GLENWOOD PRESERVE MONITORING REPORT
Year 1

Scotts Valley, California

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EXECUTIVE SUMMARY

This Year 1 Annual Monitoring Report describes the management and monitoring activities conducted on the Glenwood Preserve ("Preserve"). Monitoring is conducted according to the guidelines set forth in the final Open Space Management Plan ("OSMP") for the Preserve (WRA 2003).

A grazing program has been implemented on the Preserve to monitor the horses' grazing patterns and coordinate the horse grazing rotation plan in order to minimize localized overgrazing of preferred sites and to encourage more even forage utilization. Improvements to pasture infrastructure, including repair and replacement of perimeter fencing, construction of cross fencing and gates, and installation of water troughs, were completed in 2004, which will allow implementation of a grazing program as described in the OSMP. Monitoring and management of the grazing program in 2004 included reconnaissance surveys, coordination of the grazing rotation program, photo documentation, vegetation transects, and end of the season measurements of grazing utilization, which are determined by measuring residual dry matter (RDM). The Preserve was grazed at about 60% of its grazing capacity in 2004. The RDM plots indicate that forage production of Pasture A and portions of Pasture C could conservatively be 1200 pounds per acre higher. Therefore, rangeland productivity values presented in the OSMP have been adjusted to reflect this increase. This change allows addition of 3 more horses to the herd. This report includes a Pasture Rotation Program for the Glenwood Preserve revised for 2005 based on adjusted rangeland production values. In order to fully implement the grazing program, the revised rotation program will be discussed with the owners to gain their approval to rotate their horses. Access for horse owners to Pastures B and C will be improved. Development of an email group to improve communication and help coordinate movement of horses between pastures is recommended.

In order to initiate a long-term vegetation monitoring program on the Preserve, fifteen permanent transects were established throughout the Preserve in different habitat types. Within the Ohlone tiger beetle and Scotts Valley spineflower habitats, three transects each were used to measure the habitat characteristics. Three transects were established in wetlands, three in native grasslands, two in annual grasslands, and two in grasslands with the larval food plant (*Platystemon californicus*) for the Opler's longhorn moth. Plant composition data from annual vegetation monitoring at these transects will be used to assess effects of preserve management on sensitive habitats and special status plant and insect species.

Monitoring of the federally endangered Ohlone tiger beetle (*Cicindela ohlone*, OTB) occurred on the Preserve between February and October of 2004. A total of 239 adult observations occurred throughout 2004, compared to 372 during 2003. During the July 2003 monitoring of larval burrows, 556 active larvae were inventoried in the Glenwood Preserve. Unfortunately, most tags used to identify the individual larval burrows were removed by vandals during the winter months, so only 17 burrows could be revisited in 2004. A total of 347 active larval burrows were observed during the

June 2004 visit, but vandals also removed the tags marking these burrows. Changes to burrow marking techniques are being investigated so that information on survival rates of larvae, and adult emergence can be obtained. The observed decline in the number of larval burrows and occupied area between 2003 and 2004 may be due to the absence of grazing in the OTB habitat between 2003 and 2004, weather conditions, or other unidentified factors. Since suitable soil conditions for the OTB appear to be limited to a rather small portion of the Preserve, it is important to continue the grazing there to maintain bare and sparsely-vegetated areas of ground for the OTB to use. OTB monitoring in future years once the Preserve's grazing program is established will demonstrate whether the grazed habitat allows the OTB to extend its distribution within the Preserve.

Point counts of adult Opler's longhorn moth (*Adela oplerella*, OLM), a Federal Species of Concern, were performed at the seven patches of its larval food plant, *Platystemon californicus*, which had been previously identified within the Preserve. These counts were performed on the same dates as the transect counts for the OTB. A total of 48 adults of the OLM were observed at one of the seven patches of its food plant, while no OLMs were observed at any of the other six patches. Implementation of the grazing program is expected to increase the abundance of the OLM's larval food plant, which in turn may increase the population size of the moth.

Population monitoring of the federally endangered Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*) occurred on the Preserve in May 2004. A total of 27,241 individuals were counted at ten sites. Seven sites that contained plants in 1992 had no aboveground spineflower plants in May 2004; five of these occur in a narrow panhandle off Tabor Drive which was previously disturbed by the adjacent housing development and had been fenced from grazing for several years. No adverse environmental site conditions were noted during the spring 2004 field surveys, and there was no evidence of erosion, over-grazing or trampling in the spineflower habitat. It is recommended that grazing continue to occur in the spineflower habitat, particularly at those sites where no spineflower was observed in 2004. New fencing on the portion of the Preserve west of Glenwood Drive is planned; this should discourage residents from using the hillside area near several spineflower sites for recreational activities, thus preventing potential future impacts to the plants.

Several other special status plant species are present in the Preserve. Mt. Diablo cottonweed (*Micropus amphibolus*), a CNPS List 3 plant, continues to occur on the Preserve in small patches in Pastures B, C, and D. Two additional special status plant species, Santa Cruz clover (*Trifolium buckwestiorum*) and Choris's popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*) were documented on the Preserve during 2004 monitoring visits. Santa Cruz clover, a U.S. Fish and Wildlife Service (USFWS) Species of Concern and California Native Plant Society (CNPS) List 1B species, had been first discovered on the Preserve in 2003. Choris's popcorn flower, a USFWS Species of Local Concern and CNPS List 1B species, had been reported on the Preserve about 15 years ago and has been observed by WRA each year since 2002. Surveys for these species will be part of the annual monitoring program. Targeted surveys confirmed that Scotts Valley polygonum (*Polygonum hickmanii*), recently listed as a federally endangered species, does not occur on the Preserve.

A copy of this report is being provided to The City of Scotts Valley, the Glenwood Homeowners Association, the Land Trust of Santa Cruz County, the Department of Fish and Game, and the US Fish and Wildlife Service.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
1.0 INTRODUCTION 1
1.1 PRESERVE DESCRIPTION 1
1.2 BACKGROUND 1
2.0 GRAZING MANAGEMENT 3
2.1 METHODS 3
2.2 RESULTS AND DISCUSSION 3
2.2.1 Pasture Infrastructure 3
2.2.2 Grazing Rotation Program 4
2.2.3 Residual Dry Matter 5
2.2.4 Revised forage production and grazing capacity 10
2.3 DISCUSSION AND RECOMMENDATIONS 14
3.0 VEGETATION MONITORING IN SENSITIVE HABITATS 15
3.1 METHODS 15
3.2 RESULTS 16
4.0 OHLONE TIGER BEETLE 19
4.1 METHODS 19
4.1.1 Adult OTB Counts 19
4.1.2 OTB Larval Burrows 21
4.2 RESULTS 21
4.2.1 Adult OTB Counts 21
4.2.2 OTB Larval Burrows 24
4.3 CONCLUSIONS AND RECOMMENDATIONS 25
5.0 OPLER'S LONGHORN MOTH 28
5.1 METHODS 28
5.2 RESULTS 28
5.3 CONCLUSIONS AND RECOMMENDATIONS 28
6.0 SCOTTS VALLEY SPINEFLOWER 28
6.1 METHODS 29
6.1.1 Quantitative Sampling of Vegetation within Spineflower Habitat Areas 29
6.1.2 Spineflower Population Counts 29
6.2 RESULTS 29
6.2.1 Vegetation within Spineflower Habitat Areas 29
6.2.2 Population Counts 30
6.3 CONCLUSIONS AN D RECOMMENDATIONS 34

7.0 OTHER SPECIAL STATUS PLANTS....36
7.1 METHODS....36
7.3 RESULTS....37
7.3.1 Mt. Diablo cottonweed....37
7.3.2 Gray's clover....37
7.3.3 Santa Cruz clover....37
7.3.4 Choris's popcorn flower....37
7.3.5 Scotts Valley polygonum....37
7.3.6 Other rare plant species....38
8.0 EXOTIC PEST PLANTS....38
9.0 REFERENCES....38

APPENDICES

Appendix A: Preserve Map
Appendix B. Sample datasheets from vegetation and Ohlone tiger beetle monitoring
Appendix C: Data from vegetation transect monitoring
Appendix D: Photographs of the vegetation transects from monitoring visits

LIST OF FIGURES

Figure 2-a. Aerial photograph showing pasture infrastructure and identifying the heavily grazed areas in the 2004 grazing season 7
Figure 2-b. Photograph of ungrazed south-facing slope in Pasture B 11
Figure 2-c. Photograph of ungrazed wetland area in Pasture C 11
Figure 2-d. Photograph of grazed Ohlone tiger beetle habitat 12
Figure 3-a. Relative percent cover of vegetation and bare ground in vegetation transects 17
Figure 3-b. Relative percent cover of native and non-native species in vegetation transects 17
Figure 3-c. Relative percent cover of grasses, sedges, and rushes compared to forbs in vegetation transects 18
Figure 3-d. Species composition of vegetation transects 18
Figure 4-a. Location of OTB transect route and intervals 20
Figure 4-b. OTB and OLM seasonal population curves for 2004 23
Figure 4-c. Comparison of 2003 and 2004 OTB burrow locations 26
Figure 6-a. Relative cover by species in spineflower transect T6 31
Figure 6-b. Relative cover by species in spineflower transect T14 31
Figure 6-c. Relative cover by species in spineflower transect T15 32
Figure 6-d. Photograph of Scotts Valley spineflower 35
Figure 6-e. Photograph of spineflower habitat 35
Figure 6-f. Photograph of spineflower site C-77 35

LIST OF TABLES

Table 2-a. Actual grazing during the 2003-04 grazing season (November to October), showing AUMs by month and pasture 5
Table 2-b. The degree (%) of grazing for 2004 Grazing Season based on ocular estimates. 6
Table 2-c. Residual Dry Matter Summaries (Pastures A, B, C, and D). 8
Table 2-d. Revised grazing capacity using 2004 measurements of Danville loam productivity at Glenwood Preserve 13
Table 2-e. Four Pasture Rotation Program for the Glenwood Preserve revised for the 2004-05 grazing season (November to October) based on adjusted rangeland production values 14
Table 4-a. Summary of Adult OTBs Observed in 2004 at Glenwood Preserve 22
Table 4-b. Comparison of Numbers of OTB Burrows by Larval Instar in 2003 and 2004 at Glenwood Preserve 25
Table 6-a. Census of Scotts Valley Spineflower at Glenwood Preserve, 1992 and 2004 33

1.0 INTRODUCTION

This document presents results and recommendations of the first year of monitoring activities conducted on the Glenwood Open Space Preserve ("Preserve") in Scotts Valley, Santa Cruz County, California. The 160-acre Preserve was dedicated in 2003 to the City of Scotts Valley by American Dream / Glenwood, L.P. as a condition of approval for development of forty-four single-family residences on the remainder of the 195-acre Glenwood property.

1.1 PRESERVE DESCRIPTION

The Preserve is located on either side of Glenwood Drive, north and east of Scotts Valley High School in the City of Scotts Valley, Santa Cruz County. The Preserve is included in the Felton and Laurel Quadrangles (USGS 7.5 minute series topographic maps). Adjacent land uses are rural-density residences to the north, Scotts Valley High School and undeveloped parcels to the west, medium-density residential housing to the east, and Vine Hill School and existing homes and Siltanen Park to the south.

Approximately 60 percent of the Preserve is non-native annual grassland with the remainder consisting of wetlands, willow riparian, native grassland, coyote bush scrub, and oak and redwood forest. Soils in the valleys are primarily of Danville loams, which are deep, well-drained soils with slow permeability found on alluvial fans and valley bottoms (USDA 1980). Slopes are moderate with elevations of 750 to 860 feet. Soil on the slopes and ridges is Bonnydoon loam, which is a shallow, somewhat excessively drained soil with moderate permeability.

Two federally listed species occur in the Preserve. The southeast corner of the Preserve is one of fifteen currently known locations of the endangered Ohlone tiger beetle (*Cicindela ohlone*, sometimes referred to as OTB) (USFWS 2001, DFG 2002). Portions of grassland in the Preserve also support the endangered Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*, sometimes referred to as SVSF), and the Preserve is part of designated critical habitat for the species (USFWS 2002).

Several additional special status species are known to occur within the Preserve. The Opler's longhorn moth (*Adela oplerella*, sometimes referred to as OLM), a Federal Species of Concern, has been observed in the southeastern portion of the Preserve. Mount Diablo cottonweed (*Micropus amphibolus*), included on the California Native Plant Society's ("CNPS") List 3, has been observed in grassland throughout the Preserve.

1.2 BACKGROUND

Prior to 2004, sensitive species or habitats were not managed or monitored on the Glenwood property. The property east of Glenwood Drive was fenced as a single pasture and grazed by horses

at above its calculated carrying capacity. Horses had year round access to sensitive habitats, including Ohlone tiger beetle habitat, and concentrated in sensitive native grasslands, wetlands, and riparian areas in the dry season. In contrast, the property west of Glenwood Drive had not been grazed for many years. In the absence of grazing, growth of non-native annual grasses is dense and native shrubs have become established. The conditions within those portions of the site containing native grassland, Scotts Valley spineflower and other sensitive plant species habitat have not been monitored.

The City of Scotts Valley, in approving the Environmental Impact Report, Mitigation and Monitoring Reporting Program (MMRP) for the Glenwood Project, required the preparation of an Open Space Management Plan ("OSMP" or "Plan") (WRA 2003). The Plan was developed after several public hearings and input from resource agencies, environmental groups and the public. The OSMP provides guidance on how to maintain the existing condition of the sensitive habitats (wetland, riparian, and native grassland) and of the grassland habitat that is home to the rare insect and plant species. Restoration and enhancement of sensitive habitats are not required by the project conditions and the MMRP. The U.S. Fish and Wildlife Service and the California Department of Fish and Game reviewed and approved the vegetation management practices recommended in the Plan.

The primary goals of the Open Space Management Plan are to:

1) Maintain, at a minimum, the existing habitat conditions in order to preserve the suitability of the grassland habitats of sensitive species, including: the Ohlone tiger beetle, Scott's Valley spineflower, Opler's longhorn moth, and Mount Diablo cottonweed;
2) Preserve and maintain the existing condition of sensitive habitats including wetland, riparian, and native grassland.

The Plan provides specific management objectives for each of the sensitive species and habitats and includes a monitoring program. The Plan objectives are based on qualitative knowledge of existing habitat conditions and site history and the current knowledge of the life histories and habitat requirements for each of the sensitive species. Thus far, there have been few quantitative surveys of the sensitive species on the Preserve, and no quantitative data exists on characteristics of the grassland habitat of the sensitive species. Therefore, it is stated in the Plan that initial data from the monitoring program is to be used as baseline data, and baseline data will need to continue to be developed as the Plan is implemented.

This monitoring report presents results of the first year of baseline data collection. Baseline data may require several years of monitoring to allow differentiation between normal fluctuations in population numbers and habitat from responses to management actions as well as variations in climatic and other natural conditions (floods, fires, drought, etc.). Once sufficient baseline data on distribution and populations are developed, thresholds can be established which alert the preserve manager when population or habitat changes occur that are outside the natural variability expected.

The manager will consider both short and long term habitat and population data, as well as the influence of climatic conditions in making adjustments to baselines, thresholds and management activities. This adaptive management approach will allow the Plan to evolve as habitat or regulatory conditions change, and as more information is gained about the site and the species through annual monitoring. Future annual monitoring reports will recommend appropriate changes in habitat management practices based on the monitoring results, revision of preliminary baselines, and refinement of thresholds.

2.0 GRAZING MANAGEMENT

Grazing management involves monitoring the horses' grazing patterns and coordinating the horse grazing rotation plan in order to minimize localized overgrazing of preferred sites and to encourage more even forage utilization. An important goal of the Preserve's grazing program is to understand the grazing processes and effects in reference to the habitat requirements of the sensitive species, particularly the endangered Scotts Valley spineflower and Ohlone tiger beetle.

2.1 METHODS

To accomplish this goal and to provide information to guide the grazing program, several monitoring tasks were undertaken in the 2004 season. These included reconnaissance surveys, photo documentation, vegetation transects, and end of the season measurements of residual dry matter (RDM). Initial reconnaissance surveys were conducted on February 2nd and March 5th and continued during the spring, summer, and fall visits. The primary rangeland vegetation transects were selected and monitored on April 15, April 30, May 21, and June 30th. The end of the grazing season reconnaissance took place on September 30th, and RDM was measured on October 1st.

2.2 RESULTS AND DISCUSSION

2.2.1 Pasture Infrastructure

Implementation of the grazing program outlined in the Glenwood Open Space Management Plan (OSMP) required creation of four pastures on the Preserve east of Glenwood Drive: Pastures A, B, and C, plus Pasture D, which includes the Ohlone tiger beetle habitat (see map in Appendix A). Necessary improvements included repair and replacement of perimeter fencing, construction of cross fencing and gates, and installation of water troughs. Lack of a perennial water source in Pastures A, B and D requires reliable water troughs in each of these pastures before grazing rotation can be implemented. During 2004, improvements to infrastructure were completed which will allow implementation of the grazing plan.

Replacement of perimeter fence and installation of cross fencing and gates to create the pastures was completed in January 2004. Connection of troughs to water source was approved by the Scotts Valley Water District on June 30. Horses subsequently damaged several of the trough float valves

during the summer making the troughs unreliable as a sole water source. Wood structures to protect from further damage were designed and installed in Pasture D in late November and in the remaining pastures in early December 2004.

The new fence system and water troughs are in excellent condition; however, during the 2004 grazing season it became apparent that some adjustments to the fence system would facilitate pasture rotation and improve horse owners' access to their horses.

The creek gate that divides Pasture A from the rest of the pastures on the east side of the creek will be reconfigured to allow the horses to use an established path. With the existing alignment, the horses were tempted to take a short cut through a long switch back getting out of the pasture system altogether.

The fence system on the upper northeast corner of the Preserve and in places along the eastern boundary consists of a series of weak wire fencing along the back of homes and the road and is in poor condition. There are plans to repair and rebuild this section of fence.

Prior to the creation of the Preserve and the separate pastures, the gate at Canham Road in what is now Pasture A was the only gate used by owners to access the site. Horses returned there regularly and owners were accustomed to locating and caring for them in this area. Access for horse owners to Pastures B and C will be improved. A small holding corral and hitching post is now planned to be constructed near the water company gate. Horse owners will now be able to access their horses, feed them separately, and hold them until they can be moved into a trailer at this location. This area will become a secondary horse access area when the horses are on the east side of the creek (Pastures B & C).

When the horses are in Pasture C the horse owners can walk a short distance to the pond dam and get their horses at this location. To aid in retrieving horses from Pasture C a second gate is planned for the dam location near the spillway, which overlooks the wet meadow area of Pasture C. Access by the horse owners to their horses when they are in the beetle pasture (Pasture D) will be from a gate on the access road behind Vine Hill Elementary School along the south boundary of the Preserve.

2.2.2 Grazing Rotation Program

In early 2003, twenty-four horses grazed the Preserve east of Glenwood Drive. Management of Preserve commenced with the start of the Glenwood Development project in July 2003. An electric fence was installed in July 2003 to exclude horses from the development area. After horses had broken through the fence into the construction area several times they were removed from the pasture by late August 2003. Removal of horses facilitated installation of new perimeter and cross fencing to create the four pastures. The new infrastructure and initial water development was constructed during the fall of 2003 and by January 2004 was largely completed. Float valves on

water troughs were damaged by horses in the summer of 2004 making the troughs unreliable as a sole water source for horses in pastures C and D which do not have a natural water source. A protective cover was constructed over the trough valve in Pasture D in November allowing horses to be placed in that pasture.

Table 2-a shows the number of horses in each of the Preserve pastures during 2004. The table summarizes the grazing capacity of each pasture in animal unit months (AUMs). Based on the forage requirements, a horse is one animal unit (AU). In February 2004, eight horses were returned to the northern pasture (Pasture A), which is the primary access or "home base" pasture where the horses had been traditionally given supplemental feed and tended by their owners. Between May and July eight more horses were gradually added, which increased the herd to 16 horses. In June the gates were opened allowing the horses access to Pastures A, B and C. This lessened the grazing pressure on Pasture A while allowing the horses to return to the Canham Drive gate where owners are accustomed to accessing the site. The gate to Pasture D was opened in July. In order to allocate AUMs to pastures between July and December when gates between pastures were open, pasture use was assumed to be proportional to grazing capacity. In November, two horses were taken off for the winter and five horses were placed into Pasture D.

Table 2-a. Actual grazing during the 2003-04 grazing season (November to October), showing AUMs by month and pasture

Total Grazing Capacity (244 AUMs)	AUMs by month												Total AUMs per Pasture
Pasture	N	D	J	F	M	A	M	J	J	A	S	O	
Pasture A (53 AUM) North Pasture	--	--	--	8	8	8	9	3.4	3.5	3.5	3.5	3.5	55.5
Pasture B (88 AUM) East Pasture								5.5	5.8	5.8	5.8	5.8	36.9
Pasture C (84 AUM) South Pasture								5.2	5.5	5.5	5.5	5.5	35.0
Pasture D (19 AUM) OTB Pasture									1.3	1.3	1.3	1.3	18.4
Total AUM's	0	0	0	8	8	8	9	14	16	16	16	16	145.8 AUM

2.2.3 Residual Dry Matter

The degree of grazing utilization is determined by measuring residual dry matter (RDM) at the end of the grazing season in the fall when the grass is completely dry. The overall OSMP goal for moderate grazing is to have RDM weights between 1000 and 1200 pounds per acre.

To measure RDM square foot quadrats are clipped, bagged and weighed in the field with a Pesola precision field scale to determine forage utilization. The plots are clipped as close to the ground as

possible without picking up dirt and debris. Ocular estimates of RDM are also used; typical areas are clipped and weighed several times to help calibrate the observers' ocular estimates.

Three types of RDM sampling occurred on the Preserve: ocular RDM estimates of grazed areas to determine grazing pressure, RDM characterization of vegetation transects using clipped plots, and clipped plot sampling in ungrazed areas to determine forage production.

The results of RDM sampling of grazed areas were that the heaviest grazed areas varied consistently between 500 to 800 pounds per acre. However, a few of the areas were grazed so close to the ground that clipping was impossible. These areas are identified in the aerial photograph base map (Figure 2-a). These areas are found primarily near the north end of Pasture A, along the swale north of the water company road, and two areas in the beetle pasture (Pasture D). The areas in Pasture D are associated with the active Ohlone tiger beetle sites. It is important to note that the white colored areas on the grasslands in Figure 2-a (approximately 10% of grassland) are slopes and balds with very little soil development. These are relics of fire break cultivation, roads, and erosion caused by heavy grazing during the historical dairy phase. By and large, the grasslands on the east side of the creek (Pastures B, C, & D) were only lightly grazed by horses in the 2004 grazing season. The horses are presently gradually expanding their grazing into these pastures.

By and large, the grasslands on the east side of the creek (Pastures B, C, & D) were only lightly grazed by horses in the 2004 grazing season. The horses are presently gradually expanding their grazing into these pastures. Table 2-b gives a summary the degrees of grazing (% of pasture) of the Glenwood pastures based on the ocular estimates as of the end of October. The horses are gradually expanding their grazing into the eastern pastures as the 2004-05 grazing season has begun.

Table 2-b. The degree (%) of grazing for 2004 Grazing Season based on ocular estimates.

Pasture	Heavy 0-1000 lbs/acre RDM	Moderate 1000-3000 lbs/acre RDM	Light/Ungrazed 3000-5000 lbs/acre RDM	Barrens	Average RDM lbs/acre
A	10%	50%	40%	--	2650
B	10%	30%	50%	10%	2650
C	5%	10%	80%	10%	3425
D	5%	10%	80%	5%	3425

To determine grazing utilization of the areas associated with the vegetation transects, 3 to 5 samples were clipped and weighed parallel to seven of the vegetation transects. The clippings were weighed in the field at the time of collection and later weighed after air-drying. There was no appreciable difference in the weights as the RDM plots were clipped at the end of the season when the forage was completely dry. The average height of the vegetation and descriptive information was recorded for

Figure 2-a. Aerial photograph showing pasture infrastructure and identifying the heavily grazed areas in the 2004 grazing season.

Key

Pasture A Pasture Fence Water Troughs W Gates Heavily Grazed Areas

each plot. The measurements near the vegetation transects, which are reported in Table 2-c, are useful for comparison over time and can be correlated with changes in species composition.

Two clipped plot samples were taken at productive south facing slopes not associated with vegetation transects where there was little or no evidence of grazing. Measurements of ungrazed areas give weights that are close to primary production of the soil type for that year which can be used as a control measure to adjust the pasture's overall grazing capacity. These samples were taken using the methods described above, and results are presented in Table 2-c.

Table 2-c. Residual Dry Matter Summaries (Pastures A, B, C, and D).

Pasture A Danville loam. Normal year forage production 4000 lbs per acre (USDA 1980).			
Grassland (**Transect 1).** Near midpoint of transect. Evidence of moderate grazing and trampling.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 1" trampled with horse manure	61 g	2.1 oz	5717
#2 Up to 3" (with rabbitfoot grass)	38 g	1.3 oz	3539
#3 4-6"	84 g	2.9 oz	7895
#4 4-5"	54 g	1.9 oz	5173
#5 8-10" (with yellow tarweed plant)	96 g	3.4 oz	9256
		Average	6316
Wetland (Transect 2). Near midpoint of transect. Evidence of moderate grazing and trampling.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 2-3" *Lolium*/sedges	83 g	2.9 oz	7895
#2 3-6" with pennyroyal	82 g	2.9 oz	7895
#3 4-6" *Lolium*/sedges	67 g	2.3 oz	6262
#4 pennyroyal patch	109 g	3.8 oz	10345
#5 1" trampled *Lolium*/sedges	43 g	1.5 oz	4084
		Average	7296
Pasture B Bonnydoon loam. Normal year forage production 3200 lbs per acre (USDA 1980).			
Cream Cups/Opler's Moth (Transect 4). Near midpoint of transect. No evidence of grazing.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 3" (tarweed)	28 g	1.0 oz	2722
#2 3-4" irregular/porous surface	22 g	0.8 oz	2178
#3 3-8" gopher, irregular/porous surface	30 g	1.0 oz	2722
#4 8-14" irreg/porous, gopher disturbed	49 g	1.7 oz	4628
#5 12-15" irreg/porous surface, *Lolium*, *Bromus hordeaceus*	46 g	1.6 oz	4356
		Average	3321
Cream Cups/Opler's Moth (Transect 7). Near midpoint of transect. Evidence of moderate grazing.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 1-2"	23 g	0.8 oz	2178
#2 lodged grasses, dense, 4-5"	50 g	1.7 oz	4628

#3 1-2" irregular/porous surface	26 g	0.9 oz	2450
#4 1-2" irregular/porous surface	22 g	0.8 oz	2178
#5 1-2" irregular/porous surface	43 g	1.5 oz	4084
		Average	3103
South Facing Slope. Perennial grass site. Overlooking water company road (3:1 slope). No evidence of grazing.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 12-14" irregular/porous surface	56 g	2.0 oz	5445
#2 2" filaree, irregular/porous surface	40 g	1.4 oz	3811
#3 heavily lodged grass nr. ground squirrel	62 g	2.2 oz	5989
#4 6-10" gopher dist. irregular/porous	41 g	1.4 oz	3811
#5 2-3", grazed edge, irregular/porous	26 g	0.9 oz	2450
			4301
South Facing Slope. Annual grass site. Steep (2:1 slope). Northeast of pond below ridgeline horse trail transect. Near but below Transect 3. No evidence of grazing.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 5-14" *Avena* irreg/porous, gopher dist.	55 g	1.9 oz	5173
#2 5-8" irregular/porous surface, gopher	36 g	1.2 oz	3267
#3 10-14" old disturbance, irreg/porous	74 g	2.6 oz	7078
#4 5-6" irreg/porous, gopher disturbance	56 g	2.0 oz	5445
#5 2-3" irreg/porous, gopher disturbance	27 g	0.9 oz	2450
		Average	4682
Pasture C Both Bonnydoon loam and Danville loam. Normal year forage production on Bonnydoon loam is 3200 lbs per acre; normal year forage production on Danville loam is 4000 lbs per acre (USDA 1980).			
Annual Grass Transect (Transect 5). Bonnydoon loam. Near midpoint of transect**.** Evidence of some light grazing and disturbance.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 12-16" *Avena*, irregular/porous surface	90 g	3.2 oz	8712
#2 8-12" irregular/porous surface	55 g	1.9 oz	5172
#3 8-12" irregular/porous surface	56 g	2.0 oz	5445
		Average	6443
Wetland (Transect 10). Danville loam**.** Near midpoint of transect. No evidence of grazing. Lodged mulch 6-8" high.			
	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 8-12" lodged grasses (*Lolium*)/sedges	115 g	4.0 oz	10890
#2 8-12" lodged grasses (*Lolium*)/sedges	118 g	4.1 oz	11162
#3 8-12" lodged grasses (*Lolium*)/sedges	140 g	5.0 oz	13612
		Average	11888
Pasture D, Beetle Pasture (Transect 12). Bonnydoon loam. Normal year forage production 3200 lbs per acre (USDA 1980).			
South end of transect in ungrazed area near eastern population of Ohlone tiger beetle. Evidence of horse grazing/lounging.			

	grams/ft.^{2}	ounces/ft.^{2}	lbs/acre
#1 8-12" lodged *Lolium,* irreg/porous	77 g	2.7 oz	7350
#2 3-4" gopher disturbance in quadrat	36 g	1.2 oz	3267
#3 8-14" lodged *Lolium,* irreg/porous	95 g	3.3 oz	8984
		Average	6533

Photographs presented in Figures 2-b, 2-c, and 2-d show grassland with varying RDMs and soil types.

2.2.4 Revised forage production and grazing capacity

Results of RDM sampling on the Preserve were used to revise the estimated forage production of Danville loam described in the OSMP. The RDM estimates for Danville loam were found to be at least 6000 to 7000 pounds per acre where moderately grazed, and, at one ungrazed wet area, over 10,000 pounds per acre (Table 2-c). Danville loam is considered agriculture grade soil, and estimates for rangeland productivity were not reported in the Santa Cruz County Soil Survey (USDA 1980). Richard Casale, the soil scientist for Santa Cruz County, estimated 4000 pounds per acre for Danville loam soils (pers com 2003). This figure was used in establishing the grazing capacity estimate in the OSMP on the Danville loam sites. Using results from the Preserve, the rangeland productivity of the Danville loam could be conservatively raised by 1200 pounds per acre to 5200 pounds per acre. Table 2-d adjusts the rangeland productivity values to reflect this increase.

RDM sampling results did not support revising the Bonnydoon loam forage production estimate used in the OSMP. The Soil Survey listed average Bonnydoon loam rangeland productivity at 3200 pounds per acre. The Bonnydoon loam RDM estimates were also at least 1000 pounds heavier (Table 2-c), ranging from 3300-6000 pounds per acre, than the Soil Survey rangeland productivity estimates. However taking into consideration the many less productive balds on Bonnydoon loam on the Glenwood Preserve, it would be difficult to raise the Soil Survey estimate over 3200 pounds per acre.

Figure 2-b. Ungrazed south facing slopes in Pasture B. Middle slope shows less productivity because of historic heavy grazing and topsoil loss. "X" marks RDM sampling location below vegetation transect T3 northeast of pond. The RDM average for this area is 4682 lbs./acre. Photograph taken September 30, 2004.

Figure 2-c. Ungrazed wetland area in Pasture C on Danville soils where RDM productivity rates measured over 10,000 lbs. per acre (See X in left distance). Straw-colored grass in the foreground has been grazed moderately (~800 lbs./acre RDM). Photograph taken in September 30, 2004.

Figure 2-d. The lightly grazed or ungrazed area in middle background averaged over 6000 lbs. per acre RDM in the Ohlone tiger beetle pasture (See X). The grazed area on either side of the trail in the foreground (~0-200 lbs./acre RDM) is active habitat for the Ohlone tiger beetle. The red flag marks vegetation transect T12. Photograph taken in September 30, 2004.

Table 2-d. Revised grazing capacity using 2004 measurements of Danville loam productivity at Glenwood Preserve

Soil	Dry Matter (lbs./acre)			Area of Grassland (acres)				Available Yearly Forage Production (lbs, dry weight /grassland area)			
	Normal Year Forage Production	Target Average Residual Dry Matter (RDM)	Normal Year Production	Pasture A North Pasture	Pasture B East Pasture	Pasture C South Pasture	Pasture D OTB Pasture	Pasture A North Pasture	Pasture B East Pasture	Pasture C South Pasture	Pasture D OTB Pasture
Danville loam (valley soil)	5,200	1,200	4,000	15	0	6	0	60,000	0	24,000	0
Bonnydoon loam (hillside soil)	3,200	1,000	2,200	0	32	23	7	0	70,400	50,600	15,400
			Total	15	32	29	7	60,000	70,400	74,600	15,400
Annual Grazing Capacity: Horses / year = available yearly production ÷ 9,600 lbs dry matter / horse / year								**6 (6.3) horses**	**7 (7.3) horses**	**8 (7.8) horses**	**2 (1.6) horse**
Monthly Grazing Capacity: Horses/ month = Animal Unit Months (AUM)								**75**	**88**	**93**	**19**

The OSMP included a pasture rotation program that allowed for grazing by 20 horses. Using the revised grazing capacity, the pasture rotation program has been modified to potentially add 3 more horses to the herd (Table 2-e). The herd and the grazing program are currently still being developed. Three horses have been temporarily removed and may be added later in the grazing season. The actual numbers will vary between 20 to 23 horses during the grazing season.

Table 2-e. Four Pasture Rotation Program for the Glenwood Preserve revised for the 2004-05 grazing season (November to October) based on adjusted rangeland production values

Grazing Capacity (275 AUMs)	2004-05 Grazing Season (November to October) (23 AU) * Move horses from A to C 10 days early												Total AUMs per Pasture
Pasture	N	D	J	F	M	A	M	J	J	A	S	O	
Pasture A (75 AUM) North Pasture					23		19			18 *		23	75
Pasture B (88 AUM) East Pasture	15			20		23			23				87
Pasture C (93 AUM) South Pasture		15	20					23			23 *		93
Pasture D (19 AUM) Ohlone tiger beetle Pasture	5	5					4			5			19
Adult Beetle/Egg Laying	**********												
Egg Hatching/Active Larvae Stages	****						**********						
Below Ground Pupae Stage			********										
Scotts Valley spineflower	**********												
Total AUM's	20	20	20	20	23	23	23	23	23	23	23	20	~260

2.3 DISCUSSION AND RECOMMENDATIONS

The revised rotation scenario is similar to the original rotation presented in the OSMP, which basically allows approximately two months rest for each pasture between grazing periods. This grazing scenario is a basic guide to the horse rotation program. The starting/ending dates can shift a month (earlier or later) each year and the horses can be moved a little earlier or later from one pasture to the next to balance the grazing capacity for the three largest pastures (Pastures A-C).

Pasture B, which contains the pond, had almost 9 months of rest from grazing between August 2003 and June 2004. During this time the recovery of the perennial wetland and shore vegetation was dramatic, yet in a few months of access during the summer the vegetation surrounding the pond was reduced to bare ground. This may not be as severe in a rotation program where grazing duration and season could be managed more closely. Depending on the response of the vegetation to next season's rotation grazing program, there is a possibility that fencing the pond from horse grazing may be necessary to protect sensitive wetland vegetation.

Implementation of the grazing program will require the support and cooperation of the owners. In November, grazing of the OTB habitat began, which implements the most important element of the grazing program. Although fifteen horses on the Preserve are excluded from the OTB pasture, they are not participating in the grazing program because they have access to all three of the remaining pastures. Full implementation of the grazing program for November would involve confining these horses to another separate pasture (A, B, or C).

In order to involve the remaining horses in the grazing program, the revised rotation program will be discussed with the owners to gain their approval to rotate their horses, which requires them to access their horses at new locations. Access for horse owners to Pastures B and C will be improved. In December 2004, installation of a corral near the Pasture B access gate and an additional a gate between Pastures B and C on the pond dam will improve access for owners to their horses when in other pastures on the Preserve. We recommend development of an email group to improve communication and help coordinate movement of horses between pastures.

3.0 VEGETATION MONITORING IN SENSITIVE HABITATS

3.1 METHODS

Quantitative sampling of vegetation transects allows tracking of changes in plant cover and species composition. This information can be used to determine the effectiveness of the grazing and other management tools in maintaining habitat for sensitive species. Fifteen permanent transects were established throughout the Preserve in different habitat types. Locations of these transects are shown on the Preserve Map (Appendix A). Within the Ohlone tiger beetle and Scotts Valley spineflower habitats, three transects each were used to measure the habitat characteristics. Three transects were established in wetlands, three in native grasslands, two in annual grasslands, and two in grasslands with the larval food plant (*Platystemon californicus*) for the Opler's longhorn moth.

Sampling was conducted along each transect using 0.1 meter-square quadrats, placed 1 meter apart, perpendicular to and on alternating sides of the meter tape. Species composition and percent cover were measured within each quadrat and recorded on datasheets (see Appendix B for sample datasheet). Plant cover was estimated using Braun-Blaquet cover classes. Special attention was focused on the presence, estimated number, and/or percent cover of native perennial bunchgrasses, sensitive plant species, and invasive species. Each transect was marked in the field with metal posts, and transect locations were documented by GPS and marked on the project base map, as depicted on the Glenwood Preserve As Built Plan.

Photographs were taken at each transect. Photographs will be used to monitor long-term changes in the site and its plant communities. Photographs can also be used to determine if localized areas are

receiving either light or heavy grazing, are subject to erosion, or are being adversely affected by invasive species.

3.2 RESULTS

Data collected during transect monitoring is presented in Appendix C. Photographs taken at the transects are presented in Appendix D. Figures 3-a - 3-d compare vegetation composition and cover across the transects.

Figure 3-a shows the relative cover of bare ground compared to vegetation in the 12 transects. The wetland transects were greater than 90 percent vegetated as were two of the OTB transects (11 and 12), one SVSF transect (14), and one of the annual grassland transects (1). Transects with the highest proportion of bare ground were 15, 9, and 7, which were in SVSF, native grassland, and OLM habitats, respectively.

The relative percent cover of the vegetation in the transects is presented in Figures 3-b and 3-c. Relative cover of native vs. non-native species is graphed in Figure 3-b. In general, the highest proportion of cover by native species was seen in the wetland and SVSF transects, and also in one of the OTB transects (13). Relative cover of forbs vs. grasses, sedges, and rushes is graphed in Figure 3.1-c. The annual and native grassland transects, OLM transects, one OTB transect (11), and two of the wetland transects (8 and 10) had high cover by grasses, sedges, and rushes. Two OTB transects (12 and 13) and all SVSF transects had high cover by forbs, as did wetland transect 2, which was dominated by pennyroyal (*Mentha pulegium*).

The number and type of species occurring in the transects are presented in Figure 3-d. Transects 4, 7, 13, and 15 had a total of 20 or more species. Ten or fewer species were observed in transects 1, 5, 12, and 2. Both OLM transects and two of the SVSF transects (6 and 15) had high numbers of native forb species, while transects 13 (OTB) and 8 and 10 (wetland) had the highest number of grasses, sedges, and rushes: three species per transect.

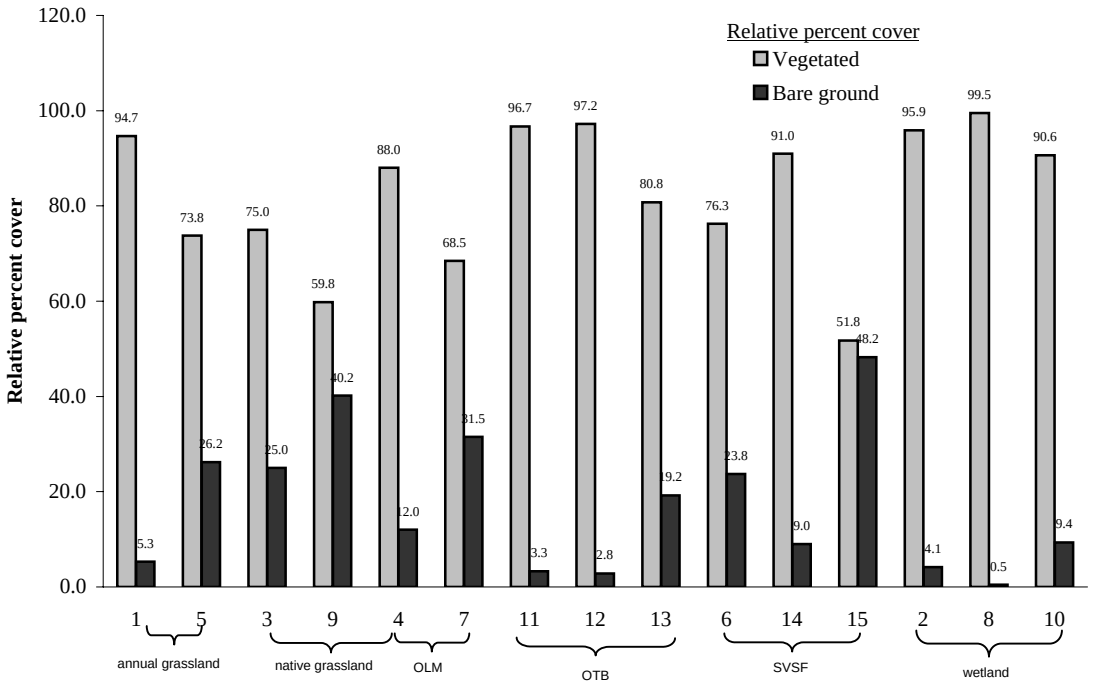


Figure 3-a. Relative percent cover of vegetation and bare ground calculated from transects placed in different habitat types in the Glenwood Preserve, 2004.

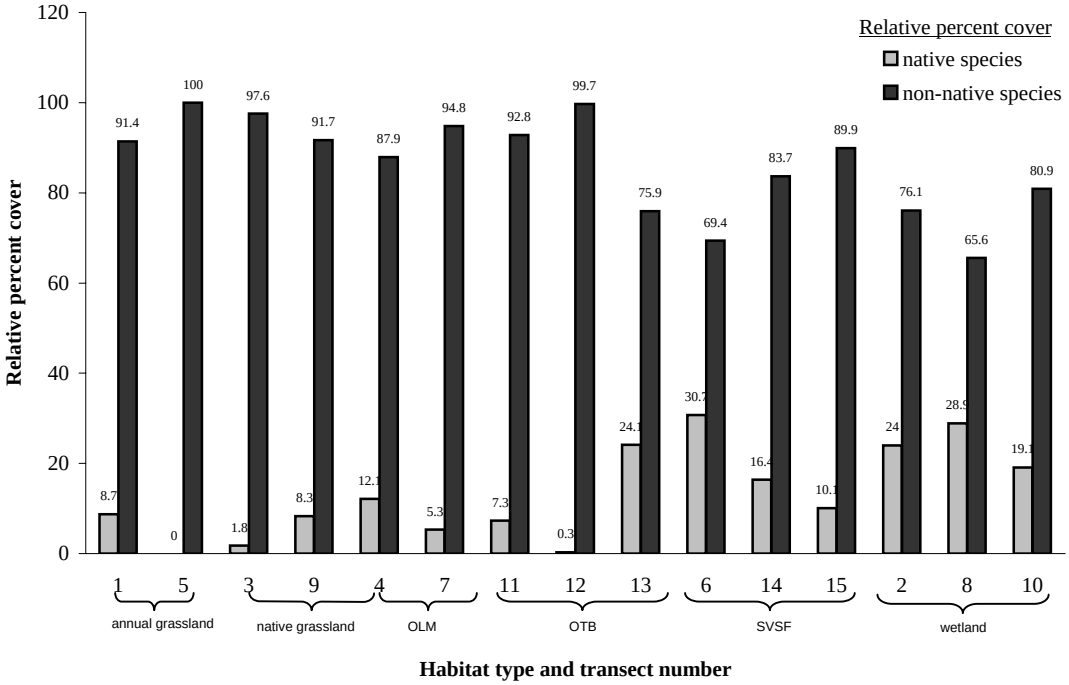


Figure 3-b. Relative percent cover of native and non-native species calculated from transects placed in different habitat types at the Glenwood Preserve, 2004.

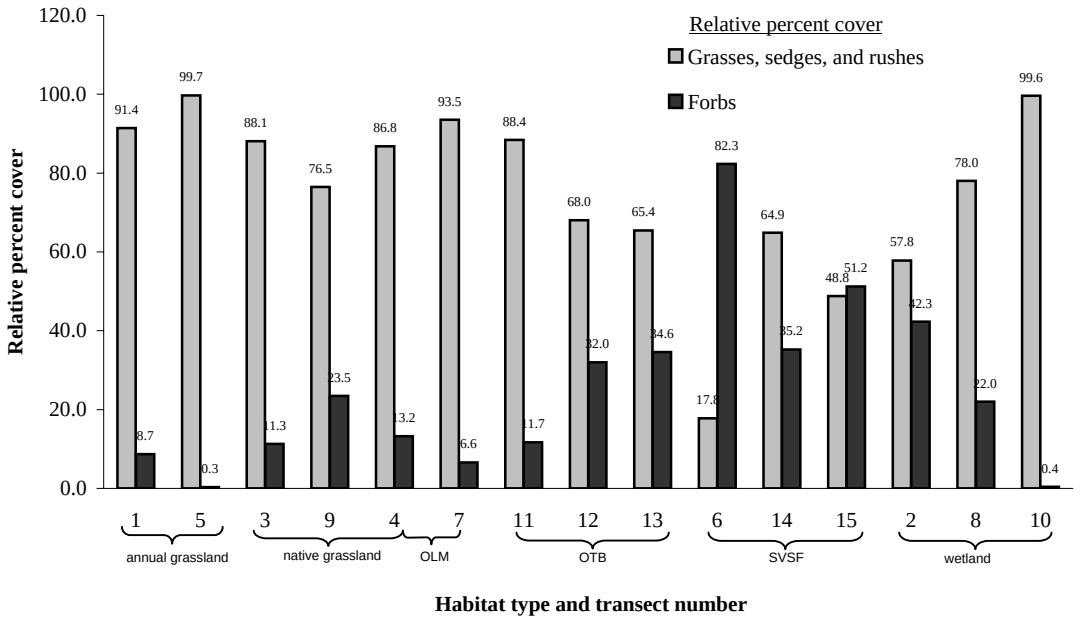


Figure 3-c. Relative percent cover of grasses, sedges, and rushes compared to forbs calculated from transects placed in different habitat types on the Glenwood Preserve, 2004.

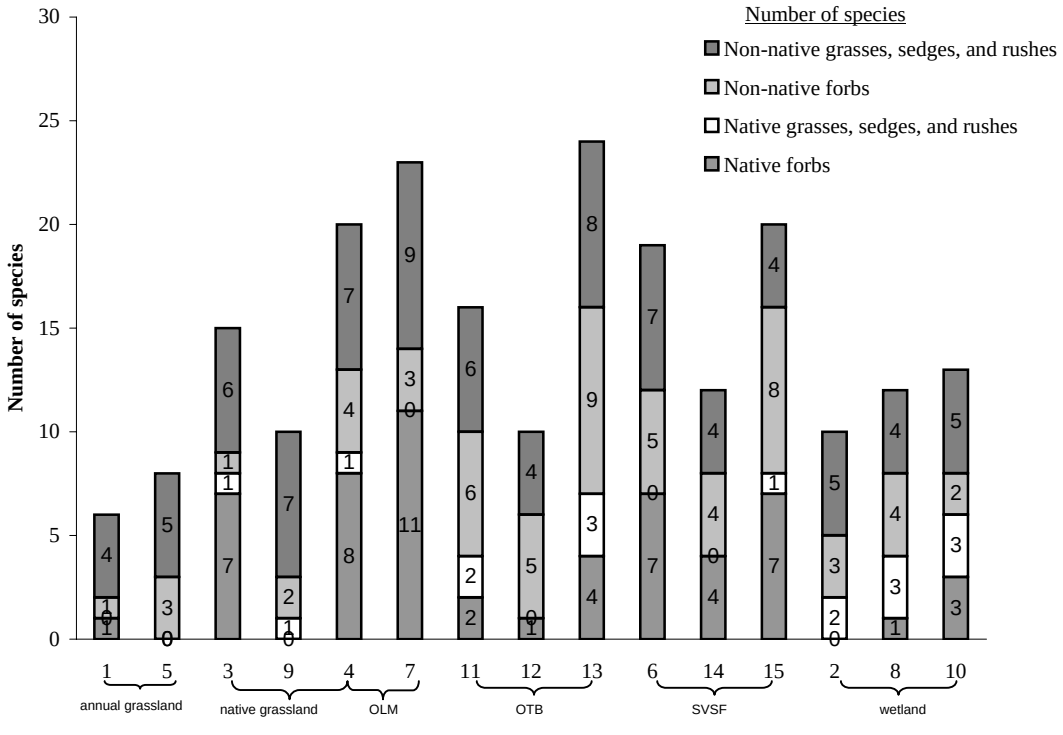


Figure 3-d. Species composition of transects placed in different habitat types at the Glenwood Preserve, 2004.

4.0 OHLONE TIGER BEETLE

Monitoring of the Ohlone Tiger Beetle was conducted by Dr. Richard Arnold of Entomological Consulting Services, Ltd.

4.1 METHODS

4.1.1 Adult OTB Counts

Adults of the OTB can be active from mid-January to mid-May, although annual variation occurs in the duration of the adult activity period, as well as its starting and ending dates. A transect route was established along existing trails in the southeastern portion of the Glenwood Preserve (see map in Appendix A for location of OTB habitat). The transect route was divided into six segments or intervals (A-F in Figure 4-a) based on landmarks or prominent vegetation in the field. Total length of the transect route is 1,105 feet, with interval A measuring 254 feet, B 156 feet, C 101 feet, D 360 feet, E 61 feet, and F 173 feet.

The entire transect route was walked once daily on each of 12 survey dates, which spanned from the beginning to the end of the 2004 adult activity period. As OTB adults were observed within 15 feet on either side of the centerline of the trail (i.e., a 30-foot wide belt transect), the location of each individual was obtained using a hand held global positioning system (GPS), and information about each individual's sex and observed behavior was recorded on a data sheet (Appendix B). The tally of all observed adults along the transect route on a particular survey date comprised the daily transect count.

The transect counts along this route establish the starting and ending dates of the OTB's adult activity period, plus the magnitude and shape of the seasonal population curve for the transect route. When the counts are plotted against the date of the adult activity period, the seasonal population curve of OTB numbers is illustrated. This seasonal population curve can be described mathematically by fitting a curve to the count data.

Dr. Richard Arnold and Dr. Tyson Holmes (Stanford University School of Medicine, Dept. of Health Research & Policy, Division of Biostatistics) have developed a deterministic transition model for estimating a seasonal population size and death rate for a closed population from transect counts. The observed counts are fitted to a mathematical function via non-linear mixed effect modeling methods (NLME), which provides the estimates of these population parameters. A complete explanation of the model will be published elsewhere (Holmes and Arnold, in prep.). The code to perform these calculations was programmed in the commercially-available statistical package, S-Plus (Insightful Corporation, v. 6.1).

Ohlone Tiger Beetle Study 2004
Scotts Valley - Glenwood Site
Adult transect route and intervals (A - F) and location of larval burrows

0 55 110 220 330 440 Feet

Figure 4-a

Prepared November 26, 2004
by Entomological Consulting Services, Ltd.

4.1.2 OTB Larval Burrows

The same trails that were used for the adult surveys were checked for egg, larval, and adult emergence burrows throughout the 2004 survey period. In addition, surveys of barren or sparsely vegetated areas within the adjacent grasslands were also checked for burrows. All burrows observed during 2004 were located within the trails or immediately adjacent to them.

Every burrow was marked as it was first observed with a pre-numbered aluminum tree tag (Forestry Suppliers part no. 1186) that was nailed to the ground with a galvanized nail. Positional coordinates for each burrow were obtained using a mapping grade GPS manufactured by Trimble. Coordinates for all burrows were differentially corrected to improve their positional precision. During subsequent monitoring visits, new burrows were similarly marked. The diameter of the mouth of every larval burrow was measured during each site visit, which occurred at approximately monthly intervals between mid-April and mid-October 2004. A datasheet (Appendix B) was used to record information about each burrow during each site visit, including burrow type (adult emergence, egg, or larval), plus the burrow diameter (measured with dial calipers), condition, and estimated larval stage (first, second, or third instar).

4.2 RESULTS

4.2.1 Adult OTB Counts

In 2004, the first adult OTBs were observed on February 9th at the Grey Whale portion of Wilder State Park by state parks biologist, Tim Hyland. At Glenwood, adult counts were performed while walking along the transect route, as illustrated in Figure 4-a, on 12 days between February 10th and April 17th. These trails were selected for the 2004 adult survey since OTBs have previously been observed along these same trails in prior years. The additional ten 2004 survey dates included February 14th and 27th, March 2nd, 7th, 12th, 14th, 20th, and 28th, plus April 3rd, 10th, and 17th. These dates were selected because weather conditions were suitable for adult OTBs to be active, i.e., sunny and temperatures $\geq 62^{o}$ F.

Table 4-a summarizes the numbers of adult OTBs that were observed on each survey date throughout 2004 by transect interval. Figure 4-b illustrates the seasonal population curve for 2004 based on the transect counts.

Table 4-a. Summary of Adult OTBs Observed in 2004 at Glenwood Preserve

Transect Survey Date	OTB Numbers by Transect Interval (A-F, see Figure 4-a)						Daily Transect Totals
	A	B	C	D	E	F	
10 Feb.	0	0	0	1	1	4	**6**
14 Feb.	0	2	1	2	3	6	**14**
27 Feb.	0	5	3	3	4	13	**28**
2 March	0	8	3	5	3	15	**34**
4 March	0	7	4	6	6	16	**39**
6 March	0	7	5	5	4	12	**33**
11 March	0	4	3	3	4	15	**29**
20 March	0	4	2	3	4	11	**24**
28 March	0	2	2	1	2	12	**19**
3 April	0	1	0	1	2	5	**9**
10 April	0	0	0	0	0	4	**4**
17 April	0	0	0	0	0	0	**0**
Seasonal Totals	**0**	**40**	**23**	**30**	**33**	**113**	**239**

A total of 239 adult observations occurred throughout 2004, compared to 372 during 2003. Average numbers of OTB adults observed per site visit was 19.9 in 2004 compared to 24.8 in 2003. The duration of the adult activity period was about 60 days in 2004 compared to about 70 days in 2003. The population peak occurred on day 27 (March 7th) in 2004 compared to day 37 (March 5th) in 2003. A possible explanation for the shorter activity period in 2004 may be that rainfall was below normal throughout most of January and during March through May, which resulted in more dry, warm days for the cold-blooded adult beetles to be active. However, several years of observations will be necessary to determine what is the normal seasonal pattern of OTB adult activity at Glenwood.

Throughout the 2004 adult activity period, approximately 47% of the beetle observations were along transect interval F which is located on a historically heavily used trail with compacted soil and sparse vegetation. In contrast, no adults were observed along interval A. Observations along the other four transect intervals ranged from about 10% to 17% of the seasonal total of observed number of adults. The disproportionate number of OTB adults along transect interval F suggests that for management to open up more areas of bare or sparsely-vegetation ground along the other transect intervals would be beneficial for the OTB.

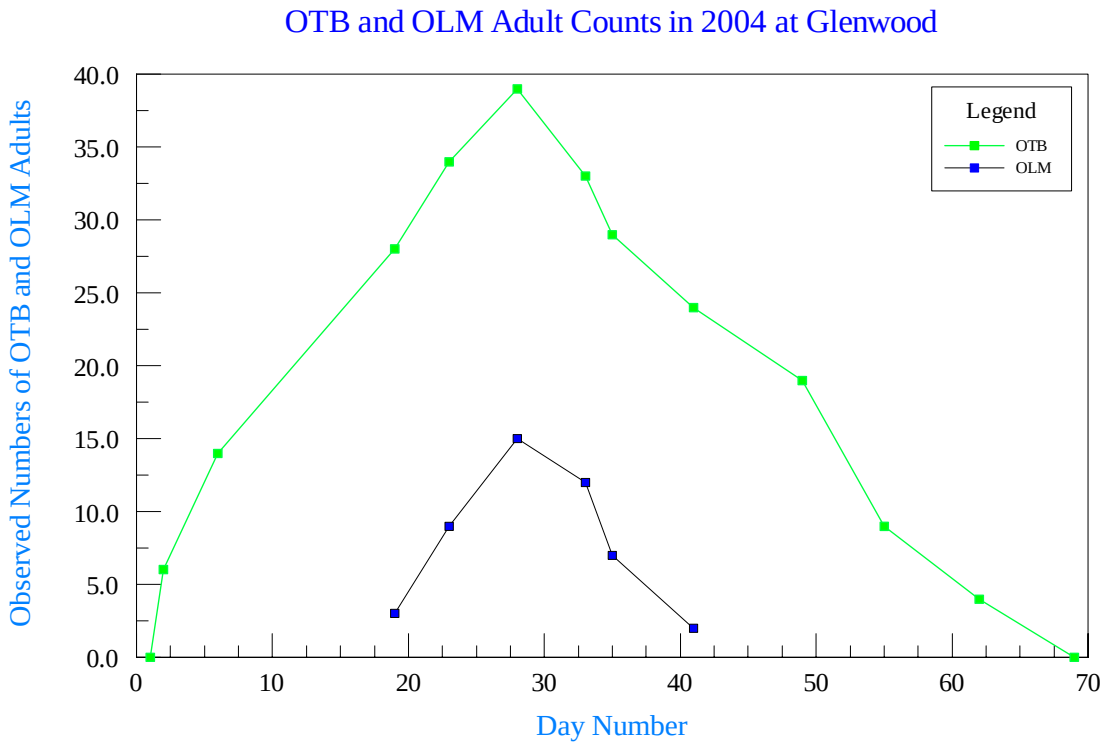


Figure 4-b. OTB and OLM seasonal population curves for 2004

The NLME model estimated a seasonal population size of 300 OTB adults in 2004 and a death rate of 0.215 per day. Observed behaviors of OTB adults included basking (n = 178), foraging (n = 4), running (n = 3), flying (n = 22), mating (n = 30), and ovipositing (n = 2). A total of 141 males and 98 females were observed. However, it is possible that some individuals were observed more than once on a particular survey date or during the 2004 adult activity period, since the beetles were not marked, captured or otherwise handled.

4.2.2 OTB Larval Burrows

During the July 2003 monitoring of larval burrows, 556 active larvae were inventoried in the Glenwood Preserve. Unfortunately, most tags used to identify the individual larval burrows were removed by vandals during the winter months prior to the 2004 OTB adult activity period. Only 17 of the 556 originally marked burrows remained with tags throughout the overwintering period and into the spring of 2004. Thus, information on survival rates of larvae, and adult emergence was lost due to this vandalism.

Of the 17 remaining tagged burrows, adult emergence holes were observed at three burrows (17.6%) in the spring of 2004. Additionally, two third instar larvae from 2003 (11.8%) held over and reemerged as third instar larvae during the spring of 2004. The remaining 12 burrows (70.5%) exhibited no sign of life in the spring of 2004 and are presumed to have died due to natural causes. Although a 70.5% mortality rate might at first seem extremely high, it is well within the normal mortality range of insects that overwinter as larvae or pupae (Varley et al. 1974).

A total of 347 active larval burrows were observed during the June 2004 visit. As detailed in Table 4-b, most of these burrows (n = 288) supported mature, third instar larvae of the OTB, with burrow diameters ranging in size from 3.6 to 6.0 mm. Most of these larvae remained active through the September and early October site visits. Shortly after October 5th, rains caused any remaining larvae to plug their burrows. The remaining larvae were first or second instars (n = 59, measuring <3.6 mm in Table 2). The correlations between burrow size and larval instar number were determined by lab rearing studies by Dr. Knisley and reported in Knisley and Arnold (2004).

Unfortunately, shortly after the June 2004 inventory of larval burrows, vandals again removed most of the tags. Thus, information on larval survival, and adult emergence for the 2004 generation of the OTB will again be minimal.

Table 4-b. Comparison of Numbers of OTB Burrows by Larval Instar in 2003 and 2004 at Glenwood Preserve

Larval Survey Year	Observed Numbers by Larval Instar			
	1.5-2.3 mm 1st Instar	2.4-3.5 mm 2nd Instar	3.6-6.0 mm 3rd Instar	Totals
2003 (July)	3	21	532	556
2004 (June)	2	57	288	347

Figure 4-c illustrates the locations of all larval burrows in the Preserve in both 2003 and 2004. Note that the occupied area was substantially greater in 2003 than 2004. Indeed, the burrow area was only 0.118 acres in 2004, which was a 43% decrease compared to 0.206 acres in 2003. In the absence of grazing during the 2003-2004 winter and 2004 spring, many patches of normally bare ground filled in with grasses and other herbaceous vegetation, which displaced the OTB.

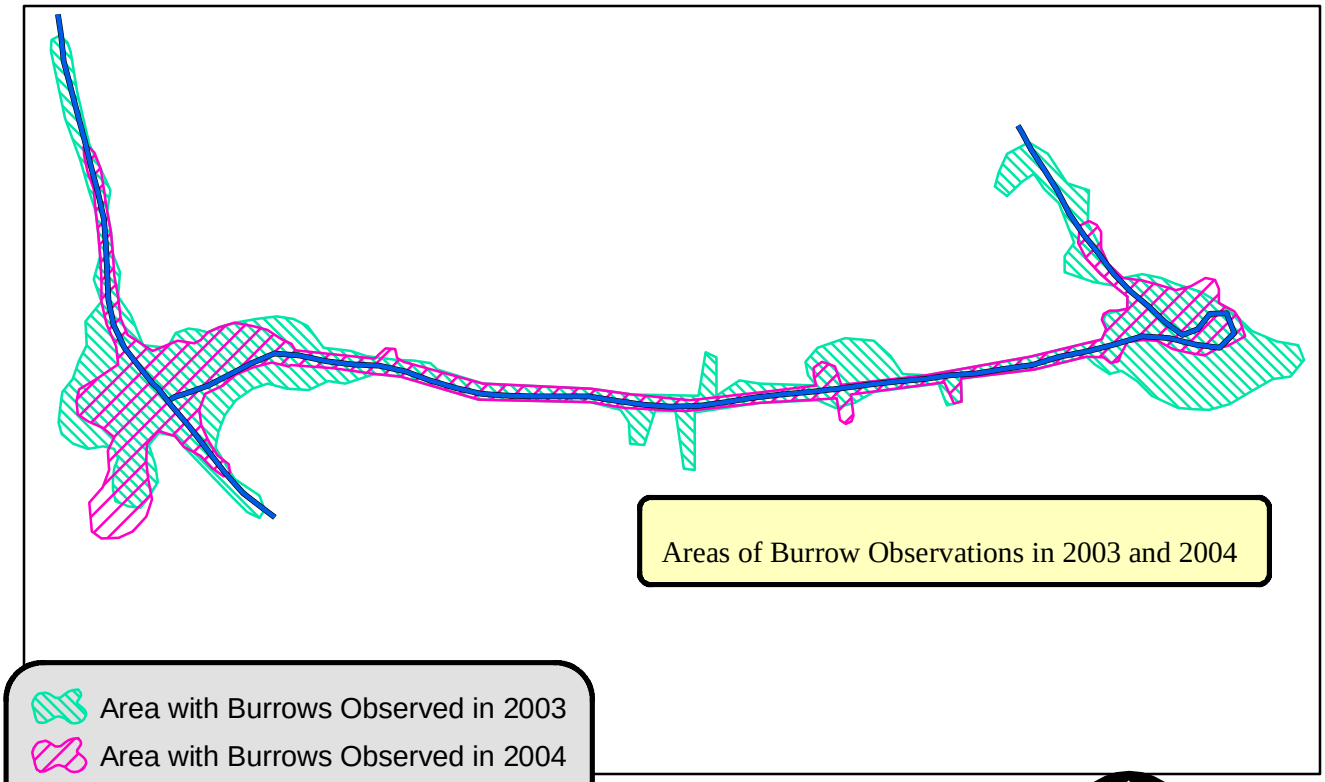
Other factors may have contributed to a decline in observed OTB. Population fluctuations can be expected as a result of variation in environmental conditions. A reduction in native annual flowering plants was observed at Glenwood and at other sites in the Bay Area. These types of apparent dramatic changes are common in California's grasslands and are closely linked to rainfall and temperature patterns. Heavy December rainfall was followed by dry spring with below normal rainfall in most of January and in March through May. A reduction in prey insects associated with this weather pattern could affect OTB numbers. There is insufficient data at this time to determine the relative contribution of grazing effects and environmental conditions in producing fluctuations in OTB numbers.

4.3 Conclusions and Recommendations

As previously mentioned, the 38% observed decline in the number of larval burrows between 2003 and 2004 and the 43% decline in occupied area between these same years may be due to the absence of grazing in the OTB habitat in the Preserve between 2003 and 2004. Adults and larvae of the OTB prefer barren or sparsely-vegetated areas of ground. Due to the lack of grazing throughout much of 2003 and 2004, many small patches of bare ground in 2003 supported grasses and other herbaceous vegetation in 2004. This change in habitat conditions could have displaced the OTB from the newly vegetated areas that were bare in 2003. Since suitable soil conditions for the OTB appear to be limited to a rather small portion of the Preserve, it is important to continue the grazing there to maintain bare and sparsely-vegetated areas of ground for the OTB to use. Continued OTB monitoring in future years once the Preserve's grazing program is established will demonstrate whether the grazed habitat allows the OTB to extend its distribution within the Preserve.

If the grazing is not successful at opening up additional areas of bare or sparsely-vegetated ground, then creating small patches of bare ground by scraping or other methods may need to be considered. This management technique has been employed at one other OTB site and occurs naturally at other OTB locations as a result of pig rooting activities.

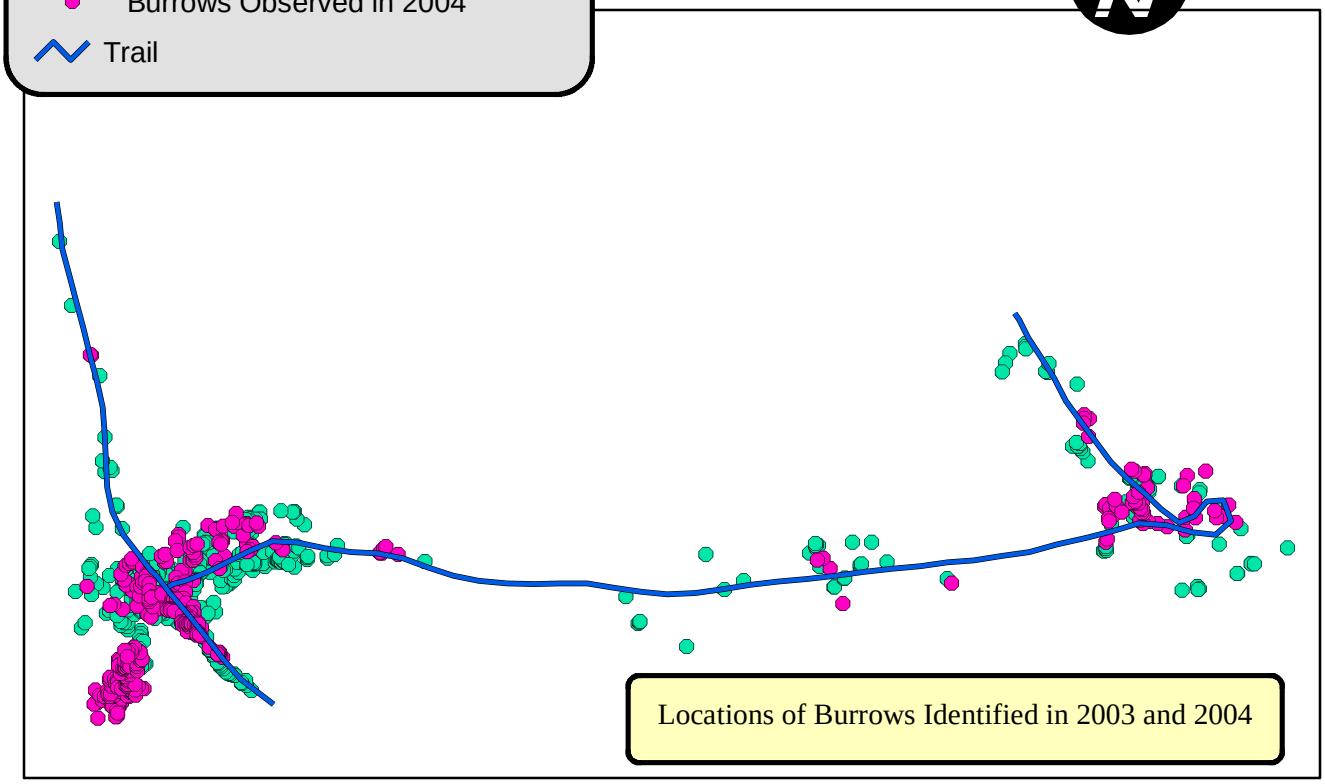
Ohlone Tiger Beetle Survey
Scotts Valley - Glenwood Site
Comparison of 2003 and 2004 Burrow Locations



Areas of Burrow Observations in 2003 and 2004

Area with Burrows Observed in 2003
Area with Burrows Observed in 2004
Burrows Observed in 2003
Burrows Observed in 2004
Trail

N



Locations of Burrows Identified in 2003 and 2004

0 20 40 80 120 160 Feet

Figure 4-c

Prepared November 26, 2004
by Entomological Consulting Services, Ltd.

Despite the new fencing in the Preserve, vandalism continues to be a problem, especially in the OTB habitat. For a second consecutive year most of the tags used to mark individual larval burrows were removed. This activity threatens to prevent the collection of proper baseline data on the OTB to demonstrate that the OSMP can successfully achieve its overall goals and objectives, as well as the specific management objectives for the OTB.

Since larvae are active for several months and some persist for more than one year, their burrows need to be individually marked to observe them throughout their development and to collect data that can be used to estimate growth and survival rates and relate these factors to habitat management actions. For the past several months an examination of alternative ways to mark the larval burrows in a manner that will hopefully not attract vandals has occurred.

One method to mark and identify OTB larval burrows that was investigated was the use of pit tags. Pit tags are microchips implanted in pets and other animals to uniquely identify them. The pit tags can be inserted in the soil near each larval burrow. Unfortunately the equipment (reader and antennas) and the pit tags (ca. $5 each when ordered in quantities of 1,000 or more) are quite expensive. If the pit tag technology works for the OTB monitoring, Ponderosa Homes has graciously offered to pay for the reader and tags.

However, in the preliminary trials, some issues have been encountered that require resolution before pit tags can be relied upon to mark the OTB burrows. For example, tags that occur in close proximity (such as areas with high densities of OTB larval burrows) either cannot be read by the existing commercially available antenna systems, or the tag signals interfere with the reading of neighboring tags. The manufacturer is making a custom probe-style antenna that will hopefully circumvent this problem. Also, each pit tag uses a combination of 15 numbers and letters to form a unique identifier. Depending upon the reader used, these character strings have to be manually entered on data sheets during every monitoring visit, typed into the GPS unit to obtain positional coordinates for each pit tag, and into the data base used to manage all observations for that burrow. This requires substantially more time than is currently budgeted for the OTB monitoring activities and substantially increases the chances of data entry errors. Due to the cost of the pit tags, they need to be retrieved, but this can result in ground disturbance near other active OTB larval burrows. Finally, the expected life of the pit tag used in this manner is unknown at this time. Ideally an individual pit tag will be reusable for several years to keep the equipment costs for the OTB monitoring reasonable. So, although the pit tag approach offers promise for a marking system that would not attract vandals, there are still a few procedural issues that need to be resolved to actually make this technology workable for use in monitoring larval burrows of the OTB.

If the pit tags approach is not feasible, an alternative method for marking burrows, such as nails, will be investigated. Use of any visible burrow marker will likely be susceptible to vandalism. For this reason, Ponderosa Homes, the City of Scotts Valley, and The Land Trust of Santa Cruz County should investigate the use of additional security measures to allow this baseline data to be collected.

Additional outreach to residential neighbors, the staff of the Vine Hill School, and users of Siltanen Park, and city police and park maintenance staff may be advisable to inform all to report trespass or suspicious activities to the police. It may also be necessary to further secure the OTB habitat by the use of barbed wire at the top of the new fencing or via other measures. Perhaps a motion sensitive camera could be mounted to overlook the OTB habitat.

5.0 OPLER'S LONGHORN MOTH

Monitoring of the Opler's longhorn moth was conducted by Dr. Richard Arnold of Entomological Consulting Services, Ltd.

5.1 METHODS

Point counts of OLM adults were performed at the seven patches of its larval food plant, *Platystemon californicus*, which had been identified within the Preserve. These counts were performed by Richard Arnold on the same dates as the transect counts for the OTB (see Section 4.1.1). Point counts were used because the seven patches of the food plant are very small in size and area. Additionally, new locations of *Playstemon californicus* were mapped when the plant was encountered during vegetation monitoring activities.

5.2 RESULTS

Adults of the OLM were observed at only one (OLM #1, as described in Arnold (2000)) of the seven patches of its food plant, on a slope next to the man-made pond. A total of 48 adults were active between February 27th and March 29th, with the peak flight occurring on March 12th (see Figure 4-b). No OLMs were observed at any of the other six patches of its food plant (OLM #2 -#7 of prior reports), even though the food plant was present in small numbers.

5.3 CONCLUSIONS AND RECOMMENDATIONS

Implementation of the grazing program should increase the abundance of the OLM's larval food plant, which in turn should increase the population size of the moth. Once this occurs, introducing the moth to other patches of the food plant within the Preserve could be considered if colonization does not occur naturally.

6.0 SCOTTS VALLEY SPINEFLOWER

Monitoring of the Scotts Valley spineflower was conducted by Kathy Lyons of Biotic Resources Group.

6.1 METHODS

6.1.1 Quantitative Sampling of Vegetation within Spineflower Habitat Areas

The occupied spineflower and suitable habitat areas were quantitatively sampled on April 16, 2004 by Kathleen Lyons and Phil Greer to document baseline conditions of plant species composition and plant cover. Three transects (T6, T14 and T15, see map in Appendix A) were established in and adjacent to occupied and suitable habitat areas to document percent vegetative cover and plant species composition. Within the three transects, a total of forty-one quadrats were sampled (20 quadrats in T6, 8 quadrats in T14 and 13 quadrats in T15).

Data from the quadrats were analyzed to determine absolute plant cover, relative plant cover and the percentage of native species, non-native species, grass species and forbs (i.e., non-grass herbaceous species). Photography was utilized to document the spineflower habitat during Spring 2004. Permanent photo stations were established at each transect and random photos were taken of other occupied areas and suitable habitat areas.

6.1.2 Spineflower Population Counts

On May 6, 2004, at the height of plant growth and flowering of the Scotts Valley spineflower, a census was conducted. Kathleen Lyons and a field assistant, Garv Hoefler, counted the number of individual plants within each occupied site (locations of spineflower colonies are shown on the map in Appendix A). For colonies supporting less than 100 individuals, accuracy is to one individual. Colonies supporting between 100 and 1,000 individuals were counted to the nearest ten individuals. For colonies supporting greater than 1,000 individuals, accuracy is estimated to plus/minus 50 individuals. These data were compared to the population data from 1992 (last available population data) and will be the basis for comparison in future monitoring.

Additionally, three reconnaissance surveys were conducted within the known and potential spineflower habitat areas on April 16, May 18 and June 8, 2004. During each site visit, the occupied and suitable habitat areas were visually assessed for plant species composition and site conditions.

6.2 RESULTS

6.2.1 Vegetation within Spineflower Habitat Areas

Data from the three transects (T6, T14, and T15, see Appendix C for data) revealed that 65% of plant species within the occupied and suitable spineflower habitat areas are non-native. The percentage of non-natives ranged from a high of 72% in T14, to 63% in T6 and 60% in T15. In T14 and T15, rattail fescue (*Vulpia myuros)* provided 62.7% and 44.9% relative plant cover, respectively. In T6, long beaked filaree (*Erodium botrys)* provided 35% relative plant cover. Other non-native plant species providing relative cover values greater than 5% were cat's ear (*Hypochearis glabra),*

shamrock clover (*Trifolium dubium)*, subterranean clover (*Trifolium subterraneum)*, wild oat (*Avena sp.)*, and filago (*Filago gallica)*. Photographs of the transects are in Appendix D.

Data from the three transects revealed that 35% of plant species within the occupied and suitable spineflower habitat areas are native. The percentage of native plant species within the transects ranged from a low of 27% in T14, to 37% in T6 and 40% in T15. In T14, Scotts Valley spineflower provided the highest native plant cover, comprising 14.2% relative cover. Three other species provided greater than 5% relative cover, yet only in T6. These species are beach aster (*Lessingia filaginifolia)*, Spanish clover (*Lotus purshianus)*, and sandwort (*Minuartia californica)*. In T15, Scotts Valley spineflower provided 4.4% relative cover. These data are portrayed on Figures 6-a (T6), 6-b (T14) and 6-c (T15).

The transect data and the seasonal reconnaissance surveys from the occupied and suitable Scotts Valley habitat areas documented the presence of several other native plant species growing amid the rocky outcrops. These species include small-headed clover (*Trifolium microcephalum)*, goldfields (*Lasthenia californica)*, toad rush (*Juncus bufonius)*, sand pygmy weed (*Crassula erecta)*, purple sand spurry (*Spergularia rubra)*, owl's clover (*Castilleja exserta)*, sky lupine (*Lupinus nanus)*, vinegar weed (*Trichostema* sp.), skunkweed (*Navarretia squarrosa)*, golden aster (*Chrysopsis villosa* var. *villosa)*, coast tarweed (*Madia sativa)*, California poppy (*Eschscholzia californica)*, California plantain (*Plantago erecta)*, blue-eyed grass (*Sisyrinchium bellum)*, soap plant (*Chlorogalum pomeridianum)*, mariposa lily (*Calochortus luteus)*, false lupine (*Thermopsis macrophyla)*, checkerbloom (*Sidalcea malvaeflora)* and purple needlegrass (*Nassella pulchra).*

Other non-native grasses and forbs were observed growing in and around the outcrop areas, including soft chess (*Bromus hordeaceus)*, ripgut brome (*Bromus diandrus)*, rattlesnake grass (*Briza maxima)*, Italian ryegrass (*Lolium multiflorum)*, nit grass (*Gastridium ventricosum)*, European hairgrass (*Aira caryophyllea)*, sheep sorrel (*Rumex acetosella)*, and catchfly (*Silene gallica*).

No invasive, non-native plant species were observed within the occupied and suitable habitat areas during the spring 2004 surveys.

6.2.2 Population Counts

The census of the Scotts Valley spineflower was conducted during a year with average rainfall, according to National Weather Service records. Individuals of Scotts Valley spineflower are depicted in Figure 6-d. A total of 27,241 individuals were counted at ten sites. Within the occupied sites, plant counts per site ranged from a low of 28 individuals to a high of 6,170 individuals, as depicted on Table 6-a. Seven sites that contained plants in 1992 had no aboveground spineflower plants in May 2004. None of the previously mapped uninhabited, yet suitable, habitat areas were found to support the spineflower in 2004.

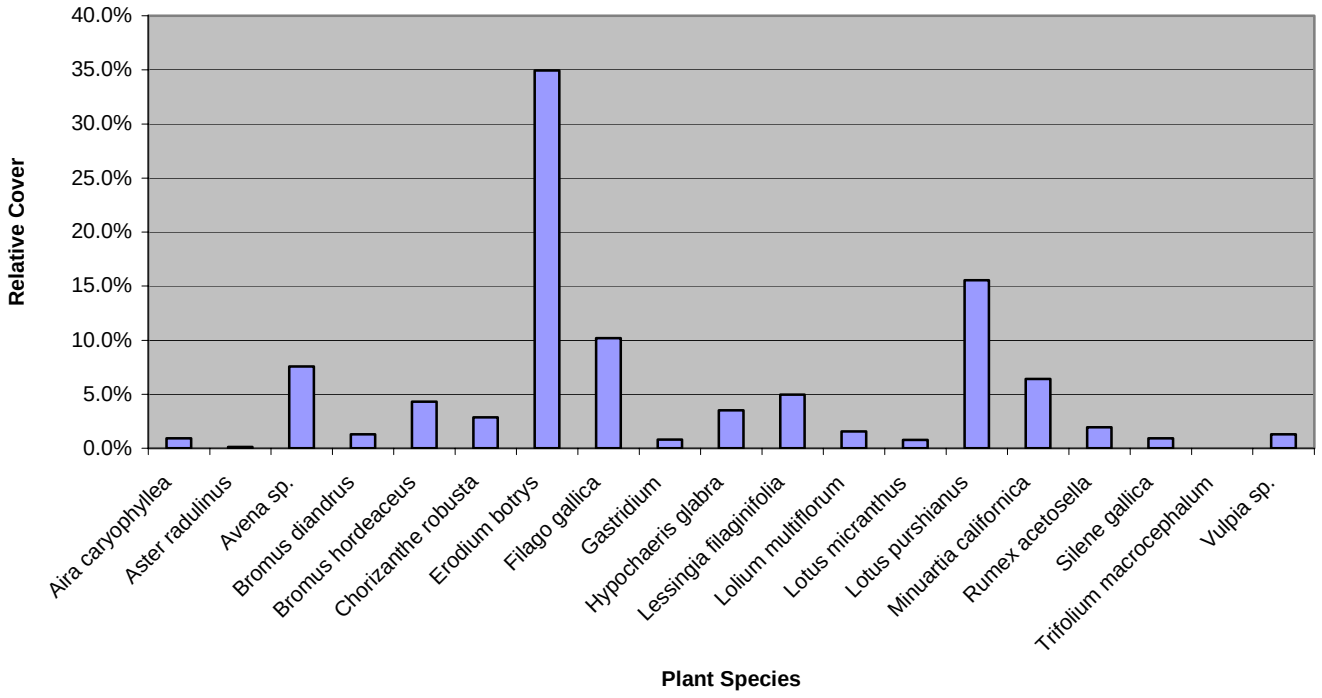


Figure 6-a. Relative cover of plant species in spineflower transect T6.

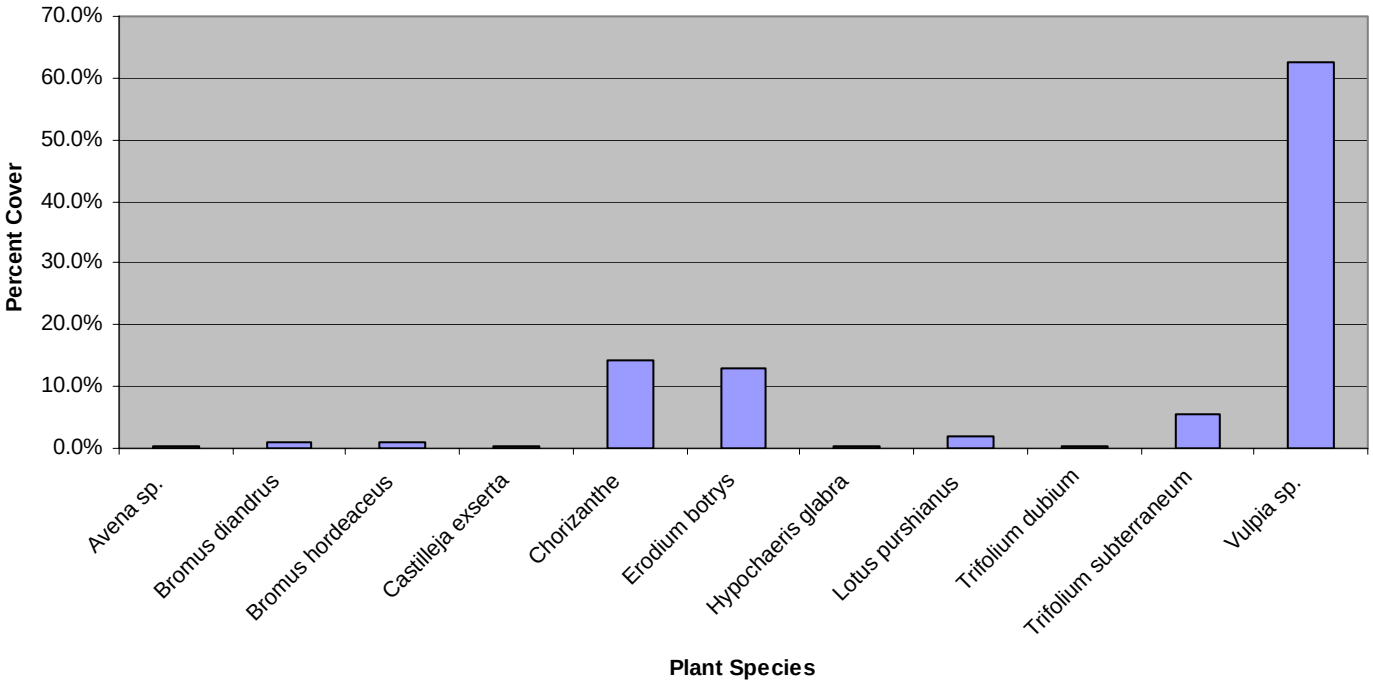


Figure 6-b. Relative cover of plant species in spineflower transect T14.

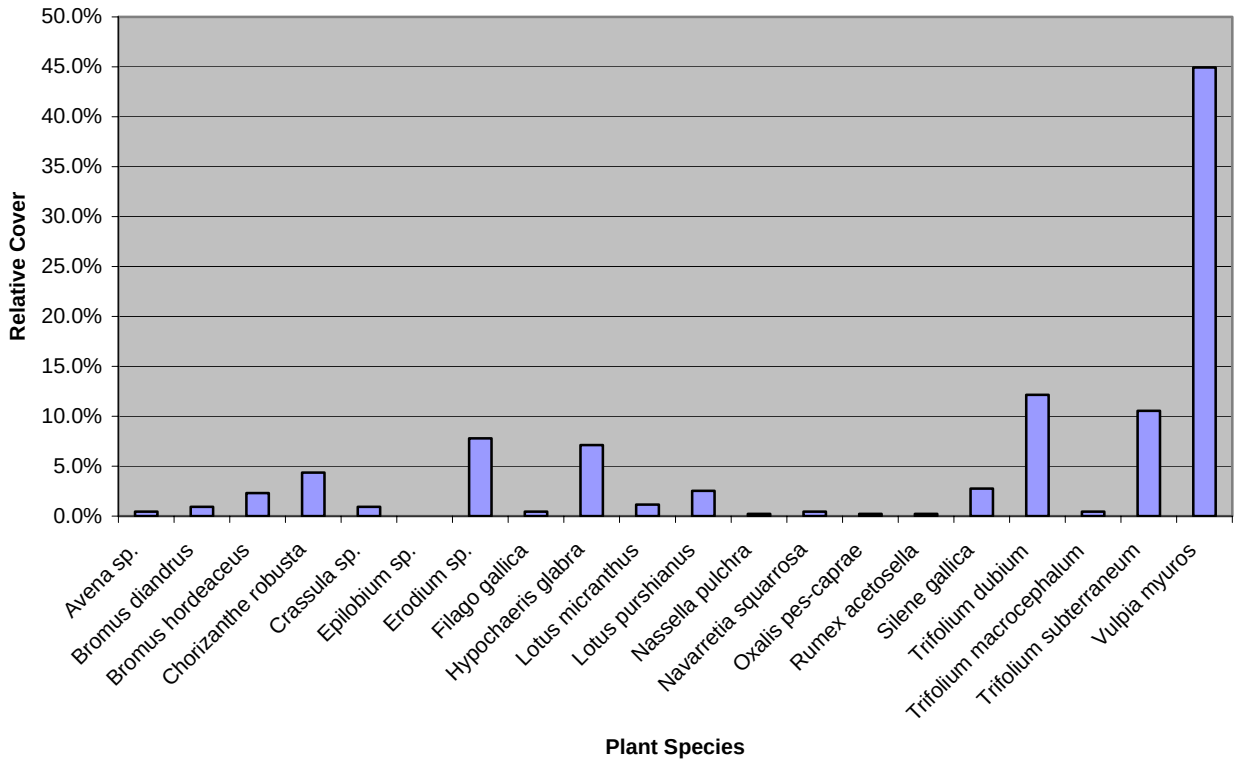


Figure 6-c. Relative cover of plant species in spineflower transect T15.

Table 6-a. Census of Scotts Valley Spineflower at Glenwood Preserve, 1992 and 2004

Site Number	Population Estimate 1992 [1]	Population Census, May 2004	Location
C-64	1-10	0	E of Glenwood Drive, SE section
C-74	10-50	55	E of Glenwood Drive, central section
C-77	1,000-5,000	1,204	E of Glenwood Drive, central section
C-122	5,000-10,000	5,050	W of Glenwood Drive, Teacup Hill
C-123	1,000-5,000	370	W of Glenwood Drive, Teacup Hill
C-124	1-10	28	W of Glenwood Drive, Teacup Hill
C-125	1,000-5,000	1,490	W of Glenwood Drive, Teacup Hill
C-126	500-1,000	200	W of Glenwood Drive, Teacup Hill
C-127	5,000-10,000	5,390	W of Glenwood Drive, Teacup Hill
C-128	5,000-10,000	6,170	W of Glenwood Drive, Teacup Hill
C-129	5,000-10,000	5,280	W of Glenwood Drive, Teacup Hill
C-147	100-500	0	W of Glenwood Drive, grassland site
C-155	50-100	0	E of Glenwood Drive, panhandle area
C-156	50-100	0	E of Glenwood Drive, panhandle area
C-158	500-1,000	0	E of Glenwood Drive, panhandle area
C-159	50-100	0	E of Glenwood Drive, panhandle area
C-160	50-100	0	E of Glenwood Drive, panhandle area
Total	**28,500-55,000**	**27,241**	

1 – Source: 1992 Survey Data, Habitat Restoration Group

All but one of the previously documented spineflower sites west of Glenwood Drive were found to support spineflower plants in 2004. As depicted in Table 6-a, most of the sites supported several thousand individuals, representing the low end of the population estimates from 1992. The spineflower inhabits the rocky outcrop along the lower edge of Teacup Hill. Native and non-native plant species intermix with the spineflower in these areas; however, the spineflower grows very densely in some areas. Individuals of dudleya (*Dudleya ceaspitosa),* California fuchsia (*Epilobium canum),* California phacelia (*Phacelia egena),* sticky monkey flower (*Mimulus aurantiacus)* were observed within these sites, in addition to the herbaceous species documented in the transects. Some human disturbances were observed in and around these sites, as it appears residents from the area and/or students from the adjacent Scotts Valley High School access the area. Vegetation trampling and debris was observed along the edge of the hillside between Teacup Hill and the high school property. The Land Trust of Santa Cruz County has received funding to install fencing on the portion of the Preserve west of Glenwood Drive. This should discourage residents from using the hillside area for recreational activities. Figure 6-e depicts the character of the rock outcrops around Teacup Hill.

Of the eight previously documented spineflower sites east of Glenwood Drive, only two sites were found to support plants in 2004. Five sites (C-155, 156, 158, 159 and 160) that occur in a narrow panhandle off Tabor Drive did not support any aboveground spineflower plants in 2004. This area had been fenced from grazing for several years and was previously disturbed by the adjacent housing development, as evidenced by piles of construction debris, base rock, and garden clippings. During the May 2004 field survey, annual, non-native grasses and forbs dominated the area, although the persistence of some native species was observed (i.e., individuals of dwarf brodiaea [*Brodiaea terrestris]).* Horses grazed the area in summer 2004, reducing the cover of the non-native grasses. As depicted in Table 6-a, sites C-74 and C-77 together supported over 1,200 individuals. C-74 supports a similar population as recorded in 1992, whereas the 2004 population at C-77 represents the low end of the population estimate from 1992. Figure 6-f depicts site conditions at C-77 during the May 2004 survey.

Monitoring of Management Activities Implemented in 2004. The goal for the population of extant Scotts Valley spineflower is to maintain, on average, all extant colonies and a total population that meets or exceeds the population data collected in 1992, although it is acknowledged that the population will vary from year to year based on environmental conditions.

The grassland management program (i.e., horse grazing) was implemented in spring 2004. Due to low grazing pressures within the spineflower areas in 2004, no adverse environmental site conditions were noted during the spring 2004 field surveys. There was no evidence of erosion, over-grazing or trampling.

During 2004, the spineflower areas within the Preserve were subject to minor human disturbances. Pedestrians, dogs and students (from the nearby school) traversed through the grassland near some of the spineflower areas east of Glenwood Drive. In addition, some human disturbances were observed in and around the spineflower colonies abutting the Scotts Valley High School. Vegetation trampling and debris was observed along the edge of the hillside between Teacup Hill and the high school property. To date, however, no significant impacts to the Scotts Valley spineflower were noted from this activity, and The Land Trust of Santa Cruz County has received funding to install fencing on the portion of the Preserve west of Glenwood Drive. This should discourage residents from using the hillside area for recreational activities.

6.3 CONCLUSIONS AN D RECOMMENDATIONS

With the exception of the spineflower sites in the panhandle near Tabor Drive, non-native grasses continue to grow on and around the occupied sites, but not at levels that adversely affect the growth of the spineflower. In order to ensure the continuing presence of spineflower on the Preserve, the following recommendations are offered:

1. The grassland in and around the occupied and suitable spineflower areas east of Glenwood Drive should continue to be grazed in 2005, particularly in the panhandles (spineflower sites

Figure 6-d. View of Scotts Valley spineflower, May 2004.

Figure 6-e. View of Teacup Hill, west of Glenwood Drive. Occupied spineflower sites occur at the base of the rock outcrop, May 2004

Figure 6-f. View of occupied spineflower site C-77, east of Glenwood Drive, May 2004.

2. C-155, C-156, C-158, C-159 and C-160) and at spineflower site C-64, where no spineflower plants were observed in 2004.
3. The Scotts valley spineflower population should be monitored in spring 2005, with data compared to previous year's observations.
4. Although no evidence of impacts to spineflower was observed, the fencing and condition of the Preserve should be monitored. The Land Trust of Santa Cruz County has received funding to install fencing on the portion of the Preserve west of Glenwood Drive. This should discourage residents from using the hillside area for recreational activities.

7.0 OTHER SPECIAL STATUS PLANTS

7.1 METHODS

Mt. Diablo cottonweed (*Micropus amphibolus*), a CNPS List 3 plant, is known to occur in the Preserve. Spring surveys were conducted on April 16, 2004 to document its distribution. Locations of Mt. Diablo cottonweed were mapped using a GPS.

During reconnaissance-level surveys of the Preserve and surveys for Mt. Diablo cottonweed, botanists also searched for other rare plant species that had been historically reported to occur in the Preserve. These species included linanthus (*Linanthus parviflorus*/*androsaceus* complex), white-tipped clover (*Trifolium* aff. *polyodon*), and grassland stebbinsoseris (*Stebbinsoseris heterocarpa*), which are all species of CNPS local concern; Choris's popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*), which is included on CNPS's List 1B; and Gray's clover (*Trifolium barbigerum* var. *andrewsii*, formerly *T. grayi*), which is considered a CNPS species of local concern to the Santa Cruz Chapter.

The Scotts Valley polygonum (*Polygonum hickmanii*) was recently listed as a federally-endangered species, and the Glenwood Preserve is included in the species' designated critical habitat (USFWS, Federal Register, Vol. 68, No. 67, April 8, 2003). Habitat for this species is very similar to that of the Scotts Valley spineflower, but numerous surveys have found that populations of Scotts Valley polygonum do not occur in the Preserve. On May 6 and June 8, 2004, during the growth period and flowering period of the Scotts Valley polygonum, a census was conducted. As the Scotts Valley polygonum has not been previously recorded from the Glenwood Open Space Preserve, two nearby localities were field checked to ensure that the field surveys were conducted at the appropriate time. Kathleen Lyons and a field assistant, Garv Hoefler, conducted the census within the known and suitable Scotts Valley spineflower habitat areas.

7.3 RESULTS

7.3.1 Mt. Diablo cottonweed

Locations of Mt. Diablo cottonweed are shown on the Preserve Map (Appendix A). Vegetation transects 6 and 9 were located near patches of Mt. Diablo cottonweed so that future cottonweed population trends can be examined in relation to trends in grassland plant composition.

If structural characteristics (e.g. percent vegetative cover, cover of non-native vs. native species, etc.) of the grassland habitat preferred by the Mt. Diablo cottonweed change in a way that is judged to be negatively impacting the species, management activities such as a changes to the grazing regime will occur.

7.3.2 Gray's clover

Although Gray's clover was observed in the Preserve in 2003, it was not observed during an area-wide survey in mid-April 2004. In general, clovers bloomed earlier than expected in 2004, so it is possible that 2004 surveys were too late to locate the species. Therefore, efforts will be made to locate the species in 2005. However, it should be noted that at the state level CNPS rejected *Trifolium grayi* for listing, considering it a synonym of *Trifolium barbigerum* var. *andrewsii*, a common taxon.

7.3.3 Santa Cruz clover

Area-wide surveys for Gray's clover and Mount Diablo cottonweed found two locations of a rare plant species that had been first documented in the Preserve in 2003: Santa Cruz clover (*Trifolium buckwestiorum*), which is on CNPS's 1B List and is a USFWS Species of Concern. Locations of Santa Cruz clover are depicted on the Preserve Map (Appendix A). Approximately 300 plants were observed in the Preserve. Future monitoring of the Preserve will include surveys for this species.

7.3.4 Choris's popcorn flower

Choris's popcorn flower was located in a wetland in the southern part of Pasture C (see Appendix A, Preserve Map). Approximately 10 plants were observed. Future monitoring of the Preserve will include surveys for this species. Transect 10 was located in the portion of the wetland where Choris's popcorn flower occurs so that future popcorn flower population trends can be examined in relation to trends in wetland vegetation composition.

7.3.5 Scotts Valley polygonum

On May 6 and June 8, 2004, during the growth period and flowering period of the Scotts Valley polygonum, a census was conducted. No individuals of Scotts Valley polygonum were observed in the Preserve.

7.3.6 Other rare plant species

The rare linanthus complex, white-tipped clover, and grassland stebbinsoseris were not observed on the Preserve in 2003 or 2004. Care will be taken to look for these species during Preserve reconnaissance surveys and surveys for Mount Diablo cottonweed and Santa Cruz clover.

8.0 EXOTIC PEST PLANTS

Reconnaissance-level surveys were used to identify new stands of exotic pest plants (species listed on the Cal-IPC List A or B) that may threaten sensitive habitats and to monitor effectiveness of control activities.

Several exotic plants on Cal-IPC's List A or B were located on the Preserve:

- Pennyroyal (*Mentha pulegium*, List A-2) was located in the wetland swale near the south end of Pasture A.
- French broom (*Genista monspessulana*, List A-1) was located in a few locations in the Preserve: east of the wetland in Pasture C, in the middle of Pasture A, and at the east end of Pasture D. Only a few plants were present at each location.
- Blackwood acacia (*Acacia melanoxylon*, 'Need More Information' List) was located in a few locations near the West Branch of Carbonera Creek and near the Water District Road.
- Italian thistle (*Carduus pycnocephalus*, List B) and bull thistle (*Cirsium vulgare*, List B) were found in scattered locations throughout the Preserve.

The acacia and broom will be removed by a landscape contractor prior to 2005 monitoring. Thistle will continue to be monitored and efforts will be made to pull it before it sets seed during Spring 2005 reconnaissance surveys for special status plants. Grazing management is expected to help control pennyroyal; if 2005 monitoring shows that grazing management is insufficient to control it, additional control measures will be implemented.

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APPENDICES

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Map of Glenwood Preserve

PASTURE A
PASTURE B
PASTURE C
PASTURE D
Siltanen Park
Vine Hill School
Scotts Valley High School
Tabor Drive
Scotts Valley Water District Road
Canham Drive
Glenwood Drive
West Branch Carbonera Creek
Borrow Area
Road
CORRAL
C-160
C-159
C-158
C-155
C-156
C-64
C-77
C-74
C-147
C-129
C-122
C-128
C-127
C-126
C-125
C-124
C-123
mdc
scc
cc
cp

LEGEND
- Open Space Preserve Boundary
- Wetlands
- Fence
- Gate Location
- Water Trough
- Water Pipe
- Transect (with number)

Special Status Species
- Mount Diablo Cottonweed (mdc)
- Scotts Valley Spineflower (C-#)
- Santa Cruz Clover (scc)
- Ohlone Tiger Beetle
- Choris's Popcornflower (cp)
- Cream Cups (cc)

Date	Issues And Revisions	No.
11-30-2004	AS BUILT	

PROJECT #9065
DRAWN BY: G.O.
ORIGINAL DRAWING SIZE: 24 " X 36"

SCALE: 1" = 350'

0 350 700
SCALE: 1 " = 350 '

LANDSCAPE FENCE: The Guzzardo Partnership
BASEMAP: Ruggeri, Jensen, Azar & Assoc.

Dec 07, 2004 - 4:12pm L:\Acad 2000 Files\09000\9065\ANUAL REPORT 2004.DWG (Transects and SS Plants 11x17)

Appendix B. Sample datasheets from vegetation and Ohlone tiger beetle monitoring

Appendix C: Data from vegetation transect monitoring

Glenwood Preserve vegetation transects 2004

Date: 6/30/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 1

original transect # A2

pasture A

habitat annual grassland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SUM	% ABS	%REL	% native	% non-native	% grass	% non-grass	% native grass	% non-native grass	% native forb	% non-native forb
Anthemis sp	y	x	h														0.1		0.1	0.0%	0.0%	0.0	0.0	0	0	0	0	0	0
Bromus hordeaceus	y	x	g		2.5	2.5	2.5	15	37.5	15	15			2.5	2.5	2.5		2.5	100	6.9%	7.3%	0.0	7.3	7.3	0	0	7.3	0	0
Hordeum marinum ssp. gussoneanu	y	x	g	2.5	0.1	2.5	2.5	2.5	37.5	15	15	2.5	2.5	15	62.5	62.5	37.5	15	275.1	18.9%	20.0%	0.0	20.0	20	0	0	20	0	0
Lolium multiflorum	y	x	g	87.5	87.5	62.5	62.5	87.5	37.5	62.5	37.5	87.5	37.5	37.5	15	15	37.5	87.5	842.5	57.8%	61.2%	0.0	61.2	61.2	0	0	61.2	0	0
Madia sp.	y	n	h	2.5		2.5								37.5	37.5	37.5	2.5		120	8.2%	8.7%	8.7	0.0	0	8.7	0	0	8.7	0
Vulpia sp.	y	x	g				2.5				15	15			2.5	2.5		2.5	40	2.7%	2.9%	0.0	2.9	2.9	0	0	2.9	0	0
				VEGETATION TOTALS															**1377.7**	**94.5%**	100.0%	8.7	91.4	91.4	8.7	0	91.4	8.7	0
Bare ground							10						40				30		80	5.3									
Moss																													
Thatch																													
Rock																													
				GRAND TOTALS															**1457.7**										

Chorizanthe individuals																													

Glenwood Preserve vegetation transects 2004

Date: 5/21/04

Monitor(s) (Estimator, Recorder): P. Greer

Transect: 2

original transect # A1 Wetland

pasture A

habitat wetland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SUM	% ABS	%REL	% native	% non-native	% grass	% non-grass	% native grass	% non-native grass	% native forb	% non-native forb
Eleocharis macrostachya	y	n	g										0.1	62.5		37.5	15		115.1	7.2%	7.5%	7.5	0	7.5	0	7.5	0	7.5	0
Geranium dissectum	y	x	h									2.5					0.1		2.6	0.2%	0.2%	0	0.2	0	0.2	0	0	0	0.2
Hordeum marinum ssp. gussoneanum	y	x	g	62.5	2.5		2.5	2.5		2.5		2.5							75	4.7%	4.9%	0	4.9	4.9	0	0	4.9	0	0
Juncus xiphioides	y	n	g										37.5	37.5	87.5	37.5	15	37.5	252.5	15.8%	16.5%	16.5	0	16.5	0	16.5	0	0	0
Lolium multiflorum	y	x	g	62.5	62.5	37.5	15	37.5	15	37.5	2.5	87.5	2.5	2.5	2.5	2.5	37.5	15	420	26.3%	27.4%	0	27.4	27.4	0	0	27.4	0	0
Mentha pulegeum	y	i	h	37.5	37.5	87.5	62.5	62.5	62.5	62.5	15	2.5	37.5	15	2.5	0.1	2.5	15	502.6	31.5%	32.8%	0	32.8	0	32.8	0	0	0	32.8
Poa annua	y	x	g		0.1			0.1	2.5										2.7	0.2%	0.2%	0	0.2	0.2	0	0	0.2	0	0
Polypogon monspeliensis	y	x	g							2.5		2.5							5	0.3%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Rumex crispus	y	x	h		2.5				2.5		37.5	15	15	2.5	15	37.5	15	0.1	142.6	8.9%	9.3%	0	9.3	0	9.3	0	0	0	9.3
Vulpia sp.	y	x	g										0.1					15	15.1	0.9%	1.0%	0	1	1	0	0	1	0	0
				VEGETATION TOTALS															**1533.2**	**96.1%**	100.0%	24	76.1	57.8	42.3	24	33.8	7.5	42.3
Bare ground							2												2	0.1									
Moss																													
Thatch											40		5	5		10			60	4.0									
Rock																													
				GRAND TOTALS															**1595.2**	4.1									

Chorizanthe individuals																													

Glenwood Preserve vegetation transects 2004

Date: 5/21/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 3

original transect # B3

pasture B

habitat Native grassland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Agoseris sp.	y	n	h					2.5						2.5	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Avena sp.	y	x	g						15	2.5	0.1	2.5	2.5	22.6	2.1%	2.7%	0	2.7	2.7	0	0	2.7	0	0
Bromus diandrus	y	x	g			62.5	37.5	0.1		0.1	0.1		15	115.3	10.5%	13.7%	0	13.7	13.7	0	0	13.7	0	0
Bromus hordeaceus	y	x	g	15	0.1	37.5	62.5	62.5	37.5	37.5	2.5	2.5	62.5	320.1	29.3%	37.9%	0	37.9	37.9	0	0	37.9	0	0
Castilleja exserta	y	n	h	0.1										0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Crassula sp.	y	n	h	r	0.1									0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Erodium botrys	y	x	h	37.5	15	2.5	2.5	15	2.5	2.5	2.5	2.5		82.5	7.5%	9.8%	0	9.8	0	9.8	0	0	0	9.8
Eschscholzia californica	y	n	h										2.5	2.5	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Filago sp.	y	n	h	0.1	2.5									2.6	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Gastridium	y	x	g	0.1										0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Lichen, black	y			2.5	2.5									5	0.5%	0.6%	0	0	0	0	0	0	0	0
Lolium multiflorum	y	x	g				15							15	1.4%	1.8%	0	1.8	1.8	0	0	1.8	0	0
Lupinus bicolor	y	n	h	0.1	0.1					2.5				2.7	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Nassella pulchra	y	n	g	0.1	0.1	2.5								2.7	0.2%	0.3%	0.3	0	0.3	0	0.3	0	0	0
Trichostema sp.	y	n	h	2.5	0.1									2.6	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Vulpia sp.	y	x	g	0.1	37.5	0.1		37.5	62.5	62.5	15	15	37.5	267.7	24.5%	31.7%	0	31.7	31.7	0	0	31.7	0	0
				VEGETATION TOTALS										**844.1**	**77.2%**	100.0%	1.8	97.6	88.1	11.3	0.3	87.8	1.5	9.8
Bare ground				5	35						70	70		180	18.0									
Moss																								
Thatch				50				5	5		5	5		70	7.0									
Rock																								
				GRAND TOTALS										**1094.1**	25.0									

Chorizanthe individuals																
Nassella individuals				0	0	1								1		

Glenwood Preserve vegetation transects 2004

Date:	5/12/04
Monitor(s) (Estimator, Recorder):	P. Greer
Transect:	4
original transect #	B1
pasture	B
	OLM, native
habitat	grassland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Agoseris sp.	y	n	h										0.1	0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Aira caryophyllea	y	x	g		2.5	2.5	2.5	37.5	15	2.5	2.5			65	6.3%	7.1%	0	7.1	7.1	0	0	7.1	0	0
Avena sp.	y	x	g	2.5	2.5	15	37.5	15	15	15	62.5	37.5	37.5	240	23.2%	26.3%	0	26.3	26.3	0	0	26.3	0	0
Briza major	y	x	g				2.5							2.5	0.2%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Bromus diandrus	y	x	g				0.1		2.5		2.5	2.5	15	22.6	2.2%	2.5%	0	2.5	2.5	0	0	2.5	0	0
Bromus hordeaceus	y	x	g					15	15	2.5	37.5	37.5	15	122.5	11.9%	13.4%	0	13.4	13.4	0	0	13.4	0	0
Castilleja	y	n	h	2.5										2.5	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Clarkia sp.	y	n	h	2.5										2.5	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Dodecatheon sp.	y	n	h	2.5										2.5	0.2%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Erodium botrys	y	x	h	15	2.5	2.5		2.5	2.5					25	2.4%	2.7%	0	2.7	0	2.7	0	0	0	2.7
Eschscholzia californica	y	n	h	2.5	2.5		0.1	0.1		0.1		2.5	2.5	10.3	1.0%	1.1%	1.1	0	0	1.1	0	0	1.1	0
Hemizonia sp.	y	n	h									0.1		0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Hypochaeris glabra	y	x	h	2.5	2.5	2.5		2.5	2.5					12.5	1.2%	1.4%	0	1.4	0	1.4	0	0	0	1.4
Leymus triticoides	y	n	g							37.5				37.5	3.6%	4.1%	4.1	0	4.1	0	4.1	0	0	0
Lolium multiflorum	y	x	g							15	15	15	15	60	5.8%	6.6%	0	6.6	6.6	0	0	6.6	0	0
Plantago erecta	y	n	h	37.5	15									52.5	5.1%	5.7%	5.7	0	0	5.7	0	0	5.7	0
Rumex acetosella	y	x	h	2.5	2.5	0.1	2.5	2.5	0.1					10.2	1.0%	1.1%	0	1.1	0	1.1	0	0	0	1.1
Trifolium microdon	y	n	h			0.1	2.5							2.6	0.3%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Trifolium subterraneum		x	h											0	0.0%	0.0%	0	0	0	0	0	0	0	0
Vulpia sp.	y	x	g	15	37.5	62.5	62.5	15	15	15	2.5	2.5	15	242.5	23.5%	26.5%	0	26.5	26.5	0	0	26.5	0	0
				VEGETATION TOTALS										**913.4**	**88.4%**	100.0%	12.1	87.9	86.8	13.2	4.1	82.7	8	5.2
Bare ground				10	15	5			15				10	55	5.5									
Moss																								
Thatch						15	5	5		10		15	15	65	6.5									
Rock																								
				GRAND TOTALS										**1033.4**	12.0									

Chorizanthe individuals																

		Braun-Blaquet cover class	Range	Mean
Glenwood Preserve vegetation transects 2004				
Date:	4/30/04	5	75 to	87.5
Monitor(s) (Estimator, Recorder):	D. Amme, P. Greer	4	75	62.5
Transect:	5	3	50	37.5
original transect #	top b/c	2	5 to	15
pasture	B (11-20), C Annual	1	1 to 5	2.5
habitat	grassland	+	<1	0.1
		r	<<1	*

SPECIES	Present?	n=native, i=invasi	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Avena sp.	y	x	g			0.1		2.5	0.1	15	15	15	2.5	2.5	15	37.5	2.5	2.5	2.5	15	0.1	2.5	37.5	167.8	11.0%	16.8%	0	16.8	16.8	0	0	16.8	0	0
Bromus diandrus	y	x	g				0.1			0.1	2.5	62.5	2.5	15	15	2.5	15	2.5	2.5	37.5	15	15	2.5	190.2	12.5%	19.0%	0	19	19	0	0	19	0	0
Bromus hordeaceus	y	x	g	37.5	15	15	2.5	2.5	15	15	0.1	0.1	15	15	37.5	15	2.5	15	15	37.5	15	2.5	2.5	275.2	18.1%	27.5%	0	27.5	27.5	0	0	27.5	0	0
Geranium dissectum	y	x	h															0.1						0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Hordeum murinum	y	x	g	2.5	0.1		0.1	0.1			0.1	0.1		0.1	0.1		0.1				2.5	15	0.1	20.9	1.4%	2.1%	0	2.1	2.1	0	0	2.1	0	0
Lolium multiflorum	y	x	g	2.5	2.5	15	62.5	62.5	15	15	15	15	15	15	2.5	15	2.5	2.5	15	2.5	15	15	37.5	342.5	22.5%	34.3%	0	34.3	34.3	0	0	34.3	0	0
Rumex acetosella	y	x	h			2.5																		2.5	0.2%	0.3%	0	0.3	0	0.3	0	0	0	0.3
Trifolium subterraneum	y	x	h						0.1															0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
				VEGETATION TOTALS																				**999.3**	**65.6%**	100.0%	0	100	99.7	0.3	0	99.7	0	0.3
Bare ground				4						20														24	1.2									
Moss																																		
Thatch				50	50	30	10	20	20	20	50	10	20	20	40	15	60	15	10	10	10	20	20	500	25.0									
Rock																																		
				GRAND TOTALS																				**1523.3**	26.2									

Chorizanthe individuals																																		

Glenwood Preserve vegetation transects 2004

Date: 4/16/04

Monitor(s) (Estimator, Recorder): K. Lyons, P. Greer

Transect: T6

original transect # CHRO-

pasture C

habitat SVSF

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invas	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Aira caryophyllea	y	x	g													2.5			15					17.5	0.7%	0.9%	0	0.9	0.9	0	0	0.9	0	0
Aster radulinus	y	n	h									2.5												2.5	0.1%	0.1%	0.1	0	0	0.1	0	0	0.1	0
Avena sp.	y	x	g	2.5	0.01	0.1	15			2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	15	2.5	15	37.5	37.5	145.11	6.1%	7.6%	0	7.6	7.6	0	0	7.6	0	0
Bromus diandrus	y	x	g						2.5	2.5	2.5			2.5			15							25	1.0%	1.3%	0	1.3	1.3	0	0	1.3	0	0
Bromus hordeaceus	y	x	g	0.1	2.5	0.1	15	2.5	2.5	2.5	2.5	15	2.5	15		2.5				2.5	2.5		15	82.7	3.5%	4.3%	0	4.3	4.3	0	0	4.3	0	0
Chorizanthe	y	n	h	2.5					15	15	2.5	0.1			2.5		2.5	15						55.1	2.3%	2.9%	2.9	0	0	2.9	0	0	2.9	0
Erodium botrys	y	x	h	37.5	87.5	62.5	37.5	37.5	37.5	15	37.5	15	37.5	15	15	15	37.5	15	37.5	15	62.5	37.5	15	670	28.0%	35.0%	0	35	0	35	0	0	0	35
Filago gallica	y	x	h	0.1		2.5		15	15	15	15	15	2.5	37.5	2.5	2.5	37.5	15	15	0.1	2.5		2.5	195.2	8.2%	10.2%	0	10.2	0	10.2	0	0	0	10.2
Gastridium	y	x	g					0.1	2.5	2.5	2.5	2.5		2.5					2.5					15.1	0.6%	0.8%	0	0.8	0.8	0	0	0.8	0	0
Hypochaeris glabra	y	x	h		2.5		2.5		2.5			2.5	2.5		2.5	15	15	0.1	15	2.5	2.5		2.5	67.6	2.8%	3.5%	0	3.5	0	3.5	0	0	0	3.5
Lessingia sp.	y	n	h	37.5			37.5				2.5	2.5					15							95	4.0%	5.0%	5	0	0	5	0	0	5	0
Lolium multiflorum	y	x	g				0.1															15	15	30.1	1.3%	1.6%	0	1.6	1.6	0	0	1.6	0	0
Lotus micranthus	y	n	h																	15				15	0.6%	0.8%	0.8	0	0	0.8	0	0	0.8	0
Lotus purshianus	y	n	h	15	2.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	2.5	15	37.5	15	297.5	12.4%	15.5%	15.5	0	0	15.5	0	0	15.5	0
Minuartia californica	y	n	h			15	2.5	15	15	15	15	15	15	2.5	2.5	2.5	0.1		2.5	2.5	2.5			122.6	5.1%	6.4%	6.4	0	0	6.4	0	0	6.4	0
Rumex acetosella	y	x	h													37.5								37.5	1.6%	2.0%	0	2	0	2	0	0	0	2
Silene gallica	y	x	h			0.1			15											2.5	0.1			17.7	0.7%	0.9%	0	0.9	0	0.9	0	0	0	0.9
Trifolium macrocephalum	y	n	h													0.1								0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Vulpia sp.	y	x	g		2.5							2.5	2.5			2.5		15						25	1.0%	1.3%	0	1.3	1.3	0	0	1.3	0	0
				VEGETATION TOTALS																				**1916.31**	**80.1%**	100.0%	30.7	69.4	17.8	82.3	0	17.8	30.7	51.6
Bare ground				20	10	25	5	25	30	25	20	20	20	15	60	30	40	50	20	30	15	5	10	475	23.8									
Moss																																		
Thatch																																		
Rock																																		
				GRAND TOTALS																				**2391.31**										

Chorizanthe individuals				2					14	12	8	2			7		4	14						63											

Glenwood Preserve vegetation transects 2004
Date: 4/30/04
Monitor(s) (Estimator, Recorder): D. Amme, P. Greer
Transect: 7
original transect # OPLER 1
pasture B
habitat OLM

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Agoseris sp.	y	n	h		0.1														0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Aira caryophyllea	y	x	g	2.5	37.5	15	2.5	62.5	37.5	87.5	87.5	15	15	15	15	15	62.5	15	485	42.0%	71.4%	0	71.4	71.4	0	0	71.4	0	0
Avena sp.	y	x	g	15	0.1		0.1	0.1		2.5	2.5	15	15	2.5	2.5	2.5	15	2.5	75.3	6.5%	11.1%	0	11.1	11.1	0	0	11.1	0	0
Briza maxima	y	x	g									0.1							0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Briza minor	y	x	g		0.1														0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Bromus diandrus	y	x	g	2.5				0.1	0.1	2.5	2.5	0.1	2.5	2.5	0.1	2.5		0.1	15.5	1.3%	2.3%	0	2.3	2.3	0	0	2.3	0	0
Bromus hordeaceus	y	x	g	2.5	0.1	2.5	0.1	2.5	0.1	2.5	2.5	15	2.5	2.5	2.5	2.5	0.1	2.5	40.4	3.5%	5.9%	0	5.9	5.9	0	0	5.9	0	0
Bromus sp.	y	x?	g						0.01										0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Chlorogalum sp	y	n	h						2.5										2.5	0.2%	0.4%	0.4	0	0	0.4	0	0	0.4	0
Clarkia sp.	y	n	h							0.1	0.1	0.1		0.1		0.1	0.1	0.1	0.7	0.1%	0.1%	0.1	0	0	0.1	0	0	0.1	0
Erodium cicutarium	y	x	h		0.1	0.1	0.1									0.1			0.4	0.0%	0.1%	0	0.1	0	0.1	0	0	0	0.1
Eschscholzia	y	n	h						0.01			2.5	0.1	2.5	0.1				5.21	0.5%	0.8%	0.8	0	0	0.8	0	0	0.8	0
Filago sp.	y	n	h			0.1	0.1	0.1	0.1						0.1				0.5	0.0%	0.1%	0.1	0	0	0.1	0	0	0.1	0
Hemizonia sp.	y	n	h	0.1	2.5		0.1	0.1	0.1			0.1	2.5	0.1	0.1		2.5	2.5	10.7	0.9%	1.6%	1.6	0	0	1.6	0	0	1.6	0
Hemizonia (sticky)	y	n	h											0.1	0.1	0.1		0.1	0.4	0.0%	0.1%	0.1	0	0	0.1	0	0	0.1	0
Hypochaeris glabra	y	x	h		0.1	0.1	0.1	0.1	0.1					0.1			0.1		0.7	0.1%	0.1%	0	0.1	0	0.1	0	0	0	0.1
Lessingia sp.	y	n	h	15															15	1.3%	2.2%	2.2	0	0	2.2	0	0	2.2	0
Lolium multiflorum	y	x	g	0.1	0.1		0.1	0.1		0.1	0.1	0.1	0.1	15	0.1	0.1		0.1	16.1	1.4%	2.4%	0	2.4	2.4	0	0	2.4	0	0
Lotus micranthus	y	n	h						0.1										0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Plagiobothrys	y	n	h										0.1						0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Platystemon californicus	y	n	h													0.1			0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Rumex acetosella	y	x	h	2.5			0.1	2.5	2.5										7.6	0.7%	1.1%	0	1.1	0	1.1	0	0	0	1.1
Vulpia sp.	y	x	g	2.5	0.1		0.1							0.1					2.8	0.2%	0.4%	0	0.4	0.4	0	0	0.4	0	0
				VEGETATION TOTALS															**679.42**	**58.8%**	100.0%	5.3	94.8	93.5	6.6	0	93.5	5.3	1.3
Bare ground				30	25	70	90	25	60	10	10	1	25	10	20	10	2	70	458	30.5									
Moss					0.1			0.1		0.1	0.1		0.1				2.5	0.1	3.1	0.3%								
Thatch																15			15	1.0								
Rock																												
				GRAND TOTALS															**1155.52**	31.5								

Chorizanthe individuals																													

Glenwood Preserve vegetation transects 2004

Date: 6/30/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 8

original transect # C-5

pasture C

habitat wetland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Briza minor	y	x	g				0.1		0.1				0.1		0.1	2.5	0.1	0.1	3.1	0.3%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Eleocharis macrostachya	y	n	g	0.1					0.1	2.5		2.5	2.5						7.7	0.6%	0.6%	0.6	0	0.6	0	0.6	0	0	0
Holcus lanatus	y	i	g	2.5	0.01		15	37.5	62.5	15	15	2.5		2.5		2.5			155.01	13.0%	13.1%	0	13.1	13.1	0	0	13.1	0	0
Juncus phaeocephalus	y	n	g	2.5	2.5	15	37.5	15	0.1	2.5	2.5	15	2.5	15	37.5	37.5	15	0.1	200.2	16.8%	16.9%	16.9	0	16.9	0	16.9	0	0	0
Lolium multiflorum	y	x	g	0.1	0.1	2.5	0.1						0.1		0.1		15	37.5	55.5	4.7%	4.7%	0	4.7	4.7	0	0	4.7	0	0
Madia sp.	y	n	h	37.5	2.5					0.1			37.5		15	2.5	37.5	2.5	135.1	11.3%	11.4%	11.4	0	0	11.4	0	0	11.4	0
Polypogon monspeliensis	y	n	g				0.1		0.1				0.1						0.3	0.0%	0.0%	0	0	0	0	0	0	0	0
Taraxacum officinale	y	x	h		2.5						2.5	37.5	2.5	0.1					45.1	3.8%	3.8%	0	3.8	0	3.8	0	0	0	3.8
Trifolium dubium	y	x	h							0.1		15		0.1			0.1	0.1	15.4	1.3%	1.3%	0	1.3	0	1.3	0	0	0	5.5
Trifolium repens	y	x	h		0.1					0.1	0.1								0.3	0.0%	0.0%	0	0	0	0	0	0	0	1.3
Trifolium sp.	y	x	h	0.1	15	15	2.5	15	15	0.1	0.1	2.5						0.1	65.4	5.5%	5.5%	0	0	0	5.5	0	0	0	0
Vulpia sp.	y	x	g	15	37.5	37.5	2.5	62.5	37.5	37.5	87.5	15	15	62.5	15	37.5	2.5	37.5	502.5	42.1%	42.4%	0	42.4	42.4	0	0	42.4	0	0
				VEGETATION TOTALS															**1185.61**	**99.4%**	100.0%	28.9	65.6	78	22	17.5	60.5	11.4	10.6
Bare ground														1	1	5			7	0.5									
Moss																													
Thatch																													
Rock																													
				GRAND TOTALS															**1192.61**										

Chorizanthe individuals																													

Glenwood Preserve vegetation transects 2004

Date:	5/21/04
Monitor(s) (Estimator, Recorder):	D. Amme, P. Greer
Transect:	9
original transect #	C-3
pasture	C
habitat	Native grassland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Aira caryophyllea	y	x	g					0.1						0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Avena sp.	y	x	g	2.5	2.5	2.5	37.5	0.1	15	15	15	37.5	37.5	165.1	15.1%	23.8%	0	23.8	23.8	0	0	23.8	0	0
Briza minor	y	x	g					0.1		0.1	0.1			0.3	0.0%	0.0%	0	0	0	0	0	0	0	0
Bromus diandrus	y	x	g		0.1	2.5	15	2.5	37.5	15	2.5	15	15	105.1	9.6%	15.1%	0	15.1	15.1	0	0	15.1	0	0
Bromus hordeaceus	y	x	g	0.1	15		2.5	0.1	15	37.5	15	2.5	15	102.7	9.4%	14.8%	0	14.8	14.8	0	0	14.8	0	0
Erodium cicutarium	y	x	h		0.1	0.1	2.5	37.5	0.1	2.5	37.5	15	37.5	132.8	12.1%	19.1%	0	19.1	0	19.1	0	0	0	19.1
Lolium multiflorum	y	x	g		0.1					15				15.1	1.4%	2.2%	0	2.2	2.2	0	0	2.2	0	0
Nassella pulchra	y	n	g			2.5		15			37.5	0.1	2.5	57.6	5.3%	8.3%	8.3	0	8.3	0	8.3	0	0	0
Rumex acetosella	y	x	h	2.5	2.5			2.5	2.5	2.5	0.1	15	0.1	27.7	2.5%	4.0%	0	4	0	4	0	0	0	4
Trifolium subterraneum	y	x	h										2.5	2.5	0.2%	0.4%	0	0.4	0	0.4	0	0	0	0.4
Vulpia sp.	y	x	g	15	0.1	15	2.5	0.1	0.1	37.5	15			85.3	7.8%	12.3%	0	12.3	12.3	0	0	12.3	0	0
				VEGETATION TOTALS										**694.3**	**63.3%**	100.0%	8.3	91.7	76.5	23.5	8.3	68.2	0	23.5
Bare ground				40	15	15		30			30	10	2	142	14.2									
Moss														0										
Thatch				35	65	40	25	20	25	10	10	10	20	260	26.0									
Rock																								
				GRAND TOTALS										**1096.3**	40.2									

Chorizanthe individuals																
Nassella pulchra individuals						1		2			3	*	3	9		

Glenwood Preserve vegetation transects 2004

Date: 6/30/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 10

original transect # C4

pasture C

habitat wetland

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Briza minor	y	x	g													0.1			0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Eleocharis macrostachya	y	n	g	2.5		2.5	2.5	0.1	15		2.5	37.5	2.5	2.5	0.1	15	37.5	2.5	122.7	8.7%	9.7%	9.7	0	9.7	0	9.7	0	0	0
Hordeum marinum ssp. gussoneanur	y	x	g		0.1								0.1	0.1		15	2.5	37.5	55.3	3.9%	4.4%	0	4.4	4.4	0	0	4.4	0	0
Juncus xiphioides	y	n	g										2.5	15	2.5	15	15		50	3.6%	4.0%	4	0	4	0	4	0	0	0
Lolium multiflorum	y	x	g	87.5	87.5	87.5	87.5	37.5	2.5	37.5	2.5	87.5	87.5	37.5	37.5	15	62.5	62.5	820	58.5%	65.0%	0	65	65	0	0	65	0	0
Plagiobothrys chorisianus	y	n	h						0.1	0.1									0.2	0.0%	0.0%	0	0	0	0	0	0	0	0
Poa annua	y	x	g						0.1	0.1									0.2	0.0%	0.0%	0	0	0	0	0	0	0	0
Polgonum arenastrum	y	x	h						0.1	2.5	2.5								5.1	0.4%	0.4%	0	0.4	0	0.4	0	0	0	0.4
Polypogon monspeliensi	y	n	g				0.1	0.1	0.1	62.5	2.5	2.5		0.1	0.1				68	4.8%	5.4%	5.4	0	5.4	0	5.4	0	0	0
Rumex crispus	y	x	h	0.1	0.1				0.1										0.3	0.0%	0.0%	0	0	0	0	0	0	0	0
Trifolium wormskioldi	y	n	h		0.1			0.1											0.2	0.0%	0.0%	0	0	0	0	0	0	0	0
Veronica sp.	y	n?	h						0.1	0.1									0.2	0.0%	0.0%	0	0	0	0	0	0	0	0
Vulpia sp.	y	x	g											37.5	62.5	37.5	2.5	0.1	140.1	10.0%	11.1%	0	11.1	11.1	0	0	11.1	0	0
				VEGETATION TOTALS															**1262.4**	**90.0%**	100.0%	19.1	80.9	99.6	0.4	19.1	80.5	0	0.4
Bare ground							0.5		50	10	80								140.5	9.4									
Moss																													
Thatch																													
Rock																													
				GRAND TOTALS															**1402.9**										

Chorizanthe individuals																													

Glenwood Preserve vegetation transects 2004

Date: 4/15/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 11

original transect # OTB 3

pasture D

habitat OTB

Braun-Blaquet cover class	Range	Mean
5	100	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Aira caryophyllea	y	x	g	62.5	62.5	62.5	87.5	62.5	62.5	37.5	15	15	15	482.5	48.0%	49.7%	0	49.7	49.7	0	0	49.7	0	0
Avena sp.	y	x	g	0.1										0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Bromus hordeaceus	y	x	g	37.5	37.5	15	0.1	0.1	0.1	0.1	15	62.5	62.5	230.4	22.9%	23.7%	0	23.7	23.7	0	0	23.7	0	0
Crassula sp.	y	n	h					0.1	15	15				30.1	3.0%	3.1%	3.1	0	0	3.1	0	0	3.1	0
Erodium botrys	y	x	h	15	2.5	2.5	2.5	37.5	2.5	2.5	2.5	2.5		70	7.0%	7.2%	0	7.2	0	7.2	0	0	0	7.2
Hordeum marinum ssp.	y	x	g				0.1		0.1		2.5	2.5		5.2	0.5%	0.5%	0	0.5	0.5	0	0	0.5	0	0
Hypochaeris glabra	y	x	h	2.5				2.5						5	0.5%	0.5%	0	0.5	0	0.5	0	0	0	0.5
Juncus bufonius	y	n	g					0.1	15	15		2.5		32.6	3.2%	3.4%	3.4	0	3.4	0	3.4	0	0	0
Lepidium nitidum	y	n	h							0.1				0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Leymus triticoides	y	n	g	2.5	2.5	2.5	0.1							7.6	0.8%	0.8%	0.8	0	0.8	0	0.8	0	0	0
Lolium multiflorum	y	x	g		2.5									2.5	0.2%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Rumex acetosella	y	x	h								0.1			0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Soliva sessilis	y	x	h						0.1	0.1	2.5			2.7	0.3%	0.3%	0	0.3	0	0.3	0	0	0	0.3
Trifolium dubium	y	x	h									2.5		2.5	0.2%	0.3%	0	0.3	0	0.3	0	0	0	0.3
Trifolium subterraneum	y	x	h						0.1	2.5				2.6	0.3%	0.3%	0	0.3	0	0.3	0	0	0	0.3
Vulpia sp.	y	x	g					15	0.1	15	37.5	15	15	97.6	9.7%	10.0%	0	10	10	0	0	10	0	0
				VEGETATION TOTALS										**971.6**	**96.7%**	100.0%	7.3	92.8	88.4	11.7	4.2	84.2	3.1	8.6
Bare ground				2	5	2		10	10	2	2			33	3.3									
Moss																								
Thatch																								
Rock																								
				GRAND TOTALS										**1004.6**										

Glenwood Preserve vegetation transects 2004

Date: 4/15/04

Monitor(s) (Estimator, Recorder): D. Amme, P. Greer

Transect: 12

original transect # OTB 2

pasture D

habitat OTB

Braun-Blaquet cover class	Range	Mean
5	100	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Aira caryophyllea	y	x	g	15	37.5	62.5	62.5	15	15	15	2.5		0.1	225.1	28.0%	29.1%	0	29.1	29.1	0	0	29.1	0	0
Bromus hordeaceus	y	x	g	62.5	37.5	15	15	2.5	2.5	37.5	37.5	5	5	220	27.4%	28.5%	0	28.5	28.5	0	0	28.5	0	0
Crassula sp.	y	n	h					2.5						2.5	0.3%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Erodium botrys	y	x	h	2.5	15	37.5	15	15	37.5	2.5	15	2.5	15	157.5	19.6%	20.4%	0	20.4	0	20.4	0	0	0	20.4
Hypochaeris glabra	y	x	h				0.1							0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Lolium multiflorum	y	x	g							2.5				2.5	0.3%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Soliva sessilis	y	x	h						0.1					0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Trifolium dubium	y	x	h			0.1				2.5				2.6	0.3%	0.3%	0	0.3	0	0.3	0	0	0	0.3
Trifolium subterraneum	y	x	h						15	15	37.5	2.5	15	85	10.6%	11.0%	0	11	0	11	0	0	0	11
Vulpia sp.	y	x	g	2.5	15	0.1	0.1	15	15		15	15	0.1	77.8	9.7%	10.1%	0	10.1	10.1	0	0	10.1	0	0
				VEGETATION TOTALS										**773.2**	**96.2%**	100.0%	0.3	99.7	68	32	0	68	0.3	31.7
Bare ground				0	2	2	2	10	5	5	2			28	2.8									
Moss								2.5						2.5	0.3%									
Thatch																								
Rock																								
				GRAND TOTALS										**803.7**										

Glenwood Preserve vegetation transects 2004							Braun-Blaquet cover class			Range	Mean																																				
Date:	4/15/04								5	75 to	87.5																																				
Monitor(s) (Estimator, Recorder):	D. Amme, P. Greer								4	75	62.5																																				
Transect:	T13								3	50	37.5																																				
original transect #	OTB 1								2	5 to	15																																				
pasture	D								1	1 to 5	2.5																																					
habitat	OTB								+	<1	0.1																																				
									r	<<1	*																																				
SPECIES	**Present ?**	**n=native, i=invasi**	**g=grass, h=herb**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**SUM**	**% ABS**	**%REL**	**% native**	**% non-native**	**% grass**	**% herb**	**% native grass**	**% non-native grass**	**% native forb**	**% non-native forb**
Aira caryophyllea	y	x	g	37.5	87.5	15	2.5	37.5	63	15	15	15	62.5	0.1		0.1	0.1	15	37.5	37.5	15	15	38	37.5	15	37.5	2.5		15					615.3	22.6%	29.0%	0	29	29	0	0	29	0	0
Avena sp.	y	x	g																									0.1	0.1	2.5	15	2.5	2.5	22.7	0.8%	1.1%	0	1.1	1.1	0	0	1.1	0	0
Briza minor	y	x	g			0.1																												0.1	0.0%	0.0%	0	0	0	0	0	0	0	0
Bromus hordeaceus	y	x	g	2.5	2.5	2.5	0.1	0.01	2.5	2.5	15	2.5	2.5	0.1	0.1				0.1	2.5					2.5	15	62.5	87.5	62.5	62.5	37.5	37.5	87.5	490.41	18.0%	23.1%	0	23.1	23.1	0	0	23.1	0	0
Calandrinia sp.	y	n	h												0.1																			0.1	0.0%	0.0%	0	0	0	0	0	0	11.9	0
Crassula sp.	y	n	h	0.1	2.5	15	15	15	2.5	2.5		2.5	2.5	0.1		15	15	15	15	37.5	15	15	15	15	37.5									252.7	9.3%	11.9%	11.9	0	0	11.9	0	0	0	0
Danthonia californica	y	n	g													0.01																		0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Draba sp.	y	n	h												0.01																			0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Erodium botrys	y	x	h																													15	0.1	15.1	0.6%	0.7%	0	0.7	0	0.7	0	0	0.7
Erodium cicutarium	y	x	h	0.1	2.5	15	2.5	0.1	2.5			2.5	0.1	0.1				0.1	0.1	0.1	0.1	2.5	15	2.5	2.5		2.5							50.8	1.9%	2.4%	0	2.4	0	2.4	0	0	0	2.4
Filago gallica	y	x	h						0																									0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Hypochaeris glabra	y	x	h	2.5	0.1			0.1	0.1		0.1		0.1	0.1			0.1	2.5	0.1	0.1				2.5	2.5	0.1								11	0.4%	0.5%	0	0.5	0	0.5	0	0	0	0.5
Juncus bufonius	y	n	g													2.5	2.5	2.5	2.5	0.1	2.5	2.5	2.5											17.6	0.6%	0.8%	0.8	0	0.8	0	0.8	0	0	0
Juncus capitatus	y	x	g													0.01																		0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Lasthenia californica	y	n	h						0			0.01	0.1	2.5	2.5	2.5	15	2.5	15	2.5	2.5	15	63	37.5	62.5	15								237.62	8.7%	11.2%	11.2	0	0	11.2	0	0	11.2	0
Leymus triticoides	y	n	g	2.5	2.5	0.01																												5.01	0.2%	0.2%	0.2	0	0.2	0	0.2	0	0	0
Lolium multiflorum	y	x	g																									2.5	0.1	0.1	15	2.5	2.5	22.7	0.8%	1.1%	0	1.1	1.1	0	0	1.1	0	0
Rumex acetosella	y	x	h	15		2.5	15			15	2.5																						0.1	50.1	1.8%	2.4%	0	2.4	0	2.4	0	0	0	2.4
Soliva sessilis	y	x	h	2.5	2.5	2.5	2.5	2.5	0				0.1	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1			0.1										15.91	0.6%	0.8%	0	0.8	0	0.8	0	0	0	0.8
Spergularia rubra?	y	x	h											0.01	0.1	2.5	0.1	0.1	2.5	0.1	0.1	2.5												8.01	0.3%	0.4%	0	0.4	0	0.4	0	0	0	0.4
Trifolium dubium	y	x	h																								0.1		37.5			15	0.1	52.7	1.9%	2.5%	0	2.5	0	2.5	0	0	0	2.5
Trifolium subterraneum	y	x	h																								2.5		15		2.5	15	2.5	37.5	1.4%	1.8%	0	1.8	0	1.8	0	0	0	1.8
Vulpia bromoides	y	x	g							37.5	62.5	2.5						0.1		2.5	0.1			2.5	15	37.5								160.2	5.9%	7.6%	0	7.6	7.6	0	0	7.6	0	0
Vulpia myuros	y	x	g	2.5		2.5	15	0.1	2.5	2.5	2.5	2.5	2.5	0.1	0.1	0.1	0.01		0.01	0.1	0.1	0.1	2.5	2.5			15					0.1		53.32	2.0%	2.5%	0	2.5	2.5	0	0	2.5	0	0
VEGETATION TOTALS																																		**2118.92**	**77.8%**	100.0%	24.1	75.9	65.4	34.6	1	64.4	23.1	11.5
Bare ground				15	3	10	35	20	2	15		15	1	45	85	40	40	20	15	15	50	45	30	10	2	2							10	525	17.5									
Moss					2.5	2.5			0.1				2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.1									27.7	1.0%									
Thatch																																													
Rock											1		51																					52	1.7									
GRAND TOTALS																																		**2723.62**	19.2									

Glenwood Preserve vegetation transects 2004

Date: 4/16/04

Monitor(s) (Estimator, Recorder): K. Lyons, P. Greer

Transect: T14

original transect # CHORO-2

pasture E

habitat SVSF

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Avena sp.	y	x	g							2.5		2.5	0.3%	0.3%	0	0.3	0.3	0	0	0.3	0	0
Bromus diandrus	y	x	g		2.5			2.5	2.5	2.5		10	1.0%	1.1%	0	1.1	1.1	0	0	1.1	0	0
Bromus hordeaceus	y	x	g			2.5		2.5		2.5		7.5	0.8%	0.8%	0	0.8	0.8	0	0	0.8	0	0
Castilleja exserta	y	n	h	2.5								2.5	0.3%	0.3%	0.3	0	0	0.3	0	0	0.3	0
Chorizanthe	y	n	h	2.5	37.5	15	15	15	15	15	15	130	13.1%	14.2%	14.2	0	0	14.2	0	0	14.2	0
Erodium sp.	y	x	h	2.5	37.5	2.5	15	15	15	15	15	117.5	11.9%	12.8%	0	12.8	0	12.8	0	12.8	0	12.8
Hypochaeris glabra	y	x	h	2.5						0.1		2.6	0.3%	0.3%	0	0.3	0	0.3	0	0.3	0	0.3
Lotus purshianus	y	n	h			15		2.5				17.5	1.8%	1.9%	1.9	0	0	1.9	0	0	1.9	0
Trifolium dubium	y	x	h			2.5						2.5	0.3%	0.3%	0	0.3	0	0.3	0	0.3	0	0.3
Trifolium macrocephalum		n	h									0	0.0%	0.0%	0	0	0	0	0	0	0	0
Trifolium subterraneum	y	x	h	2.5		15	2.5	15			15	50	5.1%	5.4%	0	5.4	0	5.4	0	5.4	0	5.4
Vulpia sp.	y	x	g	87.5	37.5	87.5	62.5	87.5	87.5	62.5	62.5	575	58.1%	62.7%	0	62.7	62.7	0	0	62.7	0	0
				VEGETATION TOTALS								**917.6**	**92.7%**	100.0%	16.4	83.7	64.9	35.2	0	83.7	16.4	18.8
Bare ground				2	20	7	10	2	1	5	10	57	7.1									
Moss												0										
Thatch												0										
Rock							15					15	1.9									
				GRAND TOTALS								**989.6**	9.0									

Chorizanthe individuals				1	49	14	28	23	11	35	34	195	

Glenwood Preserve vegetation transects 2004

Date:	4/16/04
Monitor(s) (Estimator, Recorder):	K. Lyons, P. Greer
Transect:	15
original transect #	CHORO-3
pasture	E
habitat	SVSF

Braun-Blaquet cover class	Range	Mean
5	75 to	87.5
4	75	62.5
3	50	37.5
2	5 to	15
1	1 to 5	2.5
+	<1	0.1
r	<<1	*

SPECIES	Present?	n=native, i=invasive x=exotic	g=grass, h=herb	1	2	3	4	5	6	7	8	9	10	11	12	13	SUM	% ABS	%REL	% native	% non-native	% grass	% herb	% native grass	% non-native grass	% native forb	% non-native forb
Avena sp.	y	x	g				2.5									2.5	5	0.3%	0.5%	0	0.5	0.5	0	0	0.5	0	0
Bromus diandrus	y	x	g	2.5	0.1									2.5	2.5	2.5	10.1	0.6%	0.9%	0	0.9	0.9	0	0	0.9	0	0
Bromus hordeaceus	y	x	g	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	0.1	25.1	1.5%	2.3%	0	2.3	2.3	0	0	2.3	0	0
Chorizanthe	y	n	h		0.1		2.5	2.5	15	2.5		2.5	2.5	2.5	15	2.5	47.6	2.8%	4.4%	4.4	0	0	4.4	0	0	4.4	0
Crassula sp.	y	n	h						2.5	2.5	2.5			2.5			10	0.6%	0.9%	0.9	0	0	0.9	0	0	0.9	0
Epilobium sp.	y	n	h				0.01										0.01	0.0%	0.0%	0	0	0	0	0	0	0	0
Erodium sp.	y	x	h	15	15	2.5	2.5	15	2.5					15	15	2.5	85	4.9%	7.8%	0	7.8	0	7.8	0	0	0	7.8
Filago gallica	y	x	h									2.5				2.5	5	0.3%	0.5%	0	0.5	0	0.5	0	0	0	0.5
Hypochaeris glabra	y	x	h		15	2.5	15	15	2.5	2.5		15	2.5	2.5	2.5	2.5	77.5	4.5%	7.1%	0	7.1	0	7.1	0	0	0	7.1
Lotus micranthus	y	n	h							2.5	2.5	2.5		2.5		2.5	12.5	0.7%	1.1%	1.1	0	0	1.1	0	0	1.1	0
Lotus purshianus	y	n	h	15	2.5		2.5	2.5				2.5				2.5	27.5	1.6%	2.5%	2.5	0	0	2.5	0	0	2.5	0
Nassella pulchra	y	n	g													2.5	2.5	0.1%	0.2%	0.2	0	0.2	0	0.2	0	0	0
Navarretia squarrosa	y	n	h												2.5	2.5	5	0.3%	0.5%	0.5	0	0	0.5	0	0	0.5	0
Oxalis pes-caprae	y	x	h				2.5										2.5	0.1%	0.2%	0	0.2	0	0.2	0	0	0	0.2
Rumex acetosella	y	x	h													2.5	2.5	0.1%	0.2%	0	0.2	0	0.2	0	0	0	0.2
Silene gallica	y	x	h	2.5	2.5		2.5		2.5		2.5			0.1	15	2.5	30.1	1.8%	2.8%	0	2.8	0	2.8	0	0	0	2.8
Trifolium dubium	y	x	h	15	37.5	2.5		15			2.5	15		15	15	15	132.5	7.7%	12.2%	0	12.2	0	12.2	0	0	0	12.2
Trifolium macrocephalum	y	n	h									2.5		2.5			5	0.3%	0.5%	0.5	0	0	0.5	0	0	0.5	0
Trifolium subterraneum	y	x	h	15	2.5	15	15	15		2.5		2.5	2.5	15	15	15	115	6.7%	10.5%	0	10.5	0	10.5	0	0	0	10.5
Vulpia sp.	y	x	g	87.5	62.5	15	15	62.5	2.5	15	2.5	37.5	2.5	62.5	62.5	62.5	490	28.5%	44.9%	0	44.9	44.9	0	0	44.9	0	0
				VEGETATION TOTALS													**1090.41**	**63.5%**	100.0%	10.1	89.9	48.8	51.2	0.2	48.6	9.9	41.3
Bare ground					5	20		5				10		20	10	5	75	5.8									
Moss																	0										
Thatch																	0										
Rock						50	60	25	80	85	90	40	95	10	7	10	552	42.5									
				GRAND TOTALS													**1717.41**	48.2									

Chorizanthe individuals					1		1	4	6	8		8	3	2	6	3	42	

Appendix D: Photographs of the vegetation transects from monitoring visits