Annual Report for 2014

Woods Cove Development

Mitigation Plan Work Program

(January 2014 through December 2014)

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CHAPTER 1.0 INTRODUCTION

The year 2014 represented Year 12 of the long-term maintenance and monitoring phase of the Coastal Prairie Conservation Easement. In this phase, reports are prepared every other year to document mitigation activities. The long-term maintenance and monitoring period for the Conservation Easement will continue for three more years. Small-scale plantings (approximately 200 plants) were conducted in winter of 2014.

PROJECT DESCRIPTION

The Coastal Prairie Conservation Easement provides habitat for several special status plant species and sensitive plant communities. The sensitive communities present are coastal terrace prairie, seasonal wetland, and oak woodland/redwood forest mosaic. Known populations of the following rare and/or endangered plant species also occur: Santa Cruz tarplant (*Holocarpha macradenia*), San Francisco popcorn flower (*Plagiobothys diffusus*), Santa Cruz clover (*Trifolium buckwestiorum*) (none seen in recent years), and Gairdner's yampah (*Perideridia gairdneri* ssp. *gairdneri*). Locally unique plant species associated with coastal prairie habitat include coast coyote thistle (*Eryngium armatum*), gum plant (*Grindelia* sp.), Johnny jump-up (*Viola pedunculata*), coast lotus/trefoil (*Hosackia gracilis)*, and yellow calochortus lily (*Calochortus luteus*).

Construction activities for the Woods Cove Development (previously known as Graham Hill Estates) are complete, and all of the lots have sold. The Woods Cove Homeowners Association is now responsible for managing the Coastal Prairie Conservation Easement, whereas, Standard Pacific Homes was responsible in the past.

The lots are one half to one-acre minimum size, and will be primarily developed outside of the coastal prairie habitat. However, about 0.63-acre of coastal prairie was impacted by grading for the entrance road, lane widening, and portions of several lots. In addition to the residential lots, a Coastal Prairie Conservation Easement area (approximately 15.6 acres total) was established for the project. To facilitate discussion, three areas or sections have been designated, the Northern Coastal Prairie Conservation Easement area, the Central Coastal Prairie Conservation Easement area, and the Southern Coastal Prairie Conservation Easement area (Figure 1). The Northern Conservation Easement area borders on the Santa Cruz Horsemen's Association equestrian facility, and includes a 0.97-acre revegetation area. Technically, there is only one coastal prairie conservation easement.

As mitigation for impacts to sensitive botanical resources, the development will preserve and manage 10.5 acres of rare and endangered plant habitat and coastal prairie habitat, 1.5 acres of seasonal wetland, and approximately 2.1 acres of oak woodland habitat. As additional mitigation, 0.97 acres of grassland is in process of being revegetated with native coastal prairie species. Performance standards have been established for the revegetation area. According to the "Graham Hill Showgrounds Development Habitat

Mitigation Plan" (Habitat Restoration Group, June 1995), there should be a minimum of 55% vegetative cover of native species in the revegetation area at the end of the five-year establishment period. Further information on the project description and its impacts may be obtained from the "Graham Hill Showgrounds Development Draft EIR" (ESA, 1993) prepared for the County of Santa Cruz.

As part of project permitting and the CEQA process, the Habitat Restoration Group (HRG, June 1995) prepared the "Graham Hill Showgrounds Development Habitat Mitigation Plan". The intent of the Mitigation Plan is to provide mitigation measures and management actions for the sensitive botanical resources at the project site with an emphasis on actions that mitigate for impacts to coastal prairie habitat. Required mitigation activities include the control of invasive, non-native species, mowing management, revegetation of 0.97 acre of grassland with native species, and fenced conservation easement areas, preservation of special status plant species, monitoring, and reporting.

GOALS OF THE MITIGATION PLAN

The overall goal of the mitigation plan is to achieve a no-net-loss of coastal prairie habitats, including habitat size, plant population and viability, and long-term management of the prairie, oak woodland, oak woodland/redwood forest mosaic, and seasonal wetland habitat. This goal will be achieved through the following actions:

1. Re-create coastal prairie within suitable habitat areas of the project site at a minimum of a 1:1 replacement ratio; protect and manage through a dedicated conservation easement. As currently depicted on the revised site plan, 0.97 acre of coastal prairie will be revegetated.

2. Preserve and manage undisturbed coastal prairie habitat through a dedicated conservation easement:

    a. Preserve and manage undisturbed State-listed plant species (i.e., Santa Cruz tarplant, San Francisco popcorn flower) and their habitat.

    b. Preserve and manage undisturbed locally unique coastal prairie plant species/habitat (i.e., coyote thistle, grindelia/gum plant, and coast trefoil).

    c. Enhance coastal prairie habitat through the control of French broom and other invasive, non-native plant species.

3. Preserve and manage undisturbed oak woodland habitat through a dedicated preservation easement.

4. Provide a minimum 25-foot wide buffer area between the coastal prairie and adjacent land uses/other habitats to minimize indirect impacts to the coastal prairie and oak woodland habitats; preserve the buffer area through dedicated conservation easement (Figure 1).

5. Conserve forest habitats outside the development areas through a dedicated preservation easement.

6. Encourage preservation and management of the oak woodland/redwood forest mosaic habitat within the development areas through adherence to woodland/forest development and monitoring guidelines.

7. Maintain the local gene pool of native vegetation by planting, as appropriate, locally collected native species within the conservation easement areas and managing the easement areas to support their survival.

8. Control invasive, non-native plant species to minimize competition with native species.

MITIGATION PLAN WORK PROGRAM

In November 1997, The Habitat Restoration Group prepared a "Revised Graham Hill Showgrounds Development Habitat Mitigation Plan Work Program" which provided detailed information on the implementation of mitigation measures to be conducted during the five-year maintenance and monitoring period. This Work Program was approved as revised by Kim Tschantz of the County of Santa Cruz Planning Department.

This annual report documents the mitigation activities that have been implemented under the Work Program from January 2014 through December 2014 in the Coastal Prairie Conservation Easement areas. During this period, Native Vegetation Network's botanist, Valerie Haley has been managing and monitoring the Coastal Prairie Conservation Easement areas.

CHAPTER 2.0
SUMMARY OF MITIGATION ACTIVITIES
IN THE COASTAL PRAIRIE CONSERVATION EASEMENT AREAS

Maintenance activities in the Conservation Easements have included weed-trimming, thatch removal in Santa Cruz Tarplant population areas, control and removal of invasive, non-native species, and debris removal.'

CONTROL OF INVASIVE, NON-NATIVE PLANT SPECIES

The control of invasive, non-native plant species primarily used manual and mechanical methods. Under the supervision of botanist, Valerie Haley, Native Vegetation Network (NVN) field technicians conducted the manual and mechanical removal. Similar to recent years, the following invasive, non-native plant species and weeds were the focus of removal efforts in 2014: French broom, Italian thistle (*Carduus pycnocephalus*), English ivy, yellow dock (*Rumex crispus*), poison hemlock (*Conium maculatum*), black acacia (*Acacia melanoxylon*), ripgut brome (Bromus diandrus), prickly clover (*Trifolium angustifolium*), wild radish, and sheep sorrel (*Rumex acetosella*).

Herbicide was also used to control the invasive, non-native Kikuyu grass that grows in the seasonal wetland and the drainage ditch along Graham Hill Rd. (Figure 2). This invasive grass from Africa has underground creeping stems, and therefore is difficult to eradicate manually.

Figure 2. Yellowing invasive, Non-native Kikuyu grass after herbicide treatment.

Overall, wetland weeds such as poison hemlock, velvet grass (*Holcus lanatus*) and yellow dock (*Rumex crispus)* were not as much of a problem in 2014 due to dry weather conditions compared to normal precipitation years. According to central coast weather forecasters, 2014 was the driest year on record. Rains began in February 2014.

***Dittrichia graveolens* (Stinkwort) Removal.** A new highly invasive, non-native plant, *Dittrichia graveolens*, has been detected in the conservation easement near the main entrance to Woods Cove in both the coastal prairie and the seasonal wetlanr. It was also been observed and removed immediately along Graham Hill Road. A total of about 41 small plants under 1 foot tall were removed in early September prior to flowering and seed set. Ten of the plants were located along the fence near the entrance, and 11 plants were removed in the seasonal wetland. In addition, 20 plants were observed and removed outside the Conservation Easement immediately next to Graham Hill Rd. The sticky seeds are easily transported on vehicle tires. Once the yellow petals show, the seed matures right away, so any flowering plants should be bagged. Fortunately, the plants were detected prior to flowering, so bagging was not necessary

French Broom Removal

Over the last fourteen years, removal efforts have greatly reduced the levels of French broom in the open grasslands. Seedlings still emerge in the center of the prairie in the central and southern portions of the Coastal Prairie Conservation Easement. Some of the woodland edges and ditches along Graham Hill Road still support French broom. During winter and spring 2014, there was periodic hand pulling of French broom plants, while the soils were wet and the roots were easy to remove. Figure 2 shows field technicians removing French broom in the 25-foot wide buffer along the western portion of the Conservation Easement. The French broom plants were pulled before they were in flower and had set seed; therefore, there were no seeds dispersed during broom removal. The pulled material was left scattered in the woods to decompose. Removal efforts concentrated on infestations in prairie habitat and along woodland edges.

Thistle and Poison Hemlock Control

NVN technicians patrolled the redwood and coast live oak groves within the conservation easement for poison hemlock and thistle plants. Spot manual control of Italian thistle (*Carduus pycnocephalus*), slender-flowered thistle (*Carduus tenuiflorus*), and poison hemlock (*Conium maculatum*) was also performed in the Northern and Central Conservation Easement areas. A few of the Italian thistle patches are adjacent to the easement fence and extend into the residential lots. Thistle infestations by the historical red shed and the information center (sales office) were removed. Depending on plant maturation, removed thistle plants with flower heads were bagged and taken to the landfill. The plants were removed by a pick or shovel with care to minimize ground disturbance. The poison hemlock was primarily removed near the historical red shed and along the oak woodland edge. Thistle plants were removed adjacent to the previous sales office, and at the west end of the seasonal wetland.

Prickly Clover

The invasive, prickly clover (*Trifolium angustifolium*) that grows on the south side of the main entrance was weed-trimmed early in May before the seeds matured.

Velvet Grass, Wild Radish, and Yellow Dock Removal

Overall, wetland weeds such as velvet grass (*Holcus lanatus*) and yellow dock (*Rumex crispus)* were less prevalent in 2014 due the very dry winter and spring in 2014. The NVN crew used shovels to dig out yellow dock in the seasonal wetland, especially where there were concentrations along the edges of the drainage swale. A portion of the velvet grass (*Holcus lanatus)* was hand-pulled, and the rest was weed-whacked several times to reduce seed production.

THATCH REMOVAL

On October 7, 2014, a NVN field technician used a thatch rake that is specifically designed to remove old vegetation, including non-native, dead annual grasses (Figure 3).

Figure 3. Thatch removal, using thatch rake in a Santa Cruz Tarplant Population Area (October 7, 2014).

The timing of thatch removal is critical, and must be done before the onset of the rainy season, so that new seedlings are not destroyed during raking. The worked focused on raking and removing thatch (a matted layer of partially decayed leaves, stems, etc.) in the south most population area of Santa Cruz Tarplant. The goal was to open up the substrate, so that approximately 1/3 of the soil surface had exposed soil. The Santa Cruz tarplant needs seed to soil contact for successful establishment of the tarplant seedlings. Thatch removal was consistent with a recommendation made in the last annual report for the Woods Cove Conservation Easement (NVN December 2012).

MOWING MANAGEMENT

As specified in the Habitat Mitigation Plan, the Coastal Prairie Conservation Easement areas (including the seasonal wetland) were mowed in spring 2014 and fall 2014. Each mowing event required two days of tractor work to mow the three Coastal Prairie Conservation Easement areas. Ron Vaillencourt from Ron's Earth Service mowed the coastal prairie and seasonal wetland habitats on May 6th and 7th, June 17th and 18th, 2014. The fall mowing was conducted on September 23 and 24th, 2014. A John Deer four-wheel drive tractor (Model 110) with a mowing attachment was used, so that the remaining standing material was 6 to 8 inches tall after cutting.

Figure 4. Spring 2014 Mowing in the Conservation Easement.

CHAPTER 3.0

SUMMARY OF ACTIVITIES IN THE REVEGETATION AREA

During 2014, activities in the revegetation area have included weed eating (Figure 5), vegetation monitoring, planting, weeding, slug control and mowing. Performance criteria were established for the revegetation area in the "Graham Hill Showgrounds Development Habitat Mitigation Plan" (HRG, June 1995). The summer following seeding and transplanting there should be 35% cover of native plant species, and by the summer of Year 5 there should be a minimum vegetative cover of 55% native species (*ibid.*).

Figure 5. Weed-eating by Northern end of the Revegetation Area (Spring 2014)

WEED CONTROL

Weeding was mainly done around the new plantings and the rare Santa Cruz Tarplants that grow naturally near the southern boundary of the revegetation area (Figure 1).

Three crew day was spent hand weeding the following species: sheep sorrel (*Rumex acetosella*), purple velvet grass (*Holcus lanatus*), yellow dock (*Rumex crispus*), wild radish (Raphanus sativus), hairy cat's ear (*Hypochaeris radicata*) and ripgut brome.

The majority of the weeding was done in spring 2012. Weeding was done mainly around the plants that had been previously transplanted or planted from container stock. In the spring, hairy cat's ear was hand-pulled and hoed to remove young plants. In addition, portions of the revegetation area near Graham Hill Rd. and along the southern boundary of the Revegetation Area were weed-whacked several times over the growing season, when the non-native weeds and grasses exceeded 14 to 16 inches in height. This served to reduce competition between the native plants and weedy non-natives.

CONTAINER STOCK PLANTING (MARCH 2014)

The common name, container types, and the quantities planted in March 2014 are listed in Table 1. A total of 200 plants were installed. Native Vegetation Network personnel planted 2/3 of the plants near Graham Hill Rd and 1/3 of the plants along the northern boundary of the revegetation area (Figure 6). The following native species were planted: purple needlegrass, brown-headed rush, slender rush, blue-eyed grass, California oatgrass, sun cups, and soap plants. All of the container stock was grown from site-collected native seed and propagation material. The native plants were maintained in NVN greenhouses prior to out planting in the revegetation area.

Figure 6. Planting in the Revegetation Area (March 2014).

Twenty planting areas, six feet in diameter were prepared by removing non-native vegetation. The areas were cleared bare earth using a weed trimmer prior to planting. Ten plants were planted in each of the cleared circles. No supplemental fertilizer was applied.

Table 1. Container Stock Planted in the Revegetation Area, March 2014.

Common Name	Container Type and Quantity
Blue-eyed grass	40 two-inch pots
Brown-headed Rush	10 six-inch clumps
California Oatgrass	75 eight-inch clumps
Slender rush	15 four-inch pots
Sun Cups	10 four-inch pots,
Purple Needlegrass	20 four-inch pots,
Soap Plant	30 Bulbs

SUPPLEMENTAL WATERING

The new plantings in the revegetation area and the nearby Santa Cruz Tarplant population area were watered with water that had been trucked to the site in late April mid May, and early June 2014.

CHAPTER 4.0 MONITORING

COASTAL PRAIRIE CONSERVATION EASEMENT AREAS

Monitoring activities in the prairie conservation easement areas included special status plant surveys, reconnaissance surveys, and photodocumentation.

Special Status Plant Surveys

Starting in March 2014, the Coastal Prairie Conservation Easement areas were surveyed at 3 to 4 week intervals for special status and locally rare plant species. The surveys focused on the areas where such species had been documented in recent annual surveys, and known locations depicted in the "Graham Hill Showgrounds Development Habitat Mitigation Plan" (HRG, June 1995). Field notes were recorded on the approximate number of special status plants present (Table 2). The current locations of the populations were delineated on the site plan (see Figure 1).

A significant result of the special status plant surveys was that numbers of plants observed were down for 8 of 12 of the population areas. San Francisco popcorn flower (*Plagiobothrys diffusus*), Grindelia and coast trefoil had fewer individuals in spring 2014 compared to spring 2012. The reduction in the number of individuals observed was largely due to the very dry weather in winter 2013/2014 (driest on record). The rainy season started in February with concentrated rains in February.

No individuals of San Francisco popcorn flower were observed in winter or spring 2014. The results varied for (*Holocarpha macradenia*) Santa Cruz Tarplant. The population area was larger in the Northern Conservation Easement in 2014 compared to 2012. In 2012, 150-175 tarplants were observed in the Northern Conservation Easement; whereas, 200 to 225 individuals were present in spring 2014. Yet, a decline in population size was observed by the main entrance to the Woods Cove subdivision in 2014 (only 300 to 350 individuals).

Figure 1 depicts the locations of the following sensitive plant species observed in 2014: Santa Cruz tarplant, Gairdner's yampah, coyote thistle, coast trefoil, and gum plant/grindelia. No Santa Cruz clover was observed in 2012, 2013 or 2014, and no Santa Cruz tarplant has been observed in the Southern Coastal Prairie Conservation Easement area, for over 14 years. Table 2 summarizes the approximate numbers of individuals of these special status species according to each of the three Coastal Prairie Conservation Easement areas.

Northern Conservation Easement Area. The population area of Santa Cruz Tarplant was larger in the Northern Conservation Easement in 2014 compared to 2012. In 2012, 150-175 tarplants were observed in the Northern Conservation Easement, whereas, 200 to 225 individuals were present in spring 2014.

Central Conservation Easement Area. A decline in the Santa Cruz Tarplant population size in 2014 was observed by the main entrance to the Woods Cove subdivision, only 300 to 350 individuals in 2014 compared to 600 to 650 plants in 2012.

The other population area of Santa Cruz tarplant located closer to the emergency exit by Deer Path Rd. also decreased significantly. Valerie Haley observed 125 to 150 tarplants in spring 2014 compared to 300 t0 325 tarplants in 2012.

The numbers for Gairdner's Yampah were also down in the central portion of the easement near Lots 9 and 10, approximately 1,200 to 1,300 plants were observed in spring 2012 compared to 1,000 to 1,200 plants in spring 2014. Predation of Yampah tubers by gophers was also observed. Also, some tubers may have remained dormant during the recent drought years, and may sprout at a later date.

No individuals of San Francisco popcorn flower plants were observed near the main entrance to the subdivision, and none were observed in the center of the easement, east of Lots 13 and 14 (Figure 1).

Figure 7. Close-up rare Santa Cruz tarplant growing in the Revegetation Area.

Southern Conservation Easement Area. Six individuals of Gairdner's yampah were observed in late spring 2014 near the woodland along Graham Hill Road. This represents a slight decrease compared to last year (Figure 1). According to the "Graham Hill Showgrounds Development Habitat Mitigation Plan" (HRG, June 1995), Santa Cruz tarplant had been observed previously in two locations in the Southern Conservation Easement; however, no Santa Cruz tarplant has been observed in these

locations to date. Approximately 46 coast trefoil (also called harlequin lotus) (*Hosackia gracilis)* plants were counted in the Southern Coastal Prairie Conservation Easement (Table 2).

Table 2. Results of Sensitive Plant Species Surveys Spring and Summer 2014

Plant Species	Status Code	Approximate Number of Individuals
Northern Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CA Rare Plant Rank List 4.2 Locally Rare	30 - 35
Coyote Thistle	Locally Rare	8 - 10
Gairdner's Yampah	CA Rare Plant Rank List 4.2 Locally Rare	50 - 60 (planted) 30 - 40 (natural)
Grindelia/Gum Plant	Locally Rare	50 - 60
Narrow-leaved Mule's Ear	Locally Rare	90 - 100
Santa Cruz Tarplant	Federally Threatened State Endangered CA Rare Plant Rank List 1B.1	200 - 225
Central Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CA Rare Plant Rank List 4.2 Locally Rare	30 - 35
Coyote Thistle	Locally Rare	380 -400
Gairdner's Yampah	CA Rare Plant Rank List 4.2 Locally Rare	1,000 – 1,200 350 - 400
Grindelia/Gum Plant	Locally rare	250- 275
San Francisco Popcorn Flower	State Endangered CA Rare Plant Rank List 1B.1	None
Santa Cruz Tarplant	Federally Threatened State Endangered CA Rare Plant Rank List 1B.1	300 - 350 (new area 2006) 125 - 150
Southern Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CA Rare Plant Rank List 4.2 Locally Rare	46
Gairdner's Yampah	CA Rare Plant Rank List 4.2 Locally Rare	6

California Native Plant Society Rare Plant Ranks:

List 4 = Plants of Limited Distribution, a watch list.
List 1B = Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

Reconnaissance Surveys/Site Inspections

During the growing season, Valerie Haley inspected the Coastal Prairie Conservation Easements areas three times for maintenance needs and site condition. This was often done concurrently with the special status plant surveys. During the inspections, areas having high levels of weeds or invasive, non-native plant species were noted. Problem debris areas were also determined. Field technicians were instructed on how and where to conduct the needed maintenance activities. Trash was picked up several times along Graham Hill Rd. in 2014

Dead Coast Live Oak Tree. A large, dead coast live oak tree was observed in summer 2014 near the southwest corner of the Southern Coastal Prairie Conservation Easement (Figure 8).

Figure 8. Dead coast live oak tree in the southwest corner of the Southern Coastal Prairie Conservation Easement.

Invasive, Non-native Plants. Of great concern, is the newly arrived, highly invasive plant species, *Dittrichia graveolens*. It has been observed in the coastal prairie and the seasonal wetland in the Central and Northern Conservation Easements. However, no *Dittrichia* plants have been observed in the Southernmost Conservation Easement. Plants also occur immediately along Graham Hill Rd. All detected plants have been removed, and areas where removal has occurred will be monitored in the future. *Dittrichia graveolens* is very common in the Santa Clara Valley, and is easily transported by tires on vehicles, using Highway 17.

Also of concern, is a large patch of invasive, prickly clover (*Trifolium angustifolium*) that grows on the south side of the main entrance. This has been a problem area in recent years, and occurs adjacent to a colony of the rare Santa Cruz Tarplant. Slender-flowered thistle continues at low levels primarily in the central conservation easement. In three areas, patches of Italian thistles occur by the easement fence and extend past the fence onto the homeowners lots. Most of the thistle plants have been removed from a portion of the easement that is adjacent to the previous sales office. Half a crew day was spent removing seed heads of prickly clover plants near the entrance to Woods Cove. Four crew days were also spent pulling French broom and black acacia near the easement fence along Graham Hill Road.

As expected, French broom seedlings continue to emerge from the soil "seed bank". The majority of the large French broom shrubs have been removed within the conservation easements; however, "carpets" of seedlings less than 10 inches tall still occur in certain areas. Mowing the Conservation Easement areas in spring and fall has helped to keep the plants under a foot tall; however, additional control will continue to be necessary. Follow-up manual removal is planned for 2015. Hand removal efforts have greatly reduced the levels of thistle species and poison hemlock in the Central Conservation Easement area.

Wildflower Displays. In general, the wildflowers were shorter and smaller in stature in spring 2014 due to the lack of rainfall compared to normal rainfall years. Yet, the flowers were more visible, since the grasses were also shorter. The southernmost meadow by Mosswood Ave. had the best wildflower displays in spring 2014. Patches of bright yellow California buttercup, blue-eyed grass (native purple iris) and coast trefoil (yellow and pink) were common in the coastal prairie habitat. Four patches of coast trefoil and scattered stands of blue-eyed grass (*Sisyrinchium bellum*) and California buttercup (*Ranunculus californicus*) were observed.

To the north, patches of yellow brodiaea, checker bloom (*Sidalcea malvaeflora*), blue-eyed grass, yellow calochortus lily (*Calochortus luteus),* and Johnny jump-up (*Viola pedunculata*) were observed in the Central Conservation Easement. The Central Conservation Easement also has two population areas of Santa Cruz Tar plant in clustered colonies, or patches (Figure 7). Narrow-leaved mule's ears, Santa Cruz tarplant, Gairdner's yampah, and coast trefoil were also observed in the Northern

Conservation Easement (Figure 7). These plant species are considered locally rare species by the local chapter of the California Native Plant Society.

Figure 9. Close-up of narrow-leaved mule's ears (*Wyethia angustifolia*) (May 2014).

Photodocumentation. Repeat photographs were taken in spring and fall 2014 from the 14 photostations that were established in spring 1998. Their locations are depicted in Figure 1. From most of the photostations, a panorama of 3 to 4 photographs was taken. The purpose of the photographs is to record changes over time, primarily focusing on the revegetation area and areas with sensitive botanical resources (e.g., populations of special status plants and seasonal wetland). Photostations 1 through 5 document the revegetation area. Photostations 6 through 10 are located in the Central Coastal Prairie Conservation Easement area. Whereas, photostations 11 through 14 are located in the Southern Coastal Prairie Conservation Easement area. Figures 3, 4, and 5 show maintenance activities (thatch removal, weed-trimming and mowing) in the Conservation Easement. A dead coast live oak occurs in the southwest corner of the Southern Conservation Easement (Figure 6). The tree is adjacent to on of the residences on Mosswood Avenue.

MONITORING OF REVEGETATION AREA – 2014

Monitoring activities performed in the revegetation area included: vegetation sampling using belt transects, maintenance inspections, and photodocumentation. Valerie Haley, project botanist, has served as the site monitor. The approximately one-acre revegetation area is located near the northern boundary of the Northern Conservation Easement adjacent to the equestrian facility (Figure 1).

Belt Transect Sampling Methods

In accordance with the Revised Mitigation Plan Work Program (HRG, November 1997), vegetation sampling of the Revegetation Area was conducted in spring 2014, the twelfth spring after the initial seeding and planting activities. Year 2014 represents Year 12 of the monitoring program, the twelfth time that belt transect sampling was performed. Data on species composition were recorded on April 10 , 2014. The locations of the belt transects have a stratified random design, and their locations vary slightly from year to year. Twenty belt transects were evaluated for absolute vegetative cover according to species. Each belt transect was 10 feet by 20 feet; therefore, the total area sampled was 4,000 square feet, which is approximately 10 percent of the revegetation area. The 20-foot side of the belt transect was oriented in a north to south direction. The field data recorded on absolute vegetative cover were used to calculate the relative vegetative cover (percentage) of the plant species growing within each of the 20 belt transects.

Performance Criteria. The data gathered from the belt transects was used to determine whether the revegetation area is proceeding towards the performance criteria that have been established for native plant species composition. According to the "Graham Hill Showgrounds Development Habitat Mitigation Plan" (Habitat Restoration Group, June 15, 1995), the first summer after seeding and transplanting of salvaged planting stock there should be a minimum of 35% cover of native species. In Year 5, the revegetation area should have a minimum cover of native plant species of 55%. If during the five-year establishment period the revegetation area does not have a high enough native species composition, then remedial measures (e.g., supplemental planting, increased weed control or changes in the mowing schedule) will need to be implemented. Trends in plant species composition should also consider that environmental conditions (i.e., drought, temperature) change from year to year, causing natural fluctuations in the proportions of native and non-native plants.

Belt Transect Sampling Results

The relative vegetative cover according to species of the 20 belt transects is summarized in Table 3. For each belt transect, the native plant species are listed first with a subtotal for the vegetative cover of all of the native species. Then, the relative cover of each non-native plant species occurring in the belt transect is listed. In theory, the relative vegetative cover of the native species plus the cover of the non-native

species should total 100%; however, the totals given in Table 3 for the total vegetative cover for some of the belt transects vary slightly from 100%. These variations may most likely be explained by rounding error during the data calculations.

Native Species Composition. In spring 2014, only one of the twenty belt transects listed in Table 3 had 55% or greater relative cover of native plant species, and therefore, has met the performance criterion for Year 5. Transect 17, located in the western end of the revegetation area had 57 % native plant cover. This is much lower compared to the 2012 data, when 16 of the transects met the criterion for native cover. The perennial, bent grass (*Agrostis pallens*) was the most prevalent native species (ranging from 20 to 40% vegetative cover) in the revegetation area, and occurs there naturally (not planted). In portions of the revegetation area, its creeping growth habit has formed extensive thick mats. Additional native plant species with 5% or greater relative vegetative cover included Santa Cruz Tarplant, California oat grass, flowering quillwort, blue-eyed grass, short-stemmed sedge (*Carex brevissimus*), Gairdner's yampah (*Perideridia gairdneri*), soap plant (*Chlorogalum pomeridianum*), common rush (*Juncus patens*), brown-headed rush, and slender rush (*Juncus tenuis*). The soap plant growing in Transect No. 1 had 14% relative vegetative cover (Table 3). Seven of these species were actively revegetated, excluding flowering quillwort (*Triglochin scilloides*) short-stemmed sedge and toad rush.

Native Plant Species Richness. In spring 2014, the number of different native species observed in the belt transects ranged from four species (Belt Transect 19) to 19 species (Belt Transect 10). Revegetation efforts have increased the number of different native species (species richness). Native plant species introduced to the revegetation area via planting activities over the last nine years include: California oat grass, soap plant, Gairdner's yampah, coast trefoil, gum plant/grindelia, common rush, brown-headed rush, checker bloom (*Sidalcea malvaeflora*), common rush, blue-eyed grass, suncups, purple needlegrass, and coast coyote thistle.

Species Performance. Overall, the vegetation in the Revegetation Area was very drought stressed in 2014. There was no rainfall in fall or winter until February 2014. The year 2014 has been the driest year on record. Many of the plantings did not survive, despite supplemental watering. The drought partially explains the low native cover recorded. Of the native species planted in recent years, the following have proved to be strong performers: Blue-eyed grass, soap plant, California oatgrass, brown-headed rush, common rush and slender rush. The rush species and soap plant plantings have not been disturbed by gophers; whereas, California oatgrass appears to be eaten more often. All three rush species and California buttercup planted in the revegetation are becoming established in wetter portions of the Revegetation Area.

Maintenance Inspections in the Revegetation Area. Periodic maintenance inspections were conducted in the revegetation area (0.97-acre). The focus of the inspections was to note site damage and or problems that could interfere with the performance of the native vegetation.

Due to very dry weather in winter and spring 2014, drought stress was observed in the recent plantings. It was deemed necessary to do three supplemental watering events in Spring 2014. Gopher damage was common in the western half of the Revegetation Area. The rare Santa Cruz Tarplant also appeared stunted from lack of rainfall, and therefore were also watered three times last spring.

Weedy clover species and wild ryegrass seemed less prevalent in spring 2014 compared to normal rainfall years. Scattered weeds of wild radish and yellow dock and the invasive Kikuyu grass were observed along the eastern portion of the revegetation area and seasonal wetland near Graham Hill Road. The plants appear to like the wet conditions found in the ditch that crosses the area. The majority of these weedy non-native plants have been removed or sprayed with herbicide.

The following weedy and/or invasive, non-native species were also observed and weeded: sheep sorrel (*Rumex acetosella*), purple velvet grass (*Holcus lanatus*), yellow dock (*Rumex crispus*), wild radish (Raphanus sativus), hairy cat's ear (*Hypochaeris radicata*) and ripgut brome. The majority of the weeding was done in spring 2014.

The heights of the non-native weeds and annual grasses were also monitored. When the average height of the standing vegetation in the revegetation area was approximately 14.0 to 16.0 inches, a field technician was instructed to weed-trim portions of the area (Figure 5). This served to lower plant competition between the desired native species and the non-native ones. As usual, the area was also mowed twice in spring.

Gopher Damage. Gopher activity continues to be a problem in the western half of the Revegetation Area. Unfortunately, many of the planted Gairdner's yampah and California oatgrass plants were destroyed by gopher activity.

Photodocumentation of Revegetation Area

Repeat photographs were taken in the Revegetation Area in spring and summer 2012 from the five photostations that were established in Spring 1998. Their locations are depicted in Figure 1. Most of the photostations have a panorama of 3 to 4 photographs, which document the various portions of the revegetation area. Next spring and summer, repeat photographs will be taken from the photostations. This will serve to help document changes in plant species composition. Figure 4 shows a field technician weed trimming non-native grases in the Revegetation Area in spring 2012. The winter planting activities and portions of the Revegetation Area are depicted in Figure 5.

CHAPTER 5.0 RECOMMENDATIONS FOR 2015

COASTAL PRAIRIE CONSERVATION EASEMENT AREAS

1. Continue Selective Weeding South of Main Entrance

As mentioned in this report, the invasive, non-native prickly clover, *Trifolium angustifolium* is prevalent south of the main entrance. This area also supports rare plants, including Santa Cruz Tarplant (*Holocarpha macradenia*), San Francisco popcorn flower (*Plagiobothrys diffusus*), and Gairdner's yampah. A very careful, selective weeding is recommended. Botanist, Valerie Haley will be present for weeding efforts so the NVN field technicians will be shown rare plants to avoid and target weeds for removal, primarily prickly clover and cat's ear (*Hypochaeris spp.*). The goal will be to enhance the populations of rare plants that occur in the area by lowering competition with weeds.

2. Continue Thatch Removal of Santa Cruz Tarplant Population Areas

The Santa Cruz Tarplant population area growing near lots Lots 8 and 9 (Figure 1) was smaller in 2014 compared to recent years in part due to drought and competition with non-native grasses. It is recommended that non-native grasses be weeded in spring and then in late summer the area should be raked with thatch rakes to remove the old grass duff layers such that more soil is exposed. Care should be taken not to disturb Santa Cruz Tarplant, Gairdner's yampah and California oatgrass growing in the area.

3. Monitor by Main Entrance and along Graham Hill Rd. for Dittrichia graveolens

As mentioned in the text, about 21 highly invasive, non-native *Dittrichia* plants were observed and removed in early September prior to flowering and seed set. Ten of the plants were located along the fence near the entrance, and 11 plants were removed in the seasonal wetland. In addition, 9 plants were observed and removed outside the Conservation Easement immediately next to Graham Hill Rd. The sticky seeds are easily transported on vehicle tires. Follow-up monitoring and control for Dittrichia should be conducted in the prairie, seasonal wetland, and along Graham Hill Rd. Once the yellow petals show, the seed matures right away, so any flowering plants should be bagged.

4. Continue Control of Invasive, Non-native Plants

The following invasive, non-native species should be high priority for control/removal: *Dittrichia graveolens*, French broom, Cape ivy, thistle species, Kikuyu grass, English ivy, black acacia, and poison hemlock. A combination of methods (chemical, manual and mechanical) should be used to be the most successful. Manual and mechanical methods will be implemented more than chemical ones due to the sensitive habitats and plant species present. Herbicides should be judiciously used for special cases. Herbicide treatment is recommended for the Kikuyu grass areas near Graham Hill Road along the eastern edge of the easement fence. There should be as little disturbance to

the ground surface as possible, as this is known to provide open soil for additional broom and thistle seedlings to become established.

5. Continue Mowing Program Spring and Fall 2015

To reduce the competition between the non-native grasses and the desired native prairie species, it is recommended that the spring and fall mowing program continue, as specified in the Habitat Mitigation Plan (HRG, June 1995). It is recommended that a mowing subcontractor perform this task. During the summer months, the site should not be mowed so the natural seed set of the native species is not disrupted. As last year, it is recommended that certain areas of late flowering special status plants (i.e., Gairdner's yampah and Santa Cruz tarplant) be roped off and protected so these plants may produce mature seed. It is likely that some of the wetter and/or inaccessible areas will need to be weed-whacked instead of mowed.

REVEGETATION AREA

6. Coordinate with County Planning regarding Lowering the Performance Criterion for Vegetative Cover of Native Plant Species

The current criterion of 55% native plant cover in the Revegetation Area is likely too high to be sustained without continual planting. Prior to the recent drought years, this original criterion of 55% was met in many of the transects, when native plantings had been successful. There are only three more years of required long-term mitigation. At that point, there will be no more planting, and the Revegetation Area should be mostly self-sustaining, other than continued mowing and some invasive plant removal.

It is recommended that Valerie Haley contact County Planning regarding a criterion that is more appropriate, and consistent with other coastal prairie habitats.

7. Continue Using Sluggo to Control Snails and Slugs

Last year there were successful results, using Sluggo to protect young Santa Cruz Tarplant seedlings from snail damage. In winter and early spring, when soil conditions are wet, Sluggo should be applied to the known population areas of Santa Cruz tarplant. Depending on soil moisture, the Sluggo should be applied at 3 to 4 week intervals.

8. Continue Weeding Invasive Weeds

Weeding should first focus on areas supporting rare plants, locally unique plant species, and recently planted areas. The following weedy species in the revegetation area should be targeted for removal: ripgut brome, English plantain (*Plantago lanceolata*), Italian thistle (*Carduus pycnocephalus*), hairy cat's ear, prickly clover (*Trifolium angustifolium*), sheep sorrel (*Rumex acetosella*), foxtail barley (*Hordeum jubatum*), purple velvet grass, yellow dock, rattlesnake grass, wild radish, and Italian rye grass (*Lolium multiflorum*). Methods for removal will be primarily manual (i.e., hand pulling, hoeing) in conjunction with weed whacking. In addition, late in the season the seed heads of a portion of these weedy species will be removed and bagged.

Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2014 Data (Belts 1 through 10) (Cont'd.)

Scientific Name	Belt 1	Belt 2	Belt 3	Belt 4	Belt 5	Belt 6	Belt 7	Belt 8	Belt 9	Belt 10
Non-Native Species										
Aira caryophyllea		2	8	2		4	3	4		
Anagallis arvensis			2	2			3			
Avena spp.	8	6	2	4	6	4	2	4	4	1
Briza maxima			1	2	4	4	2			2
Briza minor			2	3	2	5				2
Bromus diandrus	4	2			2				1	2
Bromus hordeaceus	10	2	2	4	4	4	2	2	2	3
Erodium spp.	1	1	1	4	2	2	6	4	8	2
Festuca myuros	12	14	10	15	20	2	4	5	15	10
Festuca perennis.		2	2	2		2	5	2	2	2
Geranium dissectum	2	2	3	6	2	4	4	3		3
Holcus lanatus					1					1
Hordeum jubatum	1		2		4		1	2	2	2
Hypochaeris radicata	2	4	3.5	1	1		2	3		3
Lythrum hyssopifolia		2	1		2	8	2	6		5
Plantago coronopus		2				2				2
Plantago lanceolata	1	1	4	1	3.5	2		3	3	2
Romulea rosea				2			2	1	2	1
Polygonum arenastrum	2	3								2
Rumex acetosella	4	2	3	2	1	2	5	4	1	4
Soliva sessilis										
Spergula arvensis	2			2		4	1.5	2	3	
Stellaria media						2				
Trifolium dubium		1		2		6			2	
Trifolium angustifolium										
Trifolium subterranean	2	1	1	4			1	3		2
Vicia sp.									4	
Subtotal Relative Cover (%) (Non-Native Species)	**50.0**	**46.0**	**47.5**	**53.0**	**53.5**	**50.0**	**47.5**	**48.0**	**47.0**	**51.0**
Total Relative Cover (%) (All Species)	**100.0**	**100.0**	**100.5**	**100.0**	**99.5**	**100.0**	**100.5**	**100.0**	**99.5**	**100.0**

* = Locally Unique Species ** = Special Status Species

Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2014 Data (Belts 11 through 20) (Cont'd.)

Scientific Name	Belt 11	Belt 12	Belt 13	Belt 14	Belt 15	Belt 16	Belt 17	Belt 18	Belt 19	Belt 20
Native Plant Species										
Agrostis pallens	25	30	25	20	20	25	20	25	40	20
Brodeaia sp.										
Calandrinia ciliata	1		1							
Callitriche verna										
*Calochortus luteus**										
Taraxia ovata			1							
Carex brevissimus	4	2	3	4	2	6				6
Carex densa			2							
Chlorogallum pomeridianum	3	1			6	4	2	3	2	8
Danthonia californica	4	1		3	4	4	4	2	2	3
*Eryngium armatum**										
Grindelia sp.*		1					6	1		
*Holocarpha macradenia***										
Hosackia gracilis										
Juncus buffonius	1	2	4		2	2	3	2	2	4
Juncus patens	2	2	5	10	2					
Juncus phaeocephalus	4	4	6	6	2		4	4		2
Juncus tenuis	2	3			2	2	4	6		2
Corethrogyne filaginifolia										
*Lilaea scilloides**						2				
Montia Fontana										
Stipa pulchra	2	2		1	2	2	2			2
*Perideridia gairdneri***							6			2
*Plagiobothrys diffusus***										
Ranunculus californicus	1		3	4	2					2
Rubus ursinus										
Sidalcea malvaeflora				1						
Sisyrinchium bellum	2	2	1.5	1	2		6	6		
Festuca microstachys										
Festuca octoflora			2	4						2
Subtotal Relative Cover (%) (Native Species)	**52.0**	**50.0**	**53.5**	**54.0**	**46.0**	**47.0**	**57.0**	**49.0**	**46.0**	**53.0**

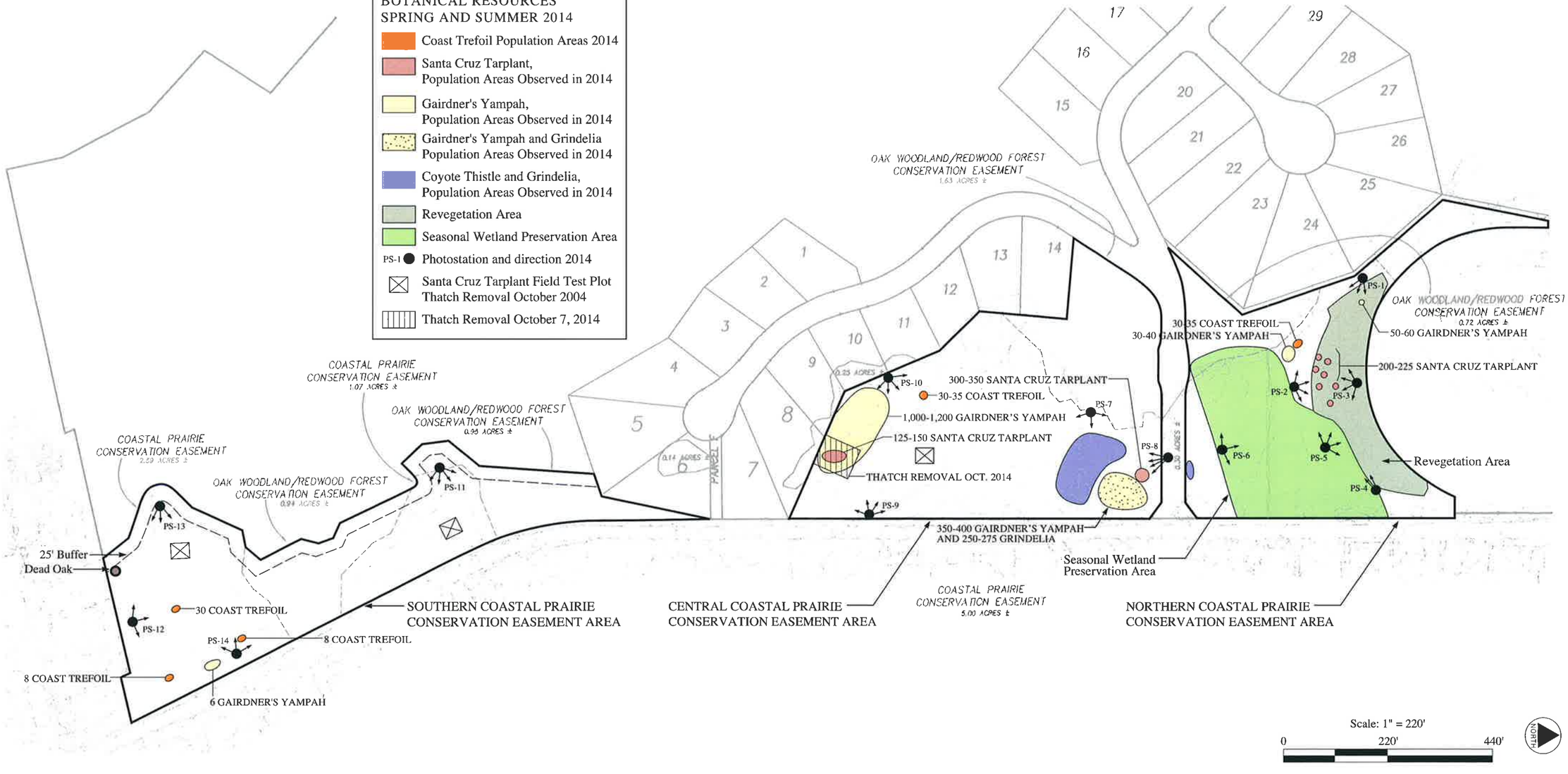
Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2014 Data (Belts 11 through 20) (Cont'd.)

Scientific Name	Belt 11	Belt 12	Belt 13	Belt 14	Belt 15	Belt 16	Belt 17	Belt 18	Belt 19	Belt 20
Non-Native Species										
Aira caryophyllea				1				2	5	4
Anagallis arvensis	1	2								
Avena spp.	2	2		1	2				2	
Briza maxima	4	2	2	2	3	3.5	3	6		4
Briza minor	2	2	3	3	2	6	1	6		2.5
Bromus diandrus	1	2			1		3		2	
Bromus hordeaceus	5	1			2	3		1	2	2
Erodium spp.	4	10	6	10	10	4	8	4	10	4
Geranium dissectum	2				3	4		1	4	
Holcus lanatus				4		2			3	
Hordeum jubatum		3	3			1	2	4	2	
Hypochaeris radicata		2	2		2		5	2	2	3
Festuca perennis	4		2	2	2	4	2	4		
Lythrum hyssopifolia	2	4	4			6	4	4		4
Plantago lanceolata		2	3		4	2	2	4	2	2
Vicia sp.	2	2		1		2	1			
Romulea rosea	4		1		4	4	5	4		
Rumex acetosella	4	4	6	2	3	2	2	3	8	2
Soliva sessilis						2				4
Spergula arvensis		3	3	4	2			1.5		
Stellaria media		2			3	2				
Trifolium dubium	4		1	1	2	2		2	2	4
Trifolium angustifolium										
Trifolium subterraneun	2	1	2		2		3	2	6	4
Festuca myuros	5	6	8	15	10	5	2	4	4	2
Subtotal Relative Cover (%) (Non-Native Species)	**48.0**	**50.0**	**46.0**	**46.0**	**54.0**	**53.5**	**43.0**	**50.5**	**54.0**	**47.5**
Total Relative Cover (%) (All Species)	**100.0**	**100.0**	**99.5**	**100.0**	**100.0**	**100.5**	**100.0**	**99.5**	**100.0**	**100.5**

* = Locally Unique Species ** = Special Status Species

LEGEND
COASTAL PRAIRIE SENSITIVE
BOTANICAL RESOURCES
SPRING AND SUMMER 2014

- Coast Trefoil Population Areas 2014
- Santa Cruz Tarplant, Population Areas Observed in 2014
- Gairdner's Yampah, Population Areas Observed in 2014
- Gairdner's Yampah and Grindelia Population Areas Observed in 2014
- Coyote Thistle and Grindelia, Population Areas Observed in 2014
- Revegetation Area
- Seasonal Wetland Preservation Area
- PS-1 Photostation and direction 2014
- Santa Cruz Tarplant Field Test Plot Thatch Removal October 2004
- Thatch Removal October 7, 2014



Native Vegetation Network

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Woods Cove Development
Mitigation Plan Work Program
Coastal Prairie Conservation Easement Areas

Figure 1
12/14
PV-104 HOA