

VEGETATION

The vegetation growing in Sausal Creek watershed is a combination of native plant species primarily found in parks and ornamental species (including planted natives) surrounding residential and commercial areas. Figure 43 shows a general depiction of vegetation types and land uses in the watershed (USGS 2001). Tables 16 and 17 describe the features of each vegetation type on the map and the acres of each by sub-basin. The USGS GIS layer is based on satellite imagery in which each pixel covers 30 meters (90 ft.); therefore, any patch of vegetation of less than 30 meters is not delineated. Small areas of riparian vegetation along creeks and small wetland areas are not delineated under this coverage. Appendix B has a comprehensive list of native plant species and locations where they were recorded in the Sausal Creek watershed. FOSC has an ongoing effort to track and map native plants that are rare in the watershed.

Table 16: Description of Vegetation Types for Figure 43

Area	Description
Open Water	All areas of open water, generally with less than 25% cover or vegetation or soil
Developed, High Intensity	Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.
Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49% of total cover. These areas most commonly include single-family housing units.
Evergreen Forest	Areas dominated by trees generally greater than 15 ft. tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
Mixed Forest	Areas dominated by trees generally greater than 15 ft. tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrub/Scrub	Areas dominated by shrubs; less than 15 ft. tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Grassland/Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

From: US Geologic Survey Land Cover Dataset

Evergreen Forest

In the upper watershed, evergreen forest dominates the parkland and vegetated areas next to houses, including creek areas. Palo Seco Creek sub-basin holds over 250 acres of evergreen forest, mostly focused in Joaquin Miller Park. Cobbledick Creek sub-basin has 110 acres of evergreen forest dispersed between houses. Similarly, Shephard Creek sub-basin has 110 acres of evergreen forest spread out in residential and park areas.

The upslope area of Joaquin Miller Park in the Palo Seco sub-basin is part of a five square-mile area in the Oakland hills once dominated by redwood forest. The area of the forest in the Sausal Creek watershed was called the San Antonio Redwoods. Logging of the redwoods started in the late 1840s and all of the trees in the Sausal Creek watershed were cut by 1860. The redwoods in this area are now second-growth. Besides the redwood forest, most early accounts and photographs of the upper Sausal

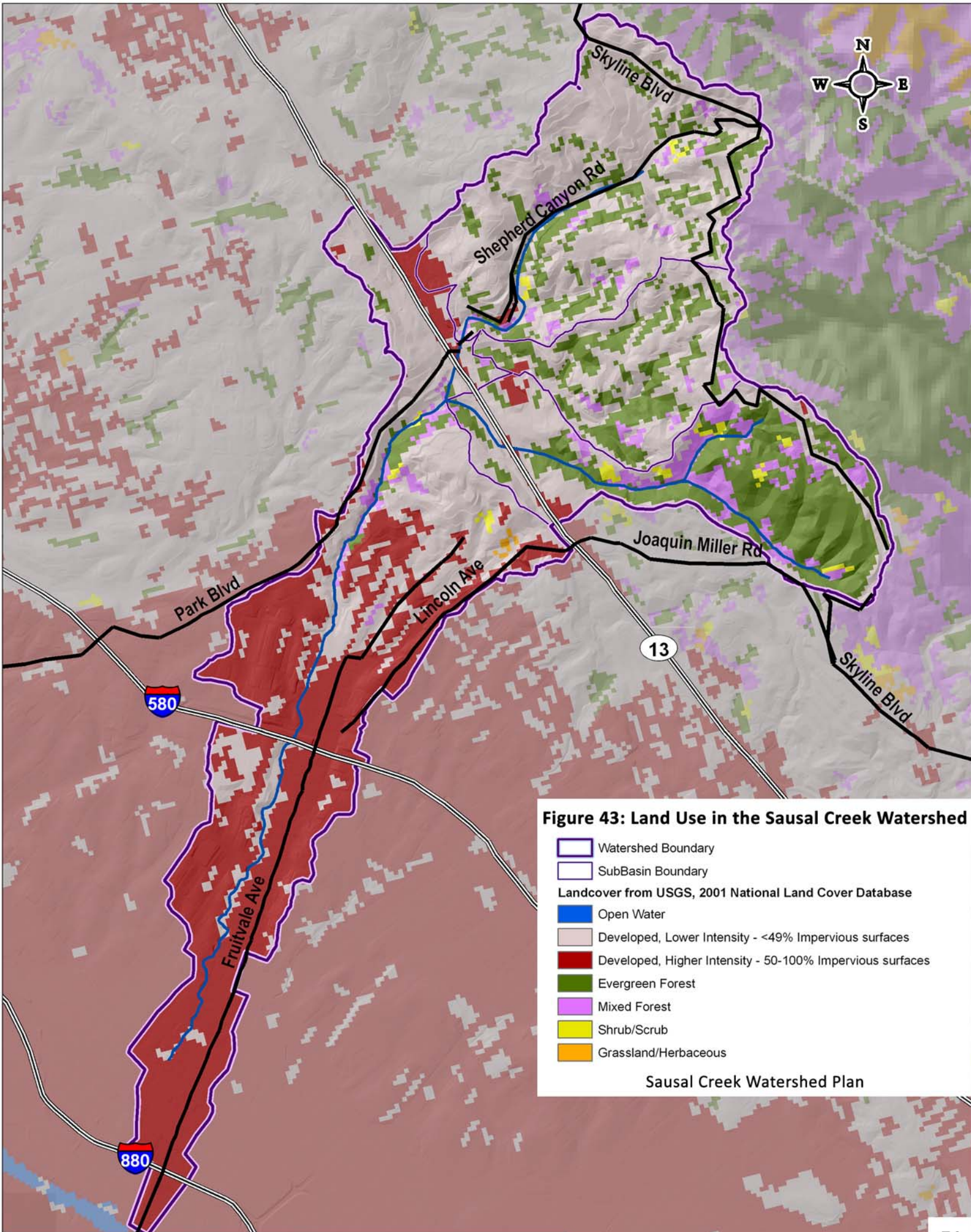
Creek watershed describe grassland and shrub/scrub cover with trees along the ephemeral and seasonal water courses (Figures 6 and 11).

Lowe (1998) evaluated the pre-European/American settlement vegetative cover in the Sausal Creek watershed. This study estimated that in 1700 watershed cover was 66% grassland and shrub/scrub vegetation, 25% riparian/mixed forest and 9% redwood forest.

Table 17: Vegetation Types and Land Uses in Sausal Creek Watershed

Land Use/Vegetation Type	Sub-Basin				Total
	Cobbledick	Palo Seco	Shepherd Canyon	Sausal	
Developed, Higher Intensity - 50-100% Impervious surfaces	185.98	155.22	547.21	439.89	1328.3
Developed, Lower Intensity - <49% Impervious surfaces	1.97	17.74	13.22	766.4	799.33
Evergreen Forest	109.62	250.3	119.27	24.1	503.29
Mixed Forest	10.81	71.48	22.15	21.75	126.19
Shrub/Scrub	0.35	10.79	3.12	3.89	18.15
Grassland/Herbaceous	<0.01	<0.01	<0.01	2.59	2.59
Total Acres	308.73	505.53	704.97	1258.62	2,777.85
Percent Urban (High and Low Intensity)	61%	41%	80%	96%	76%
Percent Vegetation (all types)	39%	59%	20%	4%	24%

Following the logging of the redwoods, thousands of trees were planted in Joaquin Miller Park and surrounding hill areas, like Piedmont Pines and Oakmore. Planted species included trees native to other areas of California—Monterey pine and Monterey cypress—as well as non-native invasive tree species: Eucalyptus and Acacia. Presently, the areas marked on Figure 43 as evergreen forest are likely to be Monterey pine forest or second-growth redwood/Douglas fir forest. Live oak, California bay laurel, and Pacific madrone may also be part of the forest along with areas of non-native Eucalyptus, Acacia, and ornamental tree species. Monterey pine and Monterey cypress cover about 25.3 acres of Joaquin Miller Park. Eucalyptus covers about 15 acres of the park and Acacia covers about 7.4 acres (Table 20).



Source: National Land Cover Dataset Land Use and Vegetation Map. 1992. USGS.

Mixed Forest

Mixed forest is mapped in a number of locations and, unlike the evergreen forest, contains deciduous species. Plant species include big-leaf maple, California buckeye, coast and interior live oak, canyon oak, box elder, California bay laurel, and Pacific madrone. Redwoods, Monterey pine, Monterey cypress, Eucalyptus, Acacia, and ornamental tree species may also be mixed in with the deciduous trees.

Shrub/Scrub

Shrub/scrub vegetation includes chaparral with two species of manzanita, ceanothus, coffeeberry, buckthorn, ocean spray, toyon, and monkeyflower. Coastal sage scrub, with sagebrush, monkeyflower, and lupine, is also mapped in this category.

Grassland

Grassland/herbaceous cover is largely free of trees and shrubs. Although the Sausal Creek watershed was once largely native grassland, this vegetation type is now rare. Grassland consisting of non-native European grasses is relatively rare in the watershed. Native grasses including needlegrass, junegrass, and California melic occur in areas with serpentine soils.

Invasive Non-Native Plants

The native vegetation areas that remain in the Sausal Creek watershed are under constant threat of invasion and replacement by invasive, non-native plant species. These plants were typically brought to California as garden plants or by the government to provide erosion control along streams or on agricultural lands. Some, such as Eucalyptus, were widely planted in the East Bay hills under the mistaken assumption that Eucalyptus would produce good lumber in California.

The spread of invasive non-native plants is a primary cause of the degradation and loss of native habitat in California. Most invasive plants are adapted to rapid germination and growth following ground disturbance. Some produce chemicals which suppress the growth of other native plants, resulting in complete dominance by the invasive species. Most invasive plants do not provide habitat values for wildlife, nor do they have natural predators outside their native land to reduce their rapid spread.

Invasive plants can exacerbate the effects of fires and floods. Most of the invasive plants that cover the understory areas along streams provide little to no erosion control, allowing streambanks to fail in floods. Some invasives are extremely fire-prone; the 1991 Oakland firestorm was spread as Eucalyptus stands exploded, sending burning embers across major freeways to start additional fires.

Monterey pine and cypress are native to other locations in California but were planted in the Sausal Creek watershed. The needle litter of these trees increases soil acidity and this change in soil characteristics appears to favor the growth of invasive non-native plants over native species (K. Paulsell, pers. comm.).

Appendix C has a long list of the invasive species recorded for the parklands of the Sausal Creek watershed. Forty-three species are described and their known occurrences listed for public park areas. Typically the approach to invasive species control is to: 1) document the species present and their areal extent; 2) determine the primary dissemination pattern (from upstream to downstream along watercourses, along trails, from parking lots into parkland, etc.); and 3) complete a multi-year strategy for eradication. When the processes of invasive plant dissemination are contained entirely within public lands, this type of approach can be successful if funding is available.

In the Sausal Creek watershed, however, public and private landscapes are intertwined, making eradication of invasives on public lands and along creeks very difficult. Unfortunately, private land in Sausal Creek watershed contains numerous non-native invasive species and serves as a major source for dissemination of these plants. For the most part, homeowners are largely unaware of invasive plants and can still purchase many of the worst species for their gardens. Although state and local governments fund invasive plant removal, and park and fire districts carry out management to remove these species, the plants have not been banned for sale in the state. This situation creates a never-ending supply of invasive plants to open space areas, while there are limited resources to remove them. Unless the ongoing cultivation of invasive plants by homeowners in the watershed is reduced, invasive non-native plants can never be eradicated on public land and along creeks in the Sausal Creek watershed. Figures 44-47 illustrate invasive non-native plants in the urban areas of the Sausal Creek watershed.

Joaquin Miller Park

Of all the public parks, Joaquin Miller Park is the least affected by private gardens due to its position in the headwaters of Palo Seco Creek. Redwood Regional Park borders the east side of the park. Developed lands border the park along Joaquin Miller Blvd. Along this border goats are used to graze and reduce invasive plants moving into the park. There are sites along Skyline Boulevard and the Castle Road neighborhood, however, which affect park biota, although these areas are also grazed. The riparian corridor adjoining Joaquin Miller Court is also badly infested with non-native plants (K. Paulsell, pers. comm.). Construction and landscaping projects have also brought invasive non-native plants into the watershed. Karen Paulsell has observed yellow starthistle and perennial pepperweed germinating from construction fill and mulch. A mulch and soil storage area at Park Blvd. near Leimert Blvd. with numerous invasive plants is on the adjacent downslope area of Dimond Canyon.

Non-native invasive plants that infest the park include: cape ivy, Acacia, broom, American elm, and Eucalyptus. Tables 18 and 19 list the approximate acreage of each species and Figures 48 and 49 depict known locations. Coverage for each species was mapped by Karen Paulsell. In addition to these mapped invasive species, a number of others have been recorded in the park but have not yet been mapped. These plants include: Algerian ivy, Himalayan blackberry, poison hemlock, spiderwort, and veldt grass. Mapped invasives and Monterey pine and Monterey cypress cover 14% of the land area of the park. Figure 50 shows the mixture of trees on a slope in the park. Several of the invasive plants are well-known fire hazards and include Acacia, Eucalyptus, and broom.



Figure 44: Top: Sausal Creek in Dimond Canyon has a very urbanized watershed. Bottom: Cape ivy, a highly invasive non-native plant, covers over native trees and shrubs and kills them, leaving a monoculture of the ivy. Urban areas are a never ending supply of invasive plants to infest downstream natural areas.



**Figure 45: Top: Cape ivy adjacent to a residential area in the Shepherd Canyon sub-basin.
Bottom: Algerian ivy covering native plants in an ephemeral creek.**



Figure 46: Invasive non-native species French broom and Eucalyptus are fire hazards.



Figure 47: French broom, a highly flammable invasive plant, is widespread in the Sausal Creek watershed and is seen here as an understory plant in both native vegetation and Eucalyptus forest.

Table 18: Mapped Invasive Non-Native Species in Parks^{1, 2}

Park	Total Park Area (acres)	Acres of Invasive Non-Native Plants				
		Acacia	Cape Ivy	American Elm	Eucalyptus	Broom ³
Joaquin Miller Park	355.1	7.45	0.54	0.32	15.05	1.67
Sequoia Lodge	5.7	-	0.02	-	-	-
Dimond Canyon Park	69.2	1.75	1.12	0.77	-	0.51
Shepherd Canyon Park and Bike Path	5.1	-	0.77	0.02	3.68	0.97
Beaconsfield Canyon Park	4.2	-	0.05	-	-	0.04
Castle Canyon Park	9.4	-	-	-	0.45	0.25

¹ Table only includes invasive species that have reliable mapping coverage. Each park has additional invasive species; see text.

² Vegetation mapping completed by Karen Paulsell

³ All species of broom are included here.

Table 19: Acres of Monterey Pine and Monterey Cypress

Park	Acres
Joaquin Miller Park	25.38
Dimond Canyon Park	0.01
Shepherd Canyon Park and Bike Path	2.28

Vegetation mapping completed by Karen Paulsell

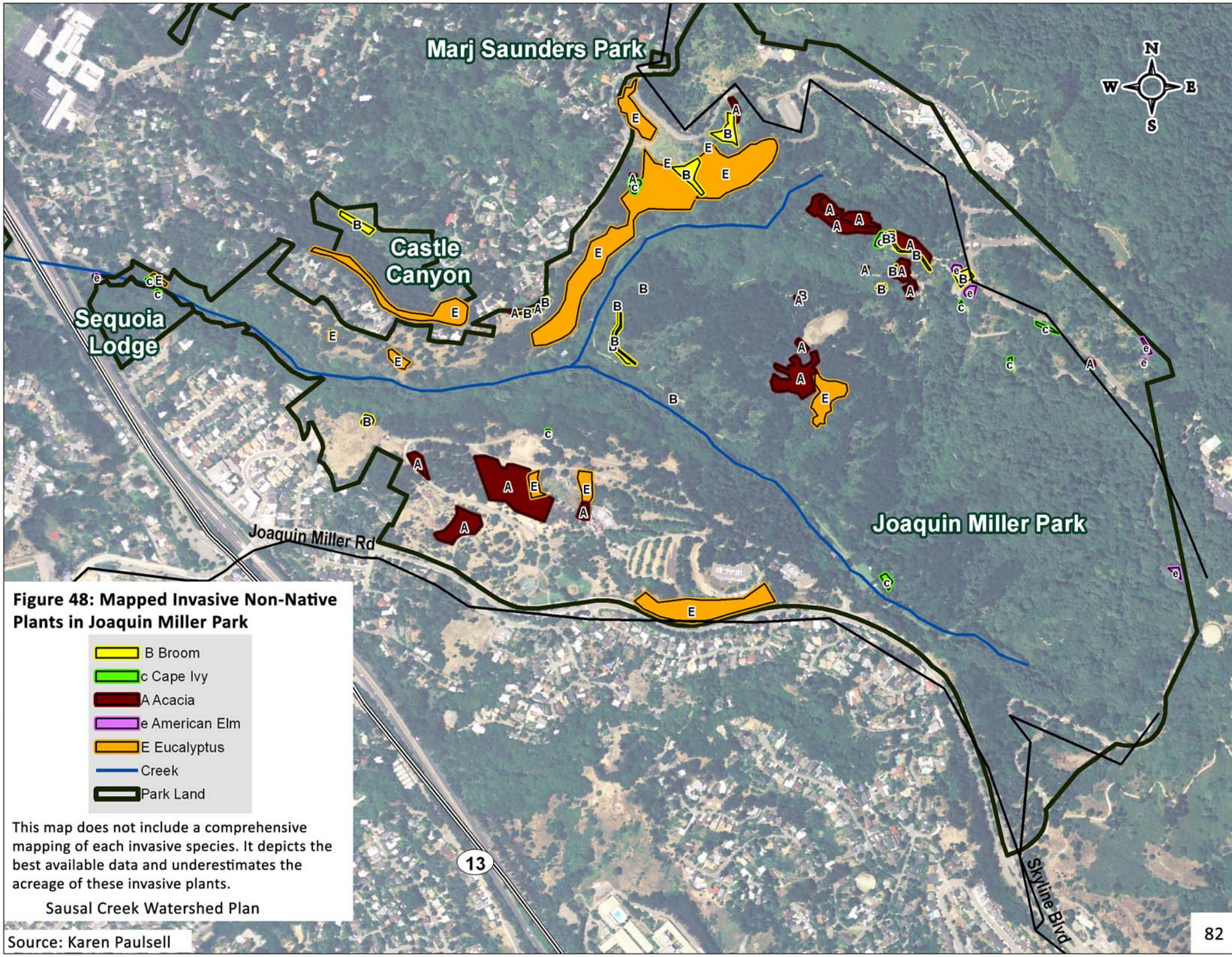


Figure 48: Mapped Invasive Non-Native Plants in Joaquin Miller Park

- B Broom
- c Cape Ivy
- A Acacia
- e American Elm
- E Eucalyptus
- Creek
- Park Land

This map does not include a comprehensive mapping of each invasive species. It depicts the best available data and underestimates the acreage of these invasive plants.

Sausal Creek Watershed Plan

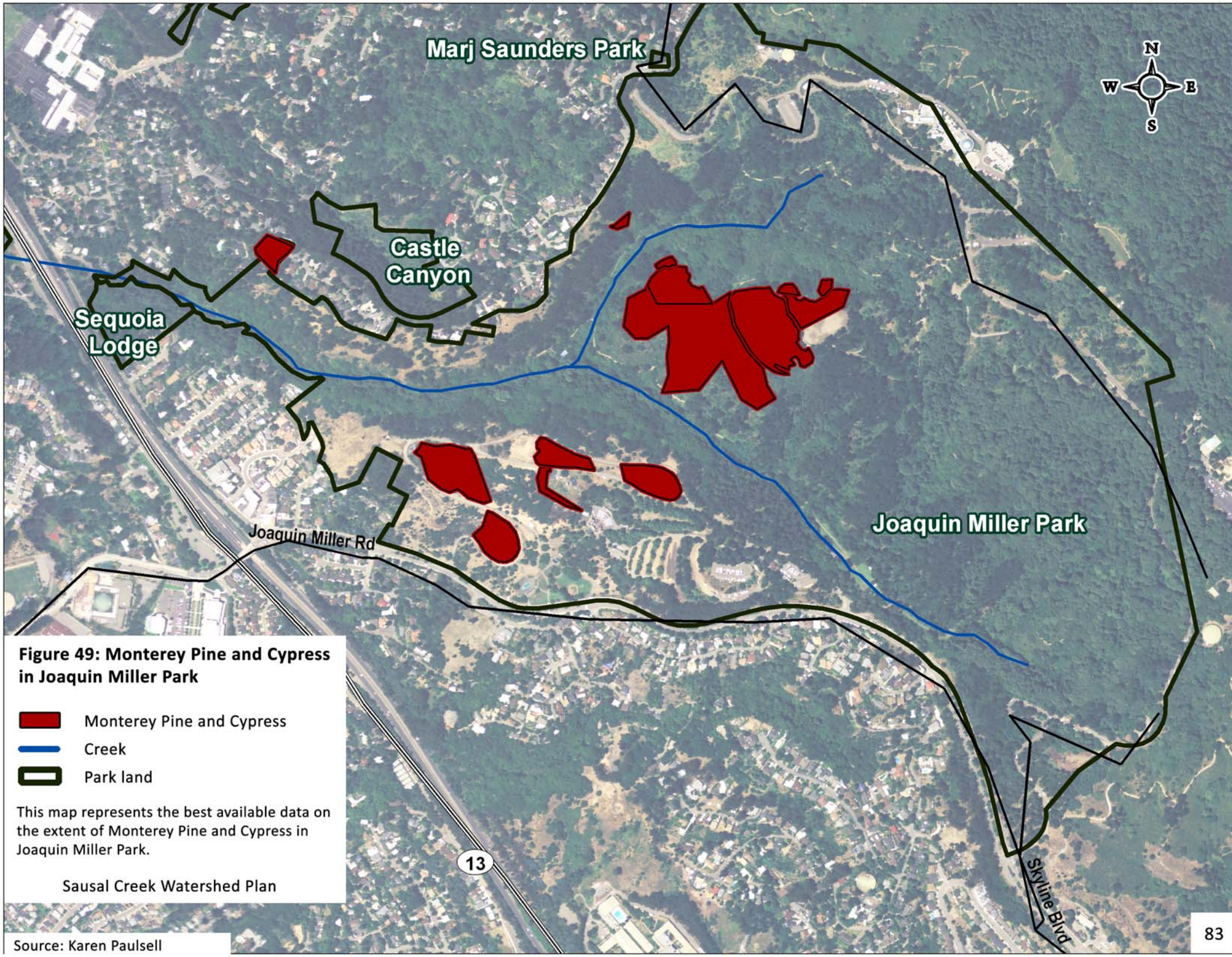


Figure 49: Monterey Pine and Cypress in Joaquin Miller Park

- Monterey Pine and Cypress
- Creek
- Park land

This map represents the best available data on the extent of Monterey Pine and Cypress in Joaquin Miller Park.



Figure 50: Mixture of vegetation in Joaquin Miller Park includes planted natives such as Monterey Pine, which does not naturally occur in the Oakland area, and non-native Acacia.

Sequoia Lodge

This small park adjacent to Joaquin Miller Park has mapped coverage of cape ivy (Figure 49) but also has Algerian ivy and Himalayan blackberry.

Shepherd Canyon Park and Montclair Railroad Trail

Shepherd Canyon Park and the Montclair Railroad trail have a large concentration of Eucalyptus and broom (Figures 47 and 51), creating a high fire hazard. In addition, Acacia, American elm, and blue periwinkle have been mapped in the park. Other invasive species in the park include Algerian ivy, Harding grass, poison hemlock, Himalayan blackberry, pampas grass, and spurge. Figure 52 depicts the extent of planted Monterey pine and cypress in Shepherd Canyon Park.

Dimond Canyon Park

Figure 53 depicts the mapped extent of several invasive species in Dimond Canyon Park. Several patches of Cape ivy have been eradicated and are “Adopt-a-Spot” maintenance sites. This species is invading Dimond Canyon Park along the Park Blvd. border from the adjoining residential area (K. Paulsell pers. comm.). In addition to these mapped species, a number of other invasive plants have been found in the park, including: Bermuda buttercup, fennel, gorse, Himalayan blackberry, Algerian ivy, pampas grass, and spiderwort. Algerian ivy is particularly widespread as a parasitic understory species. Algerian ivy climbs trees and sends adventitious roots through bark and into the cambial layer, where the tree moves sugar from leaves to roots. Over time, the ivy will weaken the tree and potentially kill it. Algerian ivy is also abundant along Palo Seco Creek canyon where this species can easily disperse into Dimond Canyon. Mapped invasive plants and Monterey pine and cypress cover 6% of the park area.

Beaconsfield Canyon Park

This small park has mapped coverage of tree of heaven, broom, cape ivy (Table 18). Other invasive species include Himalayan blackberry, veldt grass, Italian and other thistles, annual grasses, and poison hemlock.

Castle Canyon Park

This park has a large concentration of Eucalyptus and broom, both fire hazard species. Mapped invasive species cover 7% of the park area.

Figure 51: Mapped Invasive Non-Native Plants in Shepherd Canyon Park and Montclair Railroad Trail

B Broom

c Cape Ivy

b Blue Periwinkle

A Acacia

e American Elm

E Eucalyptus

Creek

Park Land

This map does not include a comprehensive mapping of each invasive species. It depicts the best available data and underestimates the acreage of these invasive plants.

Sausal Creek Watershed Plan

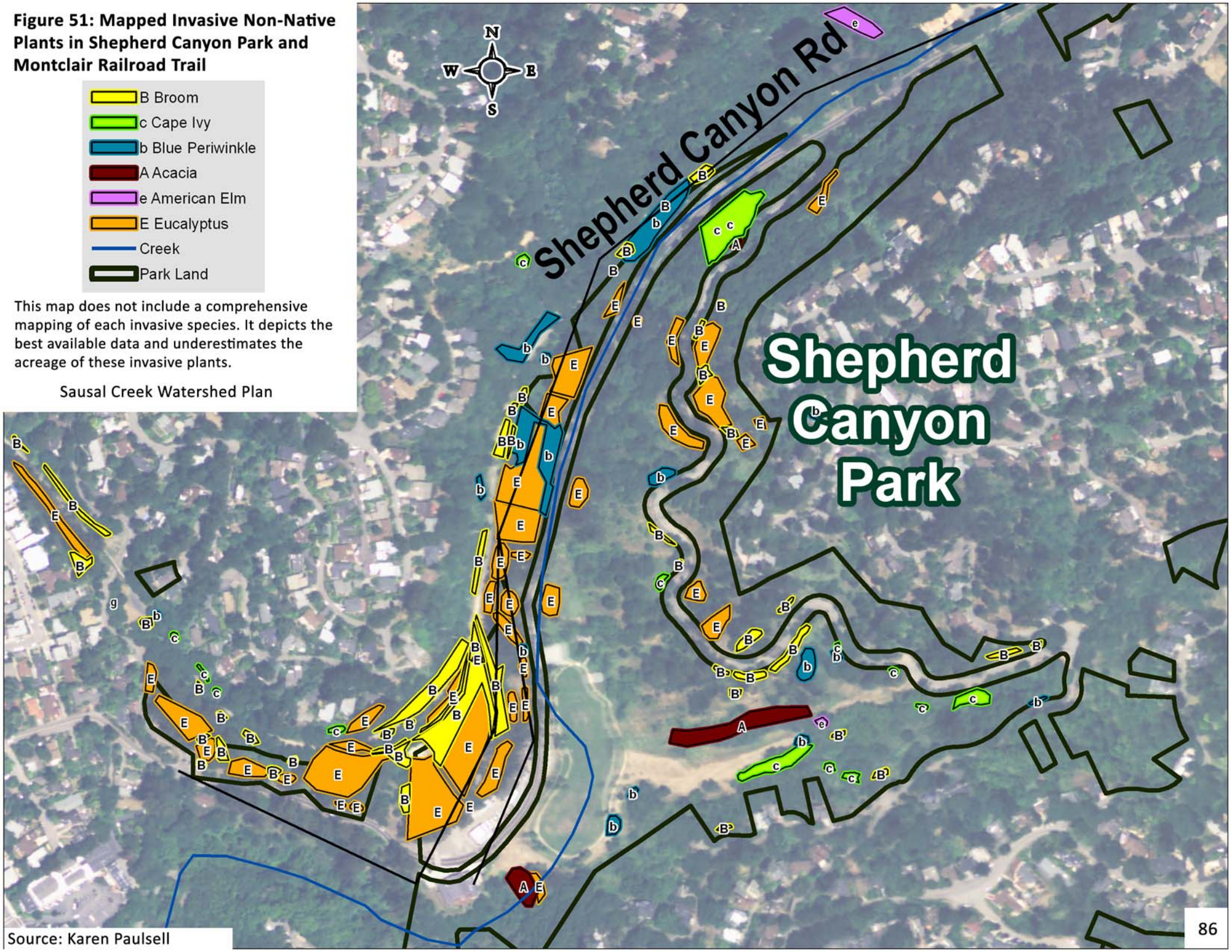


Figure 52: Monterey Pine and Cypress in Shepherd Canyon Park and Montclair Railroad Trail

- Monterey Pine and Cypress
- Creek
- Park land
- Road

This map represents the best available data on the extent of Monterey pine and cypress in Shepherd Canyon Park and Montclair Railroad Trail.

Sausal Creek Watershed Plan

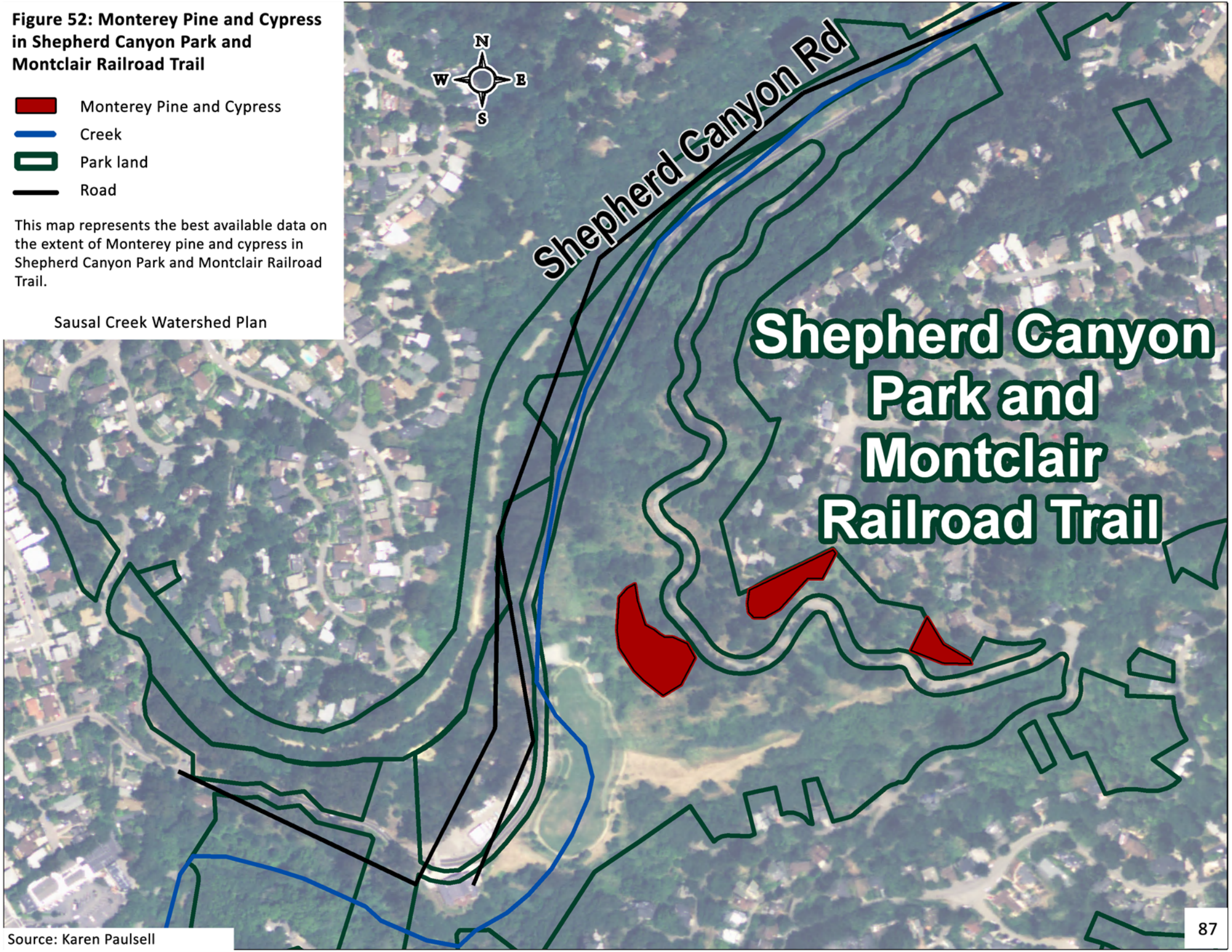


Figure 53: Mapped Invasive Non-Native Plants in Dimond Canyon Park

- B Broom
- c Cape Ivy
- b Blue Periwinkle
- Gorse
- A Acacia
- e American Elm
- E Eucalyptus
- Creek
- Park Land

This map does not include a comprehensive mapping of each invasive species. It depicts the best available data and underestimates the acreage of these invasive plants.

Sausal Creek Watershed Plan

