

**ELDERBERRY LONGHORN BEETLE MONITORING AT
UPPER COTTONWOOD CREEK WILDLIFE AREA
2007**



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Abstract

We monitored three elderberry sites at Upper Cottonwood Creek Wildlife Area (UCWA) to determine if longhorn beetles inhabit the property. The Valley Elderberry Longhorn Beetle (VELB) is threatened in California and is found in riparian patches along the Central Valley. The California Elderberry Longhorn Beetle (CELB) is a non-listed species and is found coastally. UCWA, an eastern foothill of the Coast Range, is not within the historic range of VELB, and we did not know if it was within the range of CELB. We surveyed blue elderberry on the western and eastern-most portions of the property. We found that the western sites, which are influenced by coastal fog, showed evidence of current beetle use by way of characteristic emergence holes. The eastern site is closer to the valley floor and did not yield proof of beetle occupancy. Our belief is that habitat on the west side of UCWA is conducive to CELB dispersal from their coastal range. We suggest the use of a qualified entomologist to determine which subspecies of longhorn beetle is present at UCWA, and that similar efforts are utilized on Department-owned valley floor properties which contain elderberry.

Keywords: VELB, CELB, elderberry, Central Valley, California, longhorn beetle

Introduction

Two subspecies of elderberry longhorn beetle (*Desmocerus californicus* ssp.) have been described in California. The Valley Elderberry Longhorn Beetle (VELB), *Desmocerus californicus dimporphus*, was listed as a threatened species by the U.S. Fish & Wildlife Service in 1980 (Federal Register 1980). Historically, its range was believed to have been restricted to the Sacramento and upper San Joaquin valleys (Linsley and Chemsak 1972). However, more recent surveys in California have shown a geographic distribution reaching from Redding in Shasta County (at the northern end of the Central Valley), and extending south to Bakersfield in Kern County (Barr 1991). The California Elderberry Longhorn Beetle (CELB), *Desmocerus c. californicus*, is a non-listed species with a coastal distribution from Los Angeles to Mendocino County (U.S. Fish & Wildlife 1984). Both species inhabit elderberry (*Sambucus* spp.) thickets, which usually occur within patches of riparian forest. Riparian habitat within the Central Valley is now highly fragmented due to conversion of lands to agriculture, construction for water control, and other forms of development. It is estimated that of the riparian woodlands that were present in the Central Valley 200 years ago, only about 10% remain intact today (Smith 1980, Thelander and Crabtree 1994). Thus VELB presence is now sparse throughout its range due to this huge reduction of riparian habitat. Not

only are the elderberry plants themselves lost, but riparian fragmentation may also prohibit beetle dispersal between elderberry thickets.

The California Department of Fish & Game manages and owns Upper Cottonwood Creek Wildlife Area (UCWA), located on the east side of the Coast Range foothills in Central California. This property is primarily influenced by the climate of the San Joaquin Valley. However, its western boundary peaks in elevation and is frequently shrouded by coastal fog. Patches of blue elderberry (*Sambucus mexicana*) are located throughout UCWA, and both the CELB and VELB are known to utilize this plant species. Because of the proximity UCWA has to both the coastal foothills and valley floor, we wished to determine if either subspecies might be present.

Study area

The majority of UCWA lies within Merced County (1612 ha), while the northwest corner extends slightly into Santa Clara County (96.5 ha). The property is bordered on the south by state highway 152 and is located near the San Luis Reservoir, west of the city of Los Banos (Figure 1). Elevation ranges from about 200 meters near the eastern boundary, to 610 meters toward the western edge of the property. The habitat for this wildlife area can be described as blue oak series, which includes blue and live oak woodlands, and as California annual grassland (Sawyer and Keeler-Wolf 1995). Several ephemeral streams, as well as a number of stock ponds and springs are present at UCWA. Blue elderberry thickets were recorded across the property during rapid vegetation assessments and habitat mapping efforts conducted in 2004 (California Department of Fish & Game 2004). During 2007 we were involved in other monitoring efforts at UCWA, so we chose elderberry locations that were easily accessible from our normal routes. We selected two elderberry sites along the western portion of the property where the elevation is higher and the sites are often saturated by coastal fog. There was no flowing or standing water at these sites, but due to the coastal influence, the associated vegetation is relatively thick. We also selected a third site on the lower, eastern side of UCWA, along a riparian corridor with an ephemeral stream. Though water was present, this site does not receive any coastal fog and is dominated by open grasslands (Figure 2).

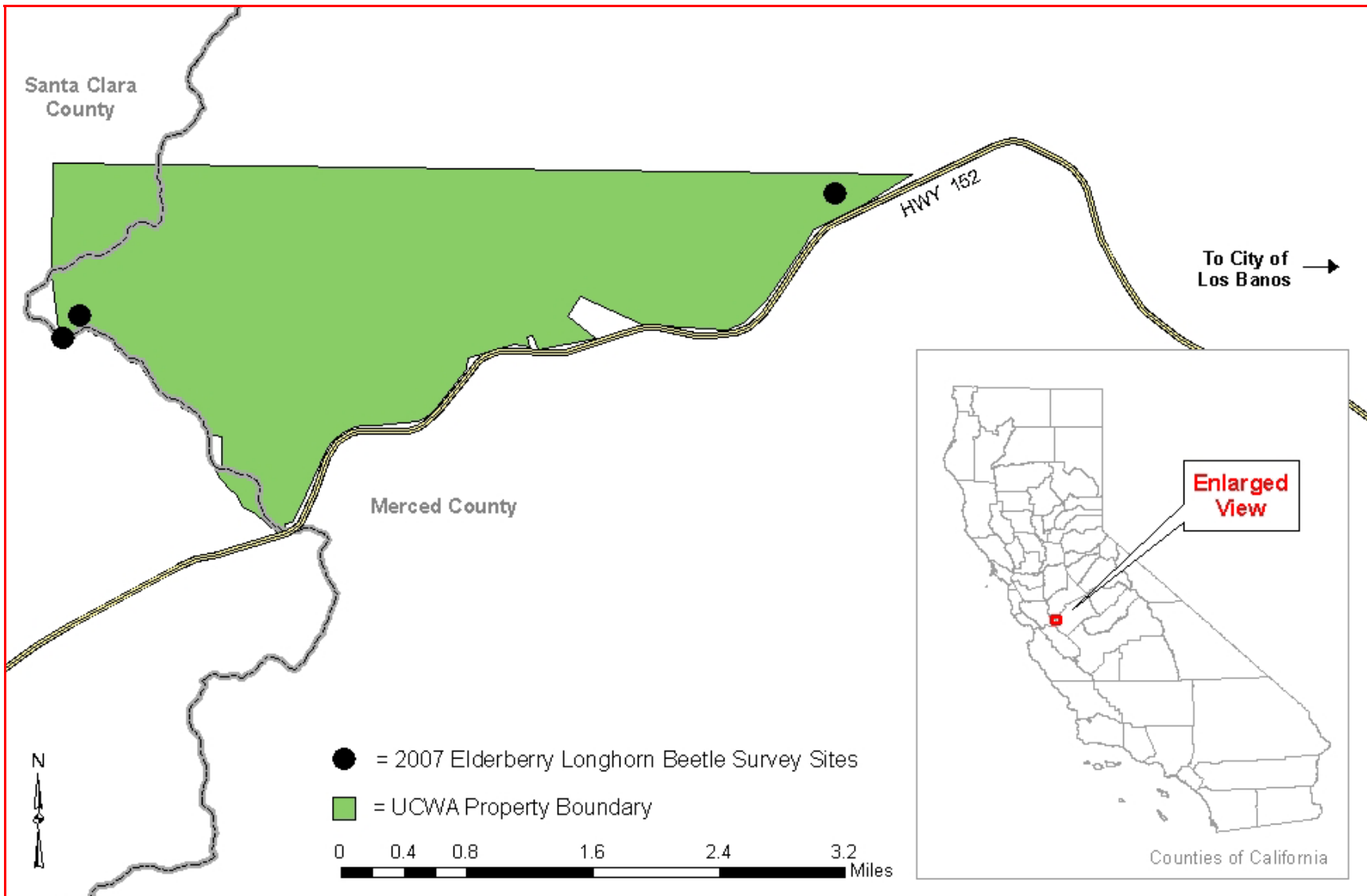


Figure 1. Elderberry Longhorn Beetle monitoring sites at Upper Cottonwood Creek Wildlife Area, 2007.

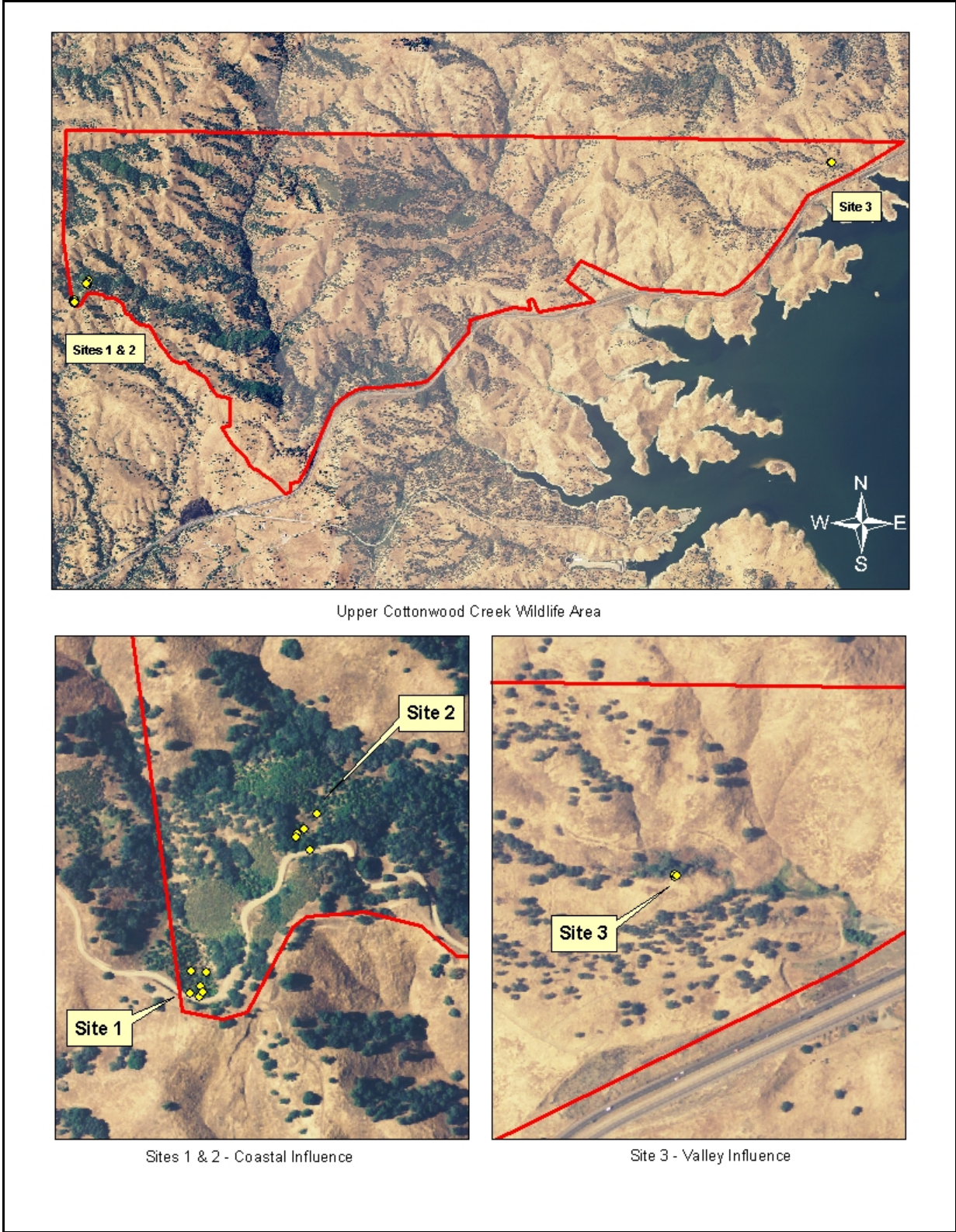


Figure 2. Blue elderberry habitat and associated vegetation differences between western and eastern survey sites at Upper Cottonwood Creek Wildlife Area.

Methods

Due to limited personnel, we surveyed elderberry sites opportunistically while completing other monitoring efforts at UCWA. Our survey methods were informal due to time constraints, but we used available protocols for VELB surveys as guidelines. Because the larvae are wood borers and adult beetles are rarely seen, we focused our efforts on searching for the characteristic exit holes left in the bark once the larvae pupate and the adult beetle emerges. We surveyed elderberry shrubs with a trunk diameter of 8 cm or greater at ground level. Our visits were timed to encompass the elderberry blooming season. Beetles are more likely to emerge (i.e. leaving visible exit holes) during this time to feed on flowers and leaves (Davis and Comstock 1924, Linsley and Chemsak 1972, U.S. Fish & Wildlife 1984). Therefore, our surveys began while elderberry plants were still forming flower heads, and we stopped surveying once all blooms were lost and much of the foliage was dropped. For each elderberry shrub, we collected GPS coordinates and labeled them alphabetically (e.g. Site 1 shrub a, b, c, etc.). We made note of the presence of old exit holes, recorded the number of recent holes observed, and photographed characteristic exit holes during each visit. Shrubs with a thick under story of poison oak were not surveyed as thoroughly so we used binoculars to search for exit holes. In addition to these methods, we conducted a one-time inventory at Site 1 early in the season in order to document vegetation associated with elderberry habitat.

Results

During April and June of 2007, we surveyed three elderberry sites opportunistically at UCWA. Due to staffing problems, sites were not visited during May. We concluded surveys in late June based on extremely dry conditions this year and the minimal foliage remaining on elderberry shrubs at that time (Figure 3).



Figure 3. Blue elderberry Site 1 during late April (in bloom above) and during mid June (below), 2007.

Each site we surveyed contained blue elderberry and consisted of multiple shrubs. Nearly all shrubs surveyed had a trunk diameter greater than 25 cm at ground level. Of our three survey sites, we observed new exit holes (i.e. beetle emergence took place this season) at Sites 1 and 2 (Table 1). We also observed old beetle exit holes at both of these western sites. In nearly all cases, we were able to easily distinguish between old and new exit holes (Figure 4). However, at Site 3 we observed some fairly uniform holes in decayed wood, but were unable to determine if they were made by longhorn beetles. Because the beetle larvae only reside in living wood, and based on the level of wood decay, these possible exit holes would have been created several seasons ago.

Table 1. Elderberry longhorn beetle surveys for new emergence holes at Upper Cottonwood Creek Wildlife Area, 2007.

Site #	# of April Surveys	# of June Surveys	New Holes per Shrub					
			a	b	c	d	e	f
1	2	2	0	4	12	4	1	5
2	1	2	0	14	0	4	--	--
3	1	1	0	0	0	--	--	--



Figure 4. Recent elderberry longhorn beetle emergence hole (below).

During early April, many plants were still in their growing season and were not yet affected by the drought conditions. We visited Site 1 during this time and identified plant species which were found growing amongst the blue elderberry. Appendix A lists all of the associated vegetation we were able to observe and identify to genus or species. The habitat associated with Site 1 is also representative of Site 2. However, the habitat at Site 3 was considerably different because it is not reached by coastal fog and was along an actively flowing stream during the time of our surveys. Table 2 lists some of the more readily identifiable plants that we noted, but due to time constraints and staffing limitations, no effort was made to identify understory vegetation.

Table 2. Associated habitat at elderberry Site 3.

Latin Name	Common Name
<i>Aesculus californica</i>	California Buckeye
<i>Artemisia californica</i>	California Sagebrush
<i>Malacothamnus fasciculatus</i>	Chaparral Mallow
<i>Salix laevigata</i>	Red Willow
<i>Sambucus mexicana</i>	Blue Elderberry
<i>Toxicodendron diversilobum</i>	Western Poison Oak

Discussion

Though our surveys at UCWA were informal and not performed at regular intervals, they were sufficient in determining the presence of elderberry longhorn beetles. We were also able to determine that beetle emergence occurred during April as well as during June, though most beetles probably emerged in May when we were unable to survey. However, because we did not observe adult beetles, and were surveying a foothill property, we were unable to positively identify which subspecies of beetle is present. We believe that CELB most likely inhabit the blue elderberry at UCWA. The sites where we obtained evidence of beetle use were those to the west, and thus are closer to the CELB range. Because coastal fog reaches these areas and the associated habitat remains relatively thick, it is likely that CELB are able to disperse to UCWA from the west. It is also feasible that no beetles inhabit our eastern site due to its isolation and lack of available dispersal habitat. If VELB presence could be confirmed at UCWA, then we suggest that two forms of monitoring take place in the future. The first would include continued surveys for beetle presence at Sites 1 & 2, and

searching new elderberry sites for beetle use throughout the property. Second would include monitoring any negative impacts on elderberry plants or associated habitat due to cattle grazing. Grazing contracts are utilized at UCWA to help control non-native grasses and other invasive plants. Grazing also aids in reducing the fire hazard later in the season when the grasslands become dry. While conducting this year's surveys, we did not observe any impacts on elderberry habitat due to cattle grazing or presence. One explanation for this may be that cattle are not kept on the property any later than March, and the elderberry plants rarely leaf out or begin to bloom until April or May. In addition, elderberry habitat at UCWA is often found in steep terrain or thickly overgrown riparian habitat. Because cattle are placed on the property during winter, a time when grasses are abundant and available stock ponds are full, it is unlikely that cattle need to use elderberry habitat for grazing or to access water.

At this time, we do not recommend additional monitoring efforts at UCWA unless a qualified entomologist is able to identify VELB presence on this foothill property. We would suggest that this person put forth a more intensive effort at sites where beetle activity is now confirmed, and that searches for adult beetles are incorporated into their surveys. Because VELB are the only insects known to form these distinctive exit holes in elderberry plants within the Central Valley (Lang et al. 1980), we do believe that even informal surveys are worth while when conducted on Department lands located within the valley. For personnel working on valley floor properties, we suggest making note of any elderberry thickets that may be worth monitoring. In addition, surveying at regular intervals will yield more information on when beetle emergence is actually taking place. Future research within the VELB range should adhere to standard protocols or available federal guidelines for elderberry survey techniques.

Acknowledgements

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Literature Cited

- Barr, C.B. 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* Fisher (Insecta: Coleoptera: Cerambycidae). U.S. Fish and Wildlife Service, Sacramento, CA.
- California Department of Fish and Game. 2004. Unpublished Data. Resource Assessment Program: San Joaquin Valley Southern Sierra Region Lands Inventory Project. Los Banos Wildlife Area. Los Banos, CA.
- Davis, A., and Comstock, J.A. 1924. Larva and pupa of *Desmocerus californicus* Horn. Bulletin of the Southern California Academy of Sciences 23. 179-181.
- Federal Register 1980. Listing the Valley Elderberry Longhorn Beetle as a threatened species with critical habitat. V. 45, No. 155, Friday, August 8, 1980. Office of the Federal Register, National Archives and Records Administration.
- Lang, F.J., Jokerst, J.D., and Sutter, G.E. 1989. Habitat and populations of the valley elderberry longhorn beetle along the Sacramento River. USA Forest Service Gen. Tech. Rep. PSW-110, pp. 242-247.
- Linsley, E.G., and Chemsak, J.A. 1972. Cerambycidae of North America. Part VI. No. 1. Taxonomy and classification of the subfamily Lepturinae. University of California Publications in Entomology 69, 1-138.
- Sawyer, J.O., and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento. 471 pp.
- Smith, F. 1980. A short review of the status of riparian forests in California. In: Sands, A. (Ed.), Riparian Forests in California: Their Ecology and Conservation. University of California Regents. Berkeley, CA, pp. 1-2.
- Thelander, C.G., and Crabtree, M. (Eds.). 1994. Life on the Edge. Biosystems Analysis, Inc. Santa Cruz, CA.
- U.S. Fish and Wildlife Service. 1984. Valley Elderberry Longhorn Beetle Recovery Plan. U.S. Fish and Wildlife Service. Portland, Oregon, p. 2.

APPENDIX A

Associated Habitat with Elderberry Longhorn Beetle Survey Site 1 at Upper Cottonwood Creek Wildlife Area, 2007.

Latin Name ^a	Common Name	CA Native
<i>Achyrachaena mollis</i>	Blow-wives	Y
<i>Adenostoma fasciculatum</i>	Chamise	Y
<i>Amsinckia menziesii</i>	Rancher's Fireweed	Y
<i>Artemesia californica</i>	California Sagebrush	Y
<i>Avena barbata</i>	Slender Wild Oat	N
<i>Avena fatua</i>	Wild Oat	N
<i>Bromus hordeaceus</i>	Soft Brome	N
<i>Bromus madritensis</i>	Foxtail Chess	N
<i>Cardamine californica</i>	Milk Maids	Y
<i>Claytonia perfoliata</i>	Miner's Lettuce	Y
<i>Collinsia heterophylla</i>	Chinese Houses	Y
<i>Cynoglossum grande</i>	Western Hound's Tongue	Y
<i>Erodium botrys</i>	Broad-leaf Filaree	N
<i>Erodium cicutarium</i>	Red-stem Filaree	N
<i>Eschscholzia californica</i>	California Poppy	Y
<i>Filago californica</i>	Mediterranean Barley	N
<i>Lactuca serriola</i>	Prickly Lettuce	N
<i>Lasthenia californica</i>	California Goldfields	Y
<i>Lotus scoparius</i>	California Broom	Y
<i>Madia sativa</i>	Coast Tarweed	Y
<i>Marah fabaceus</i>	California Man-root	Y
<i>Marrubium vulgare</i>	Horehound	N
<i>Mimulus aurantiacus</i>	Island Monkeyflower	Y
<i>Prunus ilicifolia</i>	Hollyleaf Cherry	Y
<i>Quercus agrifolia</i>	Coast Live Oak	Y
<i>Quercus douglasii</i>	Blue Oak	Y
<i>Rhamnus crocea</i>	Spiny Redberry	Y
<i>Ribes menziesii</i>	Canyon Gooseberry	Y
<i>Sambucus mexicana</i>	Blue Elderberry	Y
<i>Sanicula bipinnatifida</i>	Purple Sanicle	Y
<i>Sanicula crassicaulis</i>	Pacific Sanicle	N
<i>Scrophularia californica</i>	California Figwort	Y
<i>Solanum umbelliferum</i>	Bluewitch Nightshade	Y
<i>Stellaria media</i>	Common Chickweed	N
<i>Toxicodendron diversilobum</i>	Western Poison Oak	Y
<i>Triteleia laxa</i>	Ithuriel's Spear	Y
<i>Vulpia myuros</i>	Rattail Fescue	N
<i>Wyethia glabra</i>	Smooth Mule-ears	Y
<i>Zigadenus fremontii</i>	Fremont's Star Lily	Y

^a = Plants keyed using the 1996 ed. of The Jepson Manual Higher Plants of California.