



# Jones & Stokes

## Memorandum

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Date: October 23, 2006

To: Ken Schreiber, Santa Clara Valley HCP/NCCP Program Manager

cc:

From: David Zippin and Steve Citron-Pousty

Subject: **Conservation Gap Analysis: Preliminary Results**

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A key step in the development of a conservation strategy for regional HCP or NCCP is to determine the existing level of protection for natural communities and covered species. Species or natural communities with low levels of existing protection may require greater emphasis in the HCP/NCCP to ensure that their conservation in the study area is assured and the regulatory requirements of the NCCP Act are met. In contrast, species or natural communities that are well protected may need little or no additional protection by the Plan. For these species, the conservation strategy may instead focus on habitat restoration. For all species it is expected that enhanced management and monitoring on existing and new protected lands will be needed. The analysis we perform to determine the levels of existing protection of species and natural communities is called a “conservation gap analysis”. This memo summarizes the methods and results of this analysis.

## Existing Protected Open Space

Santa Clara County is fortunate to have an extensive network of protected open space that range from a large state park to small private conservation easements. In total, there are 147,820 acres of protected open space in the study area, or 28% of the study area. However, not all of the protected areas will support or are managed to support covered species or their habitats. We have assigned all protected open space in the study area one of four categories to indicate the certainty that it will remain protected in perpetuity as well as whether management is directed at maintaining or enhancing species and habitats. As described in the current draft of Chapter 2, the four open space categories and their acreage in the study area are:

- **Type 1 Protected Open Space:** Natural resource management and ecological protection is the primary purpose of the land and it is protected from land use change by an irrevocable means such as a conservation easement in perpetuity (20,251 acres, 4% of study area).
- **Type 2 Protected Open Space:** Natural resource management and ecological protection is the primary purpose of the land but it is not permanently protected from land use change (104,904 acres, 20% of study area).

- **Type 3 Protected Open Space:** Ecological protection is not the primary goal of land management, but the land is managed as open space with some ecological value<sup>1</sup> (14,837 acres, 3% of study area).
- **Type 4 Protected Open Space:** The land is managed as open space but offers little or no long-term or measurable ecological value (7,828 acres, 2% of study area).

Local examples of each protected open space type are provided in Table 2-3 in the current draft of Chapter 2 (also attached). The decision-making process used to assign open space lands to these types is shown in Figure 2-3 in Chapter 2 (also attached). The revised open space figure is also attached and illustrates the locations of all protected open space by category.

## Protection Status and Conservation Gaps

### Methods

To determine the conservation gaps in the study area, we overlaid the protected open space GIS layer with several GIS data sets: land cover, watersheds, topography, slope, and the Bay checkerspot butterfly habitat map. The sources and methods of assembly for all of these data sets are described in detail in the current draft of Chapter 3.

We are currently revising many of the habitat distribution models based on comments received from stakeholders, Wildlife Agency staff, and Local Partner staff. We are also awaiting key data sets to incorporate into these models. When the new models are completed, we will provide the results of the conservation gap analysis to the stakeholders. Although habitat models are the primary tool for evaluating impacts and conservation of wildlife species, plant impacts and conservation will be evaluated based on habitat models and locations of plant occurrences that are presumed extant. We are collecting additional plant occurrence data from a large private property owner based on recent surveys. Once that information is incorporated into our database, we will conduct the overlay of protected open space with plant populations and provide the results to the stakeholders.

### Results

#### Land Cover Protection

Table 1 shows the overlay of land cover with protected open space. This data provides an indication of the conservation protection and potential gaps in vegetation types and natural communities. It will be important for the HCP/NCCP to conserve a wide range of natural communities in order to meet the NCCP standards. Key findings of this preliminary analysis include:

- The overall protection of many natural land cover types is greater than 30%. Natural land cover types that are generally well protected in the study area (>40%) are: foothill pine-oak woodland (75%), ponderosa pine woodland (53%), coastal and valley freshwater marsh (51%), willow riparian forest and scrub (51%), ponds (48%), northern mixed chaparral/chamise chaparral (47%),

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<sup>1</sup> Allows multiple species to complete some portion of their life cycle (e.g., reproduction, growth, foraging) or provides critical refuge and movement opportunities (e.g., migration corridor).

blue oak woodland (47%), and central California sycamore alluvial woodland (45%).

- Natural land cover types with the lowest protection overall and where the conservation gaps are most likely to occur are knobcone pine woodland (16%), coast live oak forest and woodland (20%), serpentine rock outcrop (22%), mixed riparian forest and woodland (25%), and California annual grassland (25%). However, note that these low values are relatively modest compared to the protection status of land cover types in other areas of California.
- Agricultural land cover types are poorly protected in the study area by easements or other protection mechanism, ranging from 3.4% to 8.7% for all three types.
- Protection of all land cover types by Type 1 open space is relatively low, on average only 5% for all natural land cover types. Protection increases dramatically when Type 2 open space is added, to 33% overall for all natural land cover types. Adding Type 3 and Type 4 open space does not add substantial amounts of new protection of natural land cover types.

### **Protection of Ecosystems and Environmental Gradients**

As discussed in Chapter 1, this NCCP must protect ecosystem functions and environmental gradients. One way to measure ecosystem function is to evaluate the protection status and conservation gaps in the major watersheds in the study area (see Figure 3-6 in Chapter 3 for a map of the watershed). By ensuring adequate conservation in each of the major watersheds, we have a greater likelihood of conserving the ecosystem functions in the study area. Table 2 shows the results of the watershed overlay with open space classification. Key conclusions of this analysis include:

- Of the five major watersheds in the study area (Coyote, Pacheco-Santa Ana, Llagas, Guadalupe<sup>1</sup>, and Uvas), protection open space is greatest in quantity and proportion in the Coyote and Pacheco-Santa Ana watersheds (37 and 35%, respectively). The Llagas watershed has the least protection (13%), closely followed by the Uvas watershed (15%).
- As with land cover, most protected open space in the five major watersheds falls within the Type 2 category.
- There is no protected open space within the portion of the Santa Cruz Mountains watershed in the study area (7,269 acres) that includes headwaters of Pescadero, Tar, and Bodfish Creeks. Almost all of this watershed within the study area is on one large private parcel.

As discussed in Chapter 3, one way to measure environmental gradients is by topographic features such as slope and elevation. Figure 1 shows the distribution of slopes throughout the study area. If open space was protecting the full range of slope categories, we would expect the histogram of slope categories for open space to have a similar shape to Figure 1. Instead, Figure 2 shows that open space is deficient in areas of very flat slope and relatively good at protecting areas with moderate slope (10-25%). This is to be expected because development, rather than open space, has occurred mostly on flat slopes. As before, most of this protection occurs with Type 2 open space (Figure 3).

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<sup>1</sup> Note that the study area includes only a portion of the large Guadalupe watershed.

Examining elevation, we see that most land in the study area occurs below 500 feet (Figure 4). In contrast, open space tends to occur on moderate elevation between 1,000 and 2,300 feet (Figures 5 and 6). Protection at higher elevations diminishes as the frequency of this elevation decreases. Protection at lower elevations is generally very low because of the prevalence of urban development and agriculture.

### **Conservation Gaps for Bay Checkerspot Butterfly**

Table 3 shows the total extent in acres of all known populations in the study area of Bay checkerspot butterfly, as described in the species account (see Appendix D). Key conclusions of this analysis include:

- The overall protection by existing open space of occupied populations is 2,042 acres, or just over 25%, leaving 6,038 acres of habitat for this species left to be protected in some way to achieve 100% protection.
- Protection status varies substantially by population. Some populations are completely protected (Pound Site; 100%) while others are completely or nearly unprotected (Metcalf North Ridge, 0%; Pigeon Point, 10%; Kalana Avenue 1 and 2, 5% and 7%).
- The protection status is good to excellent at the three major sites with the potential to support the species through better management: Santa Teresa Main (50%), Santa Teresa North (98%), and Coyote-Bear Ranch County Park (100%). If improved management could alter all of the serpentine grassland in these protected areas so that they supported Bay checkerspot butterfly, this would add 710 acres of suitable habitat for this species to the Reserve System (an increase of 35%) without any expensive land acquisition.
- Unlike the other variables discussed in this memo, habitat for Bay checkerspot butterfly is mostly protected in Type 1 open space (60% of all open space on occupied populations) due the greater proportion of permanent easements established for mitigation purposes. It is unclear whether Type 3 or Type 4 open space (395 acres, or 19% of open space on occupied populations) can continue to support the species. Management supporting covered species is typically not a priority on Type 3 or Type 4 open space, and consistent long-term management (e.g., cattle grazing and invasive species removal) is essential for the persistence of the Bay checkerspot butterfly on serpentine grassland.

**Table 1. Land Cover in Protected Open Space**

Code	Land Cover Type	Open Space Classification (acres)				Total Open Space	Total in Study Area	% by Open Space Types			
		Type 1	Type 2	Type 3	Type 4			% Type 1	% Type 1 and 2	% Type 2, 3	% All OS
10	California Annual Grassland	4,297.1	14,713.6	1,888.3	440.0	21,339.0	83,997.7	5.1%	22.6%	24.9%	25.4%
15	Serpentine Bunchgrass Grassland	1,440.0	922.9	1,430.5	252.9	4,046.3	12,357.0	11.7%	19.1%	30.7%	32.7%
16	Serpentine Rock Outcrop / Barrens	1.4	11.1	44.3	1.9	58.8	268.7	0.5%	4.7%	21.2%	21.9%
17	Rock Outcrop	9.7	38.2		0.0	47.9	122.7	7.9%	39.1%	39.1%	39.1%
20	Northern Mixed Chaparral / Chamise Chaparral	1,958.1	14,392.4	596.3	17.4	16,964.1	35,923.1	5.5%	45.5%	47.2%	47.2%
21	Mixed Serpentine Chaparral	223.8	672.9	626.7	6.0	1,529.5	4,257.0	5.3%	21.1%	35.8%	35.9%
22	Northern Coastal Scrub / Diablan Sage Scrub	123.1	2,187.6	363.4	182.3	2,856.3	10,571.7	1.2%	21.9%	25.3%	27.0%
23	Coyote Brush Scrub		46.6		6.5	53.0	179.6	0.0%	25.9%	25.9%	29.5%
30	Valley Oak Woodland	1,113.1	3,191.1	26.5	67.7	4,398.5	14,574.1	7.6%	29.5%	29.7%	30.2%
31	Mixed Oak Woodland and Forest	5,065.0	29,243.8	2,604.6	618.1	37,531.4	99,679.9	5.1%	34.4%	37.0%	37.7%
32	Blue Oak Woodland	2,558.0	3,448.9	281.1	269.1	6,557.1	13,962.4	18.3%	43.0%	45.0%	47.0%
33	Coast Live Oak Forest and Woodland	616.1	4,438.3	1,346.9	231.8	6,633.2	32,250.8	1.9%	15.7%	19.8%	20.6%
34	Foothill Pine - Oak Woodland	1,133.5	22,923.2	268.9	7.8	24,333.4	32,532.4	3.5%	73.9%	74.8%	74.8%
35	Mixed Evergreen Forest	13.6	986.0	698.8		1,698.4	5,758.3	0.2%	17.4%	29.5%	29.5%
40	Willow Riparian Forest and Scrub	99.8	651.3	362.9	181.4	1,295.3	2,521.5	4.0%	29.8%	44.2%	51.4%
41	Central California Sycamore Alluvial Woodland		166.9		2.1	169.0	374.4	0.0%	44.6%	44.6%	45.1%
42	Mixed Riparian Forest and Woodland	95.9	603.3	105.4	137.7	942.3	3,832.7	2.5%	18.2%	21.0%	24.6%
50	Redwood Forest	4.2	563.1	2,512.9		3,080.2	9,763.7	0.0%	5.8%	31.5%	31.5%
51	Ponderosa Pine Woodland		460.9	1.3		462.2	873.7	0.0%	52.8%	52.9%	52.9%
52	Knobcone Pine Woodland		110.2			110.2	707.9	0.0%	15.6%	15.6%	15.6%
60	Coastal and Valley Freshwater Marsh	4.1	172.6	11.4	5.3	193.5	383.4	1.1%	46.1%	49.1%	50.5%
61	Seasonal Wetland	5.5	51.3	7.6		64.4	201.8	2.7%	28.1%	31.9%	31.9%
62	Serpentine Seep	0.8	4.8	7.7		13.3	34.3	2.3%	16.2%	38.7%	38.7%
65	Pond	39.9	217.9	130.8	146.0	534.6	1,118.8	3.6%	23.0%	34.7%	47.8%
66	Reservoir		2,412.0	51.1	49.4	2,512.5	2,815.1	0.0%	85.7%	87.5%	89.3%
<b>Subtotal All Natural or Water Land-Cover Types</b>		<b>18,802.6</b>	<b>102,631.0</b>	<b>13,367.4</b>	<b>2,623.4</b>	<b>137,424.4</b>	369,062.9	5.1%	32.9%	36.5%	37.2%
70	Orchard		86.4	5.0	0.2	91.6	2,699.9	0.0%	3.2%	3.4%	3.4%
71	Vineyard			0.0	97.1	97.2	1,394.7	0.0%	0.0%	0.0%	7.0%
72	Grain, Row-crop, Hay & Pasture, Disked/short-term fallow	1,397.3	937.0	249.3	345.4	2,928.9	33,581.7	4.2%	7.0%	7.7%	8.7%
<b>Subtotal All Agricultural Land-Cover Types</b>		<b>1,397.3</b>	<b>1,023.4</b>	<b>254.3</b>	<b>442.7</b>	<b>3,117.7</b>	37,676.3	3.7%	6.4%	7.1%	8.3%
80	Urban - Suburban	40.9	614.0	350.6	982.2	1,987.8	89,013.7				
81	Rural - Residential	2.8	124.9	164.0	37.0	328.6	12,408.4				
82	Golf Courses / Urban Parks	1.2	492.1	699.5	3,733.7	4,926.5	8,516.6				
83	Ornamental Woodland		0.0		8.6	8.6	94.7				
84	Landfill						264.6				
85	Agriculture developed / Covered Ag	7.0	0.7	1.4		9.1	1,934.8				
86	Barren		17.7	0.2		17.8	209.2				
<b>Subtotal All Development Land-Cover Types</b>		<b>51.9</b>	<b>1,249.4</b>	<b>1,215.7</b>	<b>4,761.5</b>	<b>7,278.5</b>	112,442.0				
<b>Grand Total</b>		<b>20,251.8</b>	<b>104,903.7</b>	<b>14,837.4</b>	<b>7,827.6</b>	<b>147,820.5</b>	519,181.2				

**Table 2. Watersheds in Protected Open Space**

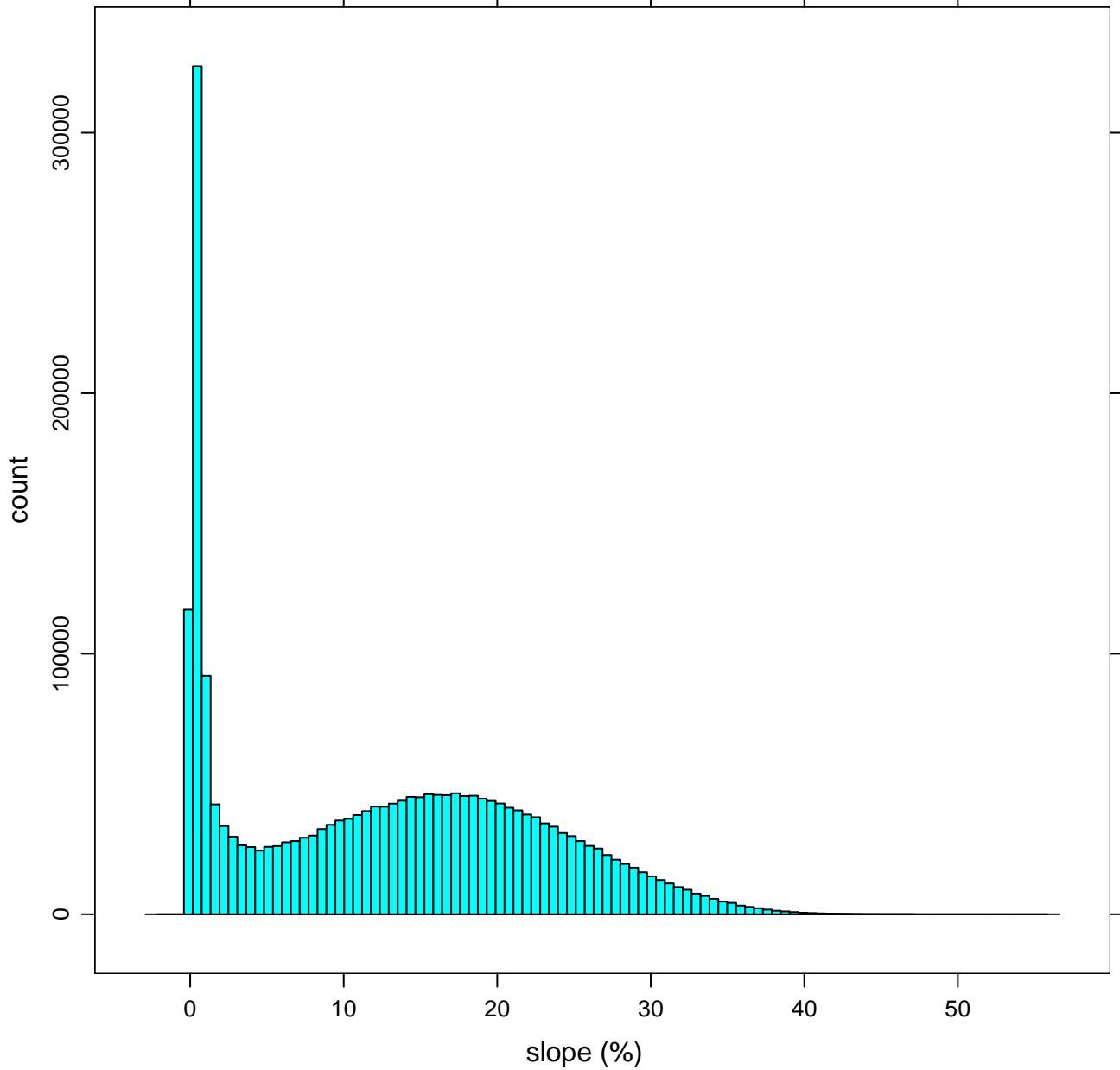
Watershed (sorted by total size)	Open Space Classification (acres)				Total Open Space	Total in Study Area	% by Open Space Types			
	Type 1	Type 2	Type 3	Type 4			% Type 1	% Type 1 and 2	% Type 1, 2, 3	% All OS
Coyote	5,869.5	66,415.2	3,539.9	3,288.2	<b>79,112.8</b>	215,363.9	2.7%	33.6%	35.2%	36.7%
Pacheco-Santa Ana	10,637.9	24,555.0	121.4		<b>35,314.4</b>	100,742.6	10.6%	34.9%	35.1%	35.1%
Llagas	1,883.8	4,527.6	927.8	1,414.2	<b>8,753.4</b>	65,365.5	2.9%	9.8%	11.2%	13.4%
Guadalupe	473.3	4,112.5	6,293.1	2,162.0	<b>13,040.9</b>	59,016.3	0.8%	7.8%	18.4%	22.1%
Uvas	1,220.0	3,571.5	2,968.9	832.2	<b>8,592.6</b>	55,916.4	2.2%	8.6%	13.9%	15.4%
Santa Cruz Mountains	0.0				<b>0.0</b>	7,269.0	0.0%	0.0%	0.0%	0.0%
San Tomas		14.2	24.7	114.6	<b>153.5</b>	5,442.2	0.0%	0.3%	0.7%	2.8%
Lower Santa Clara Valley	132.9	301.1	0.3		<b>434.2</b>	5,387.4	2.5%	8.1%	8.1%	8.1%
Alameda	15.8	1,356.2	51.8		<b>1,423.9</b>	2,843.0	0.6%	48.3%	50.1%	50.1%
Watsonville		0.1	825.6		<b>825.6</b>	852.3	0.0%	0.0%	96.9%	96.9%
Calabazas				16.2	<b>16.2</b>	705.8	0.0%	0.0%	0.0%	2.3%
Fremont Bayside		1.5	82.9		<b>84.4</b>	196.6	0.0%	0.8%	42.9%	42.9%
Santa Cruz		0.8			<b>0.8</b>	3.7	0.0%	22.2%	22.2%	22.2%
Grand Total	20,233.2	104,855.8	14,836.4	7,827.6	<b>147,752.9</b>	519,105.0	3.9%	24.1%	27.0%	28.5%

Table 3. Bay Checkerspot Populations in Protected Open Space

Bay Checkerspot Butterfly Population (Sorted by occupancy and size)	Status of Population in 2006	Total Population Extent (acres)	Open Space Classification (acres)				Total Acres	% by Open Space Type			
			Type 1	Type 2	Type 3	Type 4		% Type 1	% Type 1 and 2	% Type 1, 2, 3	% All OS
UTC	Occupied	1,606.5	96.0		35.5	110.1	<b>241.7</b>	6.0%	6.0%	8.2%	15.0%
Kirby/East Hills	Occupied	1,462.6	468.8	284.0	14.4	1.5	<b>768.8</b>	32.1%	51.5%	52.5%	52.6%
Metcalf North Ridge	Occupied	1,414.2			0.0		<b>0.0</b>	0.0%	0.0%	0.0%	0.0%
Silver Creek Hills Central	Occupied	1,327.6	162.9				<b>162.9</b>	12.3%	12.3%	12.3%	12.3%
Metcalf	Occupied	1,220.2	232.0		0.0		<b>232.0</b>	19.0%	19.0%	19.0%	19.0%
Silver Creek Hills North	Occupied	382.3	260.3			12.6	<b>272.9</b>	68.1%	68.1%	68.1%	71.4%
Tulare Hill	Occupied	308.7		132.5		2.7	<b>135.2</b>	0.0%	42.9%	42.9%	43.8%
Pound Site	Occupied	216.2			216.2		<b>216.2</b>	0.0%	0.0%	100.0%	100.0%
Pigeon Point	Occupied	116.8		11.2			<b>11.2</b>	0.0%	9.6%	9.6%	9.6%
Kalana Avenue 2	Occupied	18.2			1.3		<b>1.3</b>	0.0%	0.0%	7.2%	7.2%
Kalana Avenue 1	Occupied	6.7			0.3		<b>0.3</b>	0.0%	0.0%	5.0%	5.0%
<b>Subtotal: Occupied Populations</b>		<b>8,079.9</b>	<b>1,220.0</b>	<b>427.7</b>	<b>267.8</b>	<b>127.0</b>	<b>2,042.5</b>	<b>15.1%</b>	<b>20.4%</b>	<b>23.7%</b>	<b>25.3%</b>
Santa Teresa Main	Potential	936.5			464.1		<b>464.1</b>	0.0%	0.0%	49.6%	49.6%
Santa Teresa North	Potential	189.8			185.7	0.2	<b>185.9</b>	0.0%	0.0%	97.8%	97.9%
Coyote-Bear Ranch County Park	Potential	59.9		59.9			<b>59.9</b>	0.0%	100.0%	100.0%	100.0%
Calero	Unknown	280.0		12.6			<b>12.6</b>	0.0%	4.5%	4.5%	4.5%
Southwest Anderson Reservoir	Unknown	189.3		54.7			<b>54.7</b>	0.0%	28.9%	28.9%	28.9%
San Martin/Hayes Valley	Historic	201.3				28.4	<b>28.4</b>	0.0%	0.0%	0.0%	14.1%
Valley Christian High School	Historic	15.1				6.3	<b>6.3</b>	0.0%	0.0%	0.0%	41.9%
Grand Total		10,663.4	1,220.0	555.0	917.6	161.9	<b>2,854.5</b>	11.4%	16.6%	25.3%	26.8%

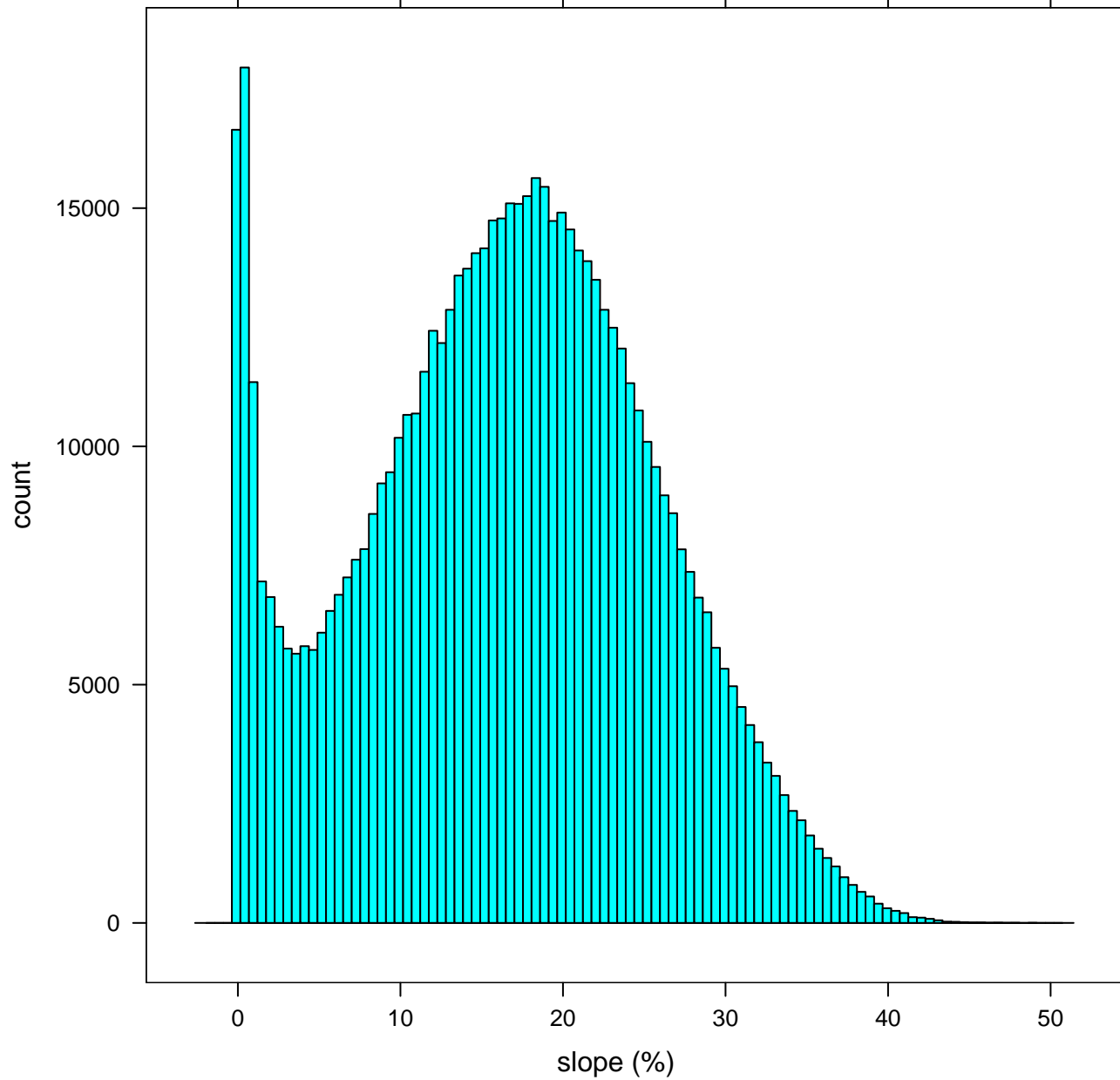
Note: See figure in draft species account for key to population names

Figure 1. Histogram of Slopes in Study Area

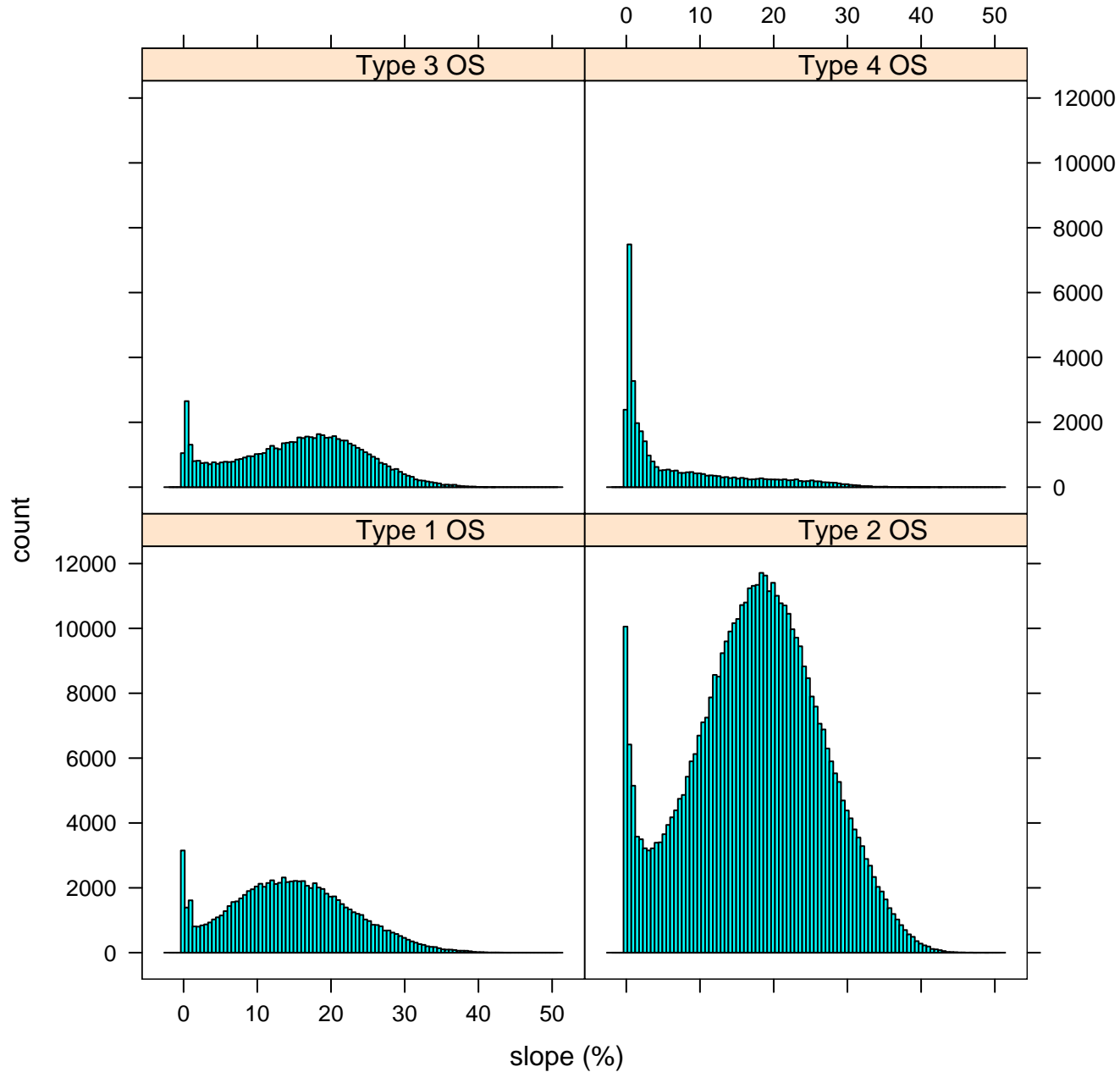




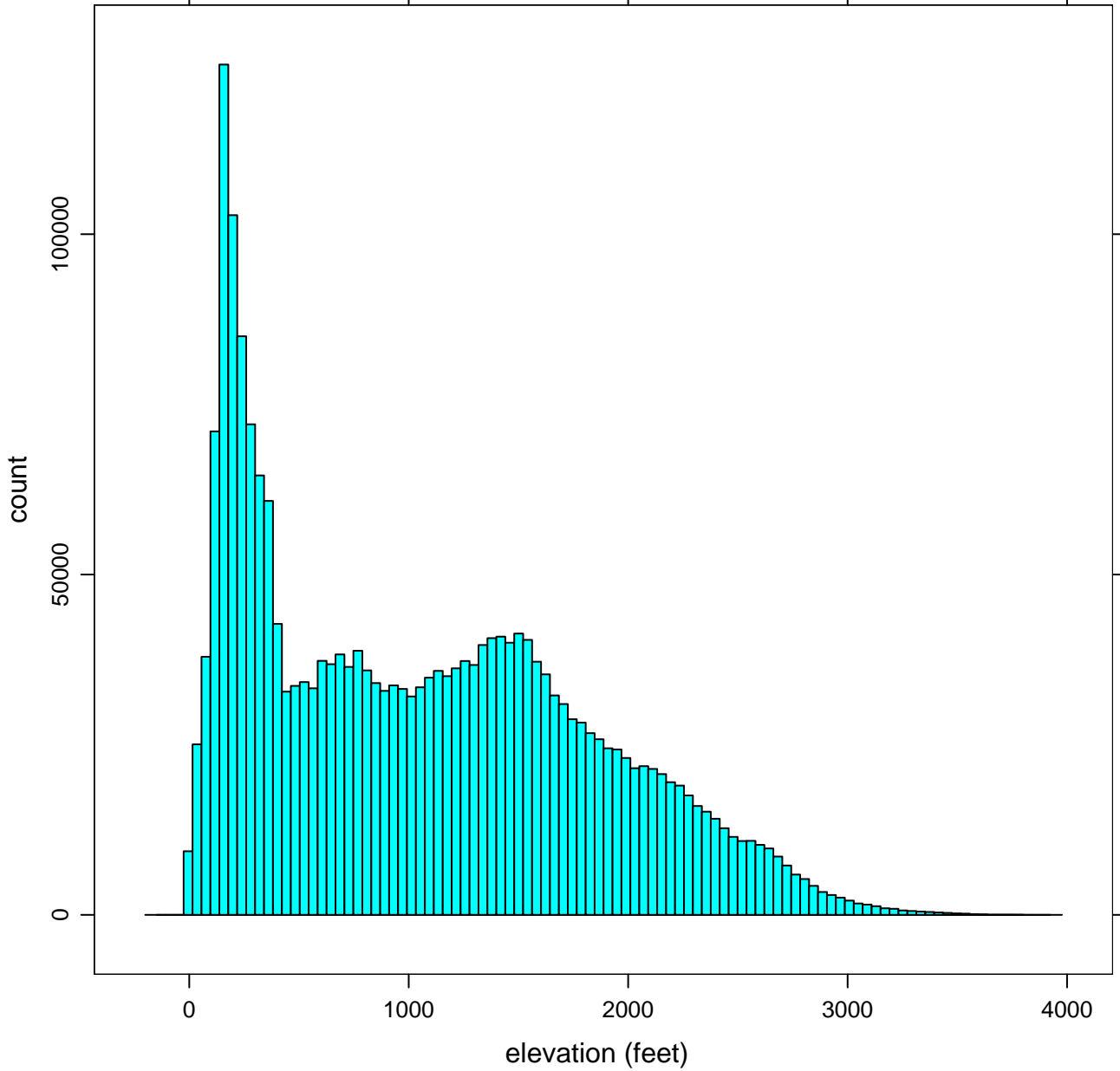
**Figure 2. Histogram of Slopes in Open Space**



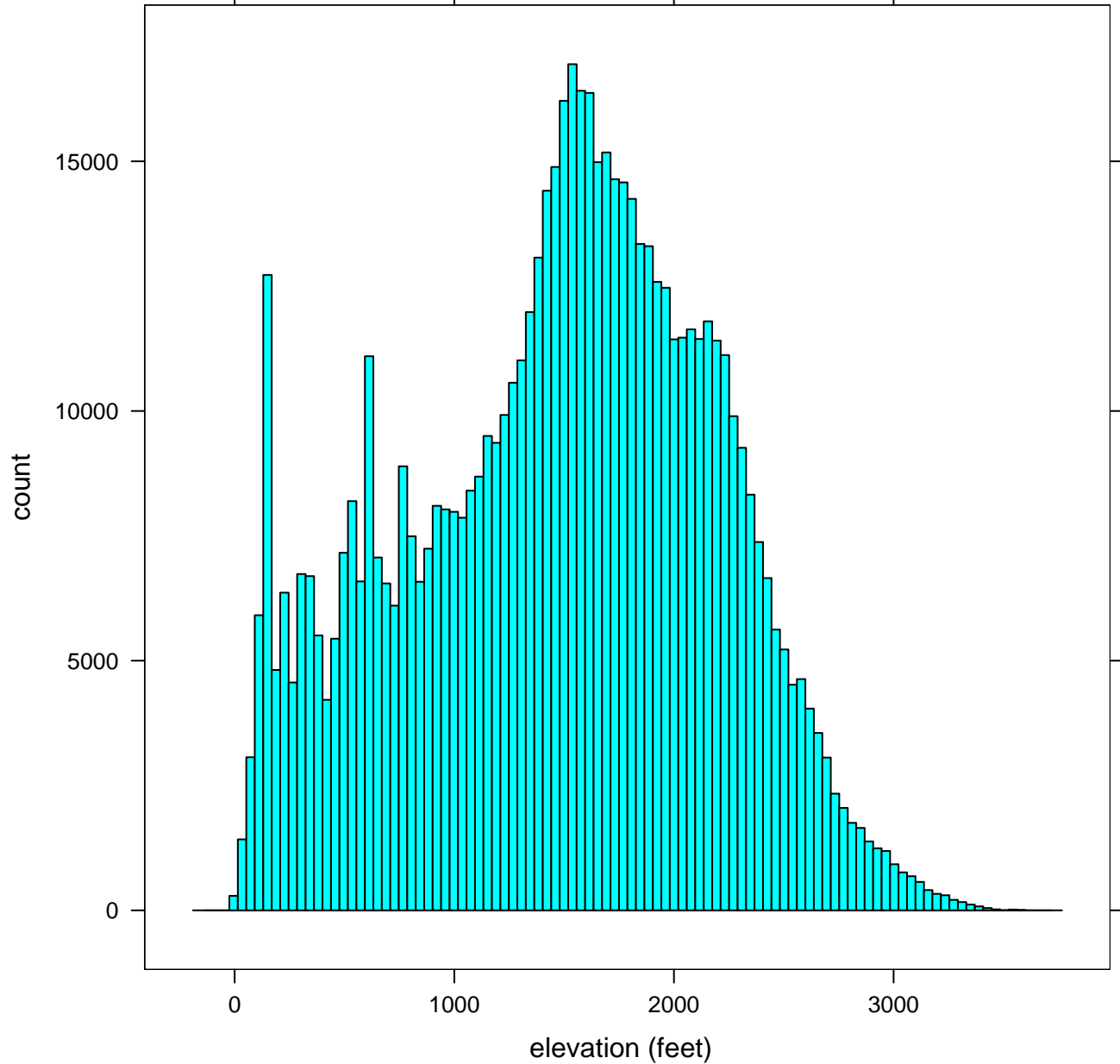
**Figure 3. Histogram of Slope in Open Space by Type**



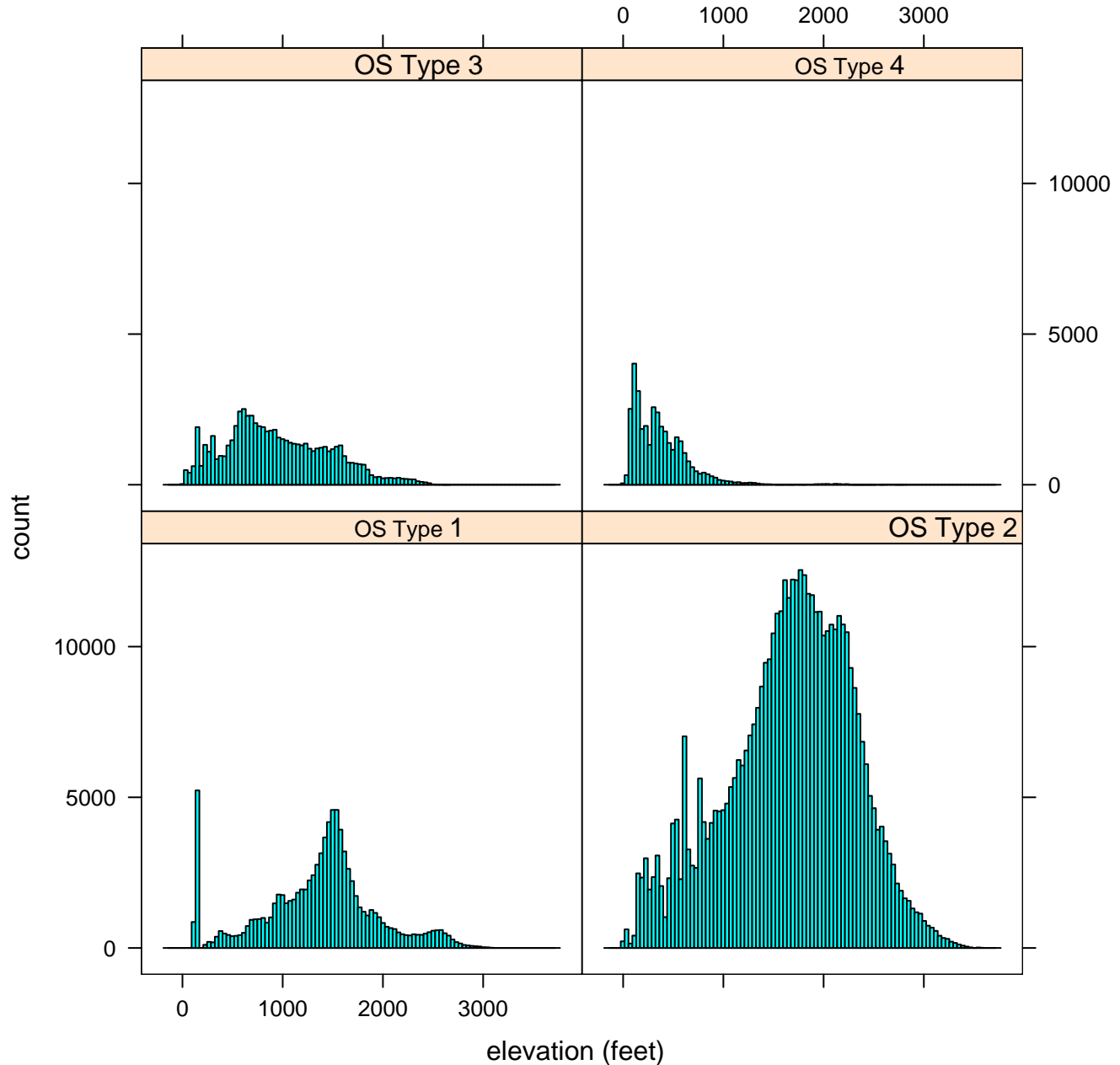
**Figure 4. Histogram of Elevation in Study Area**



**Figure 5. Histogram of Elevations in Open Space**



**Figure 6. Elevation in Open Space by Type**



**Table 2-2. Significant Open Space or Parkland Areas within the Plan Study Area<sup>a</sup>**

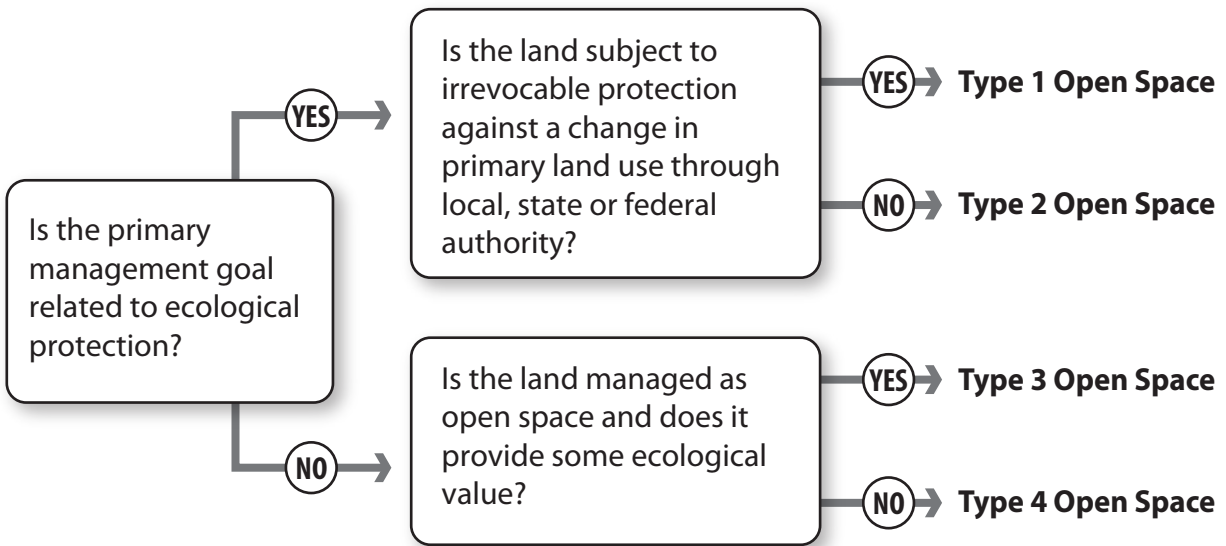
Open Space or Parkland	Primary Ownership (acres)	Other Ownership	Total Acres	Total Acres in Study Area
(unnamed parcels)	United States Bureau of Land Management		1,025	989
Henry W. Coe State Park	California State Parks		85,843	57,353
Pacheco State Park	California State Parks		6,921	734
Cañada de los Osos Ecological Area (formerly Stevenson Ranch)	California Department of Fish and Game		4,200	4,200
Almaden Quicksilver County Park	Santa Clara County Parks and Recreation Department (3,943)	SCVWD owns 209 acres	4,152	4,138
Anderson Lake County Park	Santa Clara County Parks and Recreation Department (1,773)	SCVWD owns 1,339 acres; California Pioneers owns 32 acres	3,144	3,144
Calero County Park	Santa Clara County Parks and Recreation Department (2,603)	SCVWD owns 890 acres	3,493	3,493
Coyote Creek Parkway	Santa Clara County Parks and Recreation Department (1,613)	SCVWD owns 81 acres	1,694	1,694
Coyote Lake-Harvey Bear Ranch County Park	Santa Clara County Parks and Recreation Department (3,663)	SCVWD owns 932 acres	4,595	4,171
Ed R. Levin County Park	Santa Clara County Parks and Recreation Department (1,541)		1,541	973
Joseph D. Grant County Park	Santa Clara County Parks and Recreation Department (9,560)		9,560	9,560
Motorcycle County Park	Santa Clara County Parks and Recreation Department (442)		442	322
Mount Madonna County Park	Santa Clara County Parks and Recreation Department (3,677)		3,677	3,669
Santa Teresa County Park	Santa Clara County Parks and Recreation Department (1,568)	SCVWD owns 9 acres; IBM/PG&E owns 69 acres	1,646	1,608

Open Space or Parkland	Primary Ownership (acres)	Other Ownership	Total Acres	Total Acres in Study Area
Uvas Canyon County Park	Santa Clara County Parks and Recreation Department (1,133)		1,133	1,127
Rancho Cañada del Oro Open Space Preserve	Santa Clara County Open Space Authority		3,602	3,602
Palassou Ridge Open Space Preserve (formerly Lakeview Meadows)	Santa Clara County Open Space Authority		3,515	3,515
Mitigation site	Santa Clara Valley Transportation Authority		603	603
Alum Rock Park	City of San Jose		703	703
Kirby Landfill easement	City of San Jose		250	250
Coyote Ridge Ecological Preserve	Silicon Valley Land Conservancy		95	95
Tulare Hill Ecological Preserve	Silicon Valley Land Conservancy		116	116
Romero Ranch (conservation easement)	The Nature Conservancy		28,781	10,419

Sources: Bay Area Council of Governments 2006, Jones & Stokes 2006, Santa Clara County Parks and Recreation Department 2006.

Notes:

a. Significant open space or parklands are large areas that may contribute to the Plan conservation strategy.



## Criteria

### Type 1 Open Space

- 1) The primary management goal is related to ecological protection.
- 2) That protection is irrevocable through local, state or federal authority and there are legal assurances such as wilderness status or a conservation easement that the primary land use will never change.

### Type 2 Open Space

- 1) The primary management goal is related to ecological protection.
- 2) The land is not subject to irrevocable protection from a change in primary land use or protections are uncertain or political in nature.

### Type 3 Open Space

- 1) Ecological protection is not a primary management goal, but land is managed as open space and has a consistent and measurable ecological value (allows multiple species to complete some portion of their life cycle [e.g. reproduction, growth, foraging] or provides critical refuge and movement opportunities [e.g. migration corridor]).

### Type 4 Open Space

- 1) The land is undeveloped but current management goals do not promote any consistent or measurable ecological value.