

March 1999

Botanical Inventory/Native Grassland Survey
4700 Via Los Santos Road (APN 59-290-041)
Santa Barbara, California

Prepared by: Watershed Environmental
5385 Hollister Avenue #105
Santa Barbara, California 93111

For

County of Santa Barbara
Planning and Development Department
123 East Anapamu Street
Santa Barbara, California 93110

Introduction

This report describes the botanical resources on a 14.36-acre site located at 4700 Via Los Santos Road, Santa Barbara, California and has been prepared at the request of the Santa Barbara County Planning and Development Department. The purpose of the report is to provide the information necessary to evaluate environmental impacts resulting from proposed development of the site. Development plans include subdividing the site into 14 one-acre, single-family home parcels and the extension of two roadways through the property.

Existing Conditions

The property is currently undeveloped and is surrounded on all four sides by large (approximately one-acre-parcel) single-family homes. Many of the homes in this area were destroyed during the 1990 Painted Cave Fire. We were unable to determine whether the site burned during this fire, but assume that it probably did. Elevations on the site range from 325 feet to 375 feet above mean sea level. The site is gently sloping from north to south and contains several small knolls and boulder outcrops scattered throughout the property.

Methods

Nomenclature

All botanical genus and species names used in this report conform to *The Jepson Manual, Higher Plants of California* (Hickman 1993) nomenclature. *A Flora of the Santa Barbara Region, California* (Smith 1998) was used as the source for common (vernacular) names and classification of vegetation as native or introduced species. The California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavilic 1994) was used to identify species of special concern. All plant community names follow the nomenclature described by Sawyer and Keeler-Wolf in *A manual of California Vegetation* (1995).

Botanical Inventory

We used a timed meander search to inventory vegetation systematically within the study area. This consisted of walking short transects in an irregular pattern over the entire study area until we observed no new species. New species were recorded the first time they were encountered and the elapsed time was recorded at regular 5-minute intervals. This method is widely used by botanist and

plant ecologists to survey areas for threatened and endangered species and is well described by Goff et al. in the *Journal of Environmental Management*, Vol. 6 No. 4 pp. 307-316 (1982). The method allows for a thorough inventory of species and for efficient plotting of a species/survey effort curve.

Plant Community

Identification and mapping of plant communities were performed using the Sawyer and Keller-Wolf method. This method utilizes a floristically based hierarchical classification scheme based on series (plant dominance) or association (grouping) of species. We performed plant community mapping by walking the site and plotting the location of plant series on a 1-inch equals 120-foot scale topographic/aerial photograph map. Native bunch grass populations were delineated in the field with pin flags to mark the boundaries and then measured and plotted on the topographic/aerial photograph map.

Native Grasslands

Surveys to identify locations of native grassland populations occurred on March 17, 1998. The focus of the survey was on the species *Nassella pulchra* (purple needlegrass). Five stands of native grassland were identified by direct field observation. Purple needlegrass is a perennial bunch grass that forms clumps; thus, each clump was considered an individual. For the purposes of this report, we considered a population or stand to be a group of more than 20 individual plants. We delineated populations in the field using pin flags to mark the outermost boundary. These areas were then mapped as polygons on a one-inch-equals-120-foot-scale topographic/aerial photograph map. The area (ft²) of each polygon was then calculated using geographic information system software. We did not map areas containing fewer than 20 individuals as separate populations, assuming them to be scattered individuals existing within annual grassland vegetation.

We used two sampling methods to determine the percent cover, density, and number of native grasses in each identified population. Depending on the size of the population, we performed either direct counting or transect/quadrat sampling. Direct counting was performed in stand 1, where the population covered a small area and contained less than 150 individual plants. We counted by partitioning the stand into small areas of approximately 50 plants and counted the number of individuals. The percent cover of native grasses was determined by measuring the diameter of 31

randomly selected plants. Diameter measurements were taken along the x and y axis of each plant and the average distance was used to calculate the area covered by the plant using the equation $\text{Area} = \pi r^2$. We then calculated the average plant size and multiplied it by the total number of plants to get absolute cover of *N. pulchra* within the stand. Percent cover was calculated by dividing the absolute cover by the stand size and multiplying by 100.

We carried out transect/quadrat sampling in stands 2, 3, 4, and 5, where the population size was too large to count the number of individuals directly. Sampling was performed by placing a line transect through the approximate center of the native grassland population along the primary (longest) axis. We did quadrat sampling at regular 5-ft intervals along the transect using a 10-ft² (3ft-2in x 3ft-2in) quadrat constructed of half-inch PVC pipe. We placed quadrats perpendicular to the transect and randomly chose them to be on either side of the transect based on the outcome of a coin toss (heads right, tails left). The quadrat distance (0 to 10 ft) from the transect was also randomly selected using a hand-held calculator with a random number function. We counted the number of individual *N. pulchra* plants in each quadrat and visually estimated the percent cover to within 5%. We estimated the population size (number of individuals), density (number of plants per 10ft²), and percent cover for each stand using an Excel spreadsheet for each area sampled. Attachment 1 contains the spreadsheets and summary statistics for each area sampled.

Results

Botanical Inventory

A 130-minute timed meander search of the site resulted in 62 species being recorded and collected (Figure 1). The greatest number of species observed per unit effort was highest in the beginning of the search. During the first 20 minutes, the number of species recorded was roughly 1.5 per minute. As expected, this rate of discovery tapered off as the length of time searching increased. The search was halted at 130 minutes, after 10 minutes of no new species being recorded. The 62 species recorded are listed in Table 1 by scientific and common name.

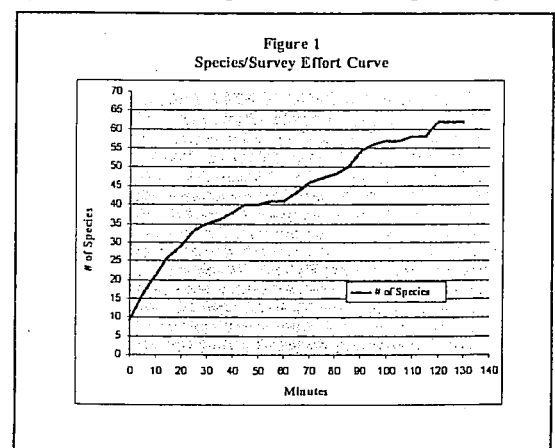


Table 1

Botanical Inventory 3/12/99
Proposed Park Hill Estates (APN 59-290-041)

Genus and Species	Common Name	Family	Lifeform	Native (N) Invasive (I)
<i>Ambrosia psilostachya</i>	Western Ragweed	Asteraceae	PH	N
<i>Amsinckia menziesii</i> var. <i>intermedia</i>	Common Fiddleneck	Boraginaceae	AH	N
<i>Artemisia californica</i>	California Sage	Asteraceae	S	N
<i>Avena fatua</i>	Wild Oat	Poaceae	AH	I
<i>Baccharis pilularis</i>	Coyotebrush	Asteraceae	S	N
<i>Brassica nigra</i>	Black Mustard	Brassicaceae	AH	I
<i>Briza minor</i>	Little Quaking Grass	Poaceae	AH	I
<i>Bromus diandrus</i>	Ripgut Brome	Poaceae	AH	I
<i>Bromus hordeaceus</i>	Soft Chess	Poaceae	AH	I
<i>Calandrinia ciliata</i>	Red Maids	Portulacaceae	AH	N
<i>Calystegia macrostegia</i> ssp. <i>cyclostegia</i>	Coastal Morning-Glory	Convolvulaceae	PH Vine	(N)
<i>Castilleja attenuata</i>	Owl's Clover	Scrophulariaceae	AH	(N)
<i>Chenopodium californicum</i>	Soap Plant	Chenopodiaceae	PH	(N)
<i>Conyza canadensis</i>	Horseweed	Asteraceae	AH	N
<i>Crassula connata</i>	Sand Pygmy Weed	Crassulaceae	AH	N
<i>Dichelostemma capitatum</i>	Bluedicks	Liliaceae	PH	(N)
<i>Echium candicans</i>	Pride Of Madeira	Boraginaceae	S	I
<i>Eleocharis macrostachya</i> W	Common Spikerush	Cyperaceae	PH	N
<i>Eremocarpus setigerus</i>	Turkey Mullein	Euphorbiaceae	AH	(N)
<i>Erodium cicutarium</i>	Redstem Stork's Bill	Geraniaceae	AH	I
<i>Eucalyptus Globulus</i>	Blue Gum Eucalyptus	Myrtaceae	T	I
<i>Foeniculum vulgare</i>	Fennel	Apiaceae	PH	I
<i>Geranium molle</i>	Dove's-Foot Geranium	Geraniaceae	A, PH	I
<i>Gnaphalium californicum</i>	Green Everlasting	Asteraceae	A, PH	(N)
<i>Gnaphalium canescens</i> ssp. <i>microcephalum</i>	White Everlasting	Asteraceae	PH	N
<i>Heteromeles arbutifolia</i>	Toyon	Rosaceae	S	N
<i>Heterotheca grandiflora</i>	Telegraph Weed	Asteraceae	A, PH	N
<i>Hordeum murinum</i>	Foxtail	Poaceae	AH	I
<i>Hypochaeris radicata</i>	Hairy Cats Ear	Asteraceae	PH	I
<i>Juncus mexicanus</i> W	Mexican Rush	Juncaceae	PH	N
<i>Juncus occidentalis</i> W	Yard Rush	Juncaceae	PH	N
<i>Lactuca serriola</i>	Prickly Lettuce	Asteraceae	AH	I
<i>Lessingia filaginifolia</i>	California Aster	Asteraceae	PH	(N)
<i>Leymus triticoides</i>	Alkali Rye	Poaceae	PH	N
<i>Lolium multiflorum</i>	Italian Rye	Poaceae	A, BH	I
<i>Marrubium vulgare</i>	Horehound	Lamiaceae	PH	I
<i>Melilotus indica</i>	Yellow Sweet Clover	Fabaceae	AH	I
<i>Nassella pulchra</i>	Purple Needlegrass	Poaceae	PH	(N)
<i>Olea europaea</i>	Olive Tree	Oleaceae	T, S	I
<i>Oxalis pes-caprae</i>	Sour-Grass	Oxalidaceae	PH	I

Table 1 (continued)
 Botanical Inventory 3/12/99
 Proposed Park Hill Estates (APN 59-290-041)

Genus and Species	Common Name	Family	Lifeform	Native (N) Invasive (I)
<i>Phalaris aquatica</i>	Harding Grass	Poaceae	PH	I
<i>Plantago major</i>	Common Plantain	Plantaginaceae	PH	I
<i>Poa annua</i>	Annual Blue Grass	Poaceae	AH	I
<i>Polygonum</i> sp.	Smartweed	Polygonaceae	S	Unkn
<i>Pyracantha</i> sp.	Firethorn	Rosaceae	S	I
<i>Raphanus sativus</i>	Wild Radish	Brassicaceae	A, BH	I
<i>Rhus integrifolia</i>	Lemon Berry	Anacardiaceae	S	N
<i>Robinia Pseudoacacia</i>	Black Lotus Tree	Fabaceae	T	I
<i>Rumex acetosella</i>	Sheep Sorrel	Polygonaceae	PH	I
<i>Rumex crispus</i>	Curly Dock	Polygonaceae	PH	I
<i>Sambucus mexicana</i>	Elderberry	Caprifoliaceae	T, S	N
<i>Sanicula bipinnatifida</i>	Poison Sanicle	Apiaceae	PH	N
<i>Schinus molle</i>	Peruvian Peppertree	Anacardiaceae	T	I
<i>Schinus terebinthifolius</i>	Brazilian Pepper	Anacardiaceae	T, S	I
<i>Sisyrinchium bellum</i>	Blue-Eyed Grass	Iridaceae	PH	N
<i>Stellaria media</i>	Chickweed	Caryophyllaceae	AH	I
<i>Thysanocarpus laciniatus</i>	Narrow-Leaved Lace Pod	Brassicaceae	AH	N
<i>Trifolium dubium</i>	Shamrock Clover	Fabaceae	AH	I
<i>Verbena lasiostachys</i> var. <i>lasiostachys</i>	Western Vervain	Verbenaceae	PH	N
<i>Vulpia myuros</i>	Rattail Fescue	Poaceae	AH	I
<i>Washingtonia robusta</i>	Mexican Fan Palm	Arecaceae	Palm	I
<i>Zigadenus fremontii</i>	Chaparral Zygodene	Liliacea	PH	N

A= annual, AH = annual herb, BH = biennial herb, PH = perennial herb, S = shrub, T = tree

The 62 taxa noted at the site represent 57 genera and 29 plant families (Table 2). Roughly 47% of the plants recorded are native to the Santa Barbara region. None of the plants found on the site are listed as sensitive species by the federal government or by the State of California. Likewise, none of the species present are listed as rare or endangered in the California Native Plant Society's 1994 manual of Rare and Endanger Vascular Plants of California.

Table 2
Summary of Species Composition (Botanical Inventory 3/12/99)
Proposed Park Hill Estates (APN 59-290-041)

Number of Species	Number of Genera	Number of Families	Percent Native	Percent Invasive	Percent Native status unknown
62	57	29	46.70%	51.60%	1.60%

Plant Community

The entire study area is dominated by herbaceous plants. The site contains few shrubs and trees most of which are concentrated along the property boundary. The majority of the site (84.6% or 12.15 acres) is dominated by California annual grassland series. This area is primarily composed of nonnative annual and biennial species, with a few scattered native shrubs. The dominant species in this community at the time of the survey were *Vulpia myuros* and *Erodium cicutarium*. As the season progresses and later blooming species develop, the dominant plants in this series will likely become *Brassica nigra*, *Coniza canadensis*, and *Eremocarpus setigerus*.

The site does, however, contain five (stands 1, 2, 3, 4, and 5) small stands of purple needlegrass (*Nassella pulchra*) series (Figure 2). These stands cover 15.4% (2.21 acres) of the property and also contain many nonnative annual grasses (*Vulpia myuros*, *Avena fatua*, *Bromus hordeaceus*, and *Bromus diandrus*); native herbs (*Ambrosia psilostachya*, *Conyza canadensis*, *Eremocarpus setigerus* and *Zygodynus fremonti*); and nonnative herbs (*Brassica nigra*, *Erodium cicutarium*) scattered among the perennial bunch grasses. Native grass stands appear to be concentrated around boulder outcrops, where they were likely protected from agricultural tilling and cattle/horse grazing.

Pennell Rd. (Private)

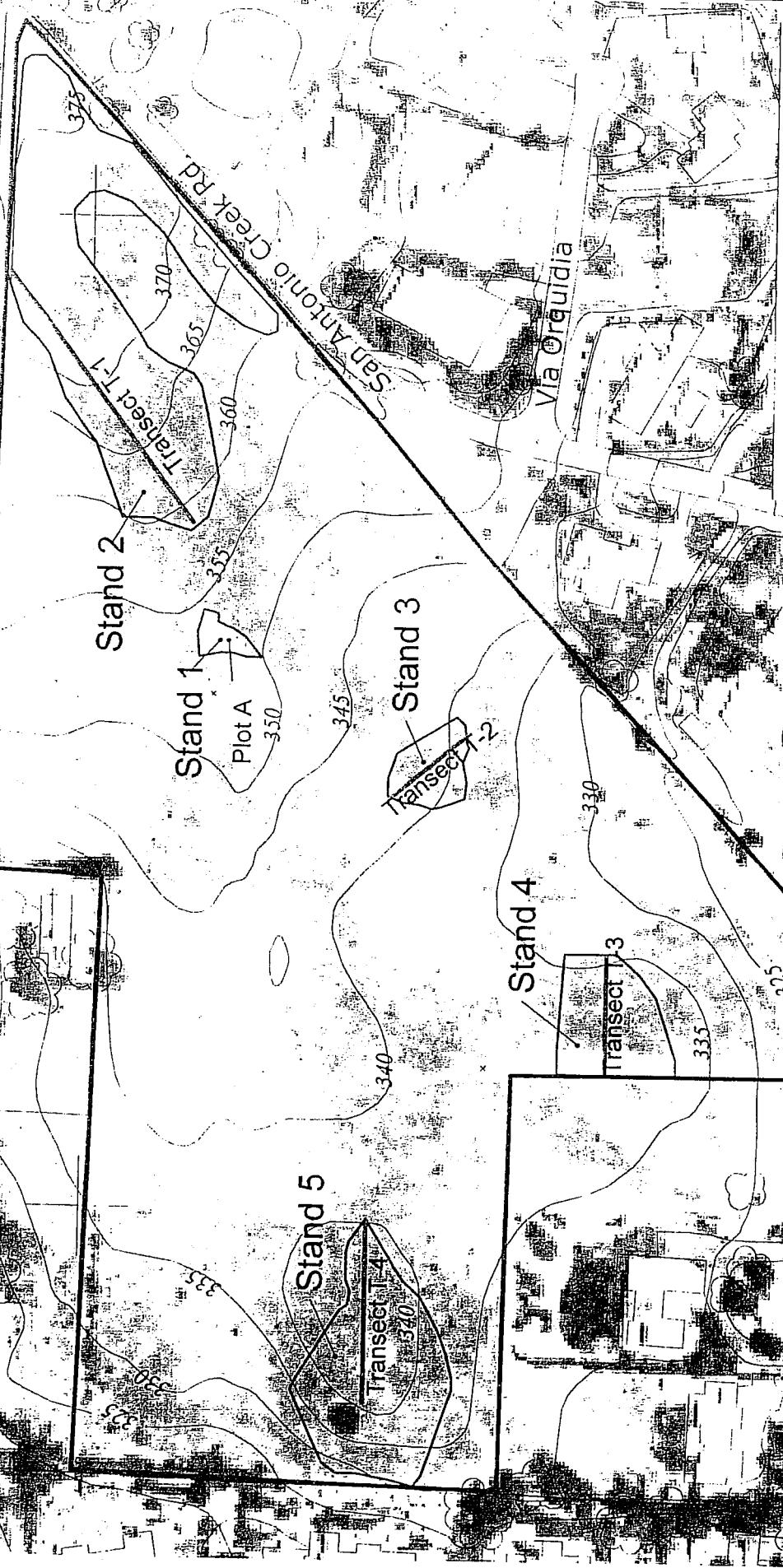


Figure 2

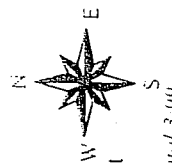
Vegetation Map

Proposed Park Hill Estates (APN 59-290-041)

Survey Limits

Nassella pulchra

0 40 80 120 Feet



Watershed Environmental 3 99

Native Grasslands

A summary of the stand size (area), estimated population size, average density, average percent cover, and standard error for estimated percent cover for each of the five native grassland stands appears in Table 3. Three of the five areas surveyed have estimated absolute cover values of *N. pulchra* greater than 10%. The estimated total area containing native grasses is approximately 2.21 acres in size. Of this total area, we estimate that 1.90 acres have an absolute cover of native grasses greater than 10%.

Table 3. Summary of Native Grassland Population Survey

Stand #/Transect	Area (acres)	Area (ft ²)	Average Density (plants/10ft ²)	Estimated Population Size	Average % Cover	Standard Error
Stand 1/Plot A	0.04	1,695	0.59	100	2.36	0.04
Stand 2/T-1	1.19	51,855	2.09	10,838	11.56	3.08
Stand 3/T-2	0.12	5,315	1.09	579	11.82	5.65
Stand 4/T-3	0.27	11,901	1.00	1,190	7.92	4.53
Stand 5/T-4	0.59	25,638	2.39	6,127	15.83	4.65
Total	2.21			18,835		

Discussion

Botanical Inventory

We believe that the timed meander was an effective means to record the number of species present at the site. The strength of the methodology was further confirmed when a subsequent field visit five days after the initial search resulted in no new species being found on the site. It should be noted that while the site has a relatively high diversity of flora, the species list generated for this report only indicates presence, not abundance. For example, Table 1 indicates that roughly 77% of the taxa present at the site are herbs, while roughly 20% of the taxa are shrubs and trees. Yet these numbers do not accurately represent abundance and/or the absolute species cover at the site. For example, by visual inspection, the grass *Vulpia myuros* and herb *Erodium cicutarium* clearly dominated the site, while the absolute cover of trees likely represented less than five% of the site.

It should also be understood that one site visit to record taxa will only give a snapshot in time of species present. Additional surveys performed later in the season would likely result in finding a few additional taxa as late-developing plants emerge and flower. For example, while conducting the botanical survey of the site, we observed a few newly emerged grasses, but without flowering parts or mature morphological growth, identification was impossible. Despite this potential source of error due to lack of information, we do not believe that further study would result in new *sensitive* species being discovered.

Plant Community

The fact that only two plant communities--California annual grassland and purple needlegrass--exist on the site demonstrates the extent to which historic land use has altered the species composition. Given the location of the site and isolated native shrubs found scattered throughout the site, it is highly likely that the site may have been dominated by coastal sage scrub vegetation or coast live oak woodland at one time. The purple needlegrass community seems to be flourishing at this site particularly after the heavy rains experienced last year. Other factors that may be contributing to its success are the recent Painted Cave Fire and lack of grazing pressure.

Native Grasslands

Estimation of plant cover is extremely difficult when cover values are near or below 10%. Visual cover estimates across a landscape or stand typically under- or overestimate cover unless systematic sampling is performed. Many factors can influence the sample results, including size of the quadrat relative to the species being studied, sampling frequency, orientation of the transect, and species phenology (life cycle) at the time of the survey. The focus of this sampling effort was to measure the cover and density of native grass stands on the project site. Toward this end, the transects were oriented parallel to areas observed to have the greatest number of individuals.

Percent cover in each quadrat was estimated to within 5%. Estimations were rounded to the nearest multiple of 5. Individual plant size varied considerably from stand to stand, with some stands (2 and 3) comprised mostly of large, mature plants. We used the average density and percent cover values obtained from the quadrat sampling to estimate the population size in each stand. This methodology

tends to overestimate the population size and absolute cover of the stand if the plants are not homogeneously distributed. It is also important to note that no sampling was performed in the mapped stands outside of the 20-ft-wide (10-ft on either side of the transect) sampling area. Additional sampling would need to be performed perpendicular to the transects at regular intervals to precisely estimate the density and cover of each stand.

The 1995 Santa Barbara County *Environmental Thresholds and Guidelines Manual* impact assessment guidelines define a native grassland as “an area where native grassland species comprise 10% or more of the total relative cover.” It goes on to state that “the removal or severe disturbance to a patch or patches of native grasses less than ¼ acre, which is clearly isolated and is not part of a significant native grassland or an integral component of a larger ecosystem, is usually considered insignificant.” Based on the above criteria, two of the stands (2 and 5) exceed the significant impact threshold. Stand 2 is 1.19 acres in size and has an estimated native grassland cover of 11.56%. Stand 5 is 0.59 acres in size and has an estimated cover of 15.83%.

Conclusions

A total of 62 species were found in the study area during the performance of a two-hour botanical survey. No state-, federal-, or CNPS-listed sensitive species were found on the site. The majority of the site (84.6% or 12.15 acres) is dominated by California annual grassland species. The remainder of the site (15.4% or 2.21 acres) is purple needlegrass series vegetation. The purple needlegrass occurs in five distinct patches on the site and is found at relatively low densities (2.5 plants/10 ft² average value from all five plots) and low absolute cover (8-16%), except for one small patch (stand 1) that had a cover of approximately 2.36%.

Literature Cited

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Attachment 1
Plot and Transect/Quadrat Data

Plot 1 Raw Data

Plot: P-1
Date: 3/17/99

Project: Park Hills Estates (APN 59-290-41)
Location: 4700 Via Los Santos, Santa Barbara, California
Person(s) Sampling: Mark de la Garza and Michael Schulman
Plant Community: Purple Needle Grass

Population Size: 100 plants (counted by direct method)
Area (ft²) of plot 1:

Estimation of *Nesella pulchra* average plant size in Area 1

Plant #	Plant Size		average (in)	radius	Area of Circle (in ²)	Area (ft ²)
	length (in)	width (in)				
1	10.0	10.0	10.0	5	78.54	0.55
2	7.0	6.0	6.5	3.25	33.18	0.23
3	11.0	7.0	9.0	4.5	63.62	0.45
4	10.0	10.0	10.0	5	78.54	0.55
5	12.0	12.0	12.0	6	113.10	0.79
6	14.0	12.0	13.0	6.5	132.73	0.93
7	8.0	10.0	9.0	4.5	63.62	0.45
8	6.0	7.0	6.5	3.25	33.18	0.23
9	10.0	13.0	11.5	5.75	103.87	0.73
10	10.0	9.0	9.5	4.75	70.88	0.50
11	6.0	7.0	6.5	3.25	33.18	0.23
12	5.0	5.0	5.0	2.5	19.64	0.14
13	10.0	13.0	11.5	5.75	103.87	0.73
14	6.0	6.0	6.0	3	28.27	0.20
15	6.0	7.0	6.5	3.25	33.18	0.23
16	7.0	8.0	7.5	3.75	44.18	0.31
17	10.0	7.0	8.5	4.25	56.75	0.40
18	6.0	7.0	6.5	3.25	33.18	0.23
19	7.0	7.0	7.0	3.5	38.48	0.27
20	7.0	8.0	7.5	3.75	44.18	0.31
21	9.0	7.0	8.0	4	50.27	0.35
22	10.0	10.0	10.0	5	78.54	0.55
23	11.0	11.0	11.0	5.5	95.03	0.67
24	10.0	8.0	9.0	4.5	63.62	0.45
25	6.0	5.0	5.5	2.75	23.76	0.17
26	4.0	4.0	4.0	2	12.57	0.09
27	8.0	8.0	8.0	4	50.27	0.35
28	8.0	8.0	8.0	4	50.27	0.35
29	11.0	10.0	10.5	5.25	86.59	0.61
30	6.0	6.0	6.0	3	28.27	0.20
31	7.0	8.0	7.5	3.75	44.18	0.31

Summary Statistics

Mean	0.40
Variance	0.04
Std Deviation	0.21
Std Error	0.04
$t_{.05(2), 30} =$	2.04
95% confidence value (upper)	0.48
95% confidence value (lower)	0.33

Absolute cover in plot 1 = (mean * number of plants): 40.41
Estimated *Nassella pulchra* percent cover plot A:

Quadrat Sampling Data Form

Transect: T-1
Date: 3/17/99

Stand 2

Project: Park Hills Estates (APN 59-290-41)
Location: 4700 Via Los Santos, Santa Barbara, California
Person(s) Sampling: Mark de la Garza and Michael Schulman
Plant Community: Purple Needle Grass
Transect: T-1 Transect Length: 320 ft

Quadrat Size: 10ft²

Direction: 38 deg.
Sampling Frequency: 5ft

Quad #	Distance form Transect	Species	% Vegetation Cover	% Native Grass Absolute Cover	Frequency
1	4.50 L	<i>Nassella pulchra</i>	90	5	1
2	4.40 L	<i>Nassella pulchra</i>	90	15	1
3	1.70 R	<i>Nassella pulchra</i>	80	0	0
4	0.20 R	<i>Nassella pulchra</i>	95	5	1
5	0.80 R	<i>Nassella pulchra</i>	85	20	6
6	4.00 L	<i>Nassella pulchra</i>	90	5	2
7	3.00 L	<i>Nassella pulchra</i>	95	10	3
8	9.20 R	<i>Nassella pulchra</i>	95	0	0
9	3.20 L	<i>Nassella pulchra</i>	95	10	2
10	2.60 L	<i>Nassella pulchra</i>	95	0	0
11	2.00 L	<i>Nassella pulchra</i>	95	0	0
12	5.10 R	<i>Nassella pulchra</i>	95	5	3
13	7.50 L	<i>Nassella pulchra</i>	50	0	0
14	2.40 L	<i>Nassella pulchra</i>	60	0	0
15	6.00 R	<i>Nassella pulchra</i>	85	0	0
16	8.10 L	<i>Nassella pulchra</i>	90	0	0
17	3.70 R	<i>Nassella pulchra</i>	50	0	0
18	5.10 R	<i>Nassella pulchra</i>	75	0	0
19	6.90 L	<i>Nassella pulchra</i>	80	5	1
20	7.20 R	<i>Nassella pulchra</i>	90	60	7
21	6.50 L	<i>Nassella pulchra</i>	95	5	1
22	0.60 L	<i>Nassella pulchra</i>	95	40	9
23	4.10 R	<i>Nassella pulchra</i>	95	60	10
24	4.20 R	<i>Nassella pulchra</i>	95	40	5
25	7.70 L	<i>Nassella pulchra</i>	75	0	0
26	7.70 R	<i>Nassella pulchra</i>	90	25	4
27	7.80 R	<i>Nassella pulchra</i>	50	0	0
28	9.50 L	<i>Nassella pulchra</i>	40	5	1
29	9.20 R	<i>Nassella pulchra</i>	95	40	6
30	2.10 L	<i>Nassella pulchra</i>	90	5	1
31	8.10 L	<i>Nassella pulchra</i>	85	5	2
32	6.00 R	<i>Nassella pulchra</i>	95	5	1

Summary Statistics

Mean	11.56	2.09
Variance	303.93	7.77
Std Deviation	17.43	2.79
Std Error	3.08	0.49
$t_{.05(2), 31} =$	2.04	2.04
95% confidence value	17.85	upper
95% confidence value	5.28	lower

Quadrat Sampling Data Form

Transect: T-2
Date: 3/17/99

Stand
3

Project: Park Hills Estates (APN 59-290-41)
Location: 4700 Via Los Santos, Santa Barbara, California
Person(s) Sampling: Mark de la Garza and Michael Schulman
Plant Community: Purple Needle Grass
Transect: T-2 Transect Length: 100 ft
Quadrat Size: 10ft²

Direction: 320 deg.
Sampling Frequency: 5ft

Quad #	Distance from Transect	Species	% Vegetation Cover	% Native Grass Absolute Cover	Frequency
1	8.60 L	<i>Nassella pulchra</i>	95	0	0
2	6.90 L	<i>Nassella pulchra</i>	95	50	4
3	7.10 R	<i>Nassella pulchra</i>	50	0	0
4	3.40 L	<i>Nassella pulchra</i>	80	0	0
5	6.10 L	<i>Nassella pulchra</i>	90	40	3
6	8.50 R	<i>Nassella pulchra</i>	95	5	1
7	10.00 R	<i>Nassella pulchra</i>	85	0	0
8	9.50 R	<i>Nassella pulchra</i>	80	0	0
9	9.50 R	<i>Nassella pulchra</i>	100	5	1
10	8.30 L	<i>Nassella pulchra</i>	100	0	0
11	2.10 R	<i>Nassella pulchra</i>	95	30	3

Summary Statistics

Mean	11.82	1.09
Variance	351.36	2.29
Std Deviation	18.74	1.51
Std Error	5.65	0.46
$t_{.05(2), 10} =$	2.23	2.23
95% confidence value	24.41	upper
95% confidence value	-0.77	lower

Quadrat Sampling Data Form

Transect: T-3
Date: 3/17/99

Stand
(4)

Project: Park Hills Estates (APN 59-290-41)
Location: 4700 Via Los Santos, Santa Barbara, California
Person(s) Sampling: Mark de la Garza and Michael Schulman
Plant Community: Purple Needle Grass
Transect: T-3 Transect Length: 110 ft
Quadrat Size: 10ft²

Direction: 80 deg.
Sampling Frequency: 5ft

Quad #	Distance form Transect	Species	% Vegetation Cover	% Native Grass Absolute Cover	Frequency
1	8.40 R	<i>Nassella pulchra</i>	100	0	0
2	3.00 L	<i>Nassella pulchra</i>	80	0	0
3	9.20 L	<i>Nassella pulchra</i>	80	0	0
4	0.70 R	<i>Nassella pulchra</i>	95	0	0
5	6.80 L	<i>Nassella pulchra</i>	100	5	1
6	7.40 L	<i>Nassella pulchra</i>	100	0	0
7	0.00 L	<i>Nassella pulchra</i>	100	0	0
8	0.08 R	<i>Nassella pulchra</i>	100	30	4
9	2.00 L	<i>Nassella pulchra</i>	100	50	5
10	4.50 R	<i>Nassella pulchra</i>	65	10	2
11	3.70 L	<i>Nassella pulchra</i>	90	0	0
12	6.10 L	<i>Nassella pulchra</i>	70	0	0

Summary Statistics

Mean	7.92	1.00
Variance	252.08	3.09
Std Deviation	15.88	1.76
Std Error	4.58	0.51
$t_{.05(2), 11} =$	2.20	2.20
95% confidence value	18.00	upper
95% confidence value	-2.17	lower

Quadrat Sampling Data Form

Transect: T-4
Date: 3/17/99

Stand 5

Project: Park Hills Estates (APN 59-290-41)
 Location: 4700 Via Los Santos, Santa Barbara, California
 Person(s) Sampling: Mark de la Garza and Michael Schulman
 Plant Community: Purple Needle Grass
 Transect: T-4 Transect Length: 180 ft
 Quadrat Size: 10ft²

Direction: 262 deg.
Sampling Frequency: 5ft

Quad #	Distance from Transect	Species	% Vegetation Cover	% Native Grass Absolute Cover	Frequency
1	2.25 R	<i>Nassella pulchra</i>	100	5	1
2	1.90 L	<i>Nassella pulchra</i>	100	10	2
3	3.80 L	<i>Nassella pulchra</i>	100	15	2
4	6.40 R	<i>Nassella pulchra</i>	100	50	7
5	7.60 R	<i>Nassella pulchra</i>	100	10	1
6	4.10 R	<i>Nassella pulchra</i>	95	10	2
7	4.10 L	<i>Nassella pulchra</i>	60	35	5
8	3.50 R	<i>Nassella pulchra</i>	90	0	0
9	9.50 L	<i>Nassella pulchra</i>	100	10	3
10	9.00 L	<i>Nassella pulchra</i>	100	40	6
11	7.90 R	<i>Nassella pulchra</i>	95	70	8
12	2.70 L	<i>Nassella pulchra</i>	95	0	0
13	3.00 R	<i>Nassella pulchra</i>	100	10	2
14	9.30 L	<i>Nassella pulchra</i>	100	0	0
15	3.70 L	<i>Nassella pulchra</i>	100	5	1
16	5.00 R	<i>Nassella pulchra</i>	100	5	1
17	4.10 L	<i>Nassella pulchra</i>	60	0	0
18	3.90 L	<i>Leymus triticoides</i>	95	10	2

Summary Statistics

Mean	15.83	2.39
Variance	388.97	6.13
Std Deviation	19.72	2.48
Std Error	4.65	0.58
$t_{.05(2), 17} =$	2.11	2.11
95% confidence value	25.64	upper
95% confidence value	6.03	lower