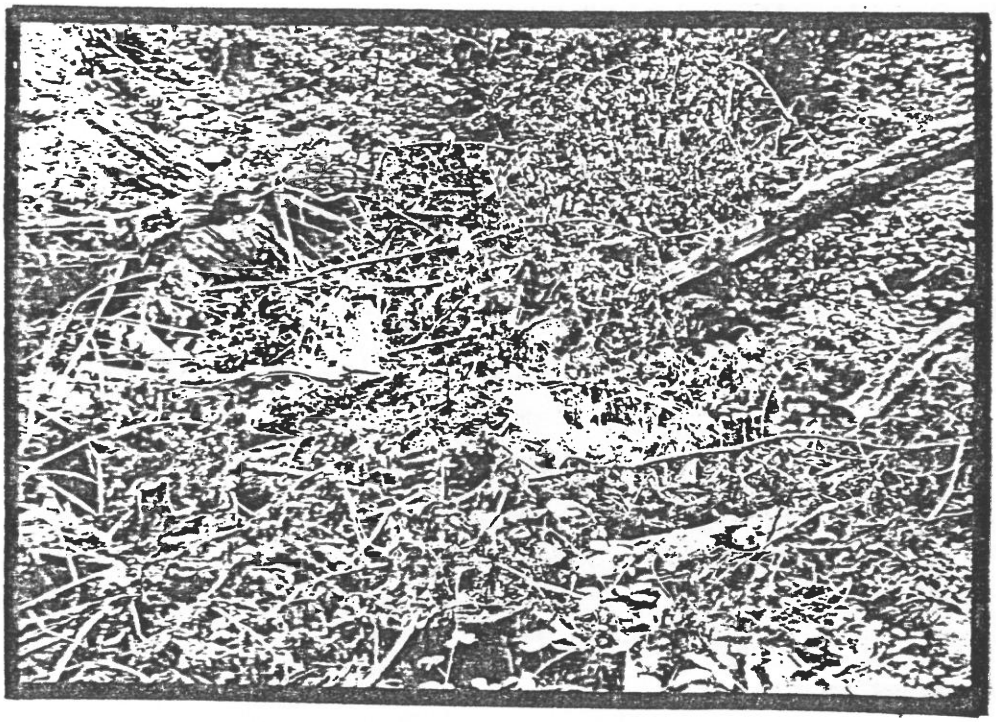
OWNER: Santa Clara County - Mt. Madonna Park.
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Downed redwoods and laurels lying over riffles. 75'x20'x4'. No pool. Log jam is stable.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10+ cfs.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Jam may wash out at 25 cfs.



14 Oct 82

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: From channel mile 0.4 upstream

LOCATION: 0.6 miles from Casserly confluence
ID #: B3 TYPE OF BARRIER: Log jam

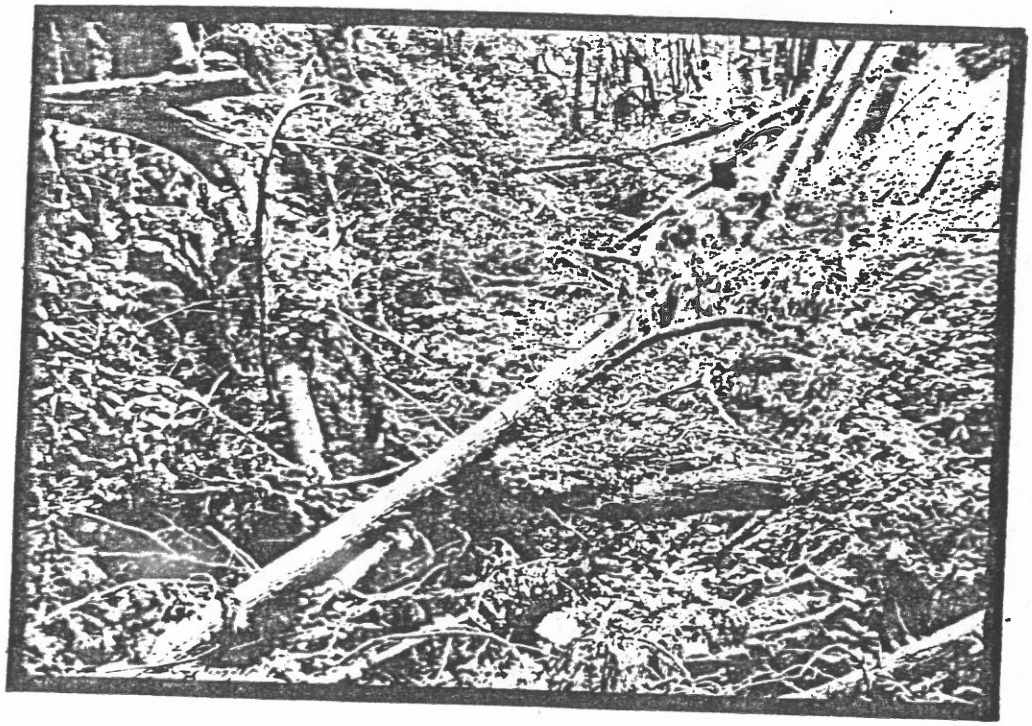
OWNER: Santa Clara County, Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Slide has downed numerous redwoods in a 25 yard stretch which lie over riffles.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably not passable except at extremely high flows (25 cfs).

Estimated flow volume or conditions required for downstream passage: 5 cfs.

COMMENTS:



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: From channel mile 0.4 upstream

LOCATION: 0.65 miles above Casserly confluence
ID #: B4 TYPE OF BARRIER: Log jam and silt

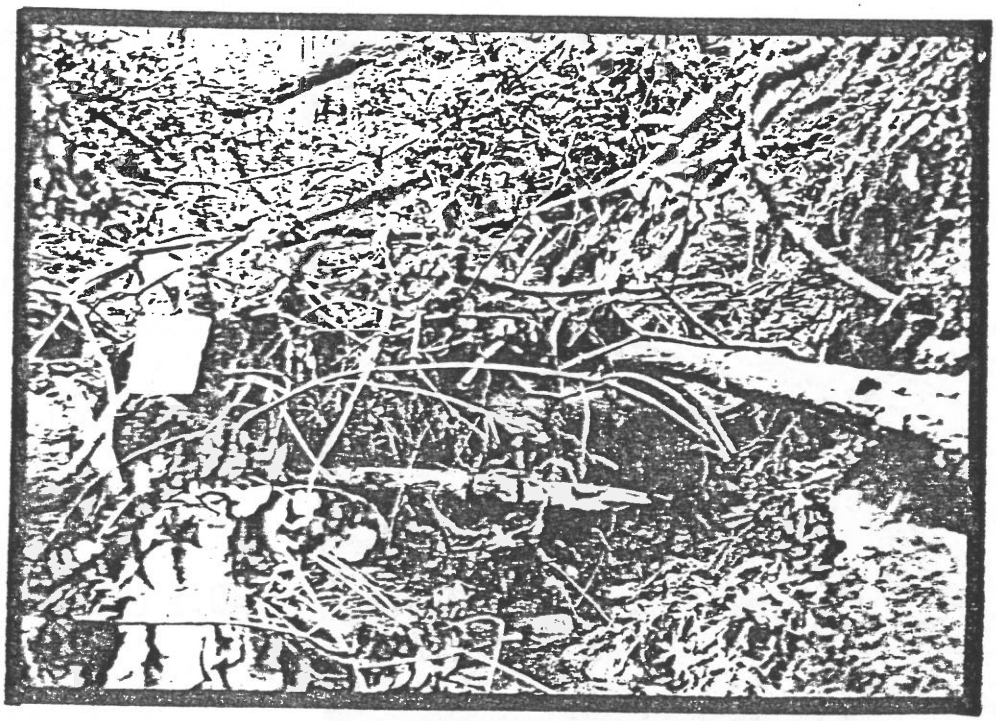
OWNER: Santa Clara Co., Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Logs and debris with silt backed up behind. 3' high and 7' wide. Unstable. No pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Should wash out at 10+ cfs.



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: From channel mile 0.4 upstream

LOCATION: 0.75 miles above Casserly confluence
ID #: B5 TYPE OF BARRIER: Bedrock falls

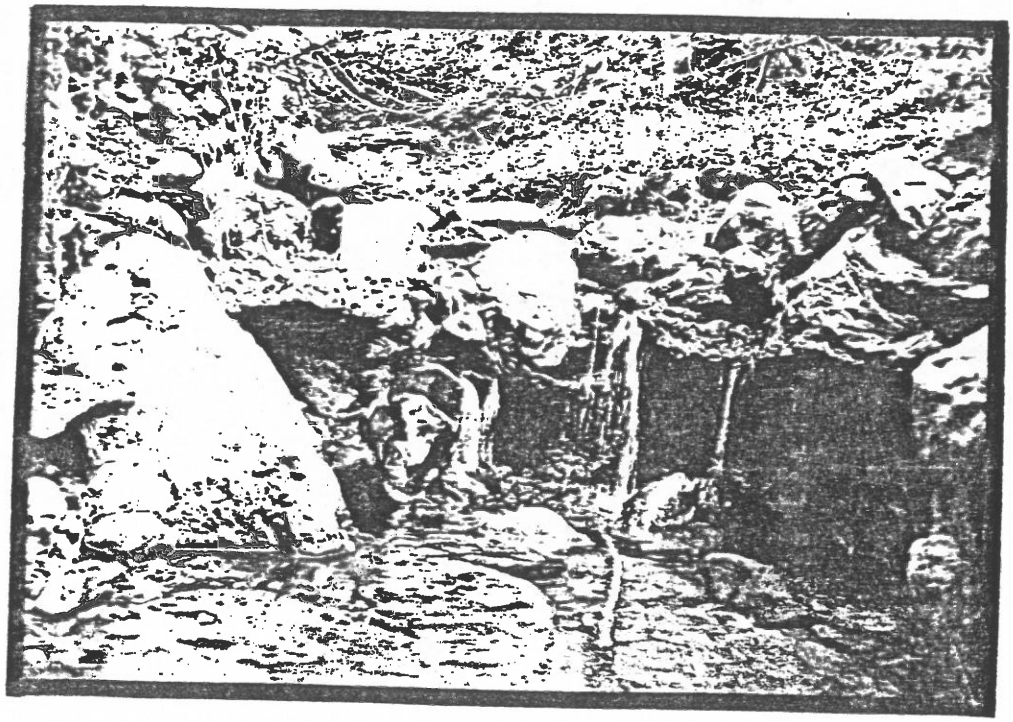
OWNER: Santa Clara Co., Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Falls are 4' high. Pool below is 6'x8' and 6 inches deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 8 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: Channel mile 0.4 upstream

LOCATION: 1 mile upstream of Casserly confluence
ID #: B6 TYPE OF BARRIER: Log jam

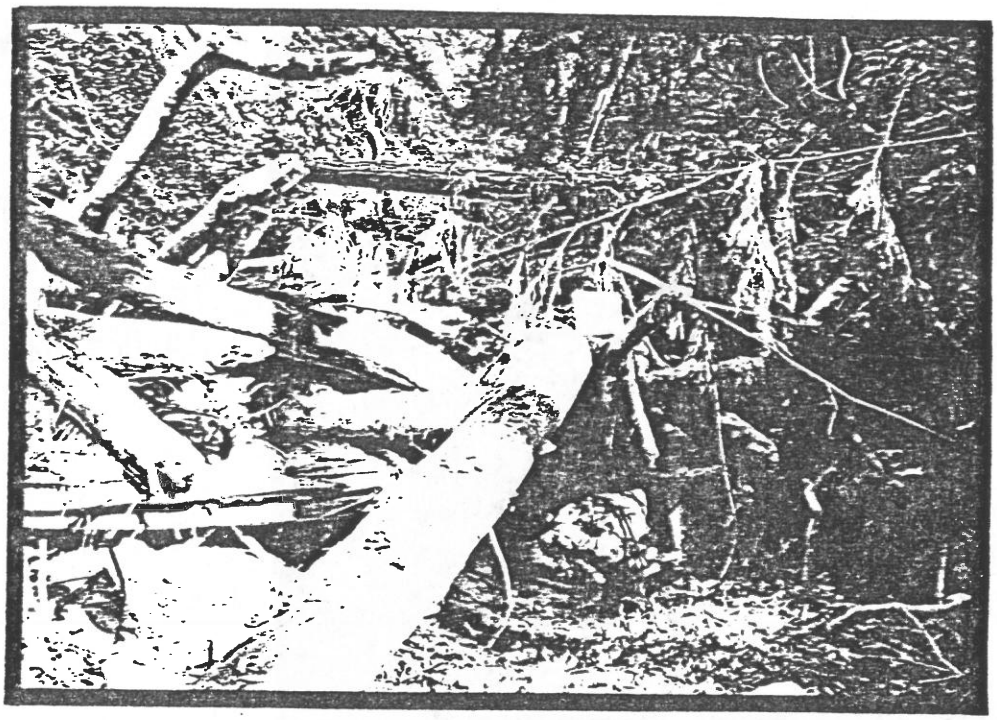
OWNER: Santa Clara Co., Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Accumulated logs. 8'x12'x5'. No jumping pool below. Adult steelhead should be able to travel upstream and downstream under jam at 1 cfs.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 1 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: Channel mile 0.4 upstream

LOCATION: 1.05 miles upstream of Casserly confluence
ID #: B7 TYPE OF BARRIER: Log jam and falls

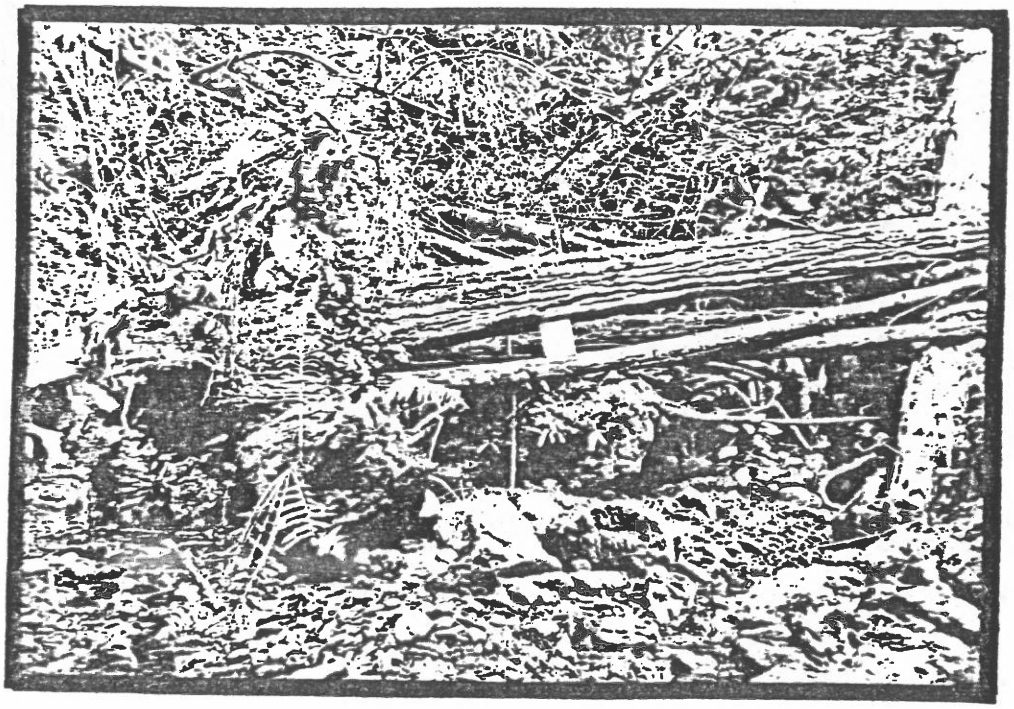
OWNER: Santa Clara Co., Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Downed redwoods, logs and debris. 25'x15'x8'. 8 ft. high falls filter through jam. No pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassible until washed out - 30 cfs needed. No pool below.

Estimated flow volume or conditions required for downstream passage:

COMMENTS:



14 Oct 82

<0.1 cfs

BARRIERS

STREAM: BANKS CANYON
OBSERVER: Turner SECTION: Channel mile 0.4 upstream

LOCATION: 1.15 miles above Casserly Creek confluence
ID #: B8 TYPE OF BARRIER: Log jam

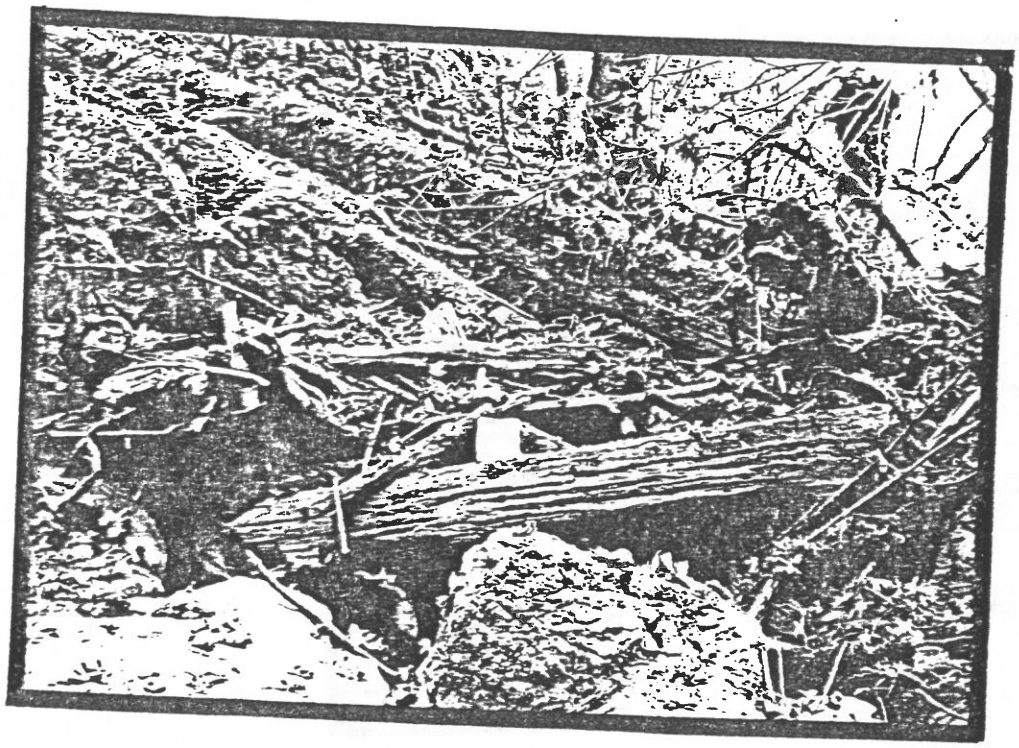
OWNER: Santa Clara Co., Mt. Madonna Park
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam. Maples downed by slide lying over riffles. 20'x15' x6'. Unstable.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 30 cfs.

Estimated flow volume or conditions required for downstream passage: 10 cfs.

COMMENTS: No habitat above. Steep and rocky.



14 Oct 82

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: From Uvas Creek confluence to BM2 (about 1.5 mi)

LOCATION: 1.25 mile up from Uvas Creek confluence, next to cactus plantation
ID #: B1 TYPE OF BARRIER: Log-branch jam

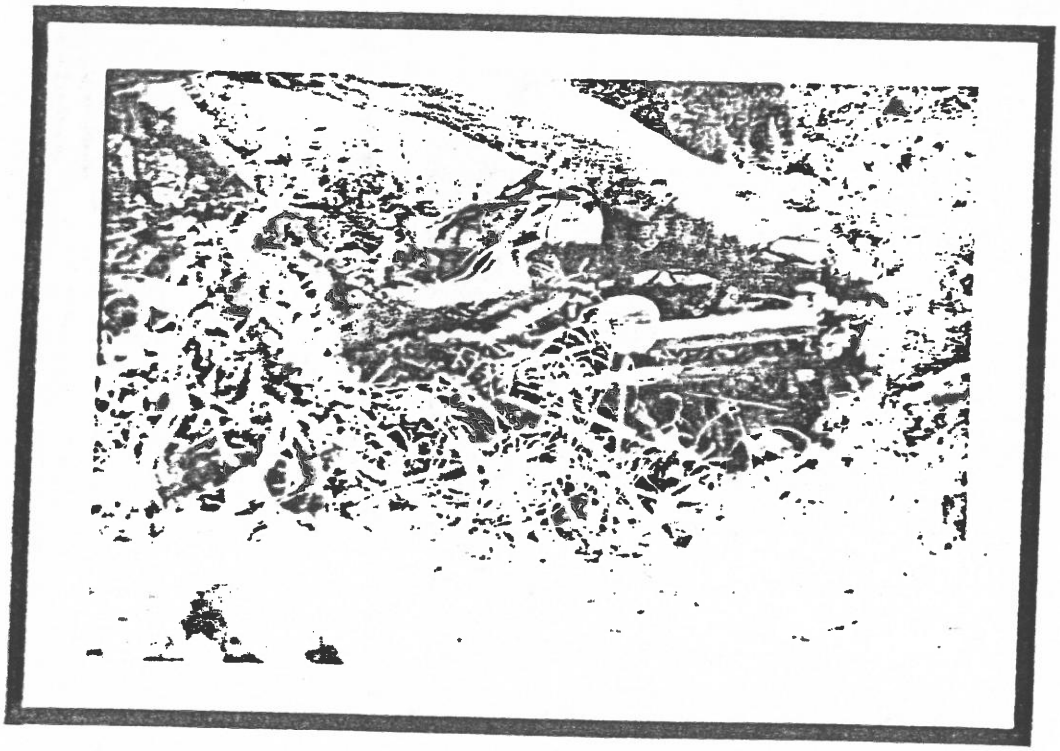
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4-5' high and passable. Stream was dry in August 1981. Streambed is not silted in behind jam.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passable - jam does not block passage.

Estimated flow volume or conditions required for downstream passage: No blockage.

COMMENTS: Old jam - was mentioned in Fish & Game 1968 report. Could potentially grow into a larger jam.



AUG 81

DRY

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: From Uvas confluence to BM2 (1.5 mi).

LOCATION: .4 miles below Whitehurst Road Bridge
ID #: BM2 TYPE OF BARRIER: Flashboard dam

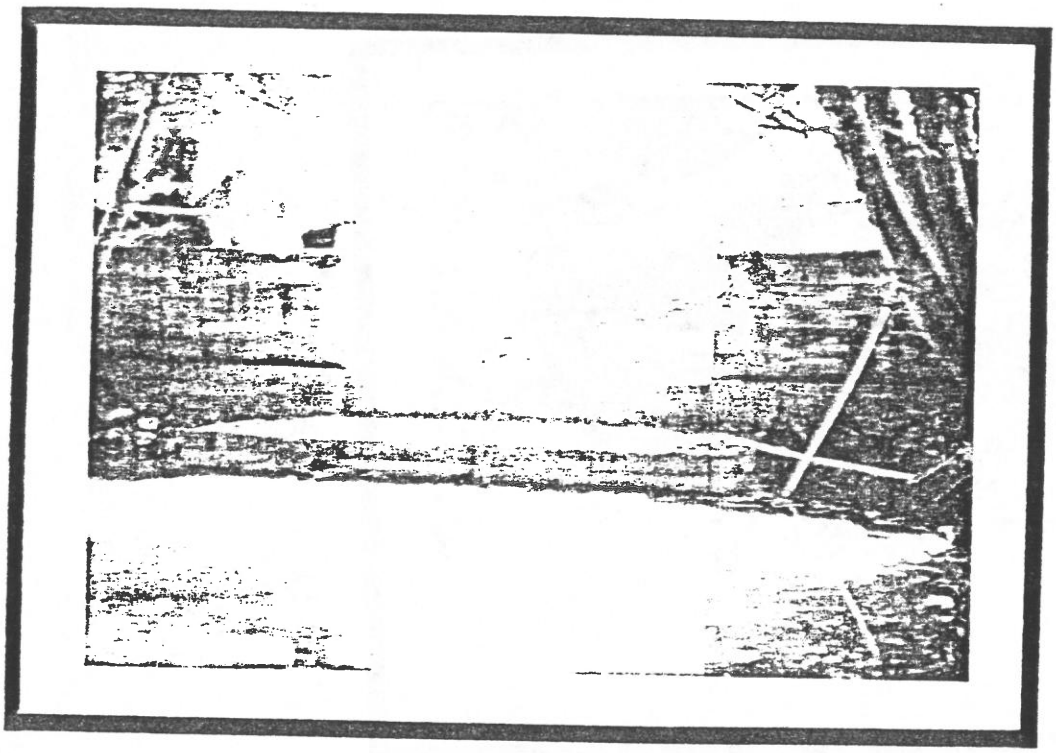
OWNER:
PURPOSE AND OPERATION: Water diversion but unused in August '81.

DESCRIPTION (type, height, pool development, permanence, etc): Potentially 8' high. Concrete lip below dam is ~2' above pool. Concrete base for boards is ~2' high. Boards would add another 4'. Pool below the dam has been deepened this summer, but there is no data on depth. Diversion pipes present.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 12+ cfs to raise level of pool so lip does not block jump.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Flat terrain to south has apple orchard with cattle grazing and a grape vineyard to the north. In August 1981 the stream was intermittent just above the dam and 150 yards below the dam. Lip blocks jump at low flows and should be modified. This is potentially a heavy poaching location if steelhead are stopped in the pool below the dam.



AUG 81

NO FLOW

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Above Sprig Lake confluence

LOCATION: 400 yds above confluence (mile 2.97 from county line)
ID #: B3 TYPE OF BARRIER: Log jam/rock cascade

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Open log jam (busted open by the 4 January 82 storm) with rock cascade. Large permanent tree trunks (since 1978) with potential to jam solid.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 6 cfs for passage.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Severity of jam fluctuates from year to year. This has been a serious jam in the past and it could again block migration. Easy access from road for removal.

14 JAN 82

2½ CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Sprig Lake to falls

LOCATION: 2/3 distance from Sprig confluence to falls (mile 2.83)
ID #: B4 TYPE OF BARRIER: Rock cascade

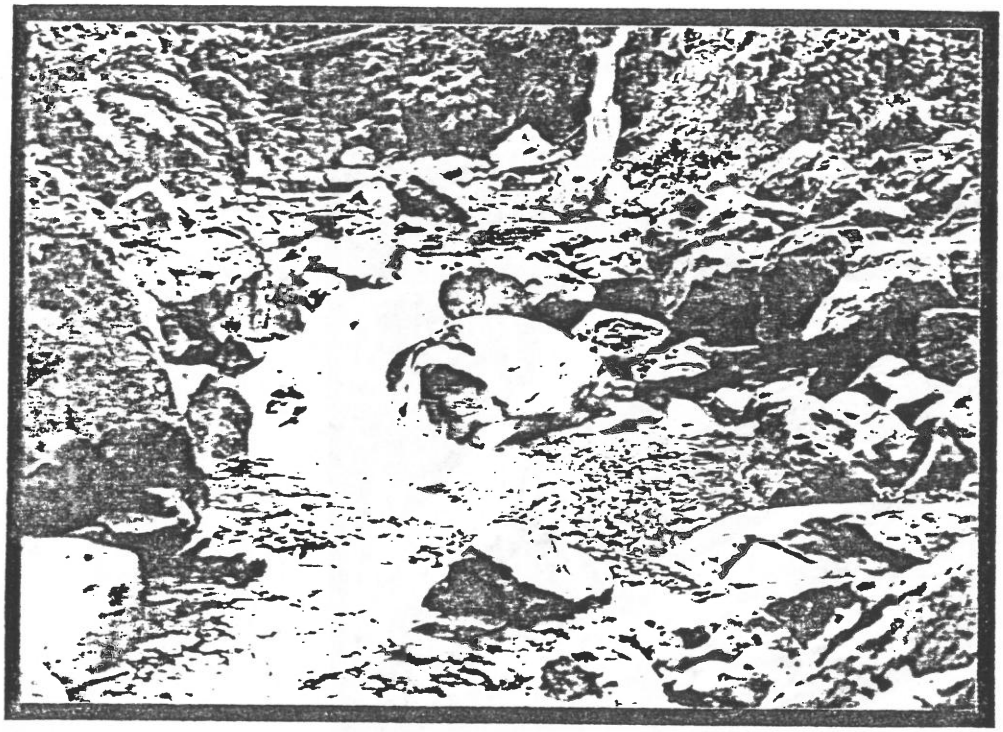
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2 step rock cascade at a 45° angle. 2' deep pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5+ cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Was log barrier prior to 4 January 82 storm. Easy access for removal (beside road) and in relatively level section so it would not reform if removed.



14 JAN 82

3 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Sprig Lake to falls

LOCATION: 2/3 distance to falls (mile 2.73)
ID #: BM5 TYPE OF BARRIER: Flashboard dam

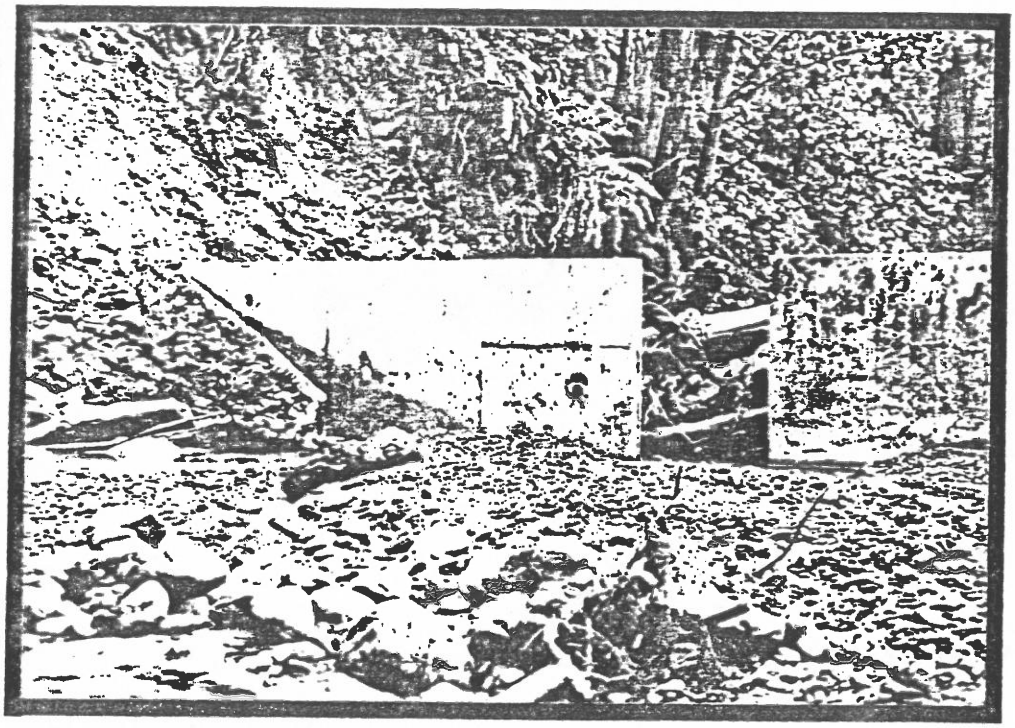
OWNER:
PURPOSE AND OPERATION: Abandoned - formerly for water supply for Sprig Lake.

DESCRIPTION (type, height, pool development, permanence, etc): 5' high but not in use. Washed out on south side.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: No hindrance to passage.

Estimated flow volume or conditions required for downstream passage: No hindrance to passage.

COMMENTS: Pipe upstream diverts from the stream at sandbag pool. Dam has the potential to cause log jams.



14 JAN 82

3 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Sprig Lake fork confluence to falls

LOCATION: 200 m below falls (B7) (mile 2.60)
ID #: B6 TYPE OF BARRIER: Rock cascades

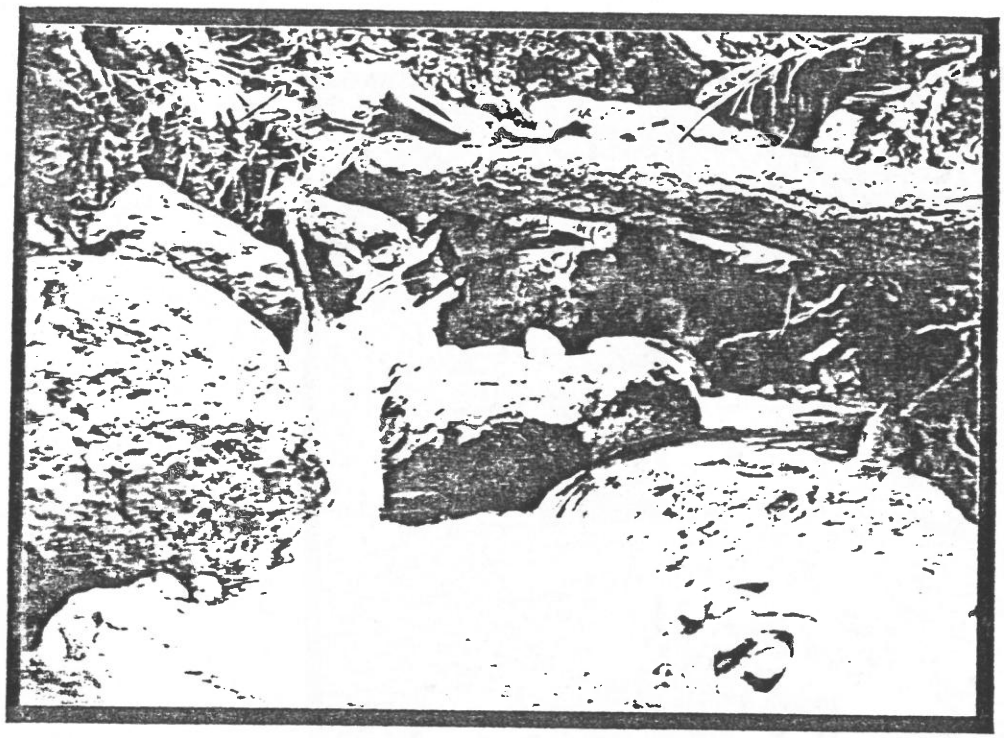
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 3 step rock cascade (each 2-2 1/2 ' high) with large log.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Appears to be passable at 6+ cfs but configuration changes each year.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: In rather level section. Could be modified by removing top step or top 2 steps to provide easy passage.



14 JAN 82

2½ CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: End of falls - Sprig Lake section

LOCATION: Start of steep gradient area (mile 2.56)
ID #: B7 TYPE OF BARRIER: Falls and cascade

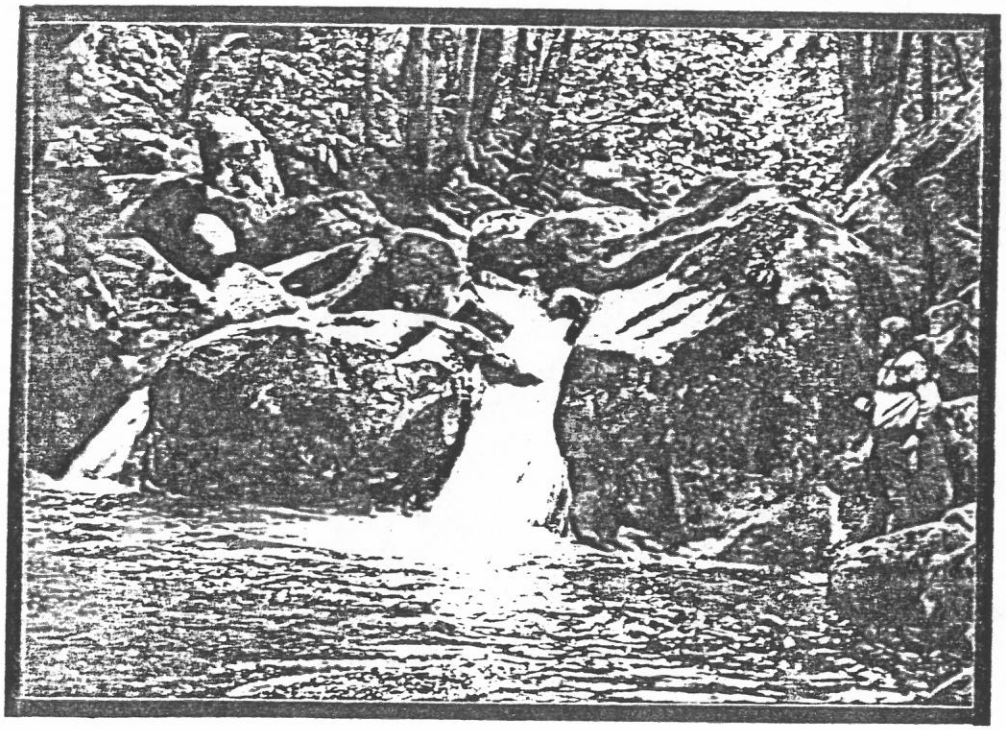
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4' deep pool with 3 1/2' jump to first landing, then 6' up through steep chute.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Between 6 to 10 cfs if passable at all. At high flows velocity is high, preventing passage.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Easiest modification would be to create rock weir at tail of pool to deepen pool and reduce first jump. Upper chute modified by 4 January 82; easier passage. Removal of large boulder in center of barrier (above first jump) might improve passage).



11 JAN 82

2½ CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Steep section

LOCATION: 100' above B7
ID #: B8 TYPE OF BARRIER: Rock cascades - 2 steps

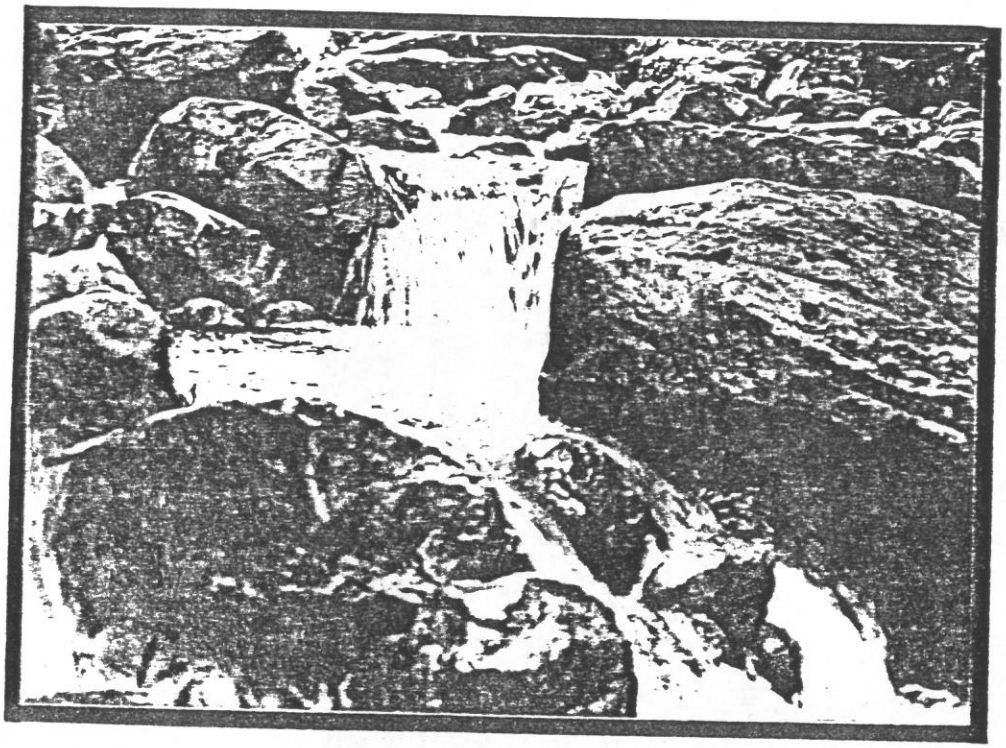
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2 rock step cascades are 2 1/2 feet high each with rocks at base preventing easy jump.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs to raise pool for jump.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Could be improved by moving boulders but effort worthwhile only if B7, B10, and B11 are modified.



11 JAN 82

2½ CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Steep section

LOCATION: Immediately above B8
ID #: B9 TYPE OF BARRIER: Log and rock cascades

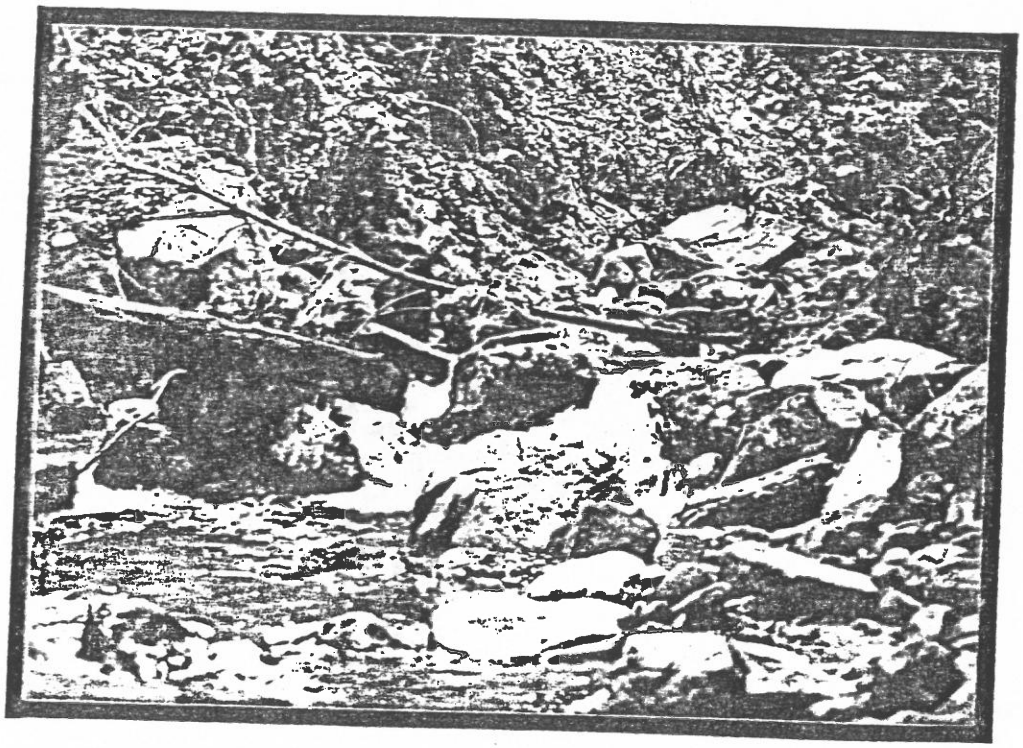
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log with 2 1/2-3' rock cascades. Rocks at base of north half of drop prevent easy jump. South side has 1 1/2' pool for jump.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 7 cfs on south side. At least 15-20 cfs on north side.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: Formed during 4 January 82 storm.



11 JAN 82

2½ CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Steep section

LOCATION: 250' above B7 (2.53 mile)
ID #: B10 TYPE OF BARRIER: Falls and rock cascade

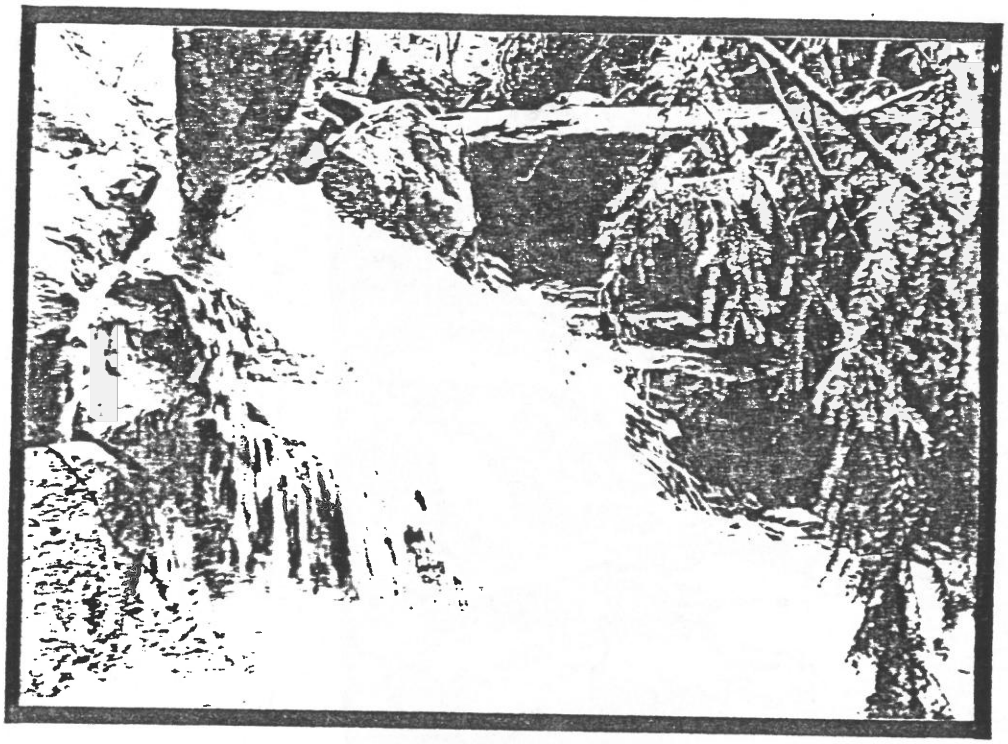
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
6 1/2' total height. Sloping rock face into a 2-2 1/2' pool.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Appears impassable. At low flows jump is too high for passage and at high flows, which raise pool height, velocity is too great.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Modification would require comprehensive reworking of entire stream B7 through B11 because of steep gradient.



27 JAN 82

4 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Steep section

LOCATION: Top of steep section
ID #: B11 TYPE OF BARRIER: Rock falls

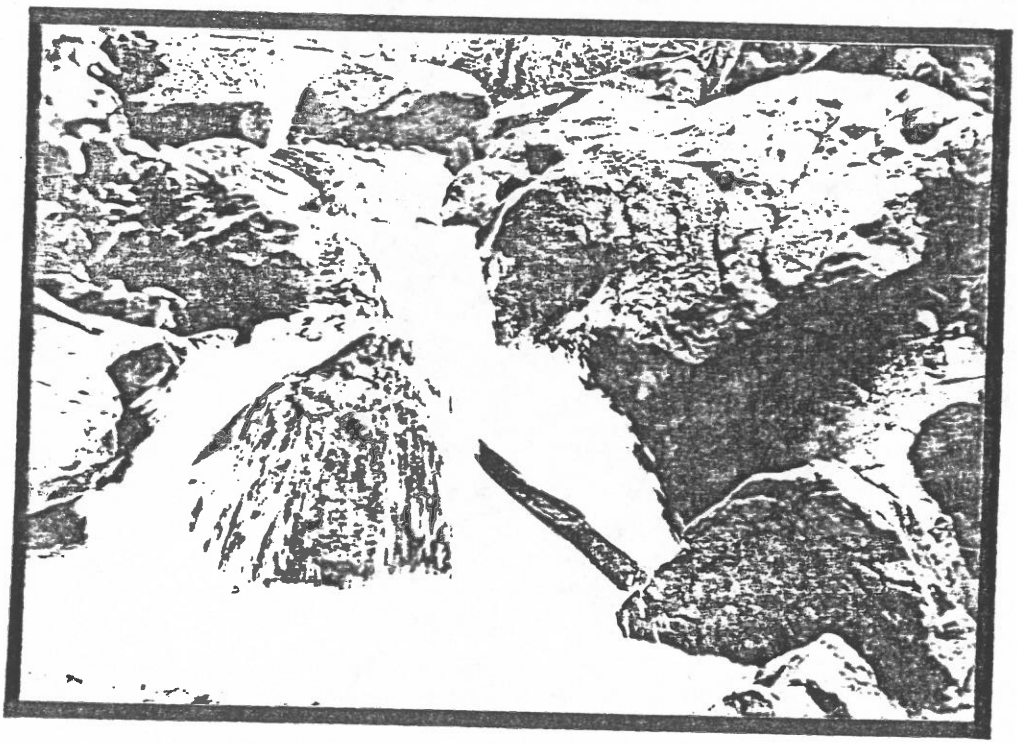
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2 steps. The first 4-4 1/2' high and the second 2'. Pool below is 15' long and 2' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Absolute barrier. It is too high at low flows and too fast at high flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Probably cannot be modified unless the entire steep section is reworked to replace large drop with a series of smaller steps. This barrier requires elevation of the stream below the barrier. The barrier is immediately beside the road.



27 JAN 82

4-5 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Smith SECTION: Above steep section to upper fork

LOCATION: Just above upper Mt. Madonna Road pullout (mile 2.27)
ID #: B12 TYPE OF BARRIER: Log jam

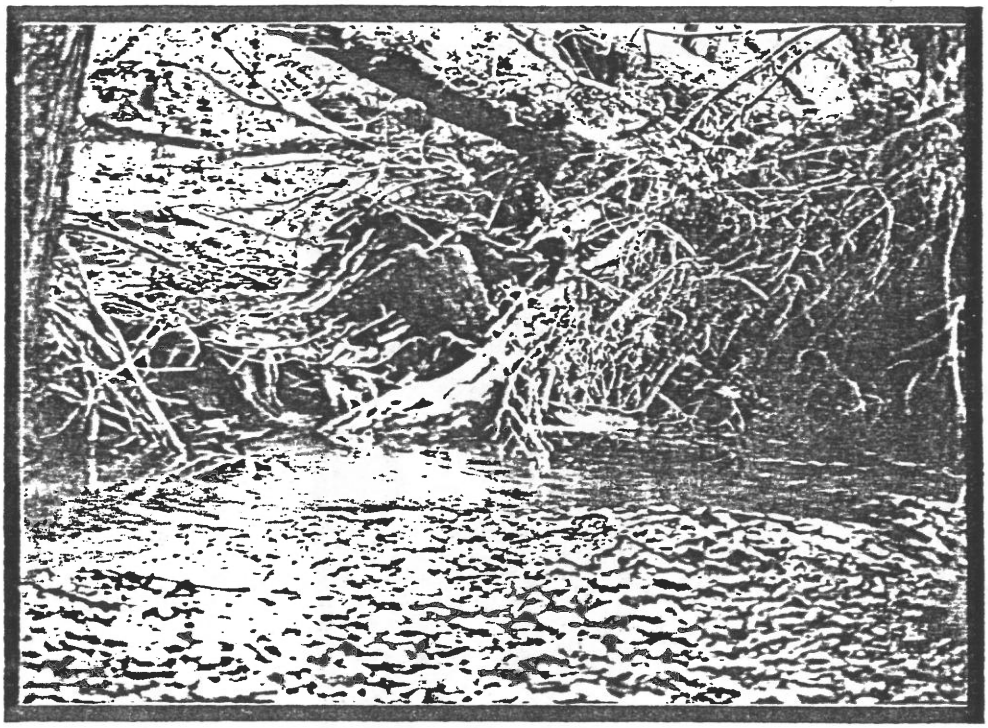
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam is 4-9' high with a 4' deep pool below. Water flows through 3 downed trees plus logs and debris. Presently by-passed on the south.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passable at 2 cfs, possible at present.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Easy access for removal at roadside pullout. Was difficult barrier (20 cfs) until 4 January 82 storm. Now it is passable at the south side.



11 JAN 82

2 CFS

BARRIERS

STREAM: BODFISH CREEK

OBSERVER: Alley SECTION: 1st mile upstream and south from Hw. 152

LOCATION: 75 yds up from confluence of Bodfish Creek and tributary which parallels Hwy. 152
ID #: B13 TYPE OF BARRIER: Log jam

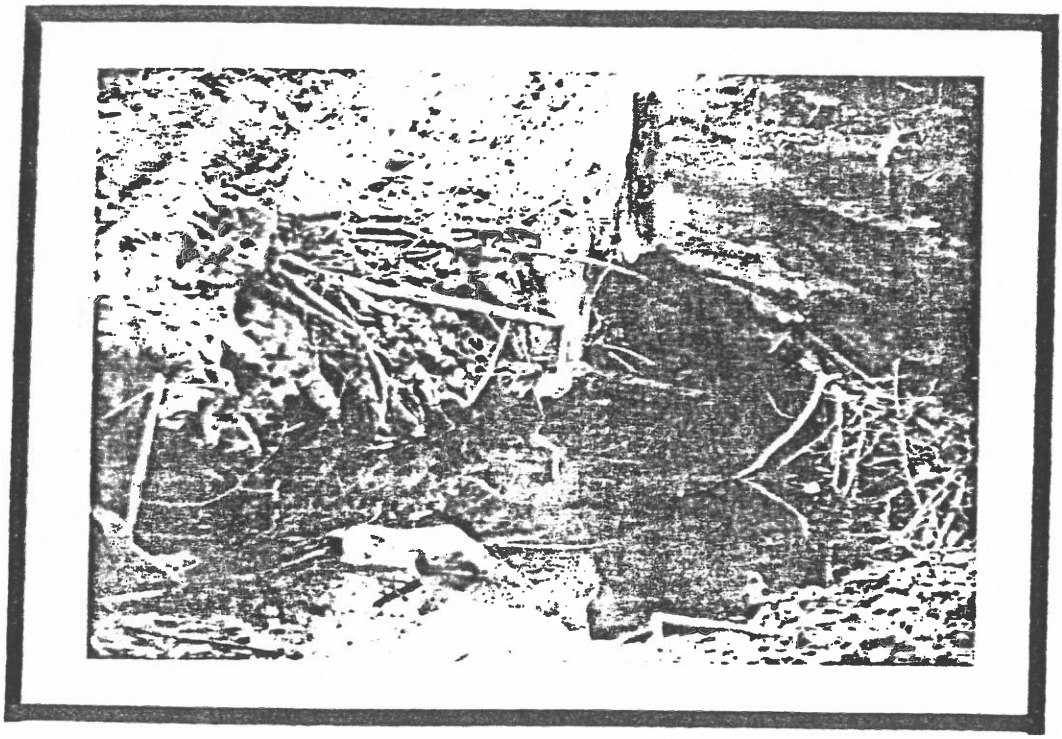
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam is 3.5 ft. high. The pool is below 152' maximum depth and averages 1.2' and 12' X 8' wide. Jam appears to be relatively permanent with some human effort to maintain jam.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs to divert around east side.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: The stream may divert around to east of barrier in very wet years to bypass barrier. Stream was intermittent just above barrier in August 1981. Could be easily removed.



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: 1st mile upstream and south from Hwy. 152

LOCATION: 80 yds up from confluence of Bodfish Creek and tributary, next to green light house
ID #: BM14 TYPE OF BARRIER: Rock and concrete wall

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Rock is 3' high and cemented together. No pool below, but large boulders in from preventing good fish jump. Permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs to raise pool level for jump.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Steepness of rock wall is about 80°.

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: 1st mile upstream and south from Hwy. 152

LOCATION: 200 yds up from confluence of Bodfish Creek and tributary downstream from a bridge.
ID #: BM15 TYPE OF BARRIER: Flashboard dam-concrete walls

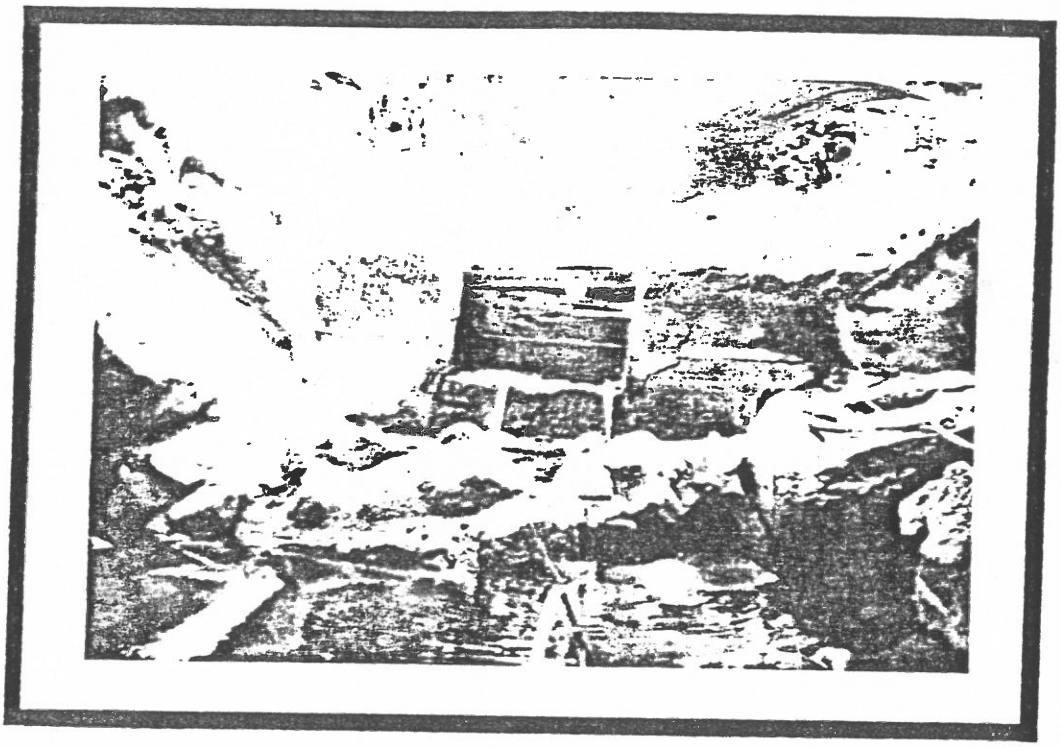
OWNER:
PURPOSE AND OPERATION: To maintain summer pools - ascetics.

DESCRIPTION (type, height, pool development, permanence, etc): Small flashboard dam. Total width is 20' and boards are 3' wide and 2' high with 1' concrete base. Large concrete and rock base below the dam prevents jump at low flows. Pool is 2.2' at deepest in summer.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs if boards are removed and 20+ cfs if not.

Estimated flow volume or conditions required for downstream passage: 2 cfs if boards are removed and 10 cfs if not.

COMMENTS: Concrete base poses 12" high barrier above 12" high step formed by concrete and rock approach. The approach could be eliminated to improve jumping ease.



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: 1st mile upstream and south from Hwy. 152

LOCATION: 250 yds up from confluence, 3rd house up from east side
ID #: BM16 TYPE OF BARRIER: Flashboard dam with rock-concrete walls.

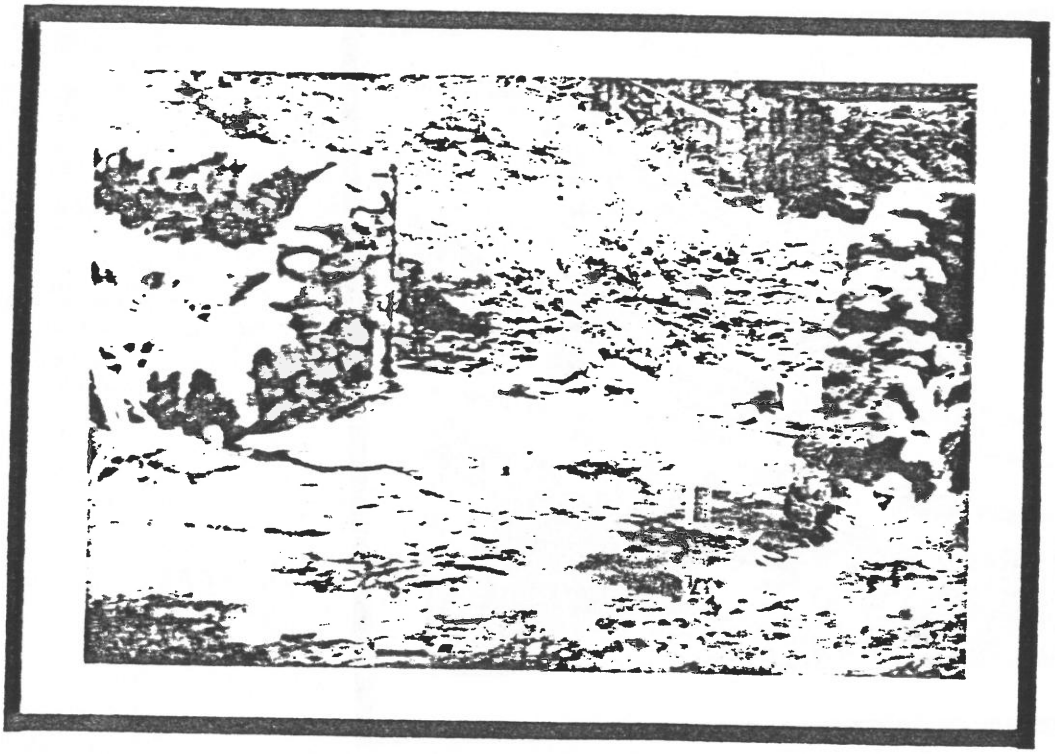
OWNER:
PURPOSE AND OPERATION: Pool formation. Not in operation August 1981.

DESCRIPTION (type, height, pool development, permanence, etc): Opening is 4.5' high X 8' wide. Dam is 20' wide with a shallow pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: No barrier if not used. Impassable if used.

Estimated flow volume or conditions required for downstream passage: No barrier if not used. 3 cfs if flashboards in place.

COMMENTS:



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: 1st mile upstream and south from Hw. 152

LOCATION: 1 mile from Hwy. 152
ID #: B17 TYPE OF BARRIER: Redwood log jam

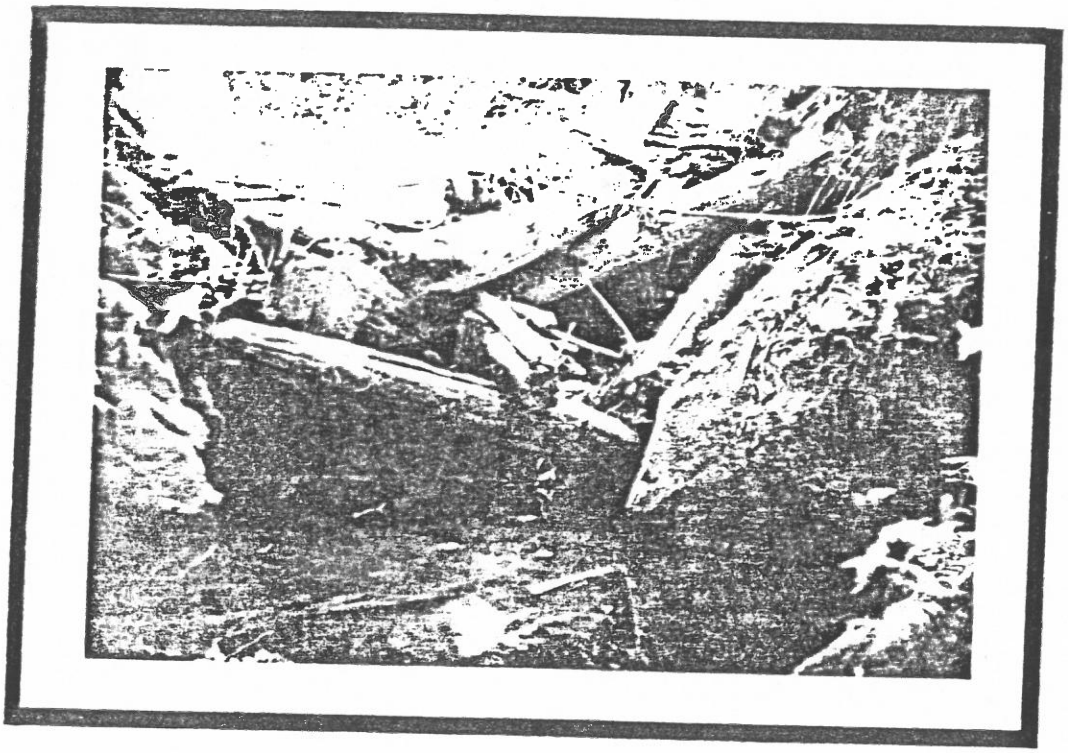
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Redwood log jam is 5' high. The pool is 4' deep at deepest and averaging 2 1/2'. Pool is 8' wide by 12' long. Redwood logs between 8" and 2.5' in diameter (logs overhang pool). One redwood stump is 5' in diameter.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable until logs are removed.

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS: Should be removed <u>if</u> B7 through B10 are modified. The jam was mentioned in the 1968 Fish and Game report.



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: Mile 1 to mile 2 above Hwy. 152

LOCATION: .25 mile up from impassable barrier (B17)
ID #: B18 TYPE OF BARRIER: Boulder-log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Log jam with boulder. First step is 0.7' high, 2' horizontal. Second step is 1.2' high. The jam appears temporary.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: Mile 1 to mile 2 of Hwy. 152

LOCATION: On east bend, 0.4 mile up from B17
ID #: B19 TYPE OF BARRIER: Boulder-log jam, 2 steps

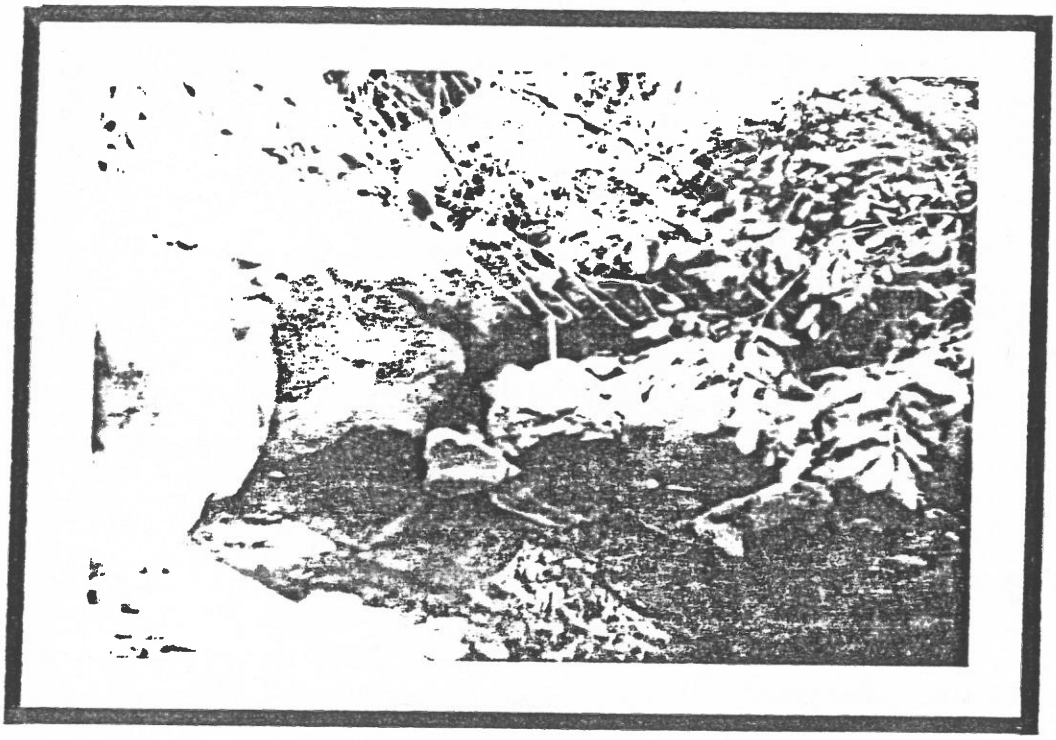
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): First step is 2' high and second step is 2.5' high. Pool below is shallow (.4' deep in summer). The jam appears temporary. High flow, (greater than 10 cfs) would possibly destroy barrier.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: Mile 1 to mile 2 upstream and south of Hwy. 152

LOCATION: 0.6 mile up from B17
ID #: B20 TYPE OF BARRIER: Boulder-log jam

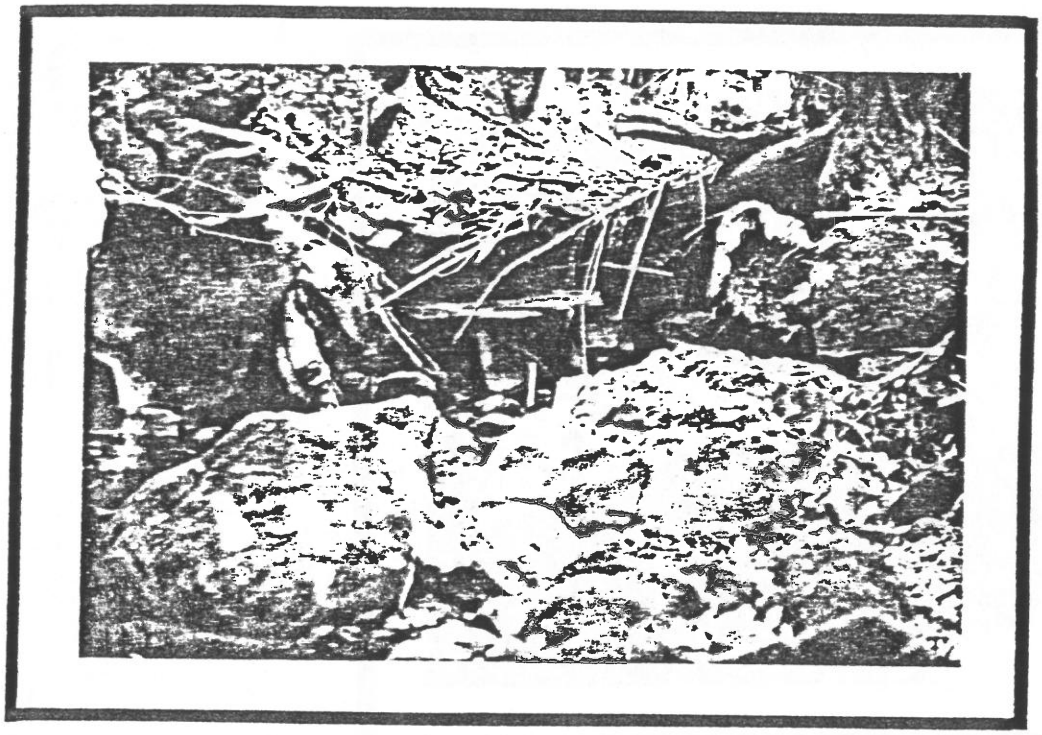
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Logs and boulders in jam are 3.5' high. Pool below is shallow (.4' deep). Jam appears temporary. High flow should remove jam.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10+ cfs if in place.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: Mile 1 to mile 2 upstream and south from Hwy. 152

LOCATION: .75 mile up from B17
ID #: B21 TYPE OF BARRIER: Log jam (mostly branches)

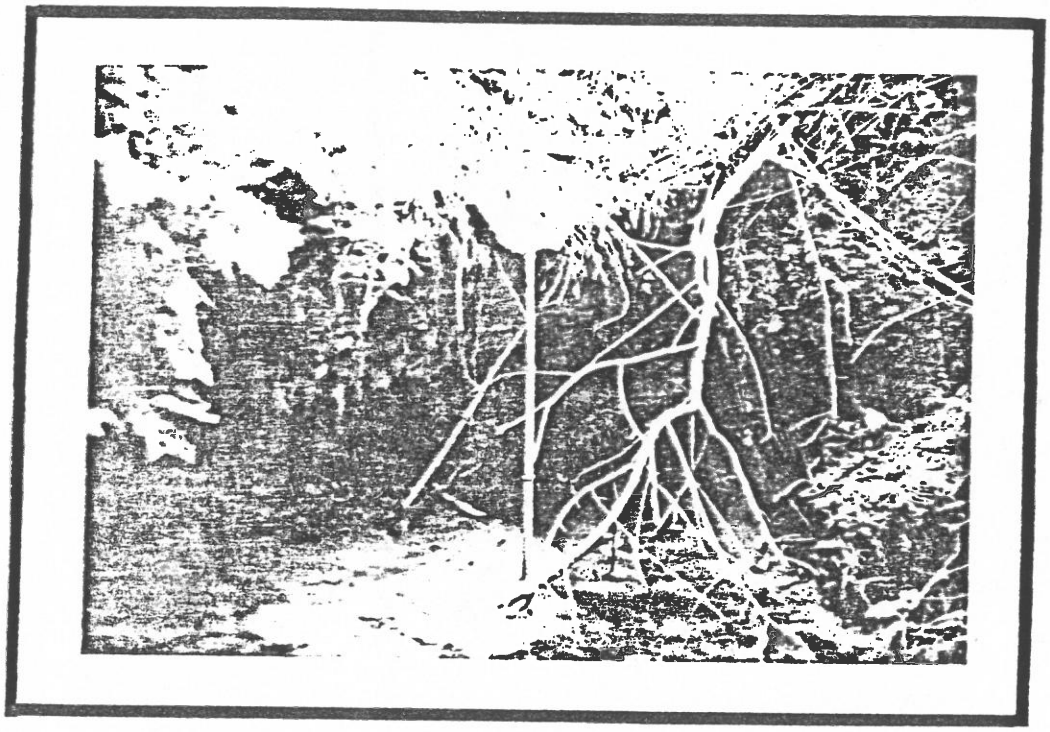
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4-5' high. Streambed is only 1' higher upstream from jam. There is no pool up or downstream of the barrier. Jam appears temporary.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: High flow would probably remove jam.

Estimated flow volume or conditions required for downstream passage: 4 cfs if stream pools up above jam.

COMMENTS:



AUG 81

<0.1 CFS

BARRIERS

STREAM: BODFISH CREEK
OBSERVER: Alley SECTION: Mile 1 to mile 2 upstream and south of Hwy. 152

LOCATION: 1 mile up from B17 just below Redwood Meadow
ID #: B22 TYPE OF BARRIER: Log jam (mostly branches)

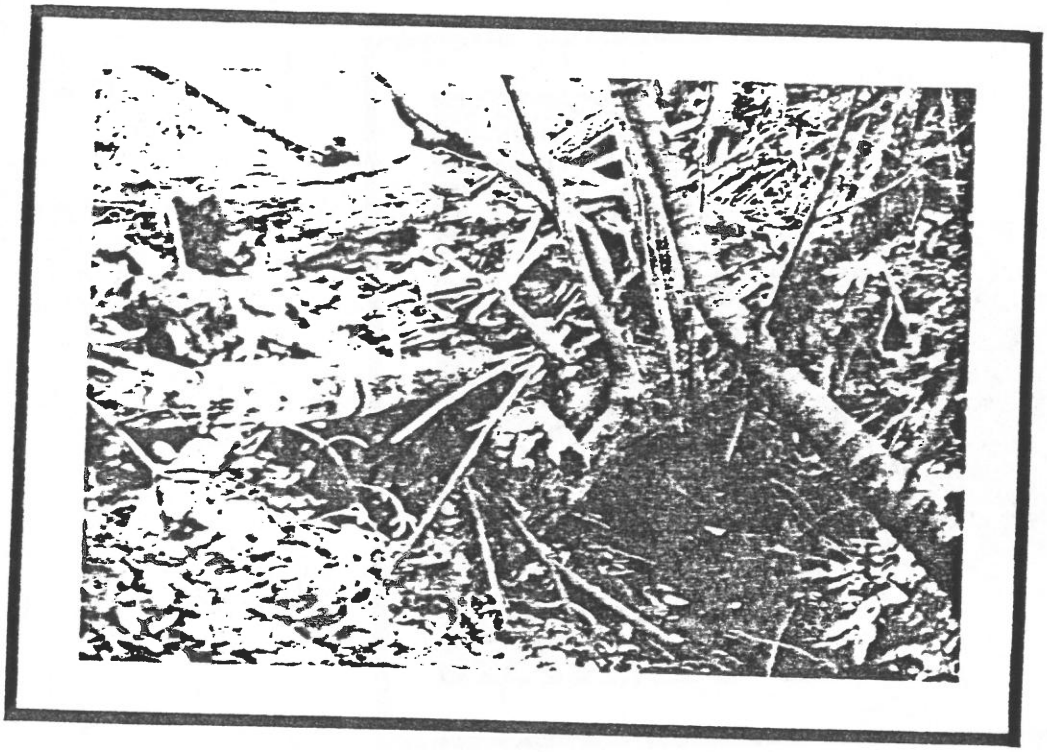
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6' high with shallow pool. 0.5' depth average in summer with a maximum of 1.2'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: If intact, requires 15+ cfs for passage. High flow might remove barrier.

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS: Stream dried up in meadow above in August 1981. Dirt road adjacent.



AUG 81

<0.1 CFS

BARRIERS

STREAM: Unnamed tributary to BODFISH CREEK
OBSERVER: Smith SECTION: Tributary to Bodfish Creek-parallels Hwy. 152

LOCATION: 0.35 miles above confluence
ID #: B23 TYPE OF BARRIER: Log jams and steep drops

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Large number of drops and log jams in very narrow channel. Stream is not passable.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable. There are too many high jumps or velocity is too fast at high water.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Limited habitat above - shallow pools, much silt.

BARRIERS

STREAM: Blackhawk Canyon Creek tributary to BODFISH CREEK
OBSERVER: Smith SECTION: Sprig Lake

LOCATION: Dam at Sprig Lake
ID #: BM1 TYPE OF BARRIER: Culvert reservoir drain

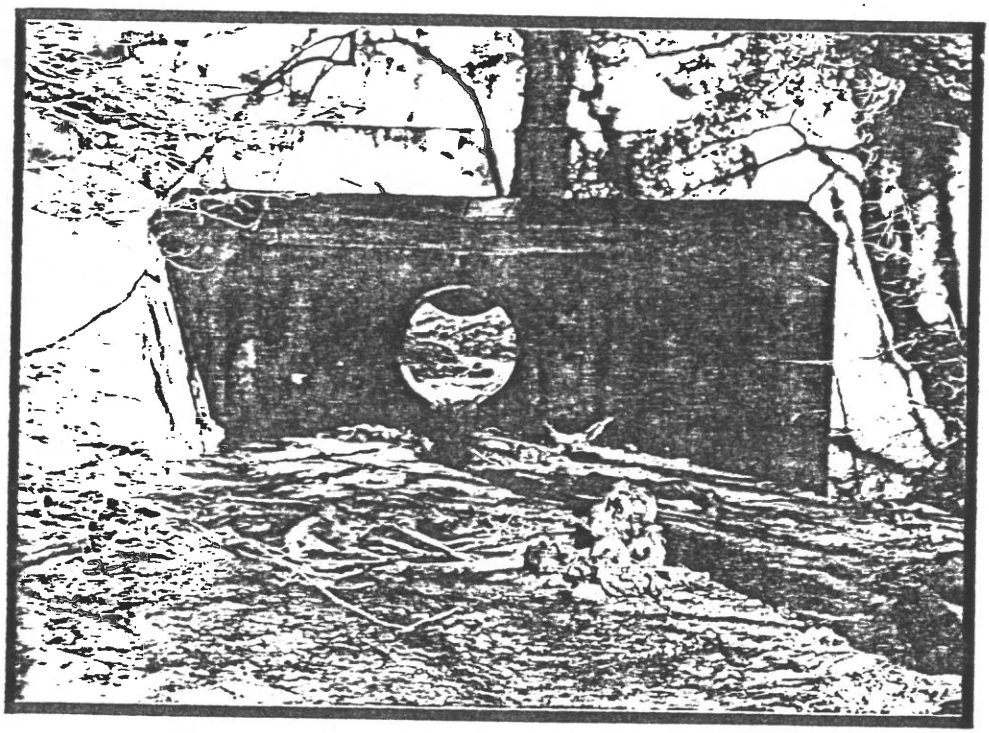
OWNER: Santa Clara County Parks and Recreation.
PURPOSE AND OPERATION: When closed it forms Sprig Lake.

DESCRIPTION (type, height, pool development, permanence, etc): (Variable). Height is 1 1/2 to 3' depending upon pool configuration. Weir immediately below helps to maintain pool. Pool depth is from 1 to 4' depending upon scour and fill.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 2 1/2 to 5 cfs depending upon pool. At high flows (above 20 cfs) there is a velocity barrier.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: Culvert closed to fill lake in April or May and opened in October to December.



14 JAN 82

1½ CFS

BARRIERS

STREAM: Blackhawk Canyon Creek tributary to BODFISH CREEK
OBSERVER: Alley/Smith SECTION: First half mile above Sprig Lake

LOCATION: .5 miles from Sprig Lake
ID #: B2 TYPE OF BARRIER: Boulders/stump

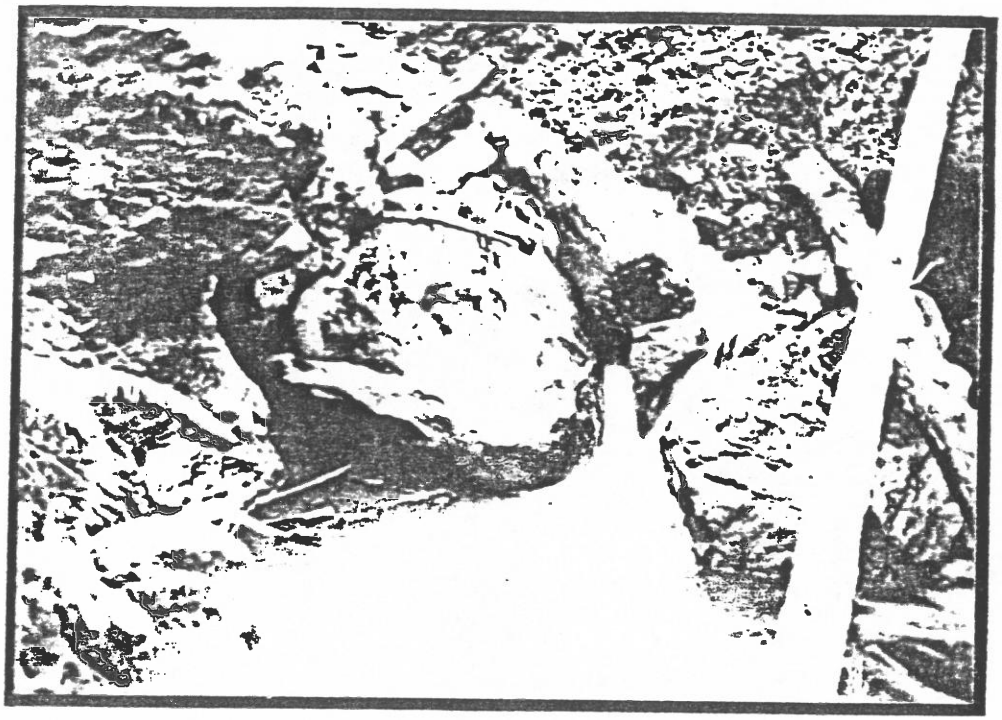
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Two large boulders and one stump producing 3 to 5' drop. At low flow most water went through cracks in bed above rather than over; modified by Smith/Alley so water does spill over lip. Pool is 2-4' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Might be passable at 5 cfs and probably passable at 10 cfs.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: No fish have been seen above barrier in 1980 or 1981. Barrier is in a relatively level stretch. It could be permanently removed to open up 1/4 mile section to B3.



14 JAN 82

0.75 CFS

BARRIERS

STREAM: Blackhawk Canyon Creek tributary to BODFISH CREEK
OBSERVER: Alley/Smith SECTION: From mile 0.5 upstream

LOCATION: 0.75 mile up from Sprig Lake
ID #: B3 TYPE OF BARRIER: Boulder

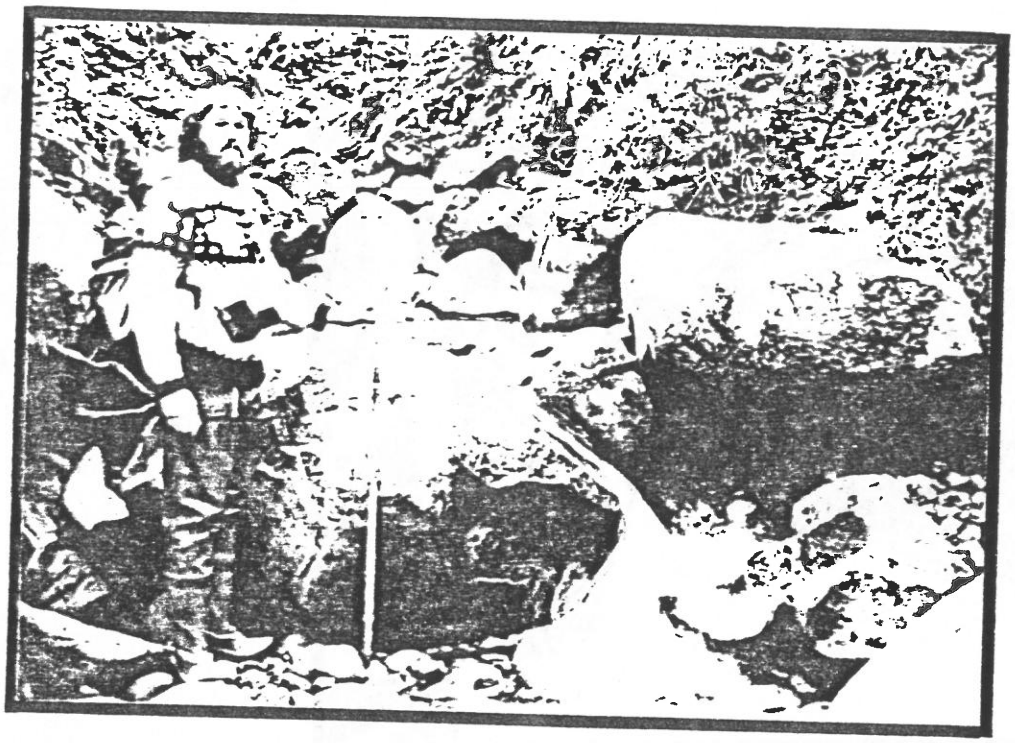
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): A 3' to 3 1/2' high boulder drop onto bedrock. There is no pool except at high flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 10-15 cfs should produce pool for jumping.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS:



14 JAN 82

1 CFS

BARRIERS

STREAM: Blackhawk Canyon Creek tributary to BODFISH CREEK
OBSERVER: Smith/Alley SECTION: From mile 0.5 upstream

LOCATION: .85 miles above Sprig Lake, where dirt road parallels stream.
ID #: B4 TYPE OF BARRIER: Boulder cascade

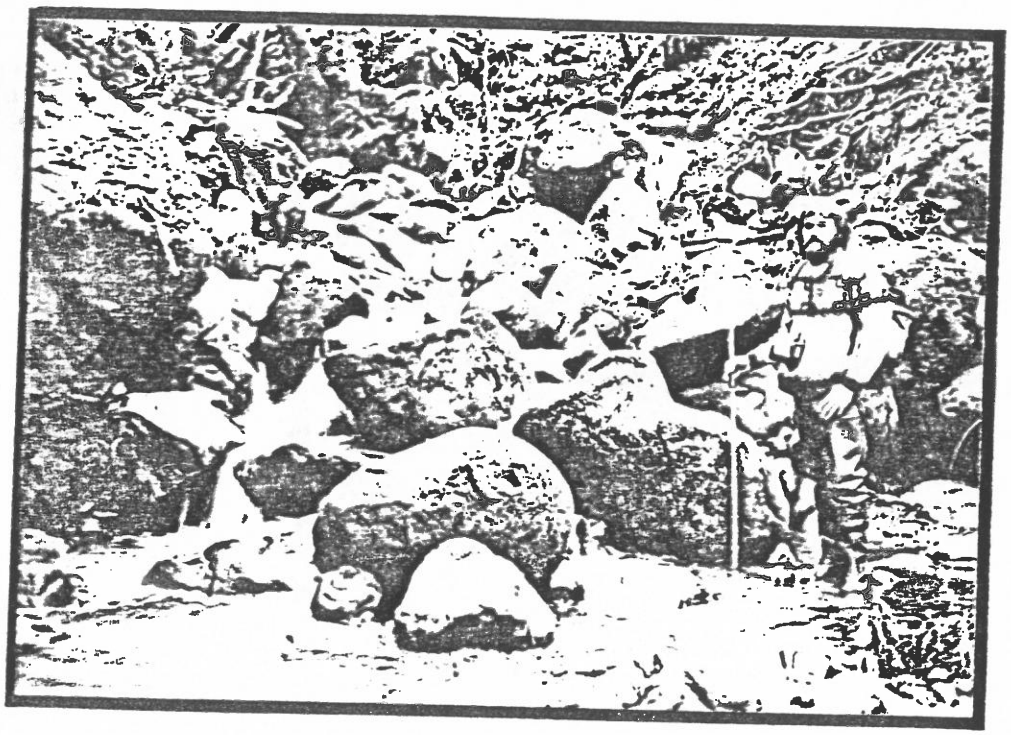
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2 step boulder cascade 4-4 1/2' total height. Shallow (1' deep) pool below at low flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably passable at 10 cfs, which is enough to raise pool height for jumping second step.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: At beginning of steeper section there are many similar barriers upstream.



14 JAN 82

1 CFS

BARRIERS

STREAM: BROWNS CREEK
OBSERVER: Smith SECTION: From Corralitos confluence to water diversion dam

LOCATION: 0.3 miles upstream of first road crossing of Browns Valley Road
ID #: BM1 TYPE OF BARRIER: Concrete dam

OWNER: Watsonville

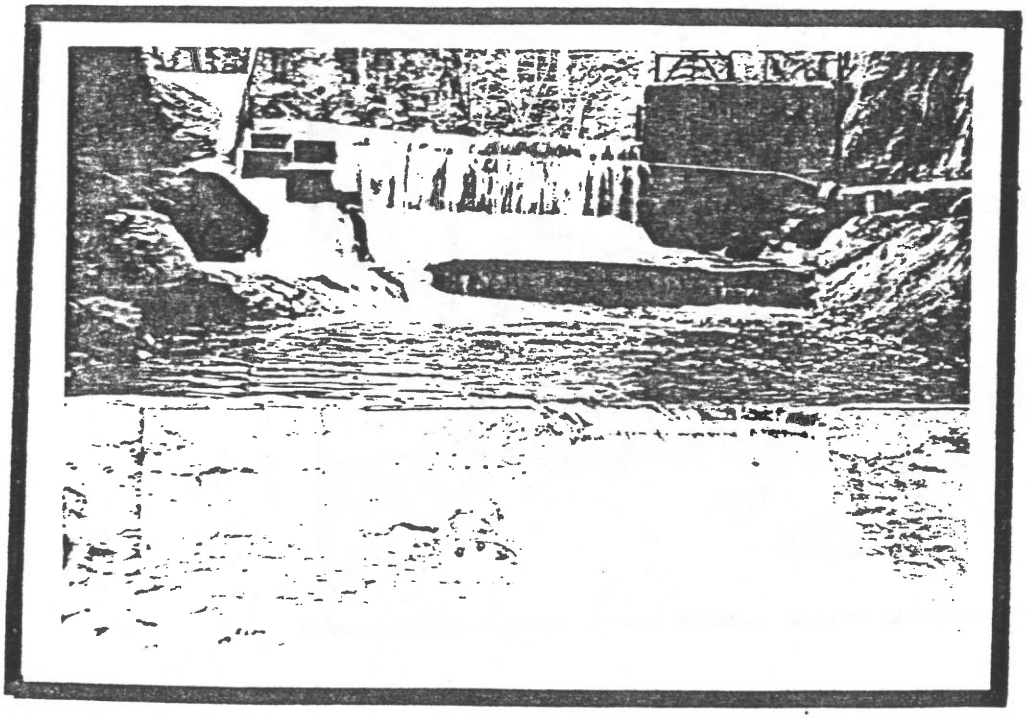
PURPOSE AND OPERATION: Water diversion for Watsonville domestic water supply.

DESCRIPTION (type, height, pool development, permanence, etc): Two step concrete dam. Total height is 8'. Fishway on west side consisting of 12' long, 4' wide jump pool (1' deep with 3' deep sump added in 1982), 1-2' above stream level with concrete walls, and a 4 compartment pool and weir, half-baffle fish ladder. First step in ladder is 2-2 1/2' above jump pool. Concrete weir 25' downstream was constructed in 1982 to raise stream level for entrance to fishway. Weir requires 20" jump from 20" deep pool.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: If undamaged, flows of at least 4 cfs and less than 25 cfs to prevent excessive turbulence in ladder.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Modified 1982 after recommendations in previous habitat problems report.



21 JAN 83

4½ CFS

BARRIERS

STREAM: BROWNS CREEK
OBSERVER: Alley SECTION: Between Gamecock and Ramsey confluences on Browns Creek

LOCATION: mile 0^{25} road marker
ID #: B2 TYPE OF BARRIER: Redwood log

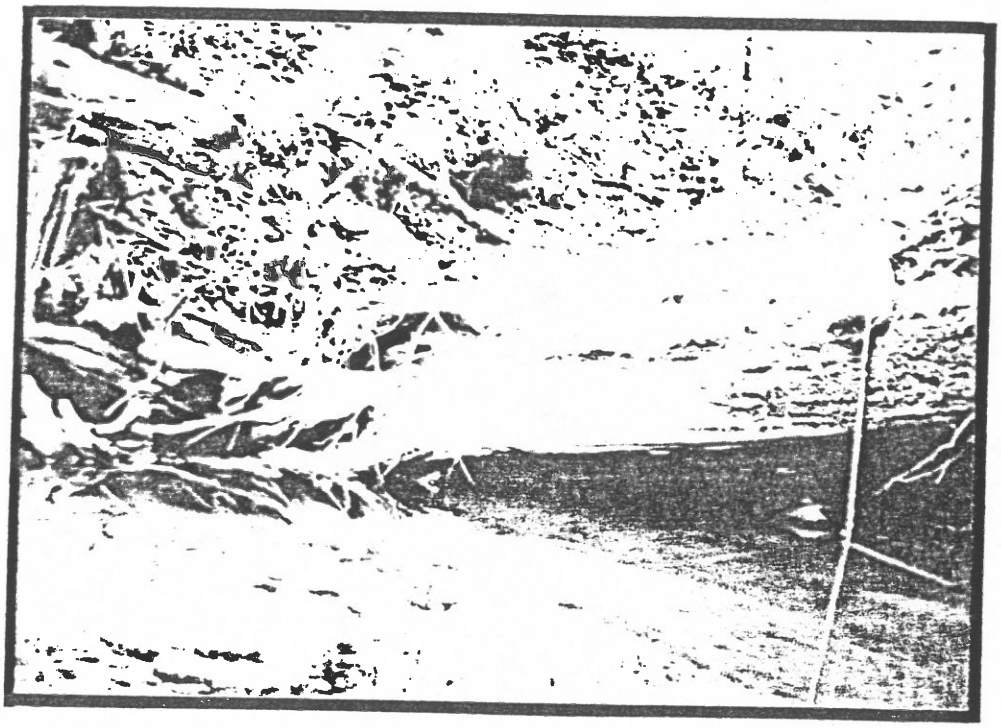
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): One redwood log across stream, silted in behind. 2 1/2 to 3' jump from pool 3-4' deep. Stream channel 25' wide, so pool level not increased much by increased flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



17 SEP 81

<0.1 CFS

BARRIERS

STREAM: Redwood Canyon Creek tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From Browns Creek confluence to B4 (.7 mi)

LOCATION: 100 yds up from confluence before first Redwood Canyon Road crossing
ID #: B1 TYPE OF BARRIER: Bedrock, log, stump jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Bedrock beneath redwood stumps and logs. Silted in behind totally, creating falls over boulders and stump overhanging. 8' high. Rocks cemented on north side are permanent. Impassable even at high flows at 4' jump with no pool above bedrock.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: Partially collapsed by 4 January 1982 storm. Still impassable.

11 JAN 82

1 CFS

BARRIERS

STREAM: Redwood Canyon Creek tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From confluence with Browns Valley Creek to B4 (.7 mi)

LOCATION: Between first and second road crossing.
ID #: B2 TYPE OF BARRIER: Redwood stumps

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 3 redwood stumps laying on side. Total height of 5'. The pool is shallow - .9-1.3' at low flow and with overhanging stumps.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable unless very high flow allows passage around north side (15-20 cfs?).

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS:

3 Aug 81

<0.1 cfs

BARRIERS

STREAM: Redwood Canyon Creek tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From confluence to B4

LOCATION: Above second Redwood Canyon Road crossing
ID #: B3 TYPE OF BARRIER: Redwood log

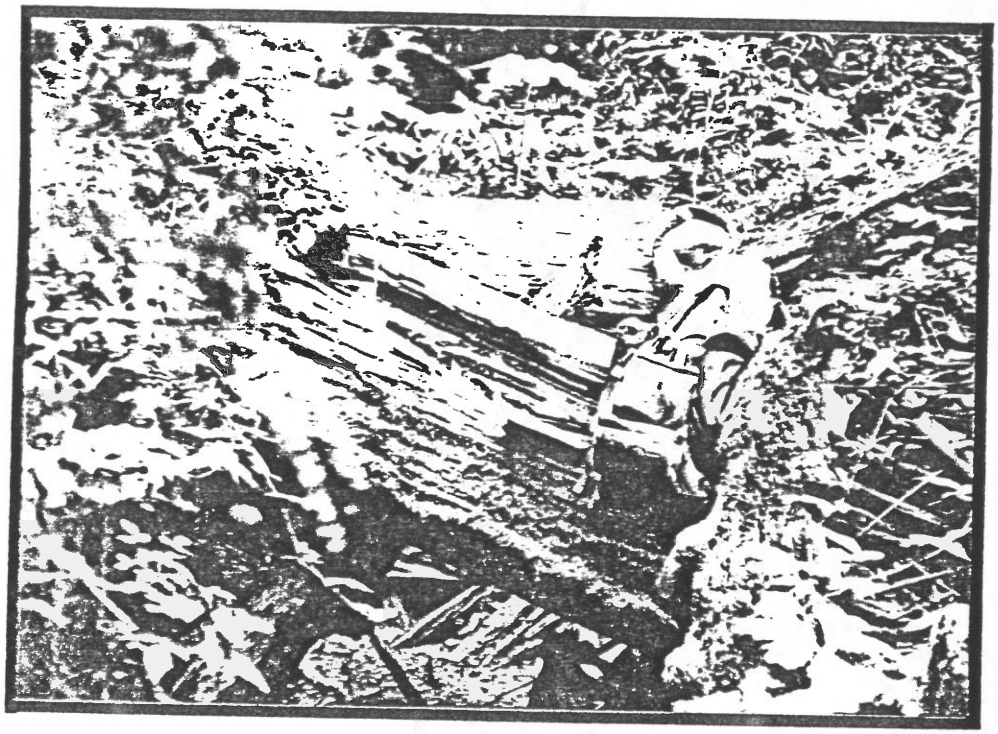
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): One 5' high redwood log across channel. Pool is only 1' deeper than the rest of the channel. Channel is narrow (12') and silted in above log.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable except possibly at very high flows (15 cfs) when velocity might still prevent passage.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS:



3 Aug 81

<0.1 cfs

BARRIERS

STREAM: Redwood Canyon Creek to tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From Browns Creek confluence to this barrier

LOCATION: 0.7 miles (3800 ft.) from Browns Creek confluence
ID #: B4 TYPE OF BARRIER: Bedrock Falls

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
40-50' high bedrock wall.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage:

COMMENTS:

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From Browns Valley confluence upstream to channel mile 0.8

LOCATION: 0.3 miles from confluence of Browns Creek
ID #: B1 TYPE OF BARRIER: Redwood stump, log jam

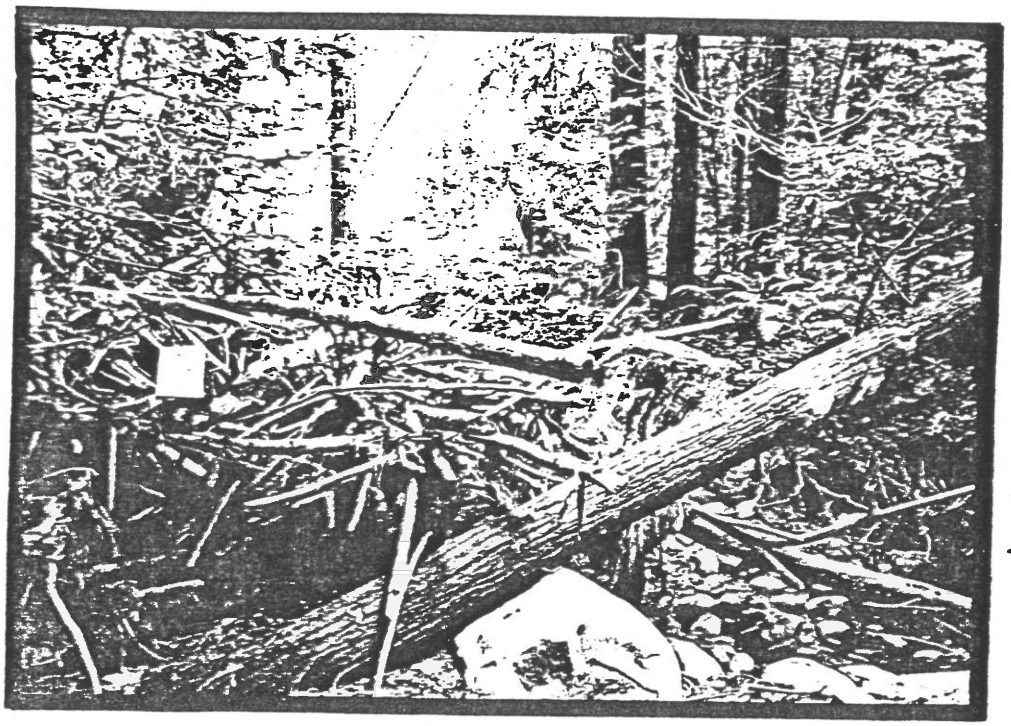
OWNER: Van Valkenburg
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Large redwood stump. Flow filters through debris 5-7' high. Pool below poorly developed.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs (?). Passable at side.

Estimated flow volume or conditions required for downstream passage: 5 cfs.

COMMENTS: Steelhead above barrier in 1981. (B1 in previous report).



15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From Browns Creek confluence upstream to channel mile 0.8

LOCATION: 0.35 miles from Browns Creek
ID #: B2 TYPE OF BARRIER: Log jam

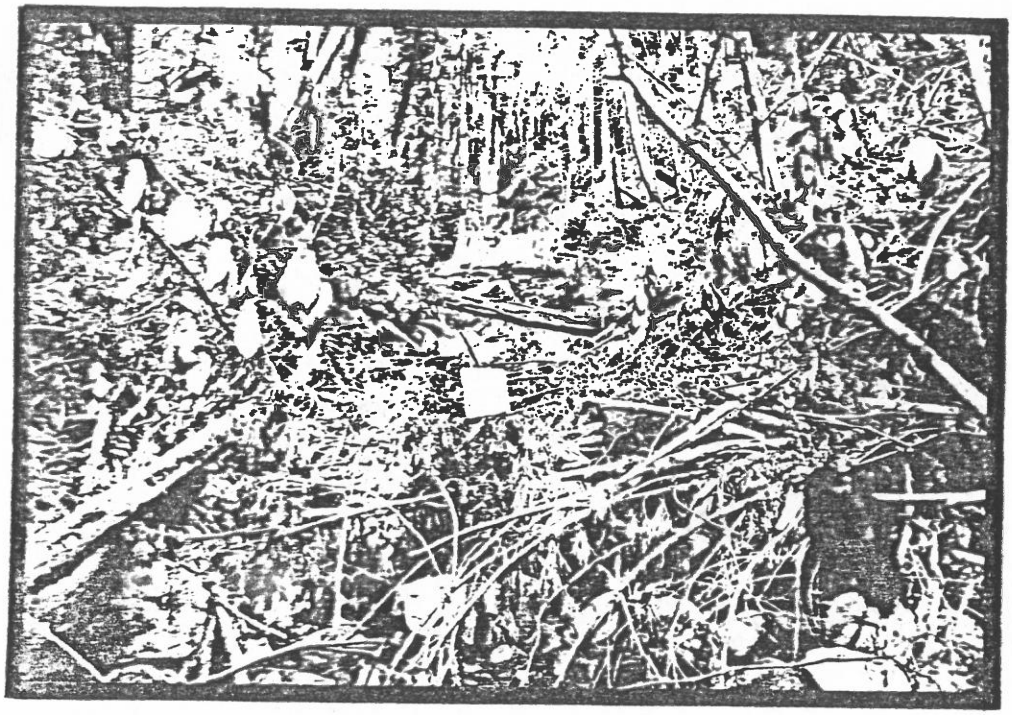
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Small jam created by debris. 20'x3'x2'. Unstable.

PASSABILITY. Estimated flow volume or conditions required for upstream passage:

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Should wash out at 10+ cfs.



15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From Browns Valley confluence upstream to channel mile 0.8

LOCATION: 0.4 miles from Browns Creek
ID #: B3 TYPE OF BARRIER: Falls, Log jam

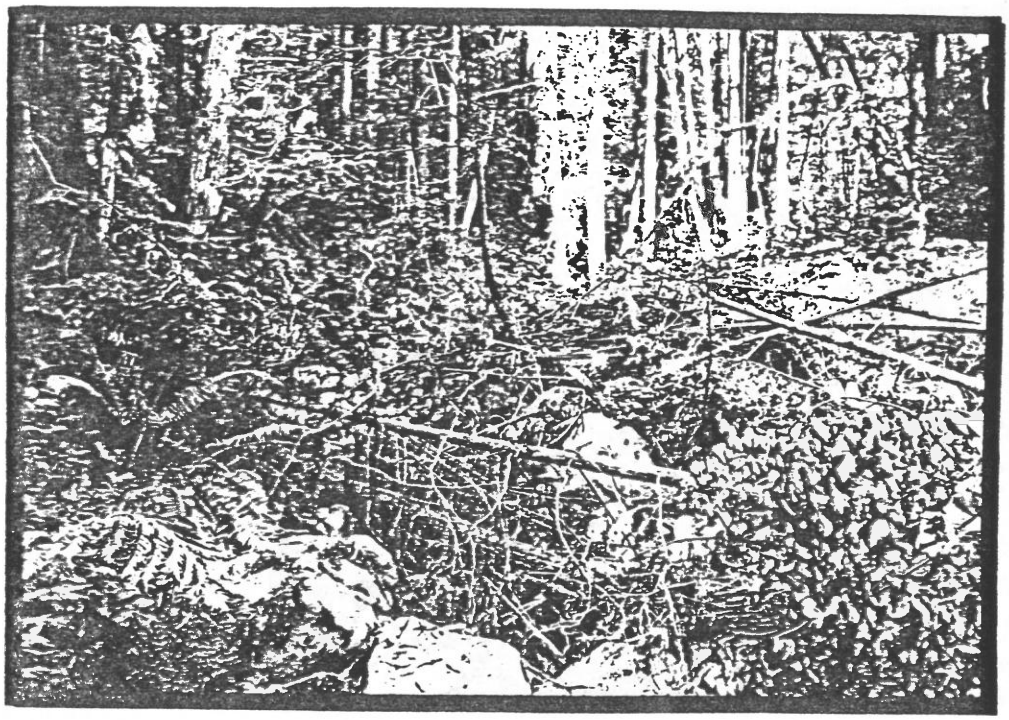
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Falls created by slide. Debris and silt are wedged between a downed redwood and a large boulder. Pool at low flow is 10'x6' and 1' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs.

Estimated flow volume or conditions required for downstream passage: 3 cfs.

COMMENTS: Several downed redwoods immediately upstream with potential to expand.



15 Oct 82

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From channel mile 0.8 upstream

LOCATION: 0.7 miles from Browns Creek confluence
ID #: B4 TYPE OF BARRIER: Log jam

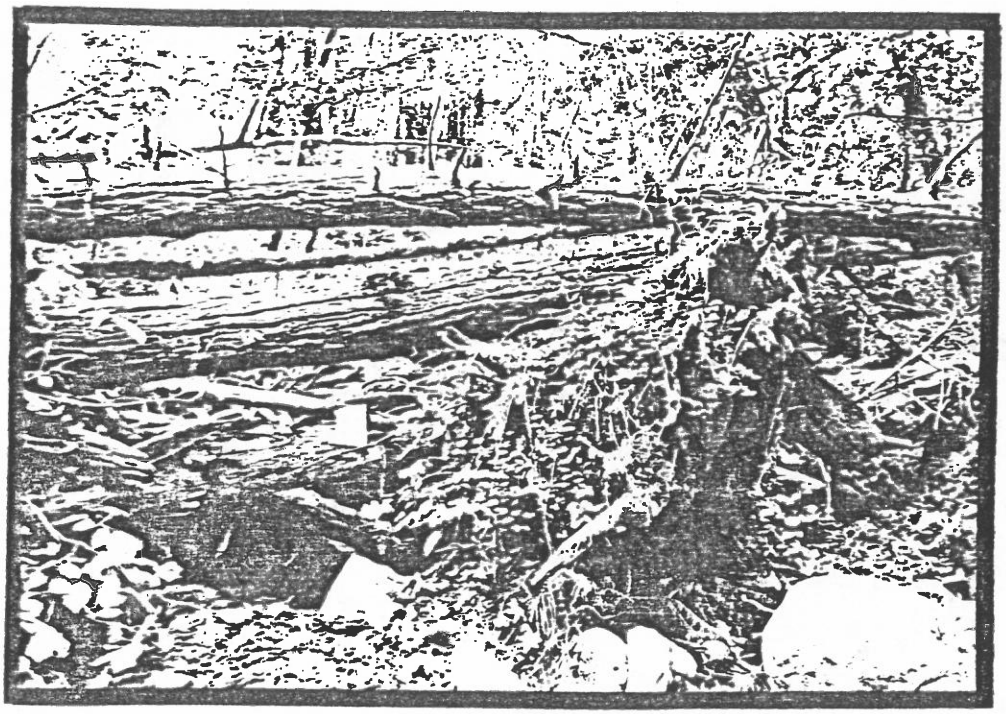
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Old jam with new log jam formed behind. 20'x20'x8'. Upstream access on left side of creek at high flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 8 cfs.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Density of young fish not decreased above. Apparently it was accessible in 1981.



15 Oct 82

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From Browns Creek confluence upstream to channel mile 0.8

LOCATION: 0.8 miles from Browns Creek confluence
ID #: B5 TYPE OF BARRIER: Log jam and falls

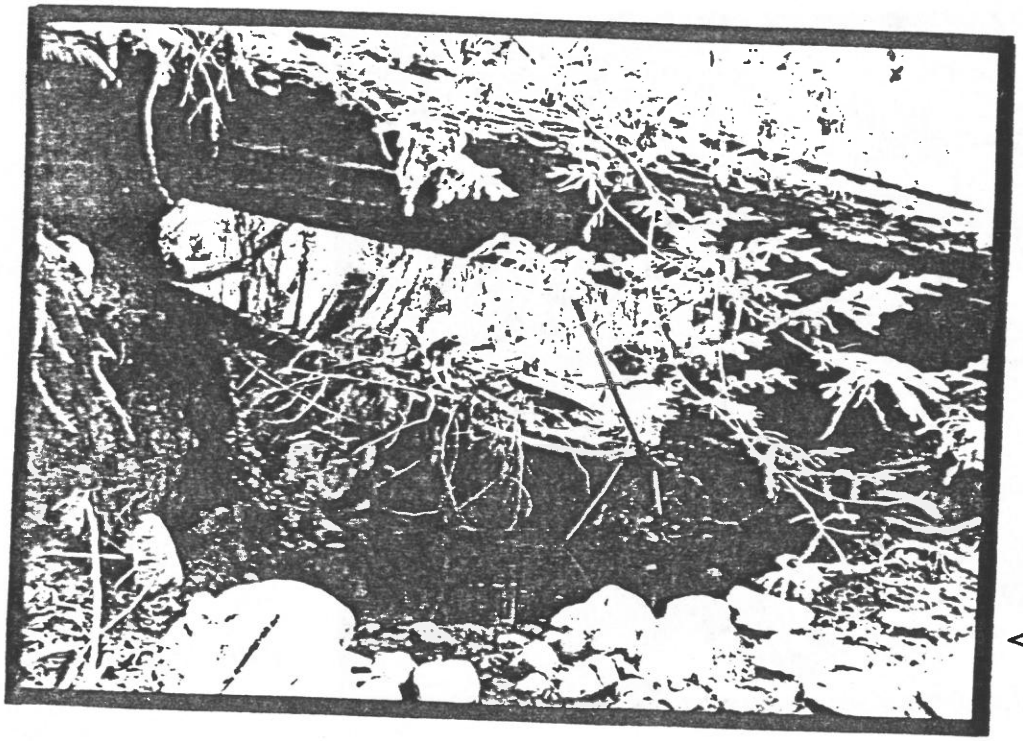
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 20' wide, 7' high. Pool is 30'x20'x1'. Log jam is 40'x20'x7'. Unstable. Logs and debris. Flow filters through jam.

PASSABILITY. Estimated flow volume or conditions required for upstreampassage: 30 cfs.

Estimated flow volume or conditions required for downstream passage: 6 cfs.

COMMENTS: Located at old log bridge.



15 Oct 82

<0.1 CFS

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Turner SECTION: From channel mile 0.8 upstream

LOCATION: 0.9 miles above Browns Creek confluence
ID #: B6 TYPE OF BARRIER: Log jam and falls

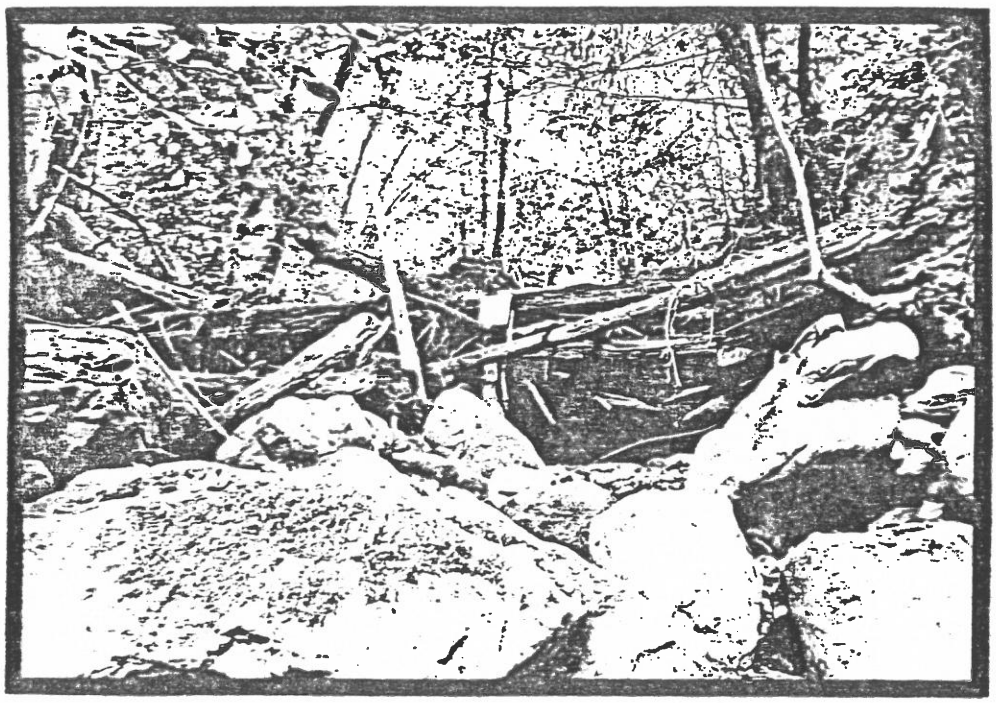
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam is 20'x3'x5' with silt backed up behind, creating 5' high falls.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably not passable.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS:



15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Ramsey Gulch tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From channel mile 0.8 upstream

LOCATION: 4800 ft. (.9 miles) above Browns Creek confluence
ID #: B7 TYPE OF BARRIER: Redwood log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 10-12' high, 15-20' long in narrow ravine and permanent. Pool below is less than 2' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS:

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: Upstream 0.9 miles from confluence with Browns Creek

LOCATION: 100' above Hazel Dell Road
ID #: B1 TYPE OF BARRIER: Log jam and falls

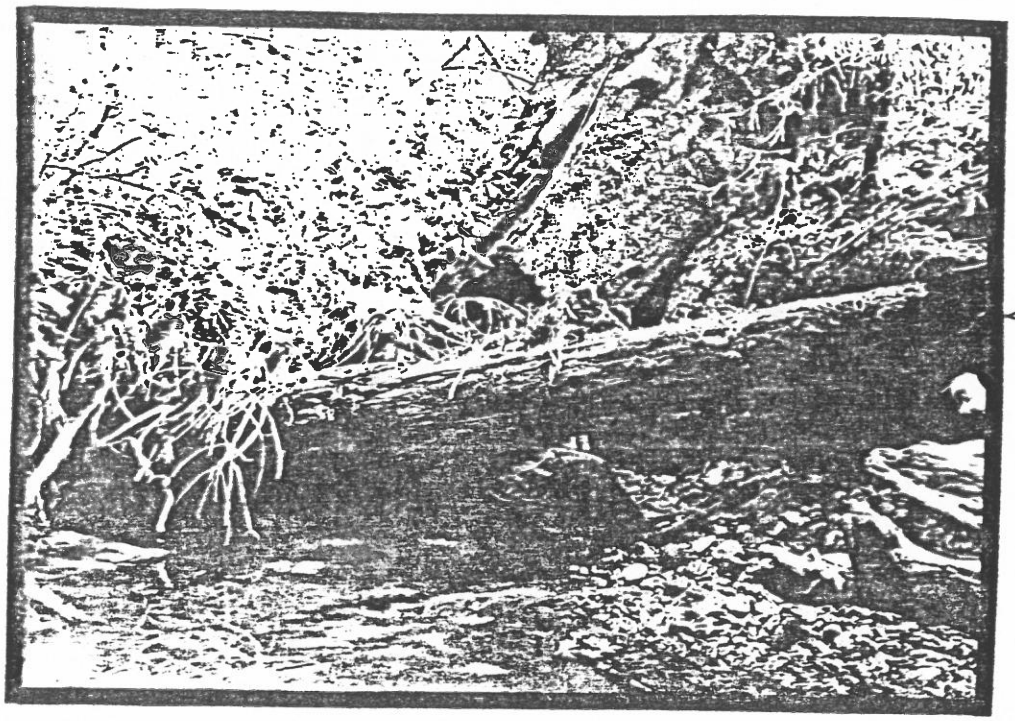
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam is 15'x10'x6', consists of large logs silted in behind. Stable. Falls are 5' high. Pool below is 15'x15'x1'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 30 cfs.

Estimated flow volume or conditions required for downstream passage: 5 cfs.

COMMENTS:



15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: upstream 0.9 miles from Browns Creek confluence

LOCATION: 0.2 miles from confluence with Browns Creek
ID #: B2 TYPE OF BARRIER: Log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam is 15'x4'x5', consists of debris, silted in behind. Unstable. High flow passage on left side of creek. No pool below. Jam may wash out.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 3 cfs.

COMMENTS:

15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: Upstream 0.9 miles from confluence with Browns Creek

LOCATION: 0.3 miles from Browns Creek
ID #: B3 TYPE OF BARRIER: Log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Slide has downed redwoods and tanbarks in a 15 yard stretch of stream over riffles. Stable.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Potential to silt in behind and become large barrier.

15 Oct 82

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: Upstream 0.9 miles from Browns Creek

LOCATION: 0.4 miles from Browns Creek
ID #: B4 TYPE OF BARRIER: Log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Jam is 30'x20'x6'. Unstable. Pool below is 15'x10' and 2' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 5 cfs. Easy passage on right side of stream during medium flows.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Jam may wash out at 30 cfs.

15 Oct 82

<0.1 cfs

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: Upstream 0.9 miles from Browns Creek

LOCATION: 0.45 miles upstream from Browns Creek. Downstream of Gamecock Ranch House.
ID #: B5 TYPE OF BARRIER: Log jam

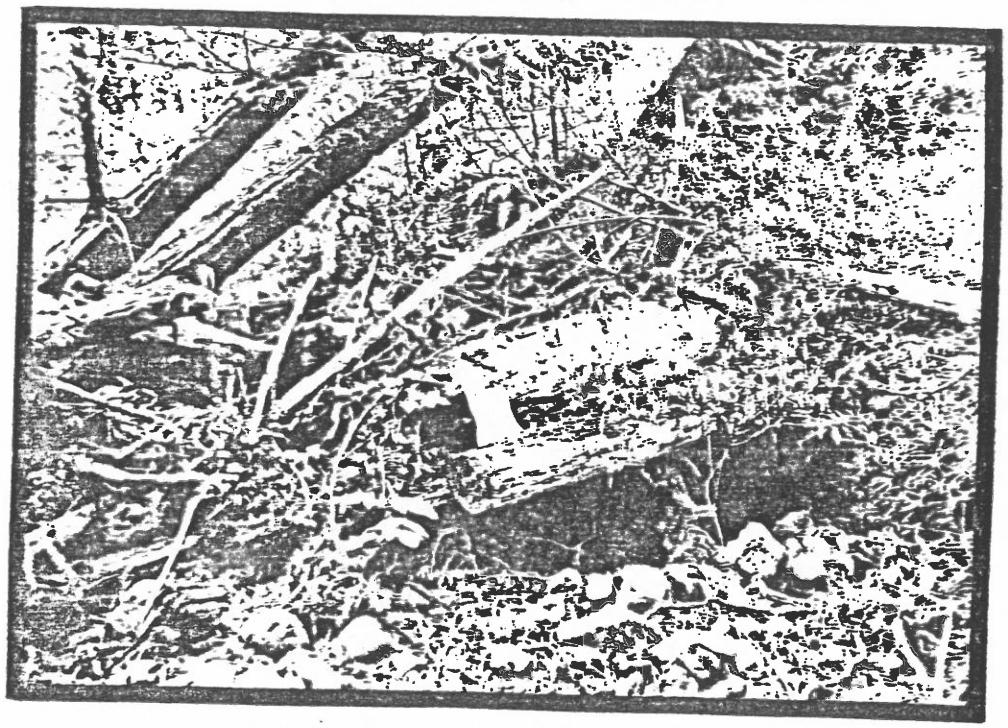
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Slides have created series of jams. 60'x15'x4'. Stable. No jumping pool. Flow filters through jam. Passage possible on left side of stream during medium flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 4 cfs.

COMMENTS: Access from Gamecock Ranch for removal.



15 Oct 82

<0.1 CFS

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Turner SECTION: Upstream 0.9 miles from Browns Creek

LOCATION: Just upstream of B5
ID #: B6 TYPE OF BARRIER: Log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Jam is 20'x8'x5'. Unstable. Flow filters through jam. No pool below.

PASSABILITY. Estimated flow volume or conditions required for upstreampassage: 8-10 cfs.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Jam might wash out at 30 cfs. Access from Gamecock Ranch for removal.

15 Oct 82

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: SECTION: Upstream 0.9 miles from Browns Creek

LOCATION: 0.6 miles from Browns Creek
ID #: BM7 TYPE OF BARRIER: Cement ford - culvert

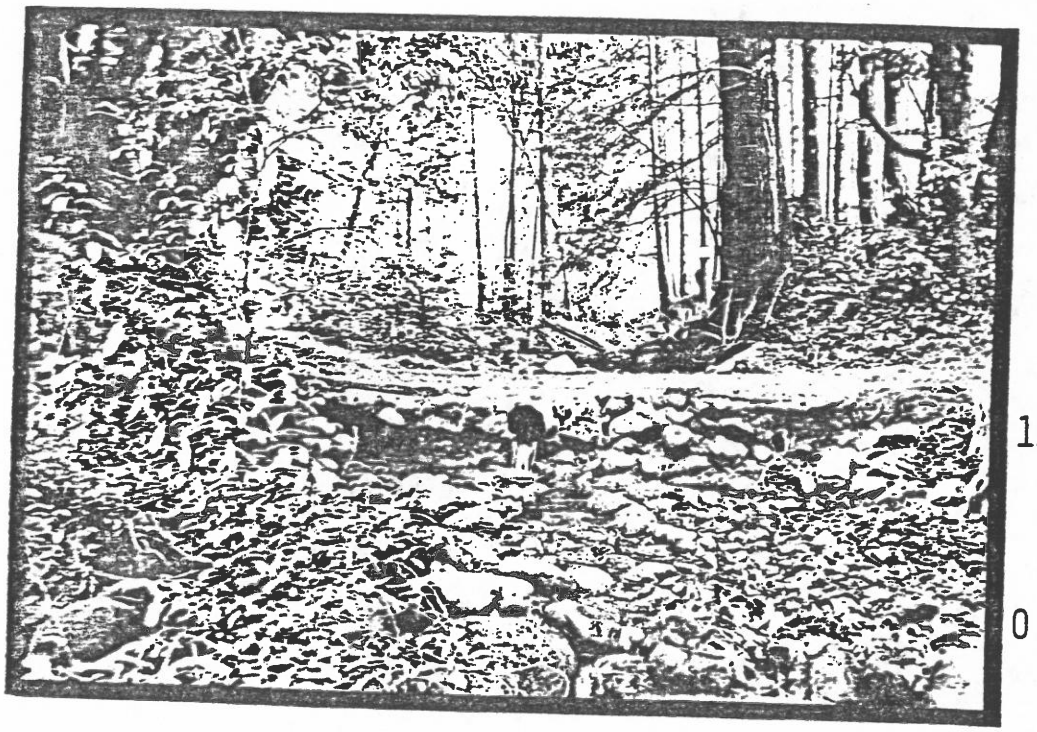
OWNER: Gamecock Ranch
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Cement Ford is 25'x10' and 2' above the low flow. Culvert, 16" in diameter, is 1' above low flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 4 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



15 Oct 82

0.2 CFS

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Alley/Turner SECTION: Upstream from channel mile 0.9

LOCATION: 1/2 mile above road that goes to Gamecock Ranch
ID #: B8 TYPE OF BARRIER: Boulder-rubble

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 3.5' high boulder falls. No pool for 5 feet down from barrier, preventing jump at low flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable except possibly at high (15+ cfs) flows. Water funnels through 5' opening and at high flow pool might raise enough to allow fish to move through rocks at head and jump.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: No fish seen between B8 and B9 but trout seen above B9 in 1981. Stream section is not too steep so barrier can be modified.

15 Oct 82

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Alley/Turner SECTION: Upstream from channel mile 0.9

LOCATION: 0.6 miles upstream form concrete bridge and culvert at Gamecock Canyon Ranch
ID #: B9 TYPE OF BARRIER: Boulder falls

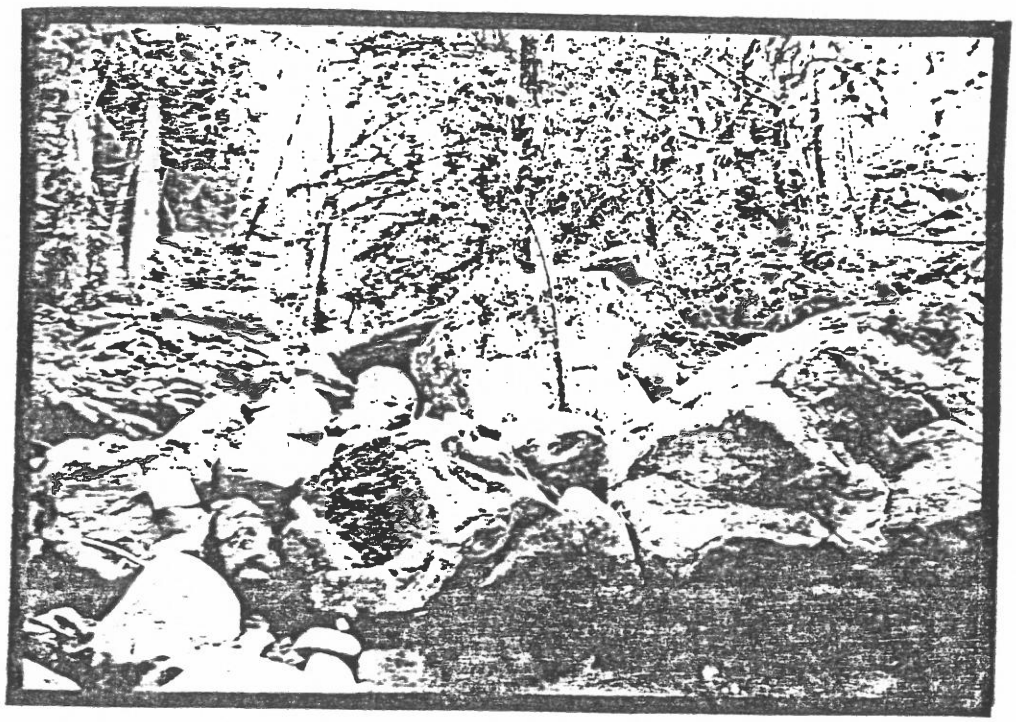
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 8' high boulder barrier, requiring jumps of 3', 3' and 4' to pass. No pools from which to jump. Permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage: 3 cfs.

COMMENTS: Resident trout seen in steep section above. Steep and with 6, 2' high obstacles from B9 to B10.



15 Oct 82

BARRIERS

STREAM: Gamecock Canyon tributary to BROWNS CREEK
OBSERVER: Alley SECTION: From mile 0.9 upstream

LOCATION: 900' above B5. 1/2 mile above Gamecock Ranch.
ID #: B10 TYPE OF BARRIER: Boulder

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Two step boulder barrier with a total height of 6' (steps of 3') Pool is only 1' maximum depth at low flow. Stream narrow and barrier is at slight bend in channel.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 1st step is probably passable at 5 cfs. Second step appears impassable.

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS:

BARRIERS

STREAM: CARNADERO-UVAS CREEK
OBSERVER: Smith SECTION: From mouth to Miller Ave.

LOCATION: Railroad crossing (BM177)
ID #: BM1 TYPE OF BARRIER: Concrete slab for trestle

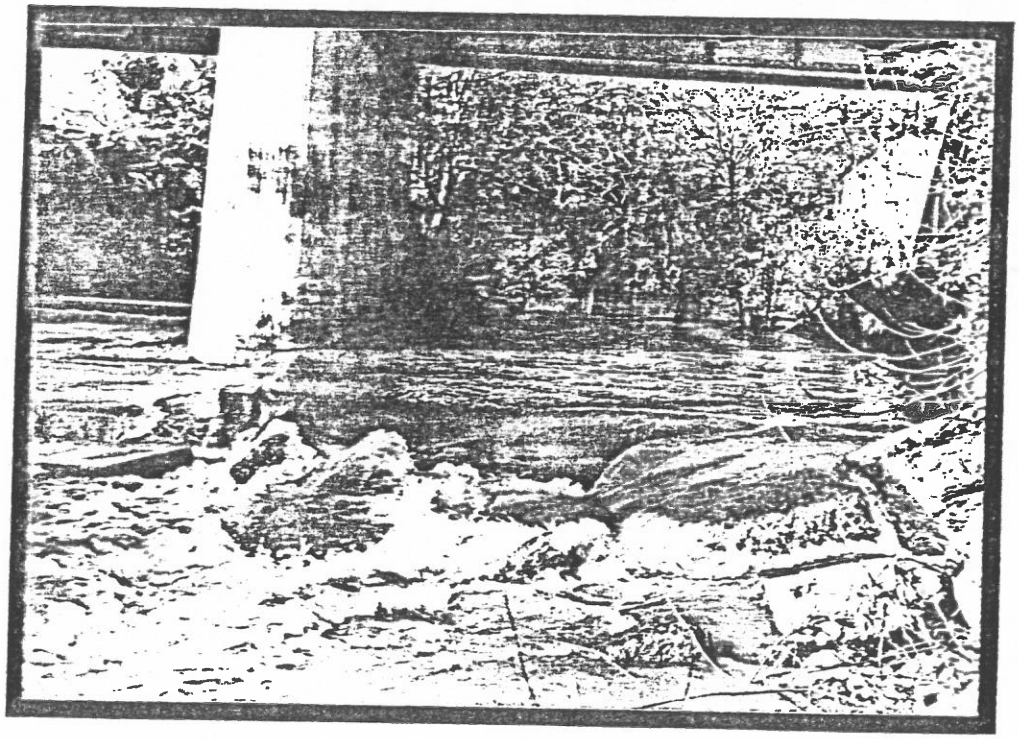
OWNER: Southern Pacific Railroad
PURPOSE AND OPERATION: Slab for trestle

DESCRIPTION (type, height, pool development, permanence, etc): Flow is presently concentrated down north half of slab but still spreads over 30 feet. Three to four foot concrete chunks are piled at base of slab, preventing easy jump. Narrow crevices do allow passage.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Flows of at least 10-15 cfs still present problems (turbulence) but barrier has been passed at about 4 1/2 cfs.

Estimated flow volume or conditions required for downstream passage: 2-2 1/2 cfs will allow fish to move through to Pajaro River.

COMMENTS: Gage height index to passage flows: Thomas Road Gage - (minimum) 1.84 (easy passage) 2.18. Removal of concrete chunks would allow jump pool development. If chunks were placed downstream as a weir this would raise pool level. Probable site of significant poaching.



14 JAN 82

≈80+ CFS

BARRIERS

STREAM: CASSERLY CREEK
OBSERVER: Smith SECTION: Mouth to confluence of Gaffey Banks Creek

LOCATION: Mt. Madonna Road crossing
ID #: BM1 TYPE OF BARRIER: Culvert and concrete lip

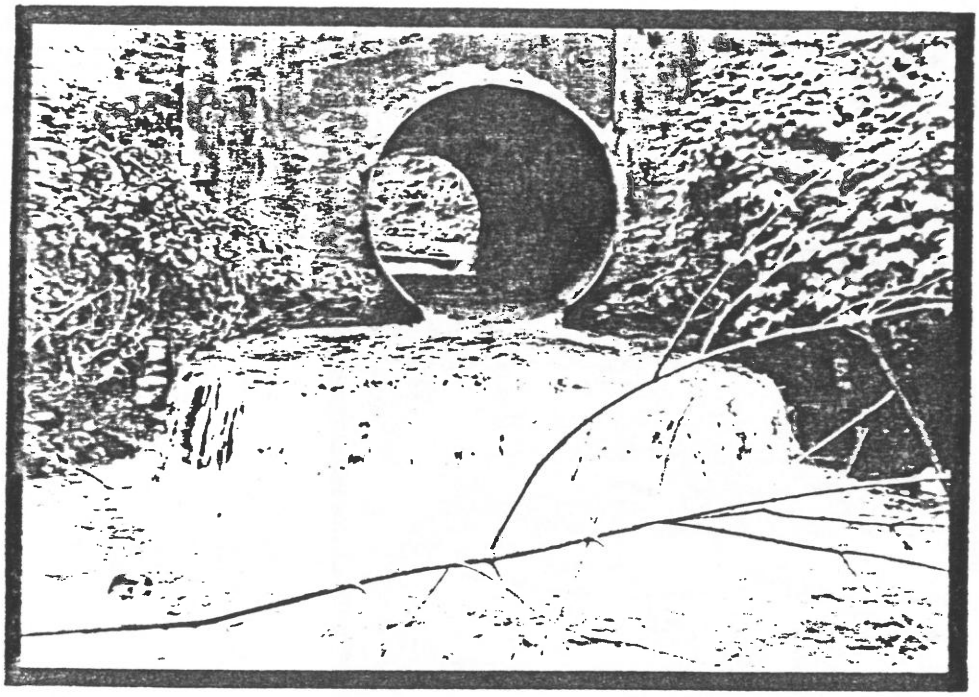
OWNER: Santa Cruz County Public Works
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6' diameter culvert. 10' wide concrete lip is 1 to 1 1/2' above stream surface. Pool development is variable, but usually very shallow and providing poor jump. Notch in center of lip allows some advantage when debris collects.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 3-10 cfs or more, depending upon pool development.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: Can be modified to concentrate flow and dig a better pool. Weir downstream would raise pool level.



27 APR 82

1½ CFS

BARRIERS

STREAM: CASSERLY CREEK
OBSERVER: Smith SECTION: Mouth to confluence of Banks and Gaffey Creeks

LOCATION: Gaffey Road crossing
ID #: BM2 TYPE OF BARRIER: Culvert road crossing

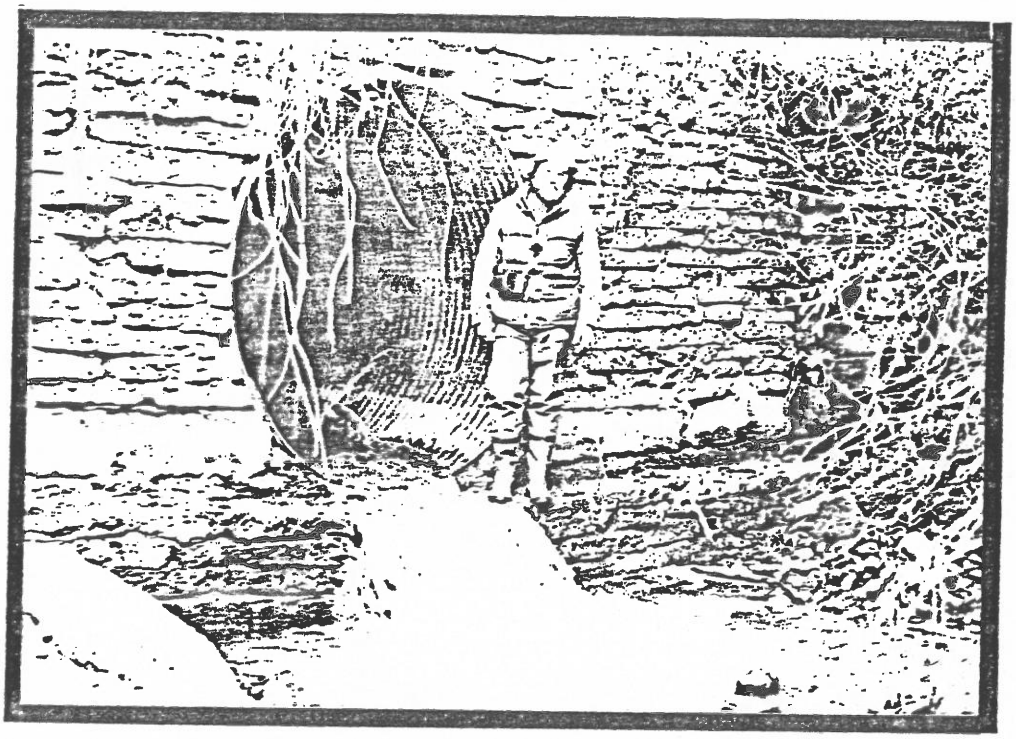
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Culvert empties directly into stream (no concrete lip) allowing good pool development 1 1/2 to 2' jump.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 1-2 cfs because of good jump pool. More (3 cfs) needed for easy culvert passage.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS:



15 JAN 82

1 CFS

BARRIERS

STREAM: CASSERLY CREEK
OBSERVER: Smith SECTION: Mouth to confluence of Banks and Gaffey Creeks

LOCATION: Immediately above Gaffey Road crossing (BM2)
ID #: B3 TYPE OF BARRIER: Log jam

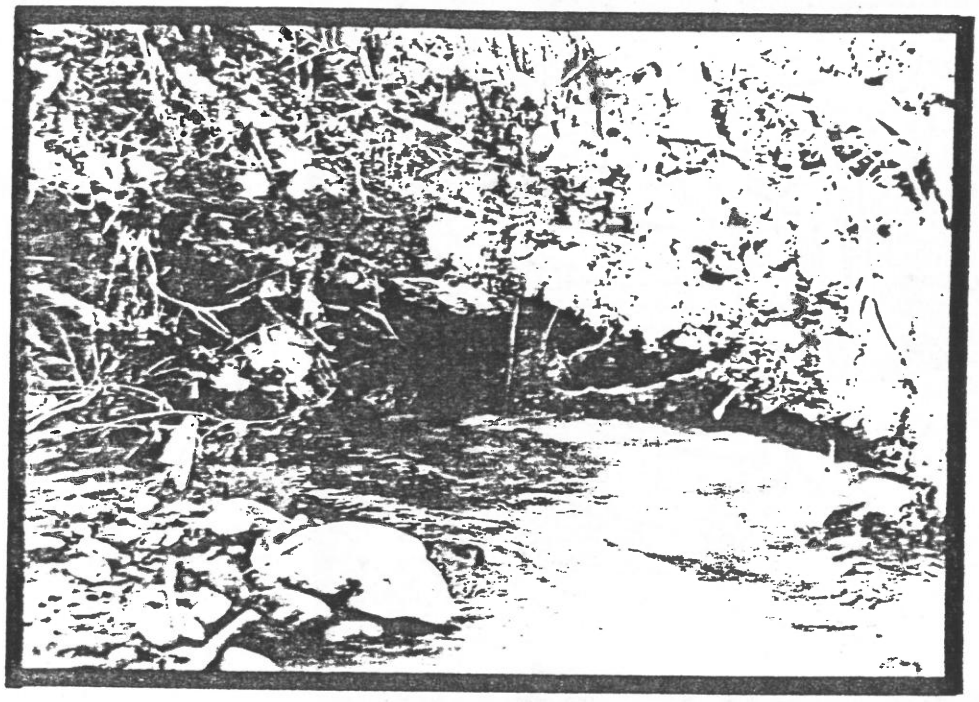
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam and 3' high fill (due to 4 January 82 storm)was partially removed by Smith and Alley. Jam formed again in February 82 as log jam 3-4' high with possible hole at bottom and anchored by embedded logs.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Both logs of "jam" and embedded anchors and branches should be removed.



27 APR 82

1½ CFS

BARRIERS

STREAM: CEDAR CREEK
OBSERVER: Turner SECTION: Mile 2.5 to mile 3.6

LOCATION: 2 1/2 miles upstream of mouth
ID #: B1 TYPE OF BARRIER: Boulder falls

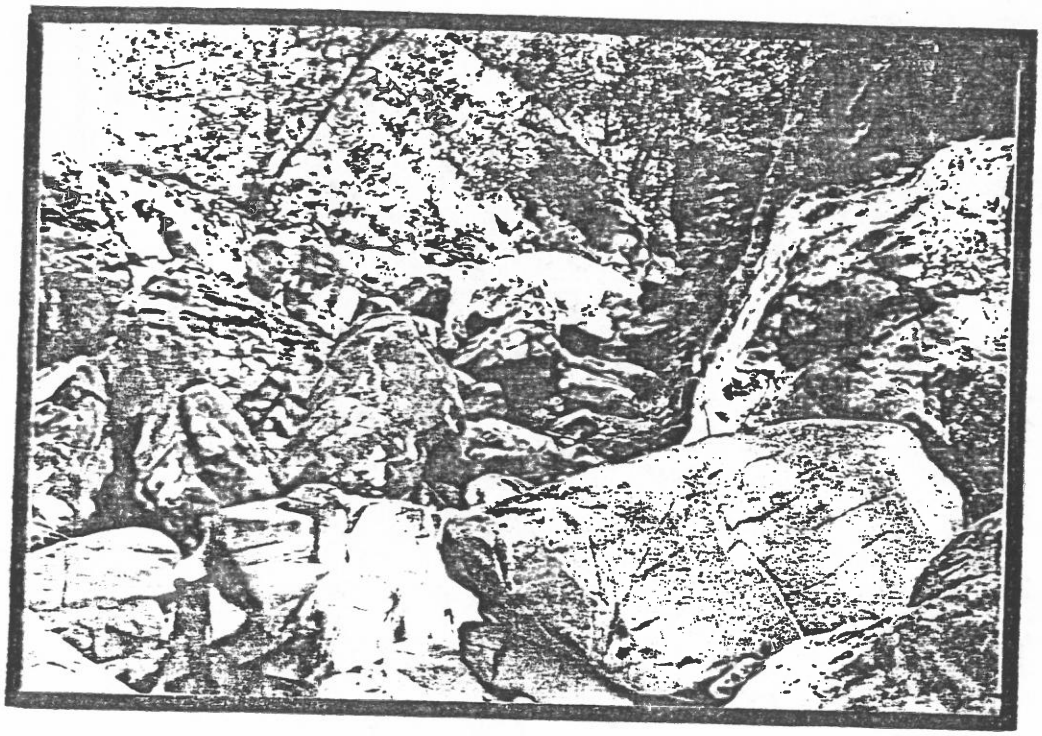
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6 ft. in height, boulders, 1 ft. jumping pool. Logs are jammed in opening at the top.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Appears passable only at very high (30+ cfs) flows. Velocity may be problem at high flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



11 Aug 82

BARRIERS

STREAM: CEDAR CREEK
OBSERVER: Turner SECTION: Mile 2.5 to mile 3.6

LOCATION: 100 yds above B1
ID #: B2 TYPE OF BARRIER: Boulder falls

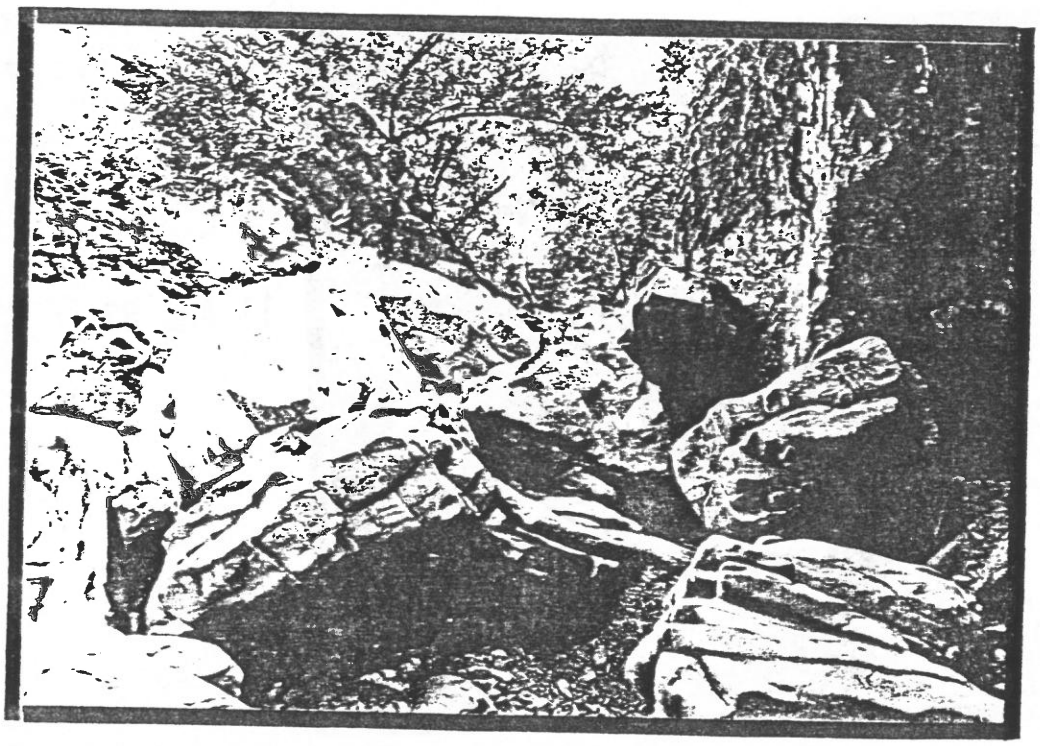
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
6 ft. high boulder falls. 1 foot pool at bottom.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable except at very high (30+ cfs) flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



11 Aug 82

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Smith SECTION: 1 mile above Green Valley Road upstream to Browns Creek confluence

LOCATION: Browns Valley Road bridge crossing
ID #: BM1 TYPE OF BARRIER: Concrete bridge apron

OWNER: County
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Concrete apron with 4' drop. Flow concentrator on west side (1981). Jump into low flow channel 2-4' high depending upon the height of pool and the amount of flow. Pool below is 3-5' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Between 7 and 80 cfs in low flow channel. At high flows, velocity in low flow channel is a problem as is height to top of falls. At high flows can swim up concrete slab on east side of channel; velocity is a problem.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Pool reworked by 4 January 82 storm, raising height and improving passage. Will dig out and degrade in the future. Passage could be improved by: 1) routing out portion of west side apron at top in order to lower stream level; 2) making pool and weir ladder in low flow channel; and 3) constructing concrete weir downstream to raise and maintain the level of the jump pool. (based upon Ted Vandesande observations).

9 MAR 82

20-25 CFS

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Smith SECTION: From Browns Creek confluence upstream to diversion dam

LOCATION: Approximately 1 mile up Corralitos Road from the town of Corralitos
ID #: BM2 TYPE OF BARRIER: Concrete diversion dam

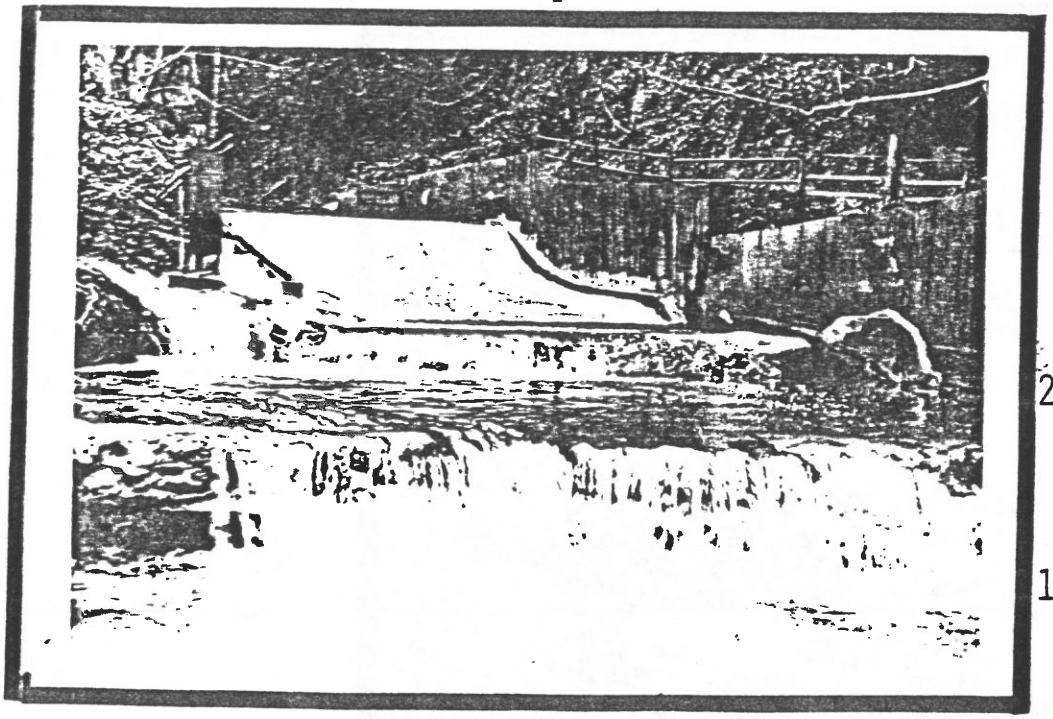
OWNER: City of Watsonville
PURPOSE AND OPERATION: Domestic water supply diversion

DESCRIPTION (type, height, pool development, permanence, etc): 9' high diversion dam with 2 concrete weirs downstream with 2 to 3+' jumps each (depending upon pool configuration and flow volume). 5-step pool-and-weir fish ladder on west side is steep and turbulent. An additional step was added at the bottom in 1982, greatly easing entrance to the ladder. The top pool was also lengthened and the jumps equalized, easing passage through the ladder; the top jump is the most difficult part of the ladder.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: The ladder is probably now passable with some difficulty at flows above 3 cfs and less than 40 cfs. Passage is possible at higher flows (to 150 cfs) but turbulence in the ladder is a severe problem.

Estimated flow volume or conditions required for downstream passage: Bypass of diversion with 2-3 cfs.

COMMENTS: Barrier was modified in 1982 after suggestions in previous habitat problems report.



21 JAN 83

11 CFS

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Smith SECTION: Rider Creek to Clipper Gulch

LOCATION: At first road crossing above Rider Creek, mile 3.0
ID #: BM3 TYPE OF BARRIER: Concrete road culvert

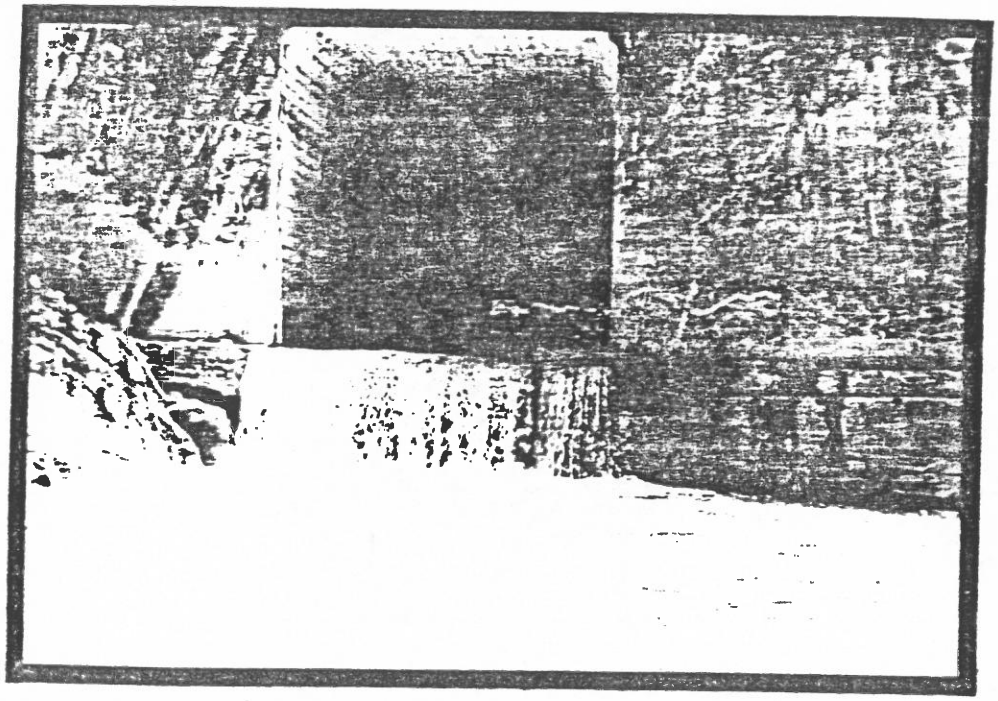
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Tunnel under road overpass creates 4' cement wall above large pool 30' wide and 40' long. Pool depth 3 1/2 to 5' or more below drop. Flow from tunnel shoots out 3' at 30 cfs and 4 1/2' at 100 cfs. Jump must come from far back.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 10 to 30 cfs depending upon fish size and pool height (reduced 1' by 4 January 1982 storm).

Estimated flow volume or conditions required for downstream passage: 1 1/2 cfs.

COMMENTS: 2 fish observed passing barrier at about 100 cfs in February 1983, but over 40 attempts were observed. Larger fish have easier time. At high flows, velocity in wide shallow tunnel (40' long) is a problem. Modifications should include: 1) construction of weir below culvert to raise and maintain pool level (redwood logs or rock), and 2) install Washington baffles in culvert to reduce velocity (based upon observations of Ted Vandesande).



27 APR 82

8 CFS

BARRIERS

STREAM: **CORRALITOS CREEK**
OBSERVER: Smith SECTION: Clipper gulch to Shinglemill Gulch

LOCATION: Immediately upstream of Cookhouse Gulch confluence
ID #: B4 TYPE OF BARRIER: Bedrock chute, boulder falls

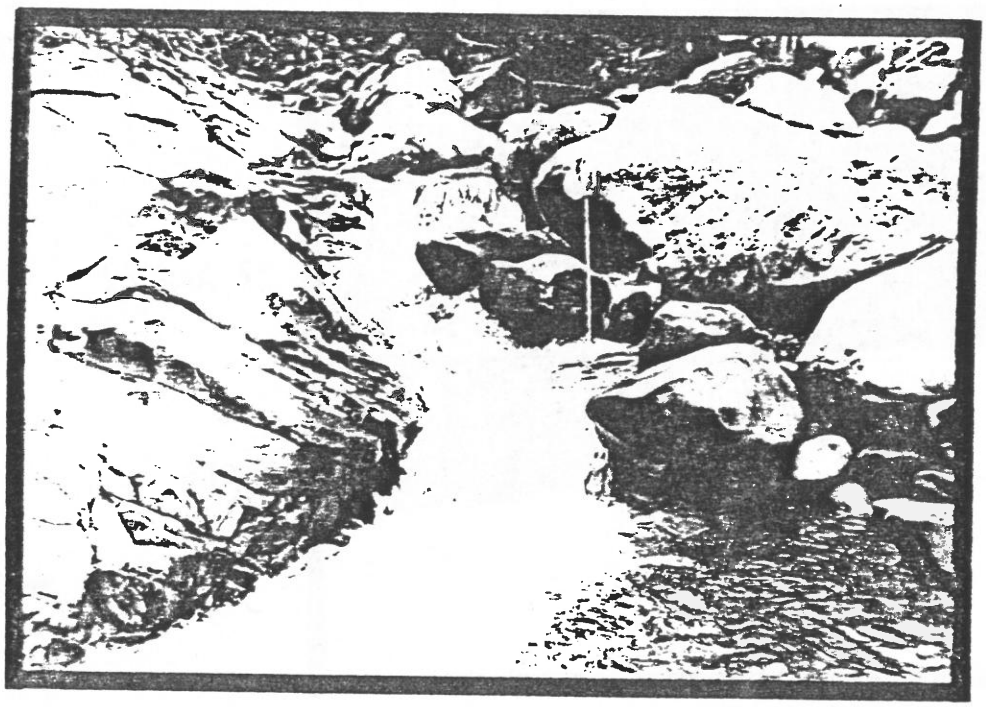
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 8' total height. Multistepped series of short boulder falls leading to bedrock chute rising 3 to 3 1/2' to level section above.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably passable at 7 cfs but at 15 cfs velocity in chute may block passage. At 25 cfs barrier is probably passable by boulder steps around east side of chute.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Barrier height increased by January 1982 storm; not considered a significant barrier in 1981.



30 APR 82

6-8 CFS

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Turner SECTION: From Shingle Mill Gulch to Diablo Gulch

LOCATION: 0.4 miles from Shingle Mill
ID #: 35 TYPE OF BARRIER: Log and rock dam

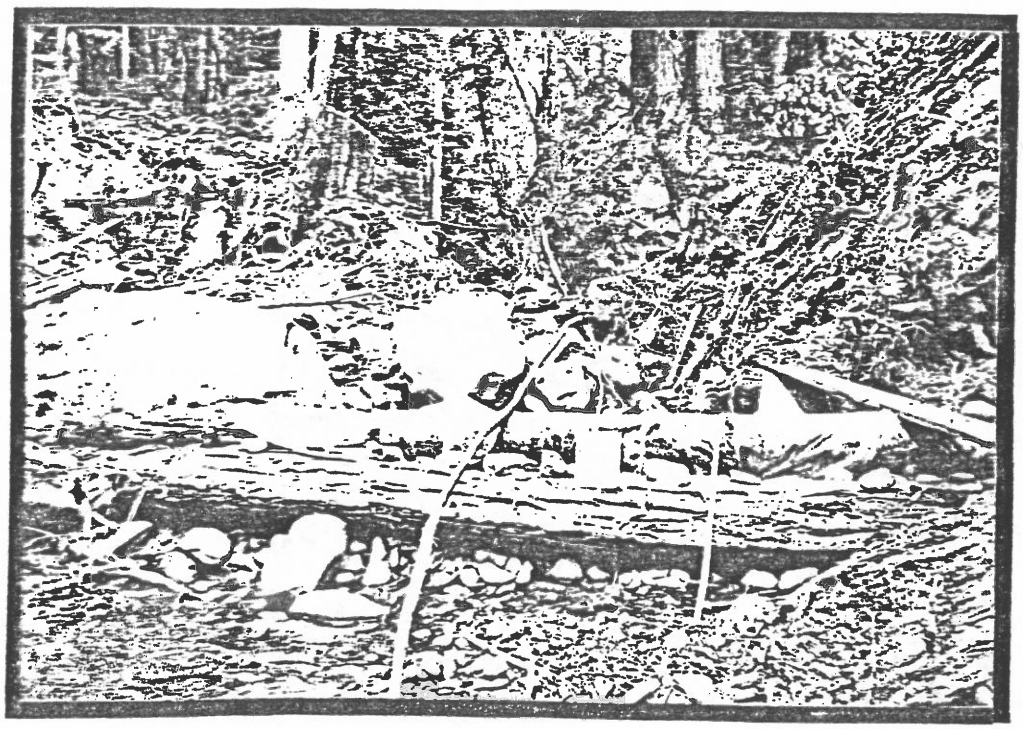
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 18' wide, 3' high. No pool below. Flow filters beneath. Will probably be dismantled when rainy season begins.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs.

Estimated flow volume or conditions required for downstream passage: 10 cfs.

COMMENTS:



18 Oct 82

<0.1 cfs

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Turner SECTION: From Shingle Mill Gulch to Diablo Gulch

LOCATION: See map. 0.5 miles from Shingle Mill Gulch
ID #: B6 TYPE OF BARRIER: Boulder falls

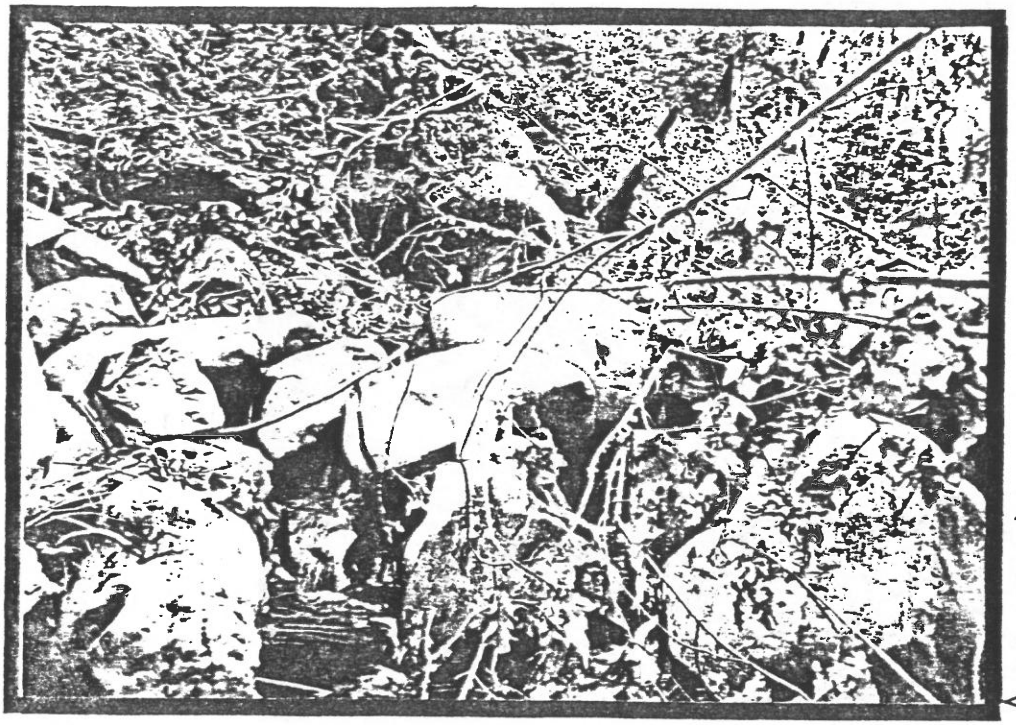
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Falls created by boulders. 4 1/2' high. No jumping pool.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS:



18 Oct 82

<0.1 cfs

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Turner SECTION: From Shingle Mill Gulch to Diablo Gulch

LOCATION: 0.65 miles from Shingle Mill Gulch
ID #: B7 TYPE OF BARRIER: Falls

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Series of falls over boulders and debris in a 70' stretch. Elevation gain is 7 ft. Pool below is 15'x15'x1'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs.

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS:

18 Oct 82

<0.1 cfs

BARRIERS

STREAM: **CORRALITOS CREEK**
OBSERVER: Alley SECTION: From Diablo Gulch confluence upstream 0.6 miles

LOCATION: .35 miles upstream from Diablo Gulch
ID #: B8 TYPE OF BARRIER: Boulder redwood stump

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Boulder (10' in diameter) and 2 redwood stumps. Total height is 7'. Pool below averages 2' deep at low flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably impassable except at very high flows (25 cfs).

Estimated flow volume or conditions required for downstream passage:

COMMENTS:

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Alley SECTION: From Diablo Gulch confluence upstream 0.6 miles

LOCATION: Just below campground and junction of intermittent west bank tributary.
ID #: B9 TYPE OF BARRIER: Boulder

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6' high with one stepped area requiring 2.5' leaps without pools. Pool below is poorly developed.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs might allow passage by raising pool height; at high flows velocity is a problem.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:

BARRIERS

STREAM: Unnamed tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Diablo Gulch confluence upstream 0.6 miles

LOCATION: 600' from confluence with Corralitos Creek
ID #: B10 TYPE OF BARRIER: Redwood log and boulder

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 5' total height. Pool below is shallow (0.5' at low flows). Permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable

Estimated flow volume or conditions required for downstream passage:

COMMENTS: This unnamed tributary is wider than Corralitos Creek at their confluence.

BARRIERS

STREAM: CORRALITOS CREEK
OBSERVER: Alley SECTION: From Diablo Gulch confluence upstream 0.6 miles

LOCATION: 0.6 miles above Diablo Gulch
ID #: B11 TYPE OF BARRIER: Series of boulder barriers

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Steep section of stream with many 3' high boulder barriers.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably impassable.

Estimated flow volume or conditions required for downstream passage:

COMMENTS:

BARRIERS

STREAM: Rider Creek tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream o.4 miles

LOCATION: 50' from confluence with Corralitos Creek
ID #: BM1 TYPE OF BARRIER: Redwood log jam

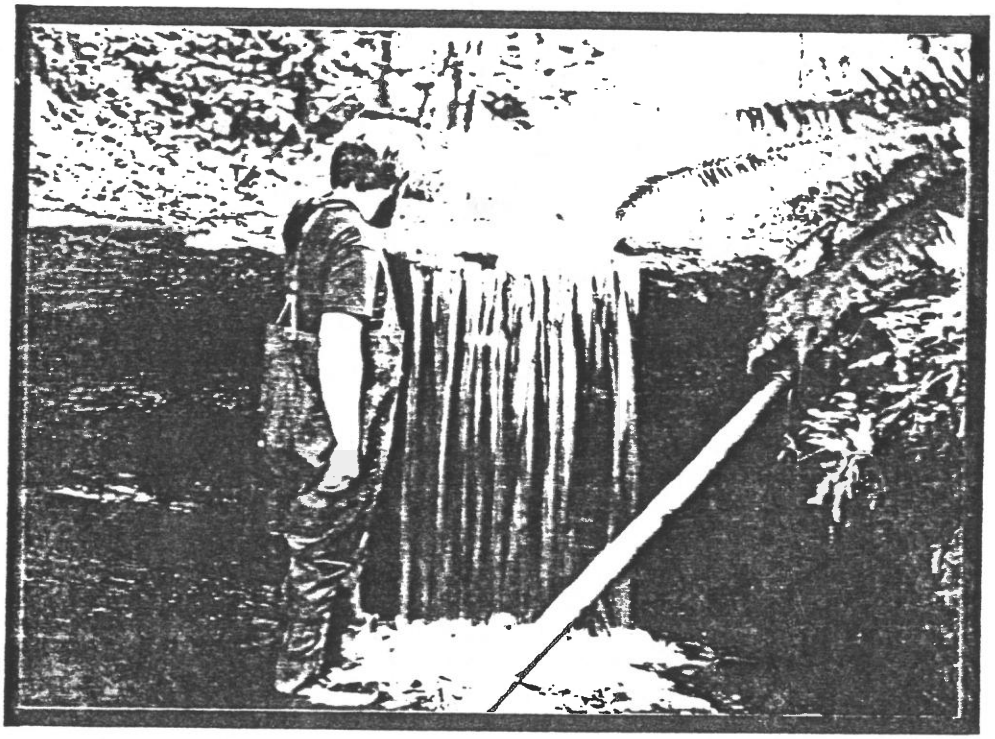
OWNER:
PURPOSE AND OPERATION: Originally, water diversion?

DESCRIPTION (type, height, pool development, permanence, etc): 4 redwood logs stacked across stream, 3-4.5' high. Permanent, silted in beyond, creating falls. Pool below is sandy and averages 0.3' deep at low flows with 1' maximum.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable except at very high (25+ cfs) flows.

Estimated flow volume or conditions required for downstream passage: 0.1 cfs.

COMMENTS: 4 January 1982 storm deposited more sand below, raising stream level 1'.



OCT 81

0.4 CFS

BARRIERS

STREAM: Rider Creek tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.4 miles

LOCATION: 100' before first Rider Road crossing (1000' above confluence)
ID #: BM2 TYPE OF BARRIER: Concrete, rubble, log

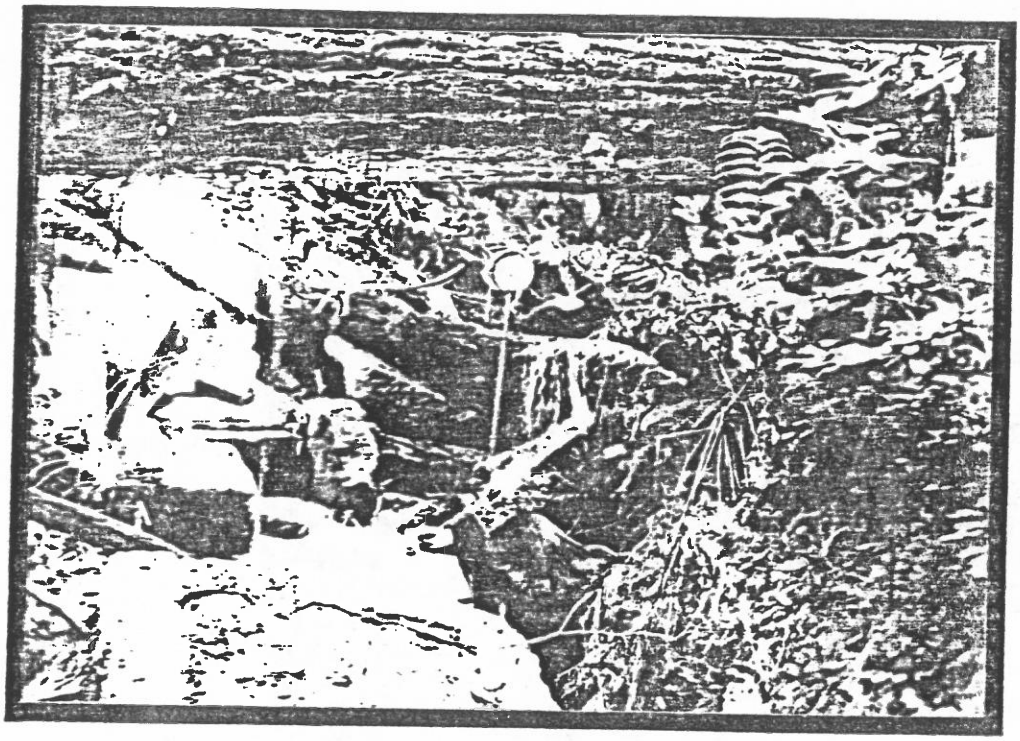
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Washed out bridge creates 3' barrier without pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Next to Rider Road and very accessible.



Aug 81

0.4 cfs

BARRIERS

STREAM: Rider Creek tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.4 miles

LOCATION: First Rider Road crossing of stream (.21 miles from confluence)
ID #: BM3 TYPE OF BARRIER: Culvert Road crossing

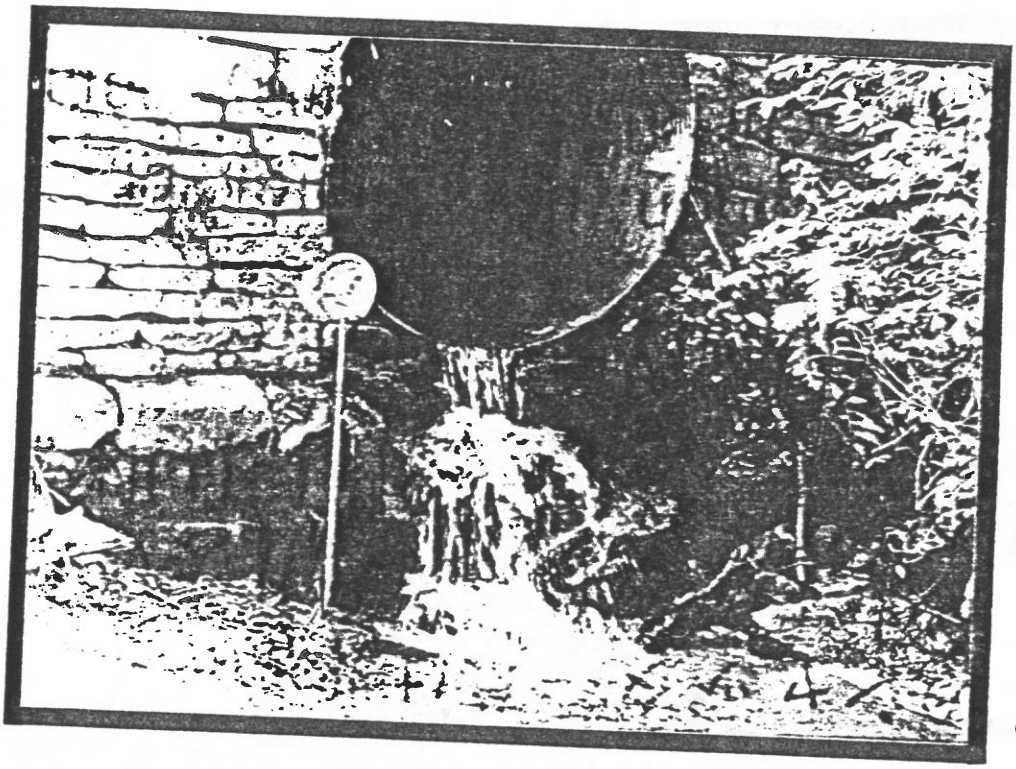
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Culvert creates 4' barrier. No pool development below due to sandy substrate.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs.

Estimated flow volume or conditions required for downstream passage: .1 cfs.

COMMENTS: Crossing washed out 4 January 1982 and new (temporary?) crossing installed with culvert at stream level.



9 Aug 81

0.3 cfs

BARRIERS

STREAM: Rider Creek tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos Creek confluence upstream 0.4 miles

LOCATION: .4 miles up from confluence above paved road junction
ID #: B4 TYPE OF BARRIER: Redwood log

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Redwood log jam of cut timber 4' high with no pool development. Permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Next to road.

9 Aug 81

0.2 cfs

BARRIERS

STREAM: Eureka Gulch tributary to Corralitos Creek
OBSERVER: Smith SECTION: From Corralitos Creek confluence upstream 750'

LOCATION: 140' above mouth
ID #: B1 TYPE OF BARRIER: Log jam

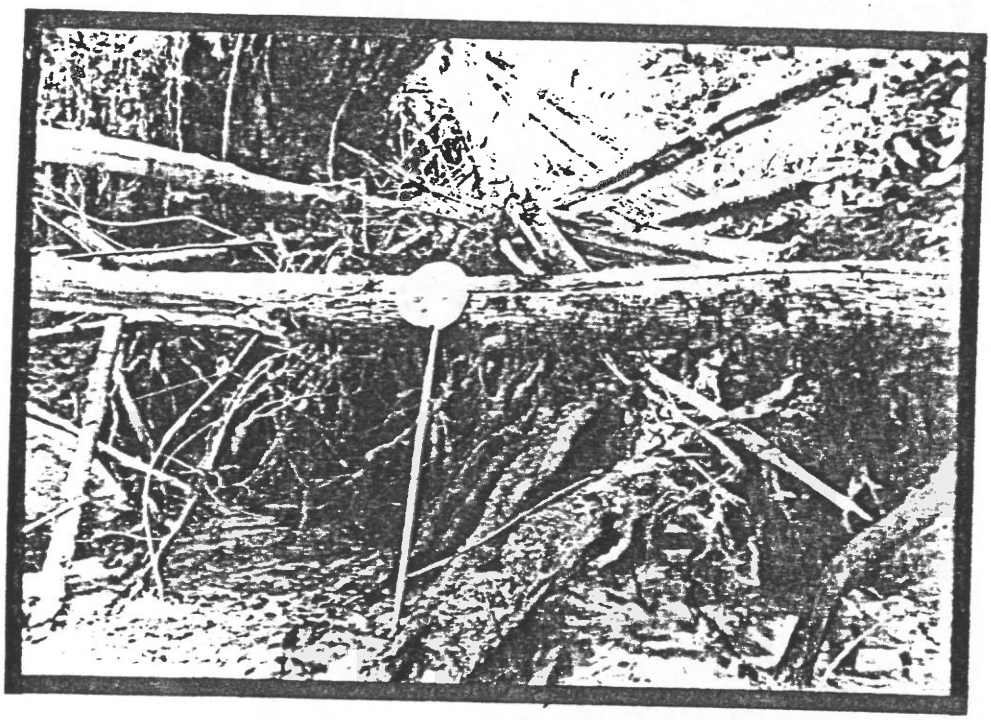
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2' first step - log jam is 18' wide and filled in behind by mud flow. Then 2' up in 30' to large (6' high) partial jam, with 1 1/2' high root tangle.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Possibly passable at high flows (20-25 cfs).

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS: Barrier formed at top of mudflow delta. May be undercut as stream cuts down further through the mudflow.



TOP STEP

30 APR 82

1 1/3 CFS

BARRIERS

STREAM: Eureka Gulch tributary to Corralitos Creek
OBSERVER: Smith SECTION: From Corralitos Creek confluence upstream 750'

LOCATION: 300' above the mouth
ID #: B2 TYPE OF BARRIER: Log jam/ mudflow

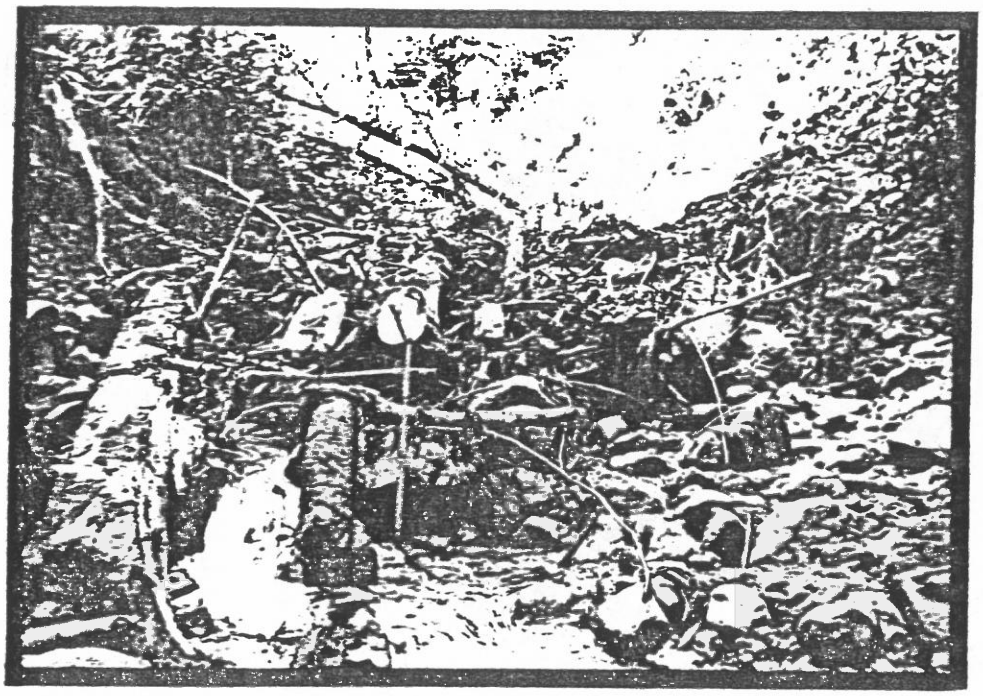
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 55' long mudflow and log jam (total height 10'). 4' high series of steps (without pools) at the base is the major obstacle. Long narrow channel up to upper jam and steps at top of flow (3' high).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passage possible over 1st steps at 15-20 cfs or more.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Will probably cut through and rearrange with large storms.



30 Apr 82

1 1/3 cfs

BARRIERS

STREAM: Eureka Gulch tributary to CORRALITOS CREEK
OBSERVER: Smith SECTION: From Corralitos confluence upstream 750'

LOCATION: 500' above mouth
ID #: B3 TYPE OF BARRIER: Log jam/ landslides

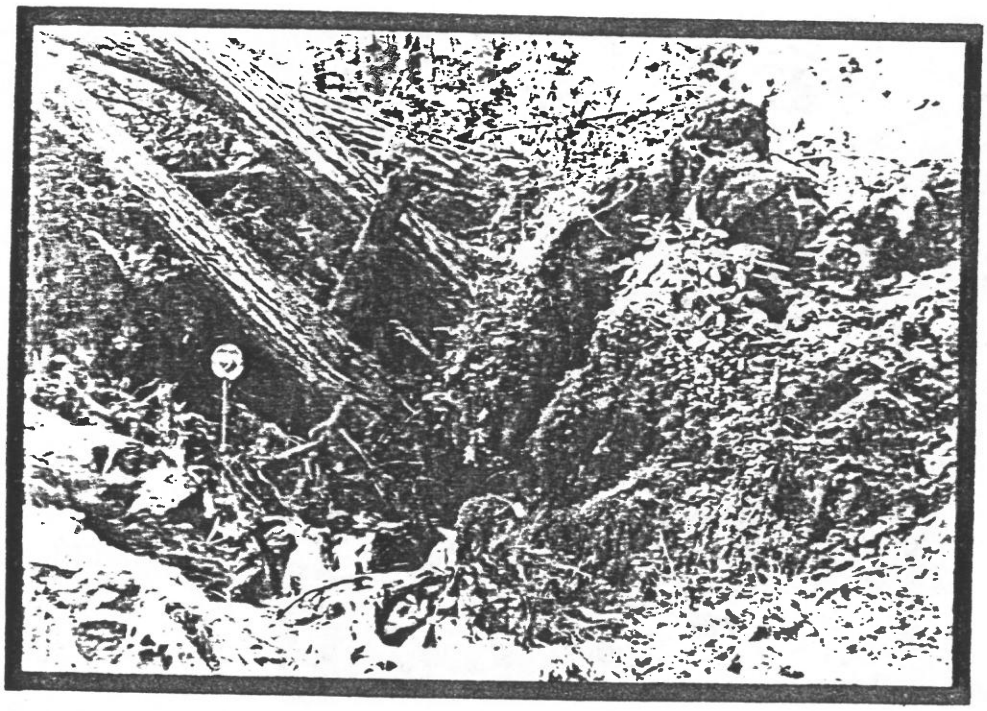
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 5 large (2' diameter) redwood trunks and root mass in streambed due to large landslide above (west side) barrier and larger landslide immediately below (east side) barrier. 3 1/2' high in 3 steps to largest part of jam, a 3.8' step below logs (no jump pool).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Presently not passable. When water is sufficient to produce jump pool, velocity a problem.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Much of barrier is well-anchored, but upper step is behind root mass and small logs and might erode through.



30 APR 82

1 1/3 CFS

BARRIERS

STREAM: Shingle Mill Gulch tributary to CORRALITOS CREEK
OBSERVER: Smith SECTION: Mouth to Rattlesnake Gulch

LOCATION: 1st road crossing - 40' above mouth
ID #: BM1 TYPE OF BARRIER: Apron for bridge

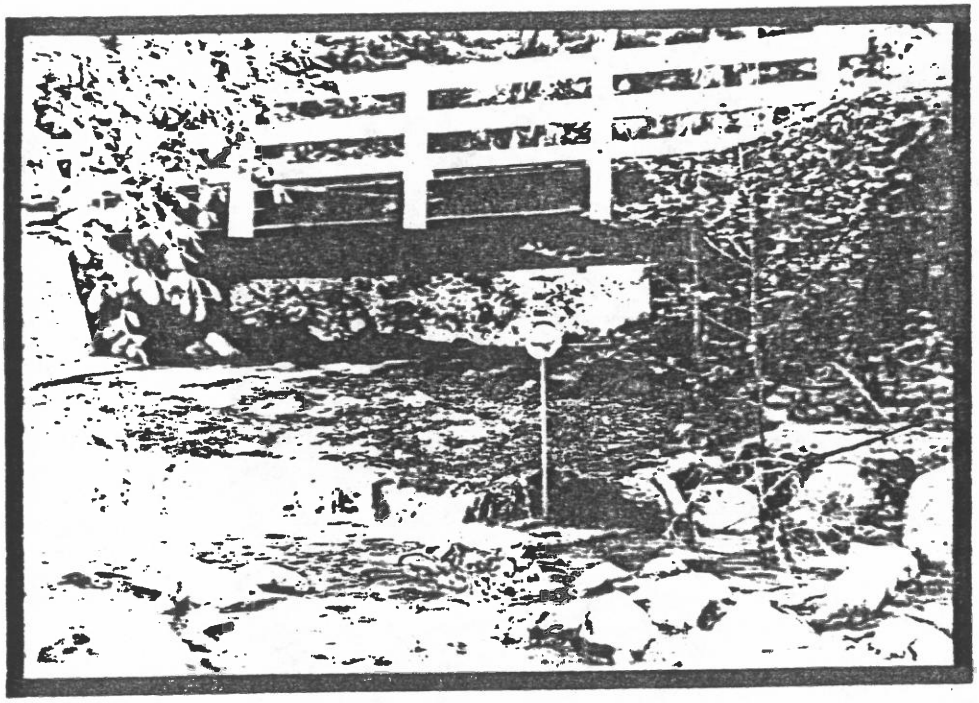
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Apron's total height is 4 1/2' (at 5 cfs). Apron is smooth, 22' wide, and lower 4-6' is at 30+ degrees. Upper 12' is inclined at 15 degrees or less. Pool below is 8-11' long and 1-1 1/2' deep. Apron is 0.8 - 1.5' above pool (at 4 1/2 cfs). Steep bouldery steps from confluence downstream.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 8 cfs to get to pool below apron. At least 20 cfs required to raise pool height so fish can swim up apron without jumping.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



30 APR 82

3½ CFS

BARRIERS

STREAM: Shingle Mill Gulch tributary to CORRALITOS CREEK
OBSERVER: Smith/Alley SECTION: Upstream to Rattlesnake Gulch

LOCATION: 450' above 2nd Eureka Canyon Road crossing
ID #: B2 TYPE OF BARRIER: Boulder and roots (sycamore)

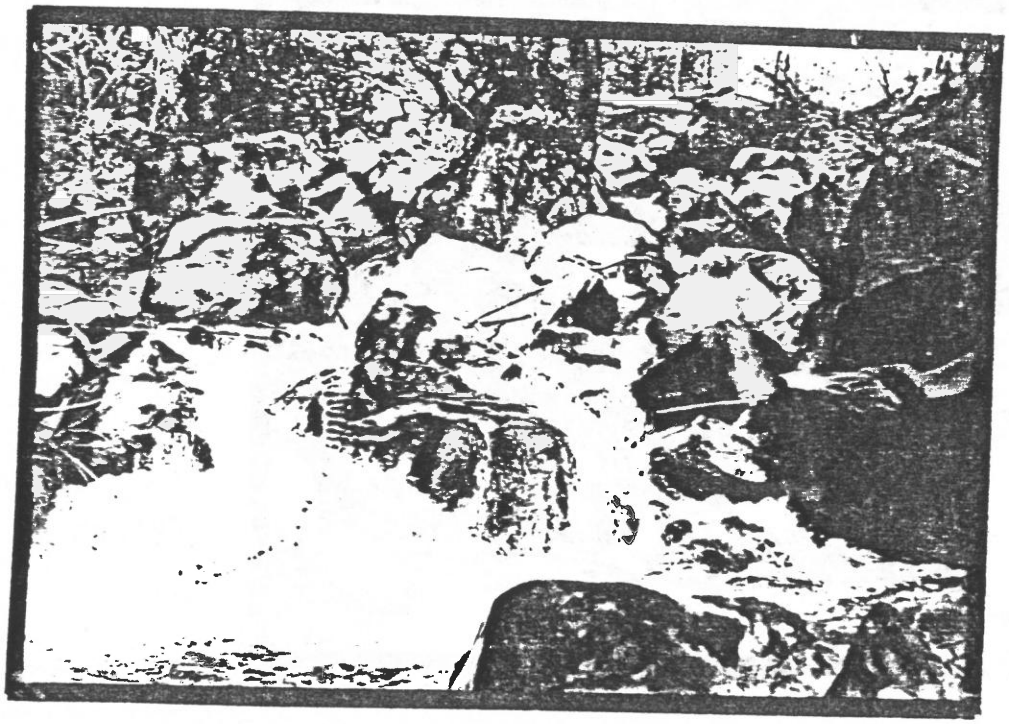
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Boulders held with roots 3.5' high. Average depth of pool below 1 1/2' at 5 cfs. 2 boulders in center of pool create obstacles to jumping.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 10-15 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Juvenile steelhead present above.



15 APR 82

8 CFS

BARRIERS

STREAM: Shingle Mill Gulch tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: Upstream to Rattlesnake Gulch

LOCATION: 480' upstream from 2nd Eureka Canyon Road crossing
ID #: B3 TYPE OF BARRIER: Boulder

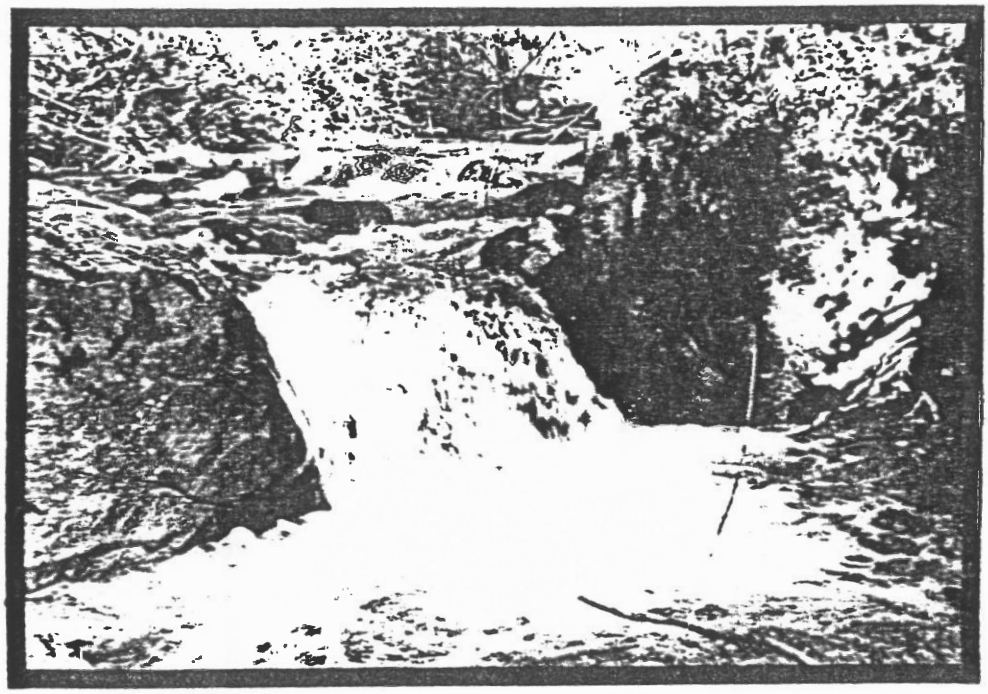
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
4' high barrier. 3 boulders - 2 are 8' in diameter and the middle one is 4' in diameter. The pool is 15' long, 8' wide with maximum low flow depth of 3' and average of 1.7'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs to raise pool enough for easy jump. Multiple steps of barrier and reach above cause difficult passage at all flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



15 APR 82

8 CFS

BARRIERS

STREAM: Shinglemill Gulch tributary to CORRALITOS CREEK
OBSERVER: Smith SECTION: Upstream to Rattlesnake Gulch

LOCATION:
ID #: BM4 TYPE OF BARRIER: Washed-out concrete dam

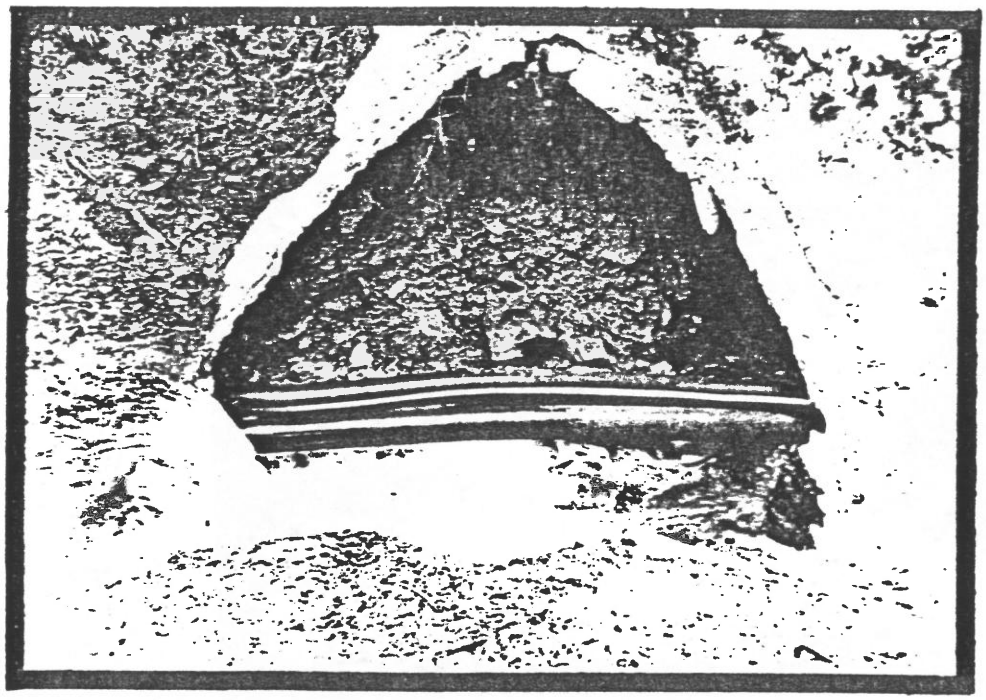
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Washed-out concrete dam has collapsed in the center and washed out beneath the downstream half. Three-foot drop from upstream portion to pool at base.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passable at 5 cfs.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS:



30 APR 82

2^+ CFS

BARRIERS

STREAM: Rattlesnake Gulch tributary to SHINGLE MILL GULCH
OBSERVER: Alley SECTION: Upstream 0.5 miles from Shingle Mill gulch.

LOCATION: Steep section .4 miles from Shingle Mill Gulch
ID #: B1-4 TYPE OF BARRIER: Series of boulder barriers

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Boulders create 4.5' high barrier. Pool shallow at low flows (0.3' average). 3 larger barriers in next 225' (B2-4).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Resident trout above barriers.

BARRIERS

STREAM: Diablo Gulch tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.8 miles

LOCATION: At confluence with Corralitos Creek
ID #: B1 TYPE OF BARRIER: Boulder

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
7-9' high. No pool below. Permanent. Channel is 15' wide.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable except possibly at very high flows (30+ cfs).

Estimated flow volume or conditions required for downstream passage:

COMMENTS: In relatively level stream section. If removed, it might not reform. Potential steelhead habitat exists upstream.

BARRIERS

STREAM: Diablo Gulch tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.8 miles

LOCATION: 300' up from Corralitos confluence
ID #: B2 TYPE OF BARRIER: Redwood log

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Large redwood log, 4' in diameter across streambed. Permanent. Poor pool development and wide channel.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 10-15 cfs.

Estimated flow volume or conditions required for downstream passage: 1/2 cs.

COMMENTS: Stream silted in above. Probably cannot be easily removed, but could be notched to allow passage.

BARRIERS

STREAM: Diablo Gulch tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.8 miles

LOCATION: 900' up from Corralitos confluence
ID #: B3 TYPE OF BARRIER: Redwood log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Log jam with 3.5' minimum height. Not completely silted in behind. Logs 1-2' in diameter.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 5-10 cfs.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS:

BARRIERS

STREAM: Diablo Gulch tributary to CORRALITOS CREEK
OBSERVER: Alley SECTION: From Corralitos confluence upstream 0.8 miles

LOCATION: .5 miles from confluence with Corralitos Creek
ID #: B4 TYPE OF BARRIER: Redwood log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Logs are less than 6" in diameter but stream is silted in above it. Probably permanent. Total height is 3 1/2'. Pool below is shallow (.5') at summer flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs.

Estimated flow volume or conditions required for downstream passage: 0.5 cfs.

COMMENTS:

BARRIERS

STREAM: COWARD CREEK
OBSERVER: Turner SECTION: Thompson Grove region upstream

LOCATION: 2 1/2 miles above the mouth
ID #: B1 TYPE OF BARRIER: Log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Logs and debris. 25'x15'x5'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Total barrier.

Estimated flow volume or conditions required for downstream passage: Unknown.

COMMENTS:

BARRIERS

STREAM: COWARD CREEK
OBSERVER: Turner SECTION: Thompson Grove region upstream

LOCATION: 2 1/2 miles above mouth
ID #: B2 TYPE OF BARRIER: Log jam and falls

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
Downed redwoods, maples and their root systems. 50'x20'x10'.
Several stepped falls work through jam, 8 ft. in height.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Total barrier.

Estimated flow volume or conditions required for downstream passage: Unknown.

COMMENTS:

BARRIERS

STREAM: GREEN VALLEY CREEK
OBSERVER: Smith SECTION: College Lake to 4th bridge upstream on Green Valley Road

LOCATION: 2nd Green Valley Road crossing upstream
ID #: BM1 TYPE OF BARRIER: Drop structure at bridge

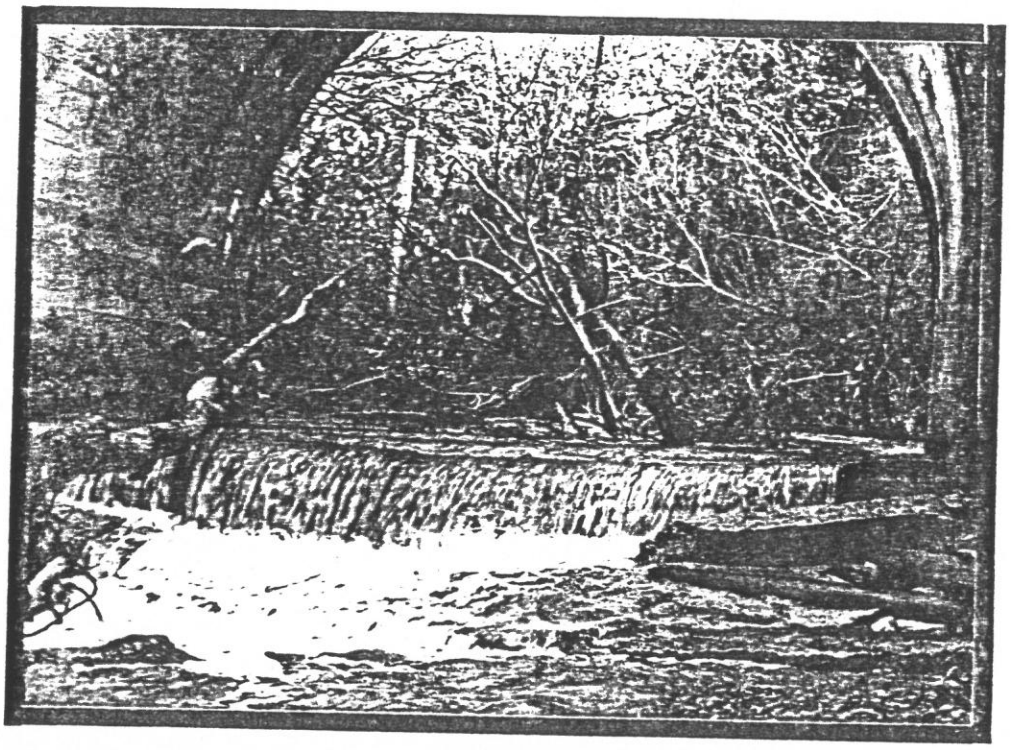
OWNER:
PURPOSE AND OPERATION: Drop structure to stabilize streambed at bridge.

DESCRIPTION (type, height, pool development, permanence, etc): 2 1/2' drop to concrete lip - 15' wide making passage difficult.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 30+ cfs to raise water level enough for jumping.

Estimated flow volume or conditions requrired for downstream passage: 2 cfs.

COMMENTS: Series of weirs placed downstream could raise pool level in 2 stages to provide passage. Notch could also be cut in center of drop structure.



11 JAN 82

5½ CFS

BARRIERS

STREAM: GREEN VALLEY CREEK
OBSERVER: Smith SECTION: College Lake to 4th Green Valley Road crossing

LOCATION: 4th Green Valley Road crossing
ID #: BM2 TYPE OF BARRIER: Bridge drop structure and concrete slab

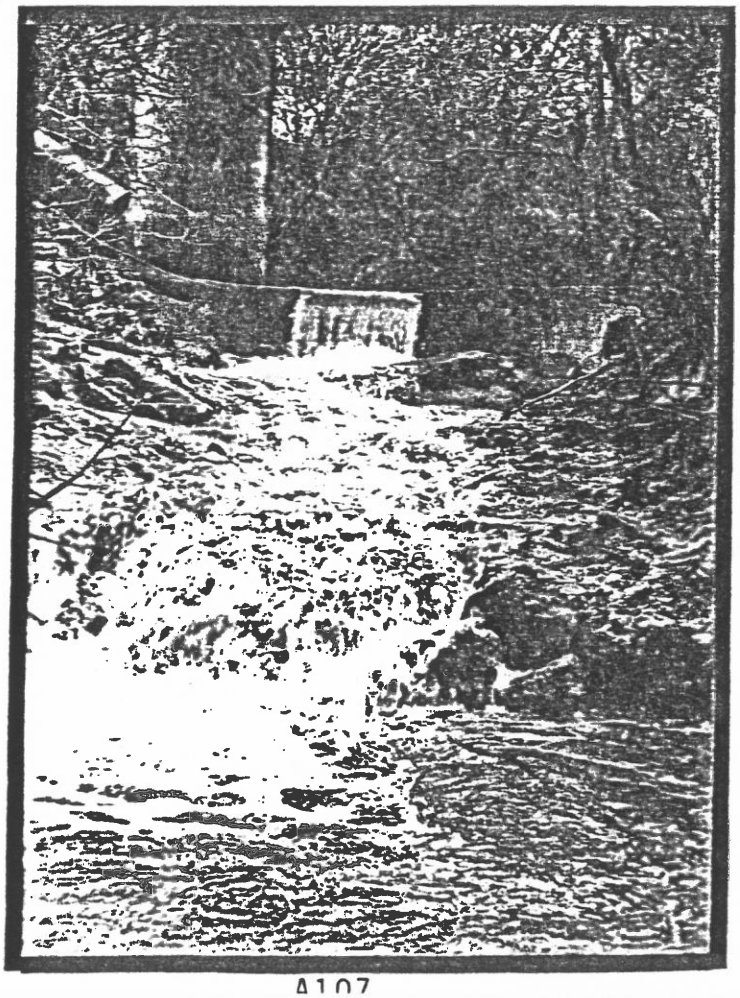
OWNER:
PURPOSE AND OPERATION: To stabilize stream channel at bridge.

DESCRIPTION (type, height, pool development, permanence, etc): 2 1/2-3 foot drop with no pool and 40 foot inclined concrete slab. Slab surface is very rough with pockets to aid fish movement. Total drop is 8-10'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 80+ cfs or more to raise water level for jump.

Estimated flow volume or conditions required for downstream passage: 1 1/2-2 cfs.

COMMENTS: May be passable only at peak flow. A series of 6-8 weirs could be used to raise stream level in steps to base of drop structure for jump.



11 JAN 82

6 CFS

BARRIERS

STREAM: GREEN VALLEY CREEK
OBSERVER: Alley/Matias SECTION: Upstream from Hazel Dell Road

LOCATION: 1200' upstream from Hazel Dell Road
ID #: B3 TYPE OF BARRIER: Redwood stump-potential barrier

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
5' high redwood stump, forming partial log jam. Water flows under it at present (1981). Pool below 0.7' deep at low flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 1 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: The jam is old. Judging from bank erosion behind jam, the jam was a complete barrier in the past and has only recently eroded from underneath.

BARRIERS

STREAM: GREEN VALLY CREEK
OBSERVER: Alley/Matias SECTION: Upstream from Hazel Dell Road crossing

LOCATION: Eastern fork - 300' upstream from fork (.55 miles from Hazel Dell Road)
ID #: B4 TYPE OF BARRIER: Boulder-log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6' high boulders with logs on top. Boulders create 3 1/2 high barrier even if logs are removed.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: No fish seen on this branch in 1981. Nearly dry.

25 Aug 81

<0.1 cfs

BARRIERS

STREAM: GREEN VALLEY CREEK
OBSERVER: Alley/Matias SECTION: Upstream from Hazel Dell Road

LOCATION: Western fork 750' up from fork (0.6 miles from road)
ID #: B5 TYPE OF BARRIER: Boulder-log jam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
4.5' high. Pool below 1' deep maximum in summer.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: May require 20 cfs for passage. Probably impassable except at extreme flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: No fish seen in 1981 below. Nearly intermittent.

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley, Smith SECTION: Mouth to Pickel Dam

LOCATION: 1.4 miles upstream from first bridge crossing
ID #: BM1 TYPE OF BARRIER: Concrete dam

OWNER: Dr. Pecal
PURPOSE AND OPERATION: Water diversion

DESCRIPTION (type, height, pool development, permanence, etc): Concrete dam is 25' high and 40-50' wide at top with impassable fishway on north side. Block square openning in dam is 10-12' up from base. Pool at base of dam is 3 to 5' deep.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable

Estimated flow volume or conditions required for downstream passage: 4 cfs.

COMMENTS: Construction of a steep pass fish ladder to opening in dam and installation of flash board covering for opening would allow passage. Length of ladder could be reduced by installing weirs below the dam to step-wise raise the water level.

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road to end of paved road

LOCATION: .25 miles upstream from Old Watsonville Road crossing
ID #: BM2 TYPE OF BARRIER: Tree branch dam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 3.5' high, constructed (not permanent) log jam. Will be washed out in winter but will leave a lot of debris in stream.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs will wash out barrier.

Estimated flow volume or conditions required for downstream passage: 5+ cfs.

COMMENTS:

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road to end of paved road

LOCATION: .46 mile upstream from bridge crossing for Old Watsonville Road
ID #: BM3 TYPE OF BARRIER: Flashboard dam

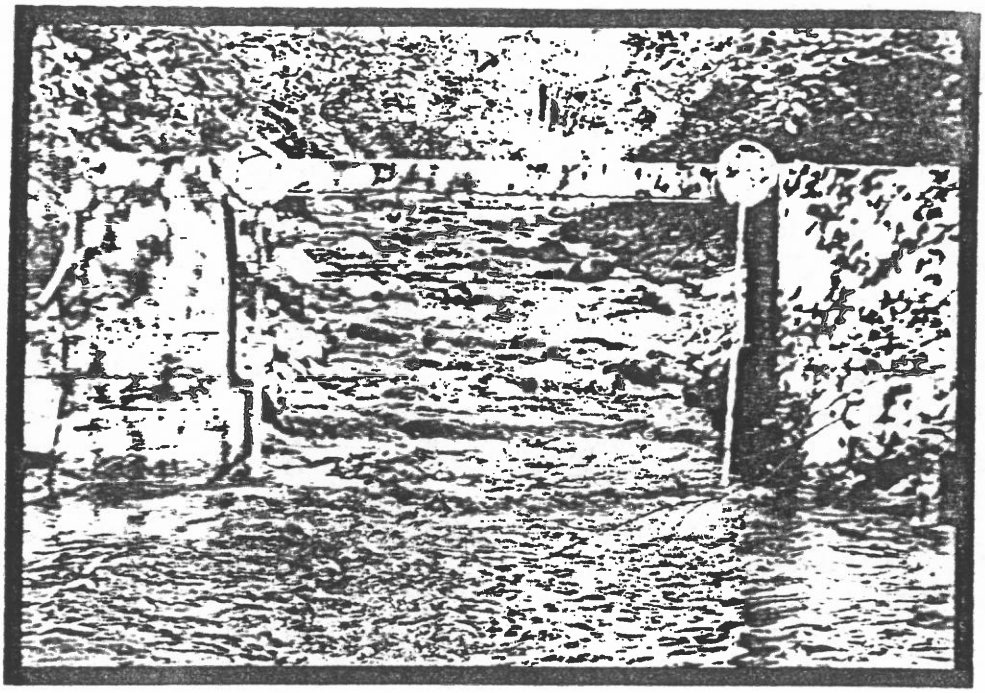
OWNER: Bolfing
PURPOSE AND OPERATION: Water diversion

DESCRIPTION (type, height, pool development, permanence, etc): 5' high. Mr. Bolfing stated that he removes wood slats each winter and puts them in every May. Pool below was too deep to wade (greater than 3' deep).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 2 cfs.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Diversion pipe and pump present in holding pond.



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road to end of paved road

LOCATION: .51 miles up from Old Watsonville Road bridge
ID #: BM4 TYPE OF BARRIER: Flashboard dam

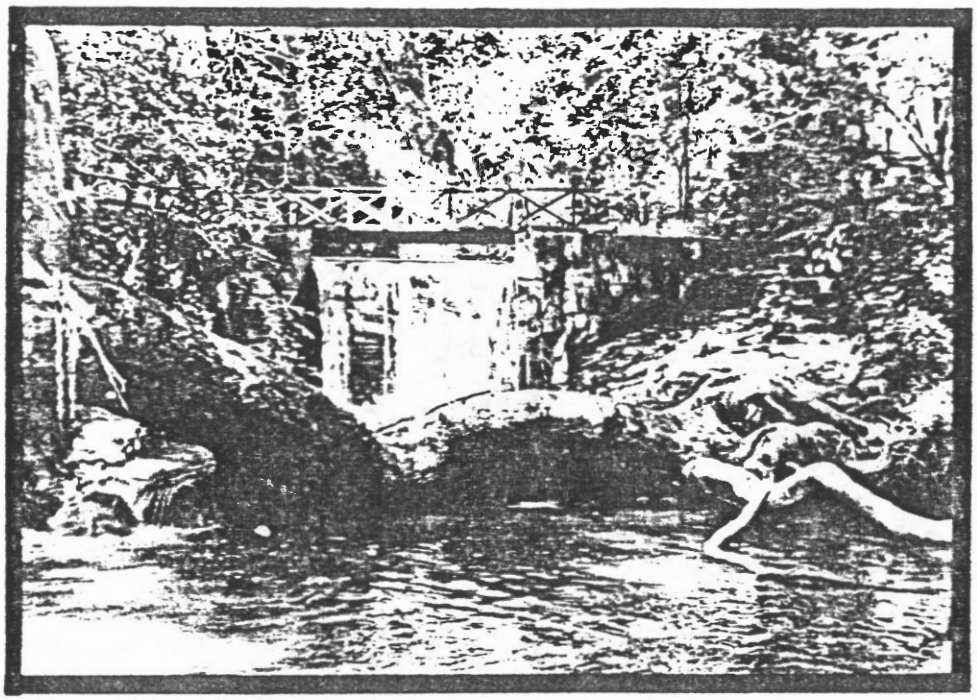
OWNER: Kuring
PURPOSE AND OPERATION: Water diversion; asthetic fishpond

DESCRIPTION (type, height, pool development, permanence, etc): 6' high at present, 7' potential. Rock apron extends out below dam 12' to wall created by sycamore and cement (2' high). Apron thus prevents pool for jumping if flashboards are in except at high flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: If flashboards are removed barrier is passable at 3 or more cfs. If 2 feet of flashboards are in at least 15 cfs are required for passage.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: In holding pond there were about 30 trout 9-18" in length and adult suckers. Fish were accustomed to hand feeding. This indicated that the barrier is occassionally maintained in winter to keep fish there.



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road crossing to end of paved road

LOCATION: .52 miles above Old Watsonville Road bridge
ID #: BM5 TYPE OF BARRIER: Flashboard dam

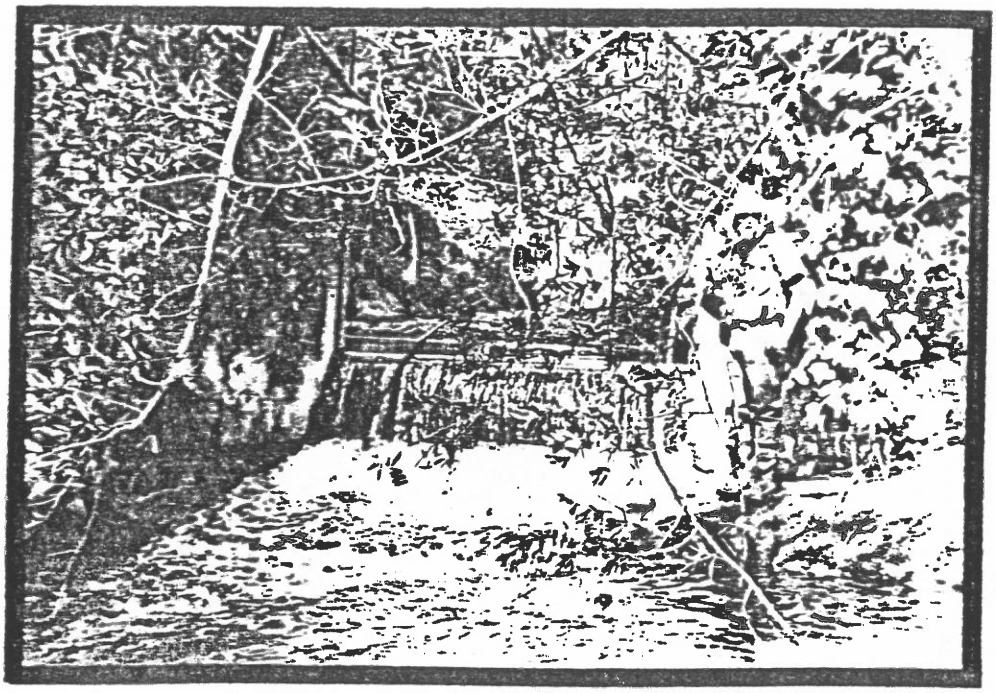
OWNER: Probably Kuring
PURPOSE AND OPERATION: Unused in August 1981.

DESCRIPTION (type, height, pool development, permanence, etc): 10' high potential. The pool below is at least 3' deep but 3' long, 1 1/2' high lip exists below dam base preventing easy jump. Pool is wide and height is not raised much by increased flow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 8 cfs if all flashboards removed. If 2' of flashboards are in barrier is passable only above 40 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs

COMMENTS:



2' OF FLASHBOARDS

4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road crossing to end of paved road

LOCATION: .53 miles upstream from Old Watsonville Road bridge
ID #: BM6 TYPE OF BARRIER: Flashboard dam

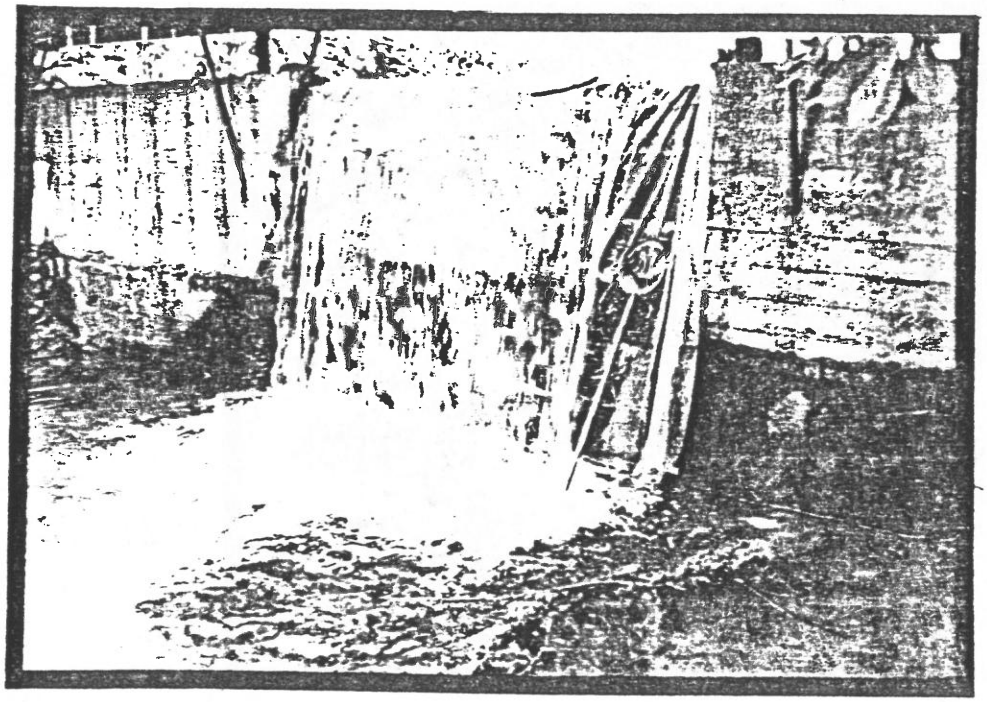
OWNER: Goodrich
PURPOSE AND OPERATION: Water diversion, but no diversion pipe apparent.

DESCRIPTION (type, height, pool development, permanence, etc): 7' total height. Concrete apron from base (1 1/2' above pool) is submerged at 3 cfs and presents a problem only if flashboards are in. Pool below dam can be shallow (1981), but was 4 1/2' deep in May 1982 (2 1/2' deep immediately below barrier).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not barrier at 3 cfs if flashboards are removed.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road to end of paved road

LOCATION: .83 miles up from Old Watsonville Road, upstream portion or Green Glen pasture with horses
ID #: BM7 TYPE OF BARRIER: Flashboard dam

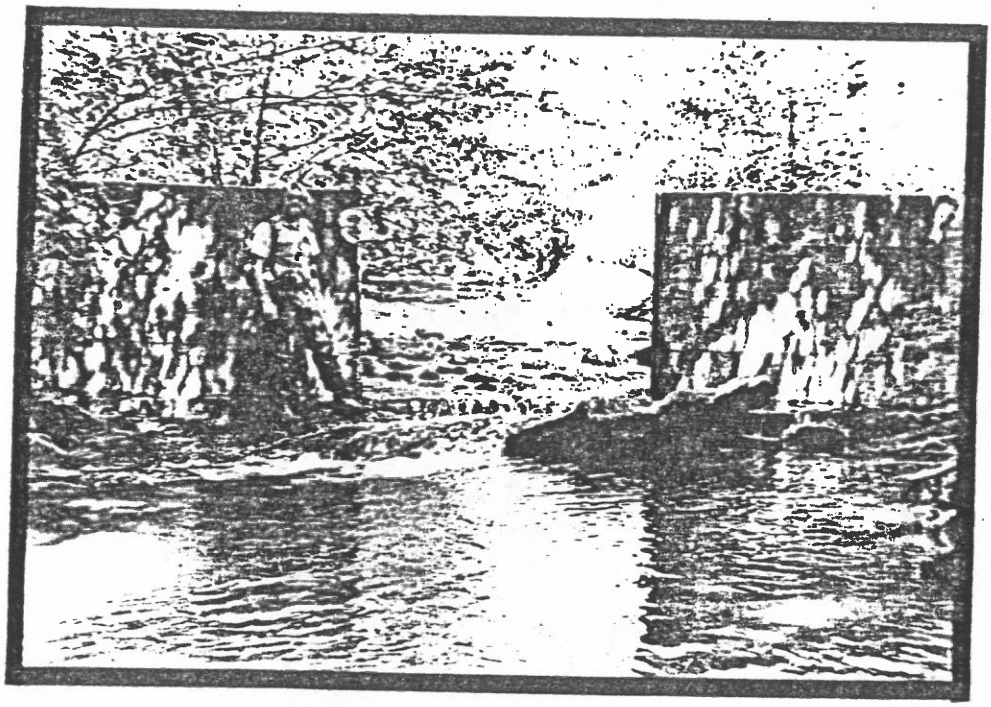
OWNER: ?
PURPOSE AND OPERATION: Unused in August 1981.

DESCRIPTION (type, height, pool development, permanence, etc): 5-6' potential height. Concrete apron below dam but no "step" in apron.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 2 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Old Watsonville Road crossing upstream to end of paved road

LOCATION: .9 miles up from Old Watsonville Road bridge, 300' before end of paved road
ID #: BM8 TYPE OF BARRIER: Flashboard dam

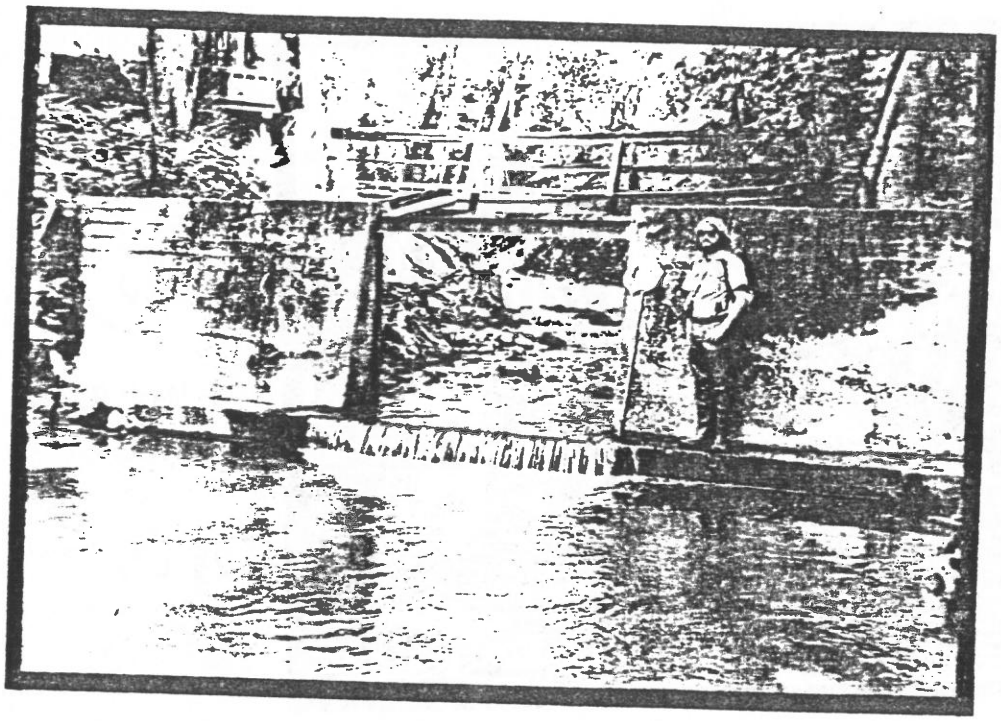
OWNER: ?
PURPOSE AND OPERATION: Water diversion, asthetic fish pond.

DESCRIPTION (type, height, pool development, permanence, etc): 6' high, pool below at least 3' deep. Concrete apron 1' high and 1 1/2' long exists as part of dam abutement.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Passable at 2 cfs if all flashboards removed.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: 15-20 large trout in pool below dam (one was 20" long). 25-30 trout in pond above dam.



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: From end of paved road upstream 1 mile

LOCATION: Above last house at Redwood Retreat
ID #: BM9 TYPE OF BARRIER: Dribbler dam

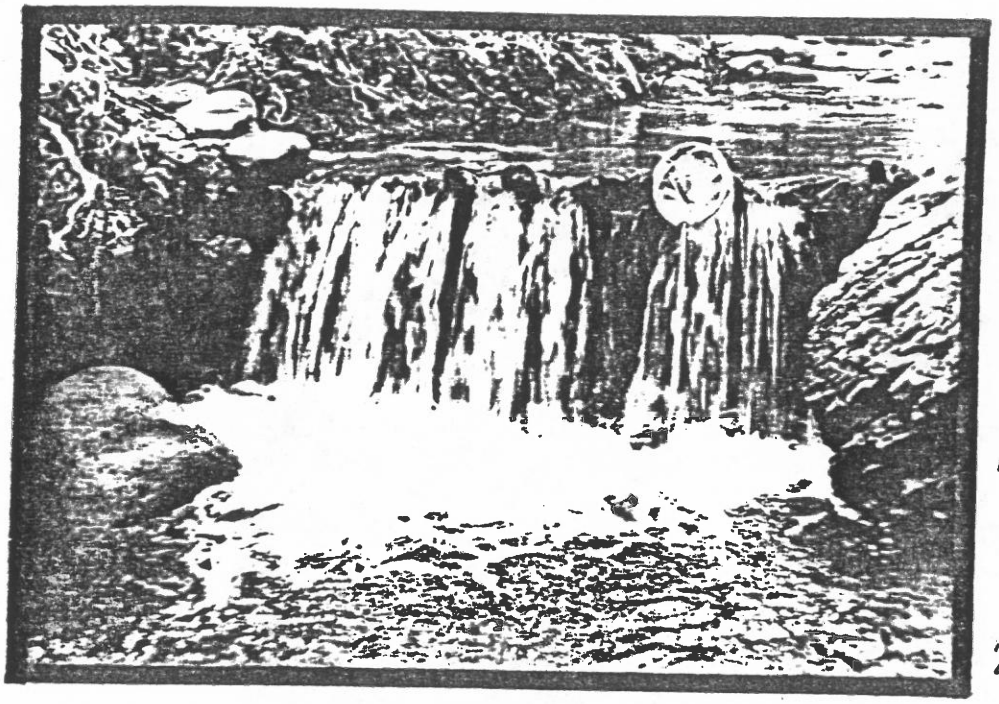
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): "Dribbler" dam made of redwood logs laying across stream creating overhanging barrier 3 to 3 1/2' high. Shallow pool (1 1/2' deep at 2 1/2 cfs) at base. Barrier is permanent.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Requires 10 to 15 cfs or more to raise pool enough for jump.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Construction of weir downstream would raise pool to allow easier jump.



4 MAY 82

2½ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: Just above bridge at Vanumanutagi Ranch entrance. 1.2 miles up from old Watsonville Road bridge.
ID #: BM10 TYPE OF BARRIER: Concrete dam and spillway

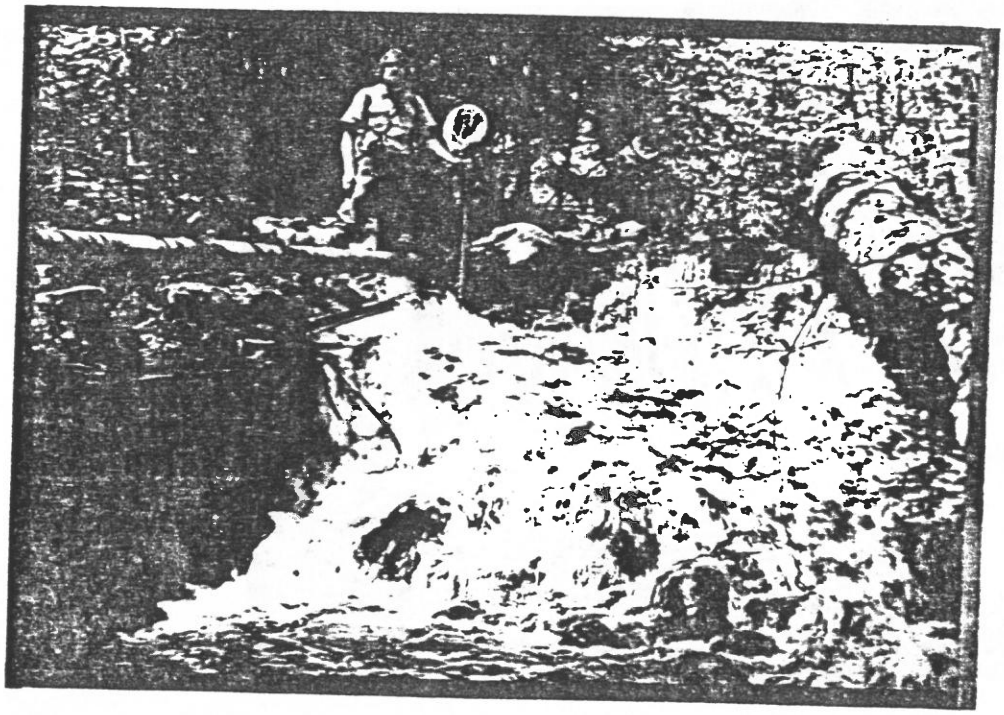
OWNER: ?
PURPOSE AND OPERATION: Water diversion

DESCRIPTION (type, height, pool development, permanence, etc): 8' high dam sloping at 30+° angle on downstream side. 2' high rock wall at top.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: May be impassable except at very high flows (60+ cfs) due to rock wall at top.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Diversion pipe from dam goes to water holding tank on north side of stream and 200 yards downstream. The holding tank is adjacent to a cleared field intended for grape vineyard. Modification for passage would require removal of part of apron at bottom, construction of a weir downstream, and substitution of a flashboard dam for 2' high wall at top.



4 MAY 82

2¼ CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Smith SECTION: End of paved road, upstream

LOCATION: Immediately downstream of Vanumanutagi Mansion
ID #: 10A TYPE OF BARRIER:

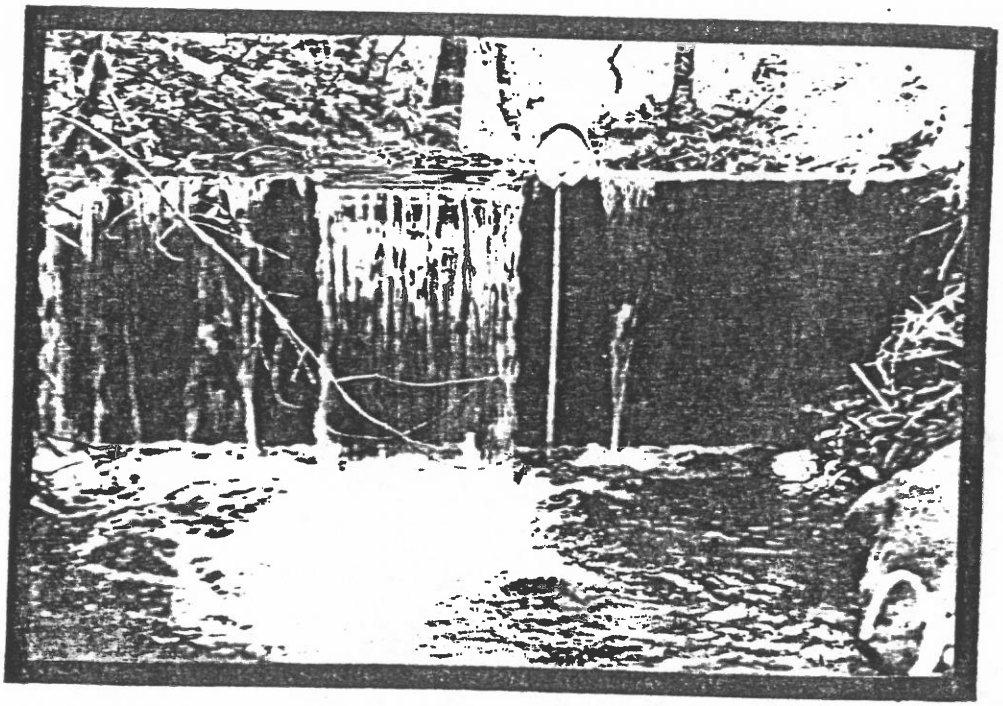
OWNER: Vanumanutagi Ranch
PURPOSE AND OPERATION: Streambed stabilization? - No function except as drop structure.

DESCRIPTION (type, height, pool development, permanence, etc): Complete concrete dam which is 4' high above pool below, with 1 1/2' step which is submerged 3" at 2 cfs. Pool below is 2-3 ' deep (1982) but streambed below was 3' higher in 1981. Silted in to top upstream.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Need 20-30 cfs or more to reduce jump height to allow passage.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Construction of weir downstream would raise height of pool to reduce jump height.



4 MAY 82

2 CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: About 300' up from Vanumonutagi Ranch bridge below mansion and immediately below mansion
ID #: B11 TYPE OF BARRIER: Tree root and boulders

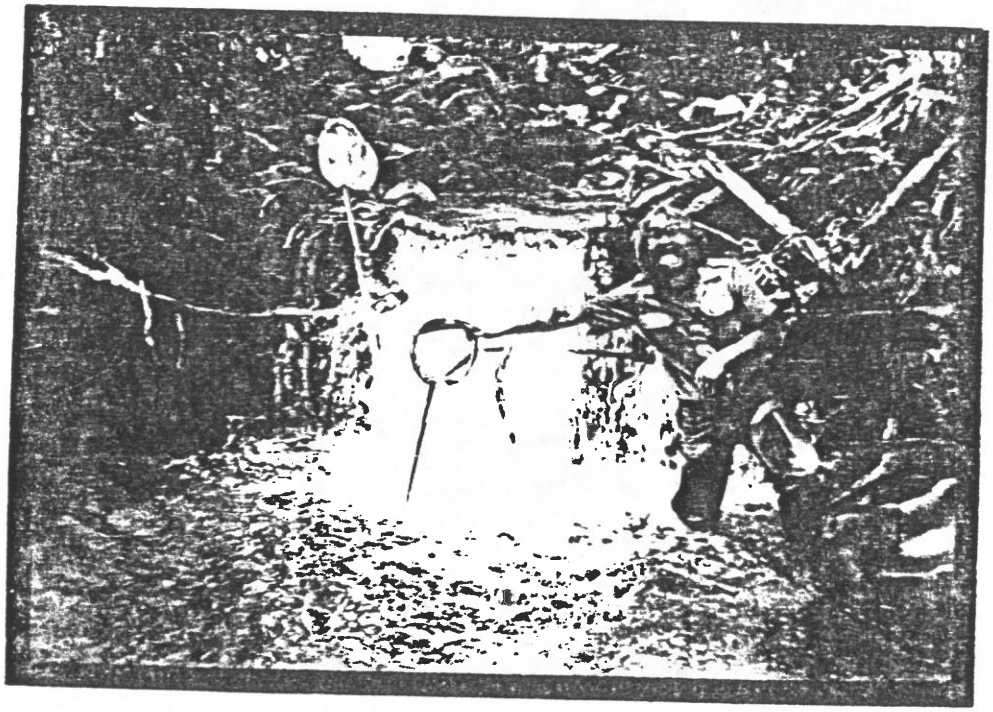
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Channel takes 45° turn and drops 3 1/2' over roots and boulders. 8' diameter pool below has maximum depth at 2 cfs of 3' and averages 2 1/2'.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Need 15 cfs to raise pool depth 1' for jump.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Can be modified by cutting top 1 1/2' of roots to reduce jump to 2' and allow passage at 3 cfs. Must also modify boulders/roots upstream (within 40') so that they won't become barriers.



4 MAY 82

2 CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: 150' below bridge above Vanumanutagi Ranch and mansion
ID #: B12 TYPE OF BARRIER: Boulder

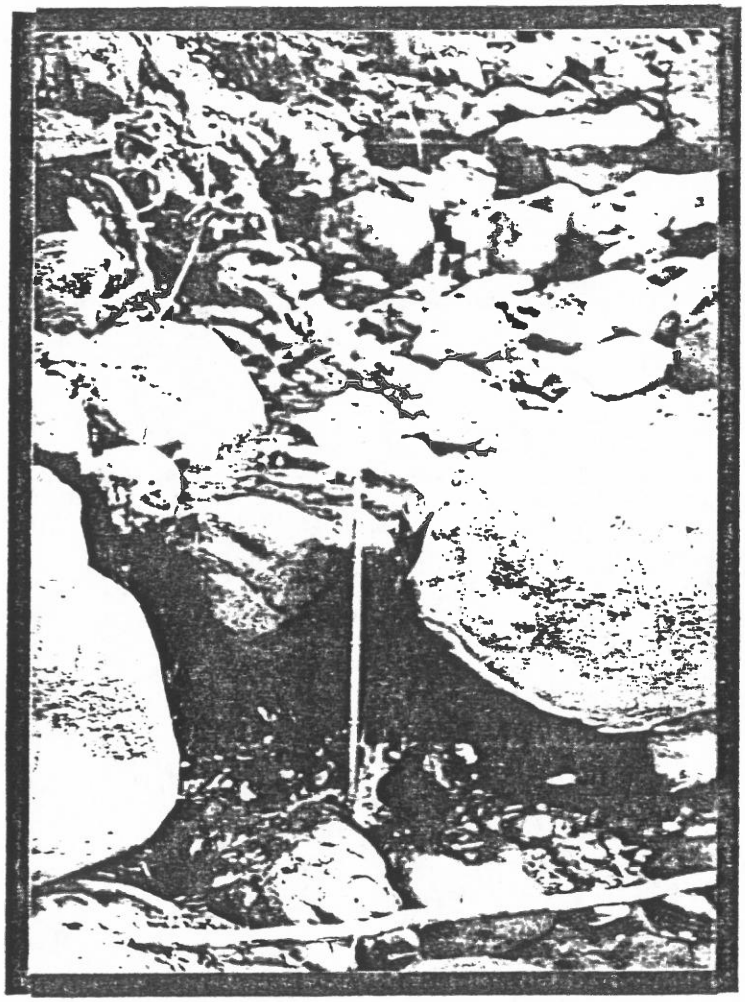
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
3.5' boulder barrier with no pool development for 3' below barrier.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 15 cfs would bypass barrier on south.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:



10 Aug 81

<0.1 cfs

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: 150' up from bridge above Vanumanutagi Ranch and mansion
ID #: B13 TYPE OF BARRIER: Boulder-redwood root

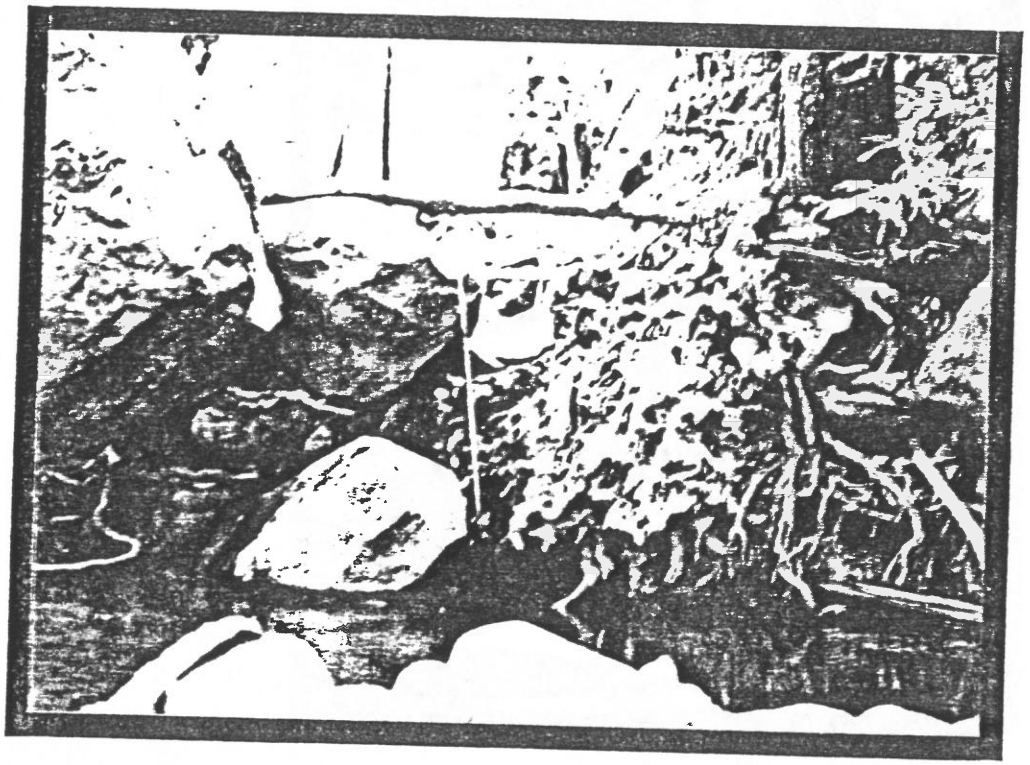
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4' high of boulders and overhanging redwood roots. Pool below averages 2' deep at low flow with a 4' maximum.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs to raise pool level one foot.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Redwood roots are from a dead tree supported by a live one.



10 Aug 81

<0.1 cfs

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: 300' up from bridge crossing above Vanumanutagi Ranch
ID #: B14 TYPE OF BARRIER: Boulder, redwood stump, log

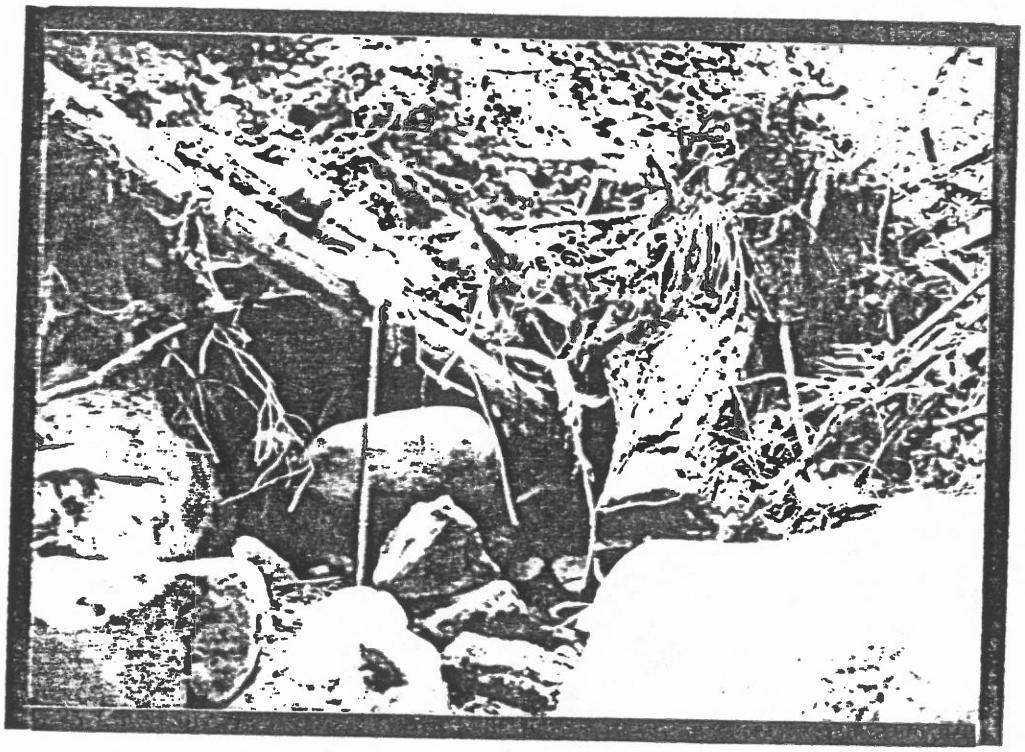
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 4.5' high. Small pool is 1-1.3' deep at low flow but starts 3' down from barrier. Barrier overhangs and may erode under in a few years.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 15-20 cfs.

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: Can be eliminated easily.



10 Aug 81

<0.1 cfs

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: 600' up from bridge for road above Vanumanutagi road
ID #: BM15 TYPE OF BARRIER: Concrete dam

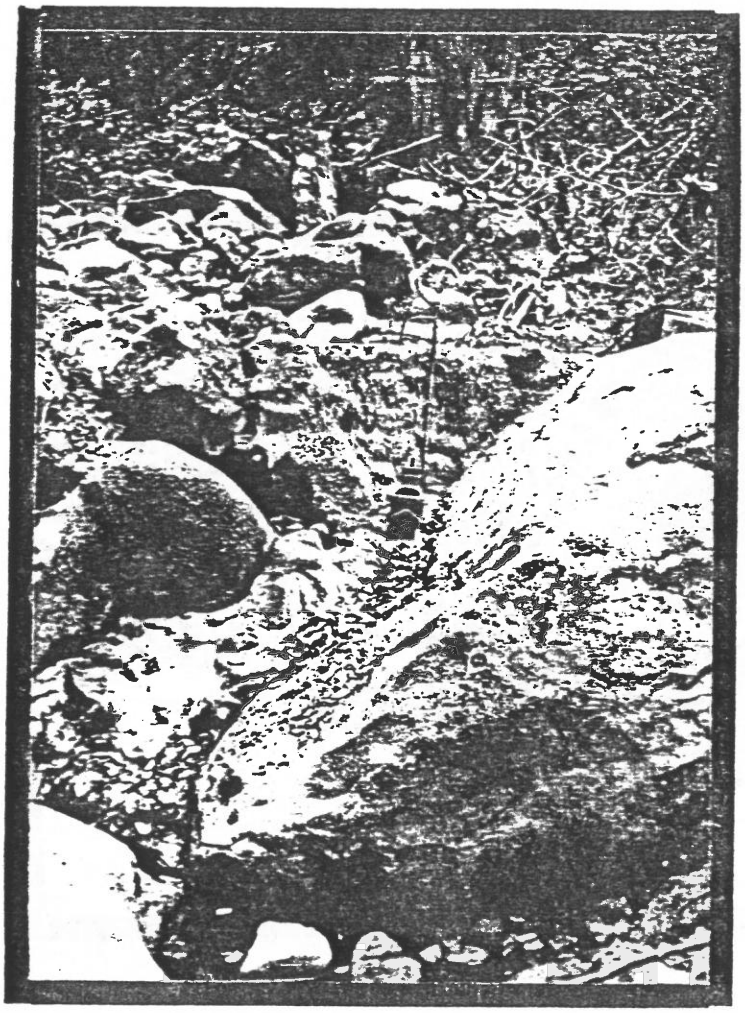
OWNER:
PURPOSE AND OPERATION: Water diversion

DESCRIPTION (type, height, pool development, permanence, etc): 4'3" concrete and rock dam, with 8' long ramp which adds an additional 4' to barrier.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable except at very high flows (60+ cfs).

Estimated flow volume or conditions required for downstream passage: 2 cfs.

COMMENTS: 6" diversion pipe and 12' diameter, 8' high water tank in use. Water piped downhill to cleared field above mansion.



10 Aug 81

<0.1 CFS

BARRIERS

STREAM: LITTLE ARTHUR CREEK
OBSERVER: Alley SECTION: Upstream from end of paved road

LOCATION: 300' up from BM15
ID #: B16 TYPE OF BARRIER: Boulder

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
5' high boulder barrier with shallow pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 40 cfs.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:

10 Aug 81

<0.1 cfs

BARRIERS

STREAM: LLAGAS CREEK
OBSERVER: Smith SECTION: Monterey Highway to dam

LOCATION: 0.8 miles below Chesbro Reservoir
ID #: BM1 TYPE OF BARRIER: Concrete and culvert ford

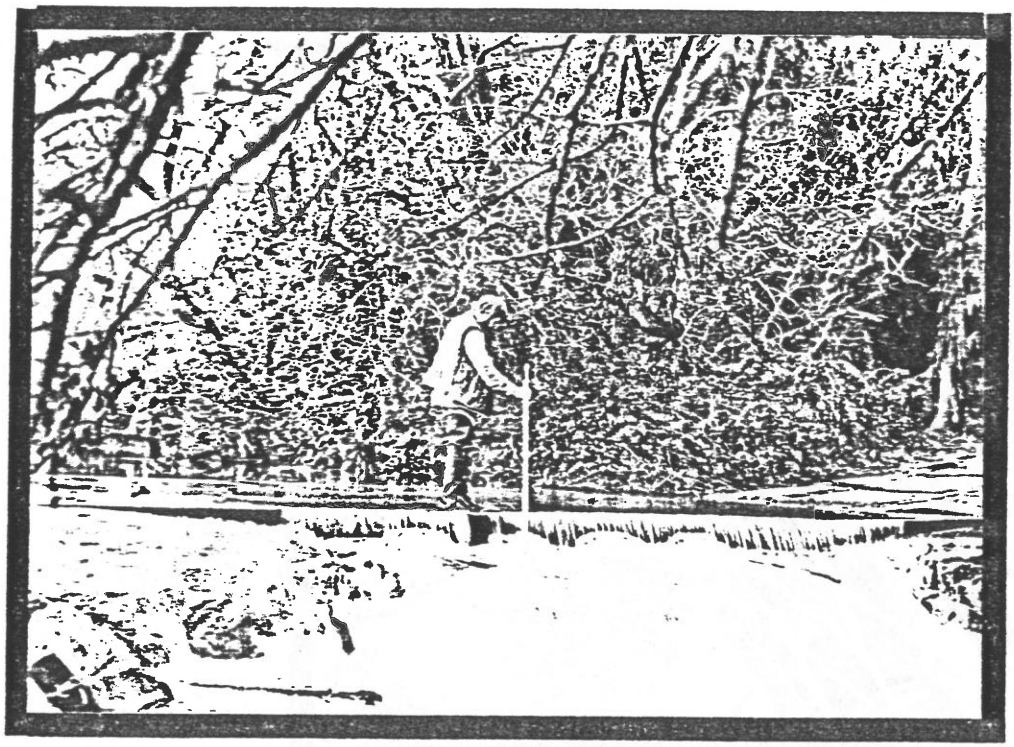
OWNER:
PURPOSE AND OPERATION: Residential access (built in 1977).

DESCRIPTION (type, height, pool development, permanence, etc): Concrete ford with 4 culverts (12" dia.) and lip on downstream side. 15 10-13 cfs velocities at downstream end of culverts are 5.2 to 6.0 f/s at 4" from bottom. 2 1/2-3' jump up inclined apron to culverts.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs if fish can (will) use culverts. At 40+ cfs fish can go over ford.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Replacement of small diameter culverts with large diameter culverts at stream level would allow easy passage.



15 JAN 82

11-13 CFS

BARRIERS

STREAM: MATTOS GULCH
OBSERVER: Turner SECTION: Mouth to 1 mile upstream

LOCATION: 1/2 mile above mouth
ID #: BM1 TYPE OF BARRIER: Culvert

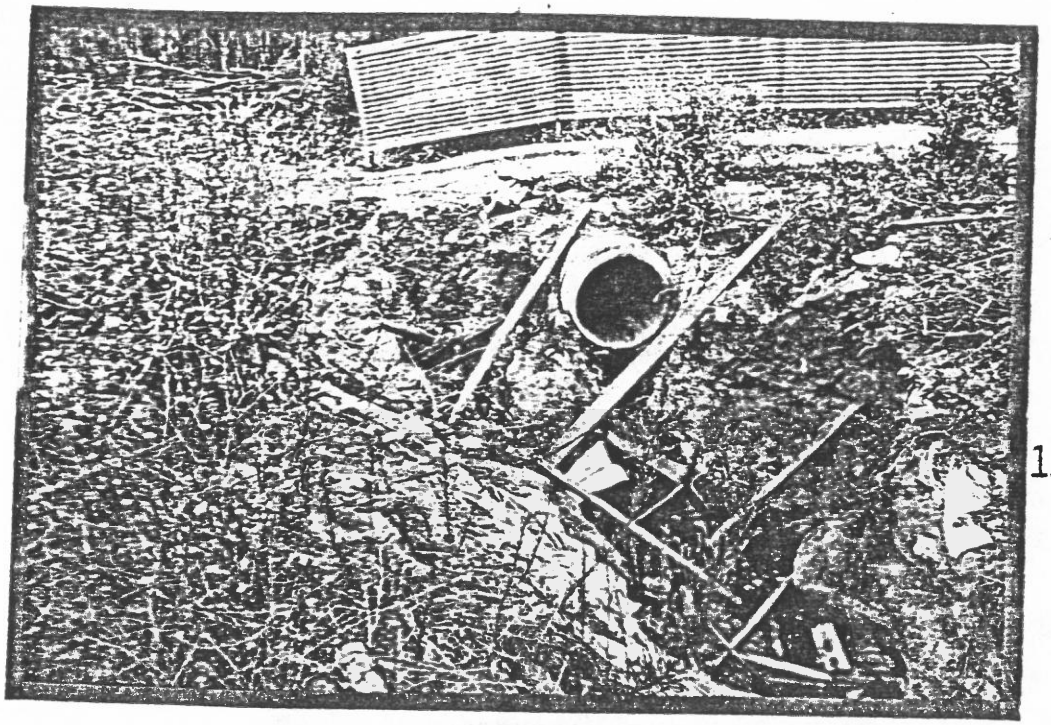
OWNER:
PURPOSE AND OPERATION: No longer in operation (?)

DESCRIPTION (type, height, pool development, permanence, etc): Concrete culvert 2 ft. in diameter. When full, pool beneath will be 1 foot deep. Distance between top of pool to culvert is 2 ft.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Unknown.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Presently, flow has formed a channel around culvert. Channel is filled in with straw and dirt, through which the flow filters.



13 Aug 82

BARRIERS

STREAM: MATTOS GULCH
OBSERVER: Turner SECTION: Mouth to 1 mile upstream

LOCATION: 0.8 miles above mouth
ID #: B2 TYPE OF BARRIER: Debris

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Debris covered by silt. 5'x5'x3'. Debris composed of twigs and small logs.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Should wash out.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: The flow filters through this obstruction.

13 Aug 82

BARRIERS

STREAM: MATTOS GULCH
OBSERVER: Turner SECTION: Mouth to 1 mile upstream

LOCATION: 0.9 miles above mouth
ID #: B3 TYPE OF BARRIER: Log jam

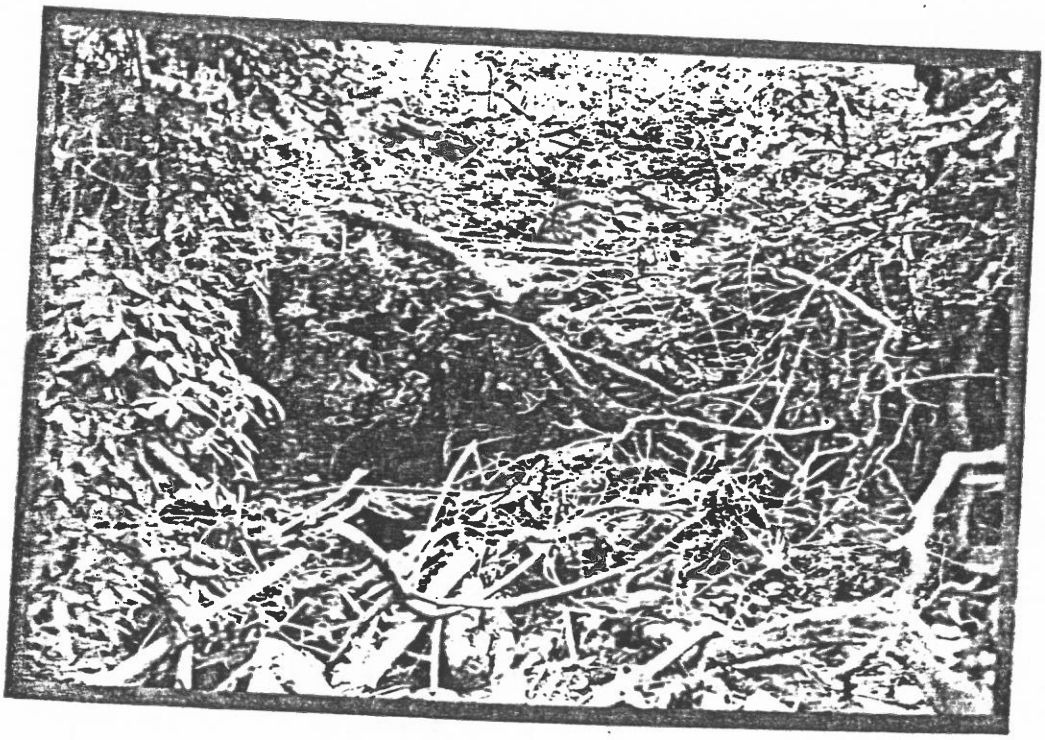
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 40'x8'x5'. Downed redwood and accumulated debris.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: May be impassable.

Estimated flow volume or conditions required for downstream passage: Unknown.

COMMENTS: Flow filters through jam in a four foot drop.



13 Aug 82

BARRIERS

STREAM: MATTOS GULCH
OBSERVER: Turner SECTION: Bend to abandoned dam

LOCATION: Upstream limit of section 2 - 1.4 miles above mouth
ID #: BM4 TYPE OF BARRIER: Dam

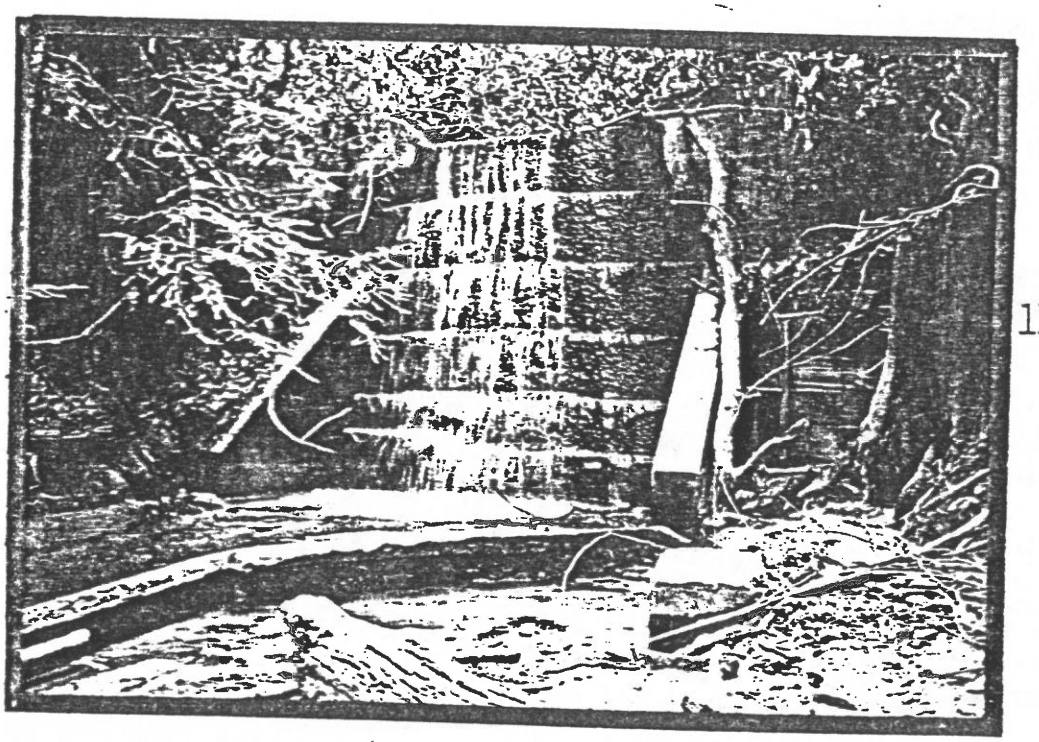
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Concrete dam, 9 ft. high and 8 ft. wide. No pool beneath. Completely silted in above.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable.

Estimated flow volume or conditions required for downstream passage: Unknown.

COMMENTS: Erosion has caved in concrete flume below dam, creating an 8 ft. drop at 45°. No pool at base.



13 Aug 82

BARRIERS

STREAM: MILLERS CANAL
OBSERVER: Smith SECTION: Pajaro River to San Felipe Lake

LOCATION: Frazer Lake Road
ID #: BM1 TYPE OF BARRIER: Drop/slab at road crossing

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
2 step concrete slab. Second step 10" high. Width is 12-14' with pool below. Fish blocked by second step at low flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 8-10 cfs to raise water so second step doesn't block jump.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: Entire structure submerged at 20 cfs.

BARRIERS

STREAM: PACHECO CREEK
OBSERVER: Smith SECTION: San Felipe Lake to Casa de Fruta

LOCATION: .1 mile upstream from junction of Hwy. 152 and Hwy. 156
ID #: BM1 TYPE OF BARRIER: Abandoned concrete dam

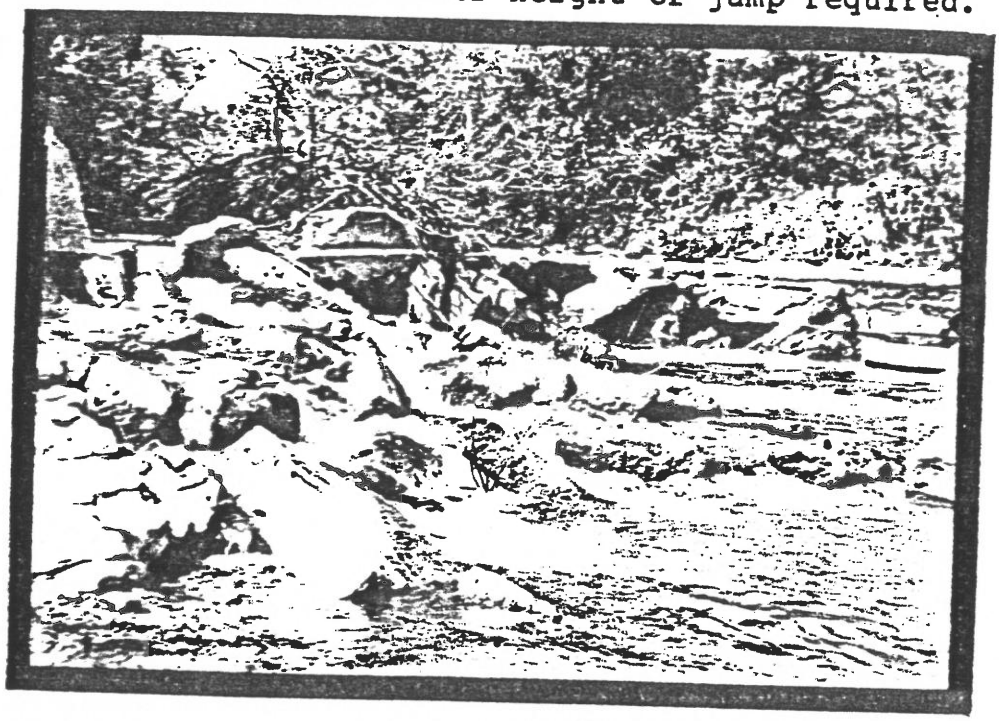
OWNER: Downstream from S&S Farms (Steve Scaglione) Ranch Road to Creek.
PURPOSE AND OPERATION: Diversion Dam - no longer in operation.

DESCRIPTION (type, height, pool development, permanence, etc): Concrete dam (4-4 1/2' high) across most of stream with flow diverted over broken concrete slabs and bedrock on west side. Two steps with the lower one 1.3' high into 10' X 10' pool with maximum depth of 3 1/2'; pool is 2-2 1/2' deep at upstream end. Second step requires 5' long, 2.7' high swim-jump up sandstone slot between 2 concrete blocks - velocity a problem at high flows and chute blocks clear jump.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably passable at 10 cfs through about 35 cfs (velocity a problem then) and also at flows above 80-100 cfs.

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS: Removal of lower portion of bedrock slot would allow straight jump (2.7' to 3' high) and ease access. Removal of concrete blocks would lower height of jump required.



27 APR 82

20 CFS

BARRIERS

STREAM: PACHECO CREEK
OBSERVER: Smith SECTION: Upstream from south fork

LOCATION: Pacheco tunnel road crossing
ID #: BM2 TYPE OF BARRIER: Culvert road crossing

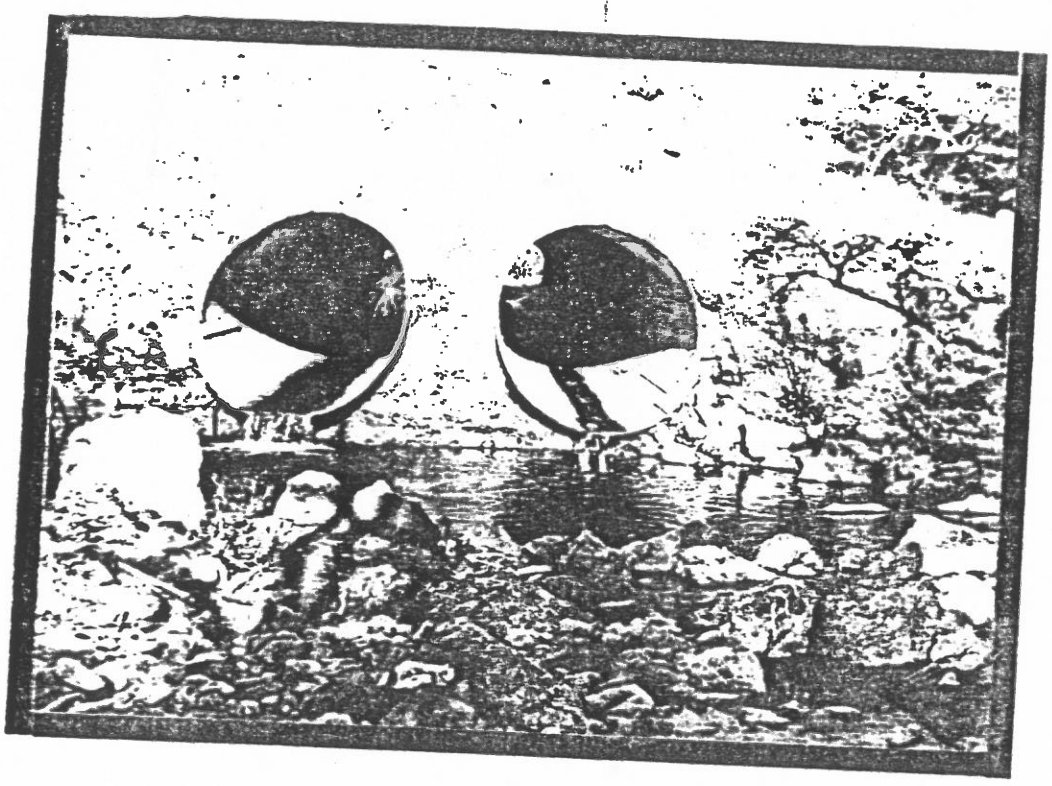
OWNER:
PURPOSE AND OPERATION: Tunnel construction access road.

DESCRIPTION (type, height, pool development, permanence, etc): Pair of 8' diameter culverts empty into 4' deep pool. At least 1-1 1/2' jump from pool to culverts. The culverts are 50' long.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 2-3 cfs to provide water for passage through culverts.

Estimated flow volume or conditions required for downstream passage: 1-1 1/2 cfs.

COMMENTS: Pool was shallow in 1978 and would have presented jumping problems then. In 1982 there are no problems.



13 JAN 82

≈1½ CFS

BARRIERS

STREAM: PACHECO CREEK
OBSERVER: Smith SECTION: Upstream of south fork to Pacheco Pass

LOCATION: Narrowing of canyon - below road pullout.
ID #: B3 TYPE OF BARRIER: Boulder falls

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 6' boulder above pool to 6-8' deep. At high flows, the jump is less but velocity is too great.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably impassable even at high flows.

Estimated flow volume or conditions required for downstream passage: 1/2 cfs.

COMMENTS: Perennial flow even during droughts.

BARRIERS

STREAM: PACHECO CREEK
OBSERVER: Smith SECTION: Upstream of south fork to Pacheco Pass

LOCATION: Narrowing of canyon 100' above B2
ID #: B4 TYPE OF BARRIER: Boulder falls

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Height 10-12' into shallow pool.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS:

BARRIERS

STREAM: South Fork, PACHECO CREEK
OBSERVER: Turner SECTION: Entire length

LOCATION: 1.2 miles above mouth
ID #: B1 TYPE OF BARRIER: Boulder falls

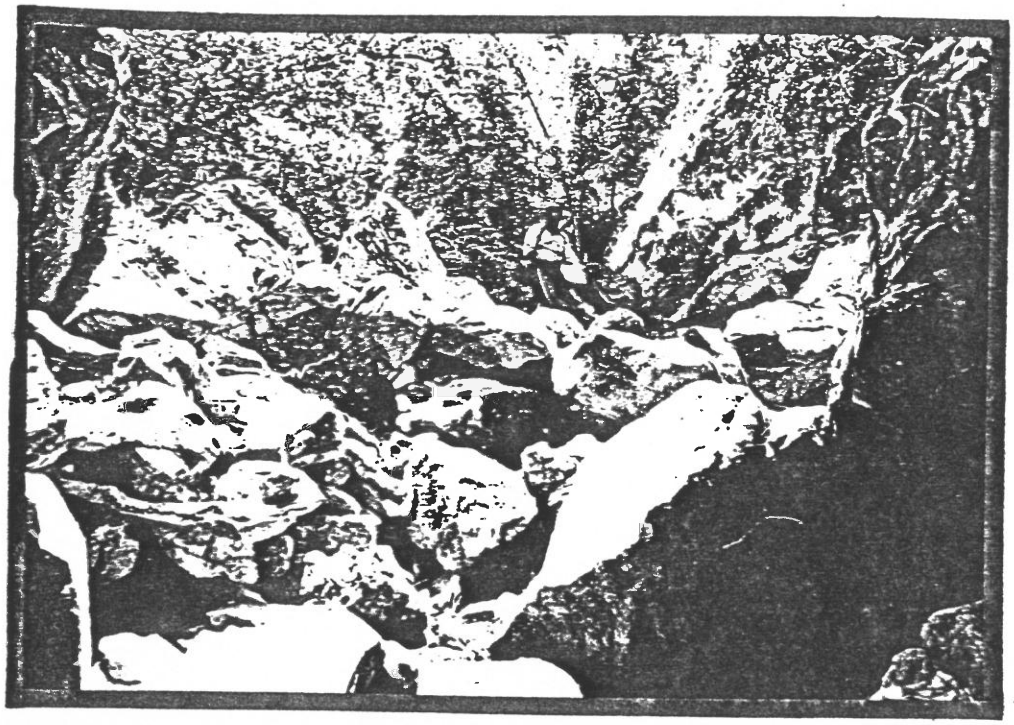
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Multi-tiered falls over boulders. Seven feet in height, 30 ft. in length at a 50° gradient. No jumping pool at the base, and resting pools inadequate.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Probably not passable except at extremely high flows.

Estimated flow volume or conditions required for downstream passage: 1 cfs.

COMMENTS: Fish numerous below, no fish seen above.



15 JULY 82

BARRIERS

STREAM: PAJARO RIVER
OBSERVER: Smith SECTION: Below Murphy Crossing to below Aromas

LOCATION: Entire graded section
ID #: BM1 TYPE OF BARRIER:

OWNER:
PURPOSE AND OPERATION: Maintains wide channel for flood control.

DESCRIPTION (type, height, pool development, permanence, etc): Channel is graded and leveed. Percolation rate is very high so the area goes dry early in summer. May be impassable by April in drier years.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 15-20+ cfs at Murphy Crossing for easy passage through shallow areas.

Estimated flow volume or conditions required for downstream passage: 8 cfs at Murphy Crossing.

COMMENTS: At low flow the wide channel creates depth and temperature problems for steelhead. Spring low flow channel would aid downstream passage.

BARRIERS

STREAM: PAJARO RIVER
OBSERVER: Smith SECTION: Hwy. 25 to San Felipe Lake

LOCATION: Upstream of Hwy. 25
ID #: BM2 TYPE OF BARRIER: Ford with drop

OWNER:
PURPOSE AND OPERATION: Ford and formerly control structure for U.S.G.S. gage.

DESCRIPTION (type, height, pool development, permanence, etc): 40' concrete apron forming 10-20' wide 2 1/2'-3' drop. Debris at lip or at base often blocks jump. Apron also presents depth/velocity problems.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 5-10 cfs or more depending upon debris.

Estimated flow volume or conditions required for downstream passage: 2 1/2 cfs.

COMMENTS: Submerged at 100 cfs.

BARRIERS

STREAM: PESCADERO CREEK
OBSERVER: Alley SECTION: Mile 1 upstream to 0.5 miles above Hatfield Canyon

LOCATION: 0.8 miles below Hatfield Canyon, behind house and upstream from level terrace.
ID #: B1 TYPE OF BARRIER: Log jam

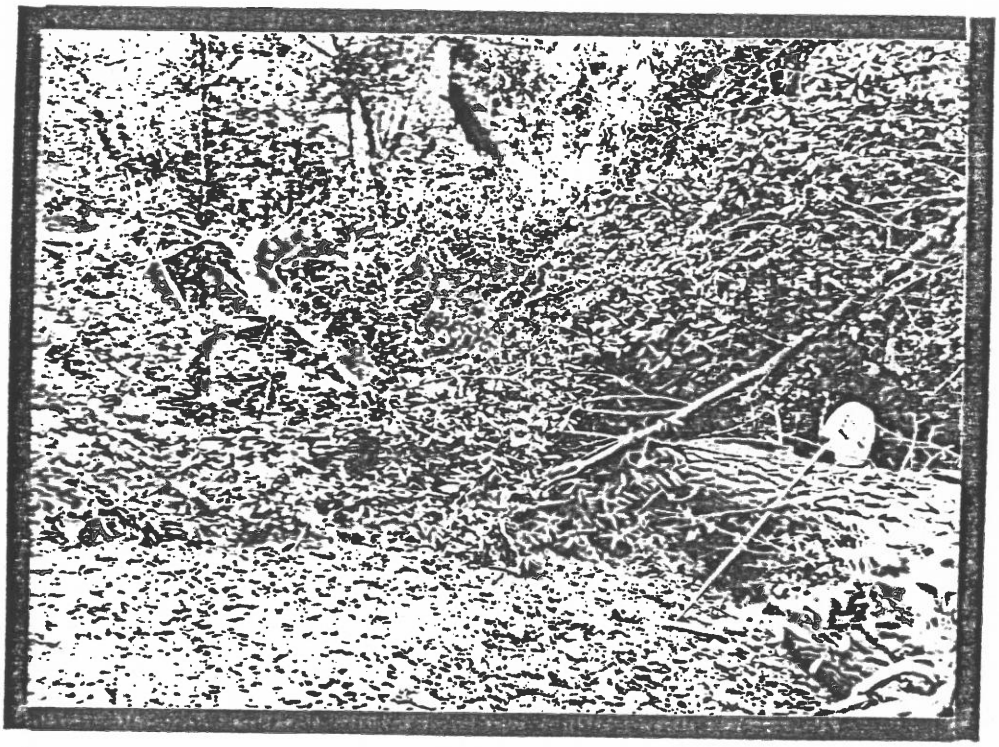
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 2 large cottonwoods across stream. Not a complete barrier, but might trap debris.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not a barrier yet.

Estimated flow volume or conditions required for downstream passage:

COMMENTS:



23 Sep 81

BARRIERS

STREAM: PESCADERO CREEK
OBSERVER: Alley, Smith SECTION: From upper road crossing upstream 0.8 miles

LOCATION: In flat section 1000' above road crossing
ID #: B2 TYPE OF BARRIER: Log-branch

OWNER: Wayne Forsythe (foreman) - Castro Valley Ranch
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): 3.5' high log jam. Presently open at bottom and not yet a barrier.

PASSABILITY. Estimated flow volume or conditions required for upstream passage:

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Easy access for clearing.

BARRIERS

STREAM: East bank tributary to PESCADERO CREEK
OBSERVER: Alley SECTION: 0.8 miles upstream of road crossing

LOCATION: 225' upstream of confluence with Pescadero Creek
ID #: B3 TYPE OF BARRIER: Log (redwood)-boulder

OWNER: Wayne Forsythe (foreman) - Castro Valley Ranch
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc):
9' high boulder and log barrier. Pool below is shallow.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Impassable.

Estimated flow volume or conditions required for downstream passage:

COMMENTS: Pescadero Creek dry above this tributary in most years. Pescadero Creek also steep with many boulder barriers above this tributary.

BARRIERS

STREAM: TAR CREEK
OBSERVER: Alley SECTION: Highway 101 upstream to Ranch Road crossing

LOCATION: At road crossing
ID #: BM1 TYPE OF BARRIER: Earthen wall

OWNER: Gulf oil
PURPOSE AND OPERATION: Result of digging hole in streambed.

DESCRIPTION (type, height, pool development, permanence, etc): Earth wall formed below road bridge resulting from digging of hole. 4' high. Will probably be washed out in winter. No pool below.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 10 cfs will probably wash it out.

Estimated flow volume or conditions required for downstream passage: 10 cfs.

COMMENTS:

BARRIERS

STREAM: TEQUISQUITA SLOUGH
OBSERVER: Smith SECTION: San Felipe Lake to confluence of Arroyos dos Picachos and de los Viboras.

LOCATION: Upstream of San Felipe Road
ID #: B2 TYPE OF BARRIER: Cattail congestion

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Very dense cattail stand upstream of bridge blocks the 15' wide channel. Substantially removed by extreme high flows in January and March 1982.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: 6 cfs is probably minimum for adult passage.

Estimated flow volume or conditions required for downstream passage: 3 cfs.

COMMENTS: Portions of the slough between B1 and B2 are shallow and provide difficult passage at less than 5 cfs. Deeper "low flow" channel might be worth constructing if it would last.

27 JAN 82

≈10 CFS

BARRIERS

STREAM: TEQUISQUITA SLOUGH
OBSERVER: Smith SECTION: San Felipe Lake to confluence of Arroyo dos Picachos and de los Viboras.

LOCATION: Up and downstream of Shore Road
ID #: B1 TYPE OF BARRIER: Cattail congestion

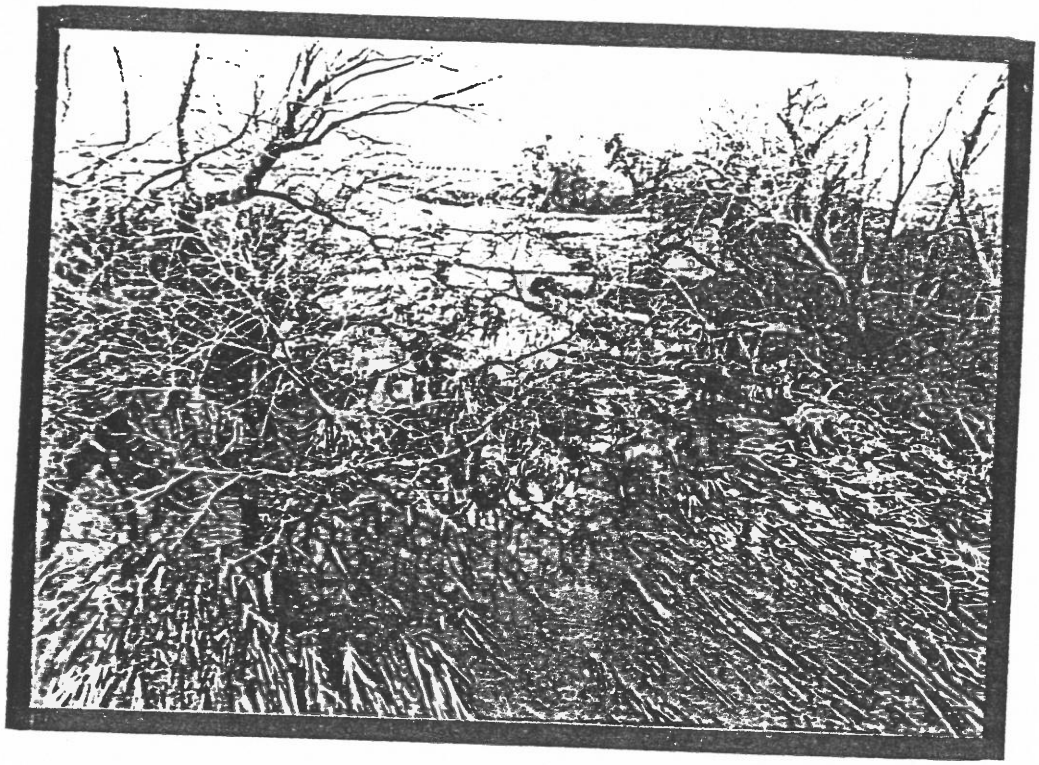
OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Dense cattail vegetation has developed up and downstream of the bridge. Congestion is especially dense immediately upstream of bridge. It is cleared out partially by repeated high flows.

PASSABILITY. Estimated flow volume or conditions required for upstream passage: At least 3-4 cfs would allow steelhead to move upstream against cattails (pointed downstream).

Estimated flow volume or conditions required for downstream passage: 1-1 1/2 cfs.

COMMENTS:



27 JAN 82

6-10 CFS

BARRIERS

STREAM: TAR CREEK
OBSERVER: Matias SECTION: From west bank tributary to concrete dam

LOCATION: Upper boundary of section
ID #: BM2 TYPE OF BARRIER: Concrete dam

OWNER:
PURPOSE AND OPERATION:

DESCRIPTION (type, height, pool development, permanence, etc): Approximately 7' high, 20' across, 1' thick. 10" pipe extruding 4' from top, apparently water goes into it. No pool behind and bed 3' higher on upstream side of dam (silted in).

PASSABILITY. Estimated flow volume or conditions required for upstream passage: Not passable except at extremely high flows (50+ cfs).

Estimated flow volume or conditions required for downstream passage: 5 cfs.

COMMENTS: No fish observed above dam.