

Annual Report
Woods Cove Development
Mitigation Work Program
(January 2010 through December 2010)



Prepared for:
Woods Cove Homeowner's Association

Prepared by:
Native Vegetation Network

Valerie J. Haley, Project Manager and Botanist

Karen Williams, Graphics Designer
Christine McKenna, Administrative Assistant

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CHAPTER 1.0 INTRODUCTION

The year 2010 represented Year 8 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 seven more years. Small-scale plantings (approximately 250 plants) were conducted in winter of 2010.

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 (*Plagiobothrys diffusus*), Santa Cruz clover (*Trifolium buckwestiorum*), 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 (*Lotus formosissimus*), and yellow calochortus lily (*Calochortus luteus*).

Construction activities for the Woods Cove Development (previously known as Graham Hill Estates) are almost complete, and all of the lots have sold. All 60 lots have completed homes or are finishing construction. 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 tenth annual report documents the mitigation activities that have been implemented under the Work Program from January 2010 through December 2010 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

CONTROL OF INVASIVE, NON-NATIVE PLANT SPECIES

The control of invasive, non-native plant species primarily used manual and mechanical methods. Some Roundup herbicide was applied on invasive, non-native Kikuyu grass by a certified applicator near the northern end of the easement, growing along the sidewalk and easement fence. 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 2010: French broom, Italian thistle (*Carduus pycnocephalus*), 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*).

Overall, wetland weeds such as poison hemlock, velvet grass (*Holcus lanatus*) and yellow dock (*Rumex crispus*) were more prevalent in 2010 due the extended spring rains in 2010.

French Broom Removal

Over the last ten 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. Three crew days were spent removing broom in 2010.

During winter and early spring 2010, there was periodic hand pulling of French broom plants, while the soils were wet and the roots were easy to remove. 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 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. Italian thistle was mainly removed in the western portion of the Central Coastal Prairie Conservation Easement.

Black Acacia Control

Black acacia saplings growing in the Southern Conservation Easement area were hand dug or pulled out in the spring 2010. This invasive, non-native tree species has been introduced from nearby residential yards and street plantings. Seedlings were removed by the bus stop and coastal prairie habitat located in the southeast corner of Southern Conservation Easement area. A large, mature black acacia over 100 feet tall grows in the woodland adjacent to the southern portion of the Conservation Easement (Figure 6).

Prickly Clover

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. NVN field technicians spent half a day weeding the prickly clover.

Velvet Grass, Wild Radish, and Yellow Dock Removal

Overall, wetland weeds such as velvet grass (*Holcus lanatus*) and yellow dock (*Rumex crispus*) were more prevalent in 2010 due the extended spring rains in 2010. Velvet grass, yellow dock, and wild radish continue to be problematic in the seasonal wetland that occurs to the north of the main entrance. 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.

MOWING MANAGEMENT

As specified in the Habitat Mitigation Plan, the Coastal Prairie Conservation Easement areas (including the seasonal wetland) were mowed in spring 2010 and fall 2010. 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 June 15 and 16. The fall mowing was conducted on October 14 and 15, 2010. A John Deer 4-wheel drive tractor with a

mowing attachment was used, so that the remaining standing material was 6 to 8 inches tall after cutting. Valerie Haley coordinated the mowing activities and notified the tractor operator when to mow. Areas inaccessible by tractor (e.g., under tree canopies) along Graham Hill Road and by the main entrance gate were weed-whacked. Prior to the spring mowing, selected wildflower fields having concentrations of soap plant (*Chlorogalum pomeridianum*), rare Santa Cruz tarplant, and yellow brodiaea were roped off to exclude mowing, so that the flowers could mature and produce seed. Prior to the fall mowing, the Santa Cruz tarplant and Gairdner's yampah plants in seed were flagged off to prevent mowing, so they could complete their seed maturation process. Figure 7 of this report shows a portion of the Southern Coastal Prairie Conservation Easement after the fall mowing. Note the vigorous madrone trees in the background of the photograph that are loaded with red berries.

DEBRIS REMOVAL

In 2010, Native Vegetation Network field technicians picked up trash and debris two times in the Coastal Prairie Conservation Easements, and along Graham Hill Road. The worst areas of debris occurred along Graham Hill Road. The majority of the debris was from passing vehicles, and included bottles, fast food containers, and paper or plastic waste.

SUPPLEMENTAL WATERING

No supplemental watering was needed due to extended spring rains through May 2010.

CHAPTER 3.0

SUMMARY OF ACTIVITIES IN THE REVEGETATION AREA

During 2010, activities in the revegetation area have included weed eating (Figure 3), 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.*).

WEED CONTROL

Due to budget constraints, weeding was minimal in the revegetation area. Weeding was mainly done around the rare Santa Cruz Tarplants that grow naturally near the southern boundary of the revegetation area (Figure 1).

Half a 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 riggut brome. The majority of the weeding was done in spring 2010. 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, the revegetation area was weed-whacked several times over the growing season when the non-native weeds and grasses exceeded 14 to 16 inches in height (Figure 3). This served to reduce competition between the native plants and weedy non-natives.

CONTAINER STOCK PLANTING FEBRUARY 2010

The common name, container types, and the quantities planted in February 2010 are listed in Table 1. Native Vegetation Network personnel planted along the northern boundary of the revegetation area in February 2010. The following native species were planted: blue-eyed grass (50 two-inch pots), coast coyote thistle (50 two-inch pots), gumplant (50 two-inch pots), common rush (50 two-inch pots), and soap plant (50 bulbs). 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. Prior to planting, thirty planting areas were cleared of vegetation by weed trimming to bare earth. No supplemental fertilizer was applied.

Table 1. Container Stock Planted in the Revegetation Area, February 2010.

Common Name	Container Type and Quantity
Blue-eyed grass	50 two-inch pots
Common Rush	50 four-inch pots
Coyote Thistle	50 two-inch pots
Gum Plant	50 two-inch pots,
Soap Plant	50 Bulbs

SUPPLEMENTAL WATERING

No supplemental watering was needed due to extended spring rains through May 2010.

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 from established photostations.

Special Status Plant Surveys

Starting in March 2010, the Coastal Prairie Conservation Easement areas were surveyed at 3 to 4 week intervals for special status and locally unique 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 surveys was that approximately 275 to 300 individuals of the endangered San Francisco popcorn flower were seen at the northern end of the Conservation Easement in spring 2010. This was significant because none were observed for the last two years. Note that this species tends to like wet conditions. The extended spring rains fostered species performance.

Another significant result was the increase in size of the recent (first observed in 2006) Santa Cruz tarplant population area by the front entrance to the subdivision. In 2008, 125 to 150 individuals were observed south of the entrance. The size of this colony increased greatly over the last two years to approximately 850 to 900 tarplants in spring 2010 (Figure 1).

Figure 1 depicts the locations of the following sensitive plant species observed in 2010: San Francisco popcorn flower, Santa Cruz tarplant, Gairdner's yampah, coyote thistle, coast trefoil, and gum plant/grindelia. No Santa Cruz clover was observed in 2010, and no Santa Cruz tarplant was observed in the Southern Coastal Prairie Conservation Easement area. 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. In Spring 2010, approximately 275 to 300 San Francisco plants were observed growing along the northern boundary of the Revegetation Area (Figure 1). This represents an increase in population size in 2010 compared to none observed last year. The extended spring rains in 2010 are likely to have fostered species performance.

The number of Santa Cruz tarplants occurring in the northern portion of the Conservation Easement slightly increased in 2010. There were approximately 600 to 650 plants in 2010 compared to 550 to 600 plants in 2008. This increase in population size may be partially attributed to the extended rains in spring 2010.

Yet, fewer Gairdner's yampah plants were seen in 2010 (approximately 120 plants) compared to approximately 135 plants in 2008 (Table 2). Gopher damage has contributed to the decline in the number of plants. The majority were the result of salvage and transplant activities from the area to be graded for the entrance road.

Central Conservation Easement Area. No individuals of San Francisco popcorn flower plants were observed near the main entrance to the subdivision, at the north end of the central conservation easement (Figure 1).

A positive result was the large increase in size of the of Santa Cruz tarplant population area located to the south of the front entrance to the subdivision. In 2008, 125 to 150 Santa Cruz tarplants were observed; whereas, 850 to 900 plants were observed in late spring 2010. This large increase may be partially contributed to weeding and soil scraping efforts done by NVN field technicians. Extended spring rains also fostered species performance.

The other population area of Santa Cruz tarplant closer to the emergency exit by Deer Path Rd. also increased significantly. Valerie Haley observed 300 to 350 plants in 2008 compared to the 800 to 850 plants in 2010. This area was also hand weeded and scraped in early October 2010. The population size of Gairdner's yampah was the same in 2008 as 2010, and ranged from 1,800 to 2,000 plants.

Southern Conservation Easement Area. Seven individuals of Gairdner's yampah were observed in late spring 2010 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 50 to 60 coast trefoil plants were counted in the Southern Coastal Prairie Conservation Easement (Table 2).

Reconnaissance Surveys/Site Inspections

During the growing season, Valerie Haley inspected the three 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.

Mature Oak Trees. Several mature coast live oaks died in the woodland adjacent to the historical red shed. The HOA contracted with a tree service to remove the trees. The majority of the cut material was taken off site. NVN was not informed of the details.

Invasive, Non-native Plants. 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 (Figure 4). Slender-flowered thistle continues at low levels primarily in the central conservation easement. In three areas, patches of 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. Three crew days were also spent pulling French broom and black acacia near the easement fence along Graham Hill Road. As noted in previous years, black acacia saplings occur in the southeast corner of the Southern Coastal Prairie Conservation Easement area. This is due to a large mature black acacia tree on the adjacent property. There are also several black acacia trees in the woodland portions of the site, including one large tree south of Deer Path Rd. (Figure 6).

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 2011. Hand removal efforts have greatly reduced the levels of thistle species and poison hemlock in the Central Conservation Easement area.

Wildflower Displays. Wildflowers were taller in spring 2010 compared to the last two drier years. In general, all vegetation, native and non-native species were more vigorous due to the extended spring rains through May 2010. Some of the native wildflowers were harder to see due to the surrounding, taller non-native grasses. Patches of yellow brodiaea, blue-eyed grass, yellow calochortus lily (*Calochortus luteus*), and Johnny jump-up (*Viola pedunculata*) were observed in the Central Conservation Easement. Narrow-leaved mule's ears and coast trefoil were observed in the Northern Conservation Easement. These plant species are considered locally unique species by the local chapter of the California Native Plant Society. Four patches of coast trefoil and scattered stands of blue-eyed grass (*Sisyrinchium bellum*) and California buttercup (*Ranunculus californicus*) were observed in the Southern Conservation Easement.

Photodocumentation. Repeat photographs were taken in spring and fall 2010 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. The majority of the photographs presented as Figures 2 through 7 were taken from the established photostations. Figures 5, 6 and 7 provide overviews of the Southern Conservation Easement. A large, invasive black acacia tree (*Acacia melanoxydon*) is growing in the woodland adjacent to the coastal terrace prairie, South of Deer Path Road (Figure 6). Figure 5 also shows a portion of the easement fence that is in need of repair.

MONITORING OF REVEGETATION AREA – 2010

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 2008, the tenth spring after the initial seeding and planting activities. Year 2010 represents Year 12 of the monitoring program, the twelfth time that belt transect sampling was performed. Data on species composition were recorded on April 23 and 24, 2010. 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 2010, ten of the twenty belt transects listed in Table 3 had 55% or greater relative cover of native plant species, and therefore, have met the performance criterion for Year 5. The percent of native cover was lower in spring 2010 compared to spring 2008, when 15 of the belt transect had met the criterion for year 5. Three belt transects had 60% or greater native plant cover, Belts 16, 17, and 18. The perennial, bent grass (*Agrostis pallens*) was the most prevalent native species (ranging from 25 to 45% 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. Other native plant species with 5% or greater relative vegetative cover include California oat grass, Santa Cruz tarplant, 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*). Five of these species were actively revegetated, excluding short-stemmed sedge.

Native Plant Species Richness. In spring 2010, the number of different native species observed per belt transect ranged from five species (Belt 8) to 13 species (Belt 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 seven 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. The extended spring rains in 2010 appear to have contributed to the increase in vegetative cover of non-native grasses, especially the invasive, ripgut brome, soft chess and velvet grass. Due to budget constraints, hand weeding in the

Revegetation Area was much reduced in 2010, another contributing factor that lowered native plant species composition.

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 the extended spring rains in 2010, the plantings in the revegetation area were less drought stressed compared to the last two years. It was deemed unnecessary to do any supplemental watering.

However, the rains also increased the cover of invasive, non-native grasses, especially the invasive, ripgut brome, soft chess and velvet grass. NVN field technicians collected and bagged mature seed heads of ripgut brome. The seeds were taken to a sanitary landfill.

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.

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 2010

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-whack the area (Figure 3). This served to lower plant competition between the desired native species and the non-native ones.

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

Repeat photographs were taken in the revegetation area in spring and summer 2010 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 3 shows a field technician weed trimming in the revegetation area in spring 2010.

CHAPTER 5.0 RECOMMENDATIONS FOR 2011

COASTAL PRAIRIE CONSERVATION EASEMENT AREAS

1. Secure Conservation Easement Gates and Repair Fence

To enable access for tractor mowing and other projects, gates have been installed in the southern, central and northern sections of the Conservation Easement. The gates located along Graham Hill Rd. in the southern and central sections of the easement are often found open. Perhaps the gates are opened by neighbors or windy weather. The reasons remain to be determined. It is recommended that combination locks and heavy metal chains be installed to replace the current rope and tie wire closures, which are easily opened. The lock combination will need to be given to the tractor mower and other consultants working in the easement.

As may be seen in Figure 5, a portion of the Conservation Easement fence has fallen, and needs to be repaired. The down fence is located along Graham Hill Rd, south of Deer Path Road.

2. Water Santa Cruz Tarplant Population Areas

According to local weather forecasters, we are having a La Nina weather pattern. Most likely spring rains will not extend as late in the season as they did in 2010. If this proves to be the case and dry weather prevails, it is recommended that the endangered Santa Cruz Tarplant population areas in the Prairie Conservation Easement be watered at 3 to 4 week intervals in late spring and summer 2011.

3. Continue Control of Invasive, Non-native Plants

The following invasive, non-native species should be high priority for control/removal: 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.

The oak woodland south of Deer Path Rd. has a very large black acacia tree growing adjacent to the prairie habitat (Figure 6). The tree should be removed by a professional tree service, as large tree removal is not part of NVN's scope of work. The "seed rain" from this tree will continue to infest the conservation easements, if it is not removed.

4. Continue Mowing Program Spring and Fall 2011

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

5. Supplemental Watering in the Revegetation Area

If a dry spring prevails in 2011, it is recommended that supplemental watering be done in the Revegetation Area. Ideally, recent plantings and the rare Santa Cruz tarplants growing in the Revegetation Area would be watered once a month in late spring and summer. The amount of water needed is about 60 to 75 gallons per watering event.

6. Increase Weeding Efforts in the Revegetation Area

Since there were budget constraints in 2010, little weeding was done last spring in the revegetation area. This resulted in lower vegetative cover of native plants, which was reflected in the monitoring results of the belt transects. To be on track with meeting the performance criterion for native vegetative cover, it is recommended that more budget be allocated for weeding. 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.

7. Continue Mowing and Weed-Whacking Program

Depending on the extent of spring rains, the revegetation area will need to be either mowed or weed-whacked at about 3 to 4 week intervals, commencing in March 2011. The vegetation should be cut when it reaches an average of 14 to 16 inches in height. As possible, native plants should be selectively avoided. Care will be taken not to damage the Santa Cruz Tarplant population areas located along the south end of the revegetation area (Figure 1).

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**Table 2. Results of Sensitive Plant Species Surveys
Conducted in Spring and Summer 2010**

Plant Species	Status Code	Approximate Number of Individuals
Northern Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CNPS List 4 Locally Unique	60 - 70
Coyote Thistle	Locally Unique	8 - 10
Gairdner's Yampah	FSC CNPS List 4 Locally Unique	60 – 70 (planted) 50 – 65 (natural)
Grindelia/Gum Plant	Locally Unique	200-225
Narrow-leaved Mule's Ear	Locally Unique	125 - 135
San Francisco Popcorn Flower	State Endangered CNPS List 1B	275 - 300
Santa Cruz Tarplant	State Endangered CNPS List 1B	600– 650
Central Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CNPS List 4 Locally Unique	35 - 40
Coyote Thistle	Locally Unique	500 – 510
Gairdner's Yampah	FSC CNPS List 4 Locally Unique	1,800 -2,000
Grindelia/Gum Plant	Locally Unique	300 - 325
San Francisco Popcorn Flower	State Endangered CNPS List 1B	None
Santa Cruz Tarplant	State Endangered CNPS List 1B	850 - 900 (new area 2006) 800 - 850
Southern Coastal Prairie Conservation Easement Area:		
Coast Trefoil	CNPS List 4	50 - 60
Gairdner's Yampah	FSC CNPS List 4 Locally Unique	7

Unites States Fish & Wildlife Service Codes:

FSC = Federal Species of Concern

California Native Plant Society (CNPS) Codes:

List 4 = Plants of Limited Distribution, a watch list.

List 1B = Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

**Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2010 Data (Belts 1 through 10)**

Scientific Name	Belt 1	Belt 2	Belt 3	Belt 4	Belt 5	Belt 6	Belt 7	Belt 8	Belt 9	Belt 10
Native Plant Species										
<i>Agrostis pallens</i>	30	35	30	40	40	45	40	40	40	25
<i>Brodiaea laxa</i>										
<i>Calandrinia ciliata</i>		1								
<i>Callitriche verna</i>										
<i>Calochortus luteus*</i>										
<i>Camissonia ovata</i>	1			2					2	1
<i>Carex brevissimus</i>	2			3		2		4	2	4
<i>Carex densa</i>										
<i>Chlorogallum pomeridianum</i>	10	5	8	4	4	4	6	4	3	6
<i>Danthonia californica</i>			4	2					4	2
<i>Eryngium armatum*</i>										2
<i>Grindelia</i> sp.*			2							2
<i>Holocarpha macradenia**</i>						5	4			3
<i>Juncus buffonius</i>	2	4	2		1	2			4	2
<i>Juncus patens</i>										
<i>Juncus phaeocephalus</i>										
<i>Juncus tenuis</i>		3	2		2		2	2	2	2
<i>Lessingia filaginifolia</i>										
<i>Lilaea scilloides*</i>										
<i>Lotus formosissimus*</i>										
<i>Montia Fontana</i>										
<i>Nassella pulchra</i>										
<i>Perideridia gairdneri**</i>										2
<i>Plagiobothrys diffusus**</i>										
<i>Ranunculus californicus</i>		2	2				1			
<i>Rubus ursinus</i>	1	3								
<i>Sidalcea malvaeflora</i>					1		2			
<i>Sisyrinchium bellum</i>	5		2	2			2	3	3	2
<i>Vulpia microstachys</i>										
<i>Vulpia octoflora</i>		2			2					2
Subtotal Relative Cover (%) (Native Species)	51.0	55.0	52.0	53.0	50.0	58.0	57.0	53.0	58.0	55.0

**Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2010 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										
<i>Aira carophyllea</i>					2				3	
<i>Anagallis arvensis</i>	1					2				
<i>Avena</i> spp.	4	2	2	2		3	2	2		2
<i>Briza maxima</i>					7		2		1	
<i>Briza minor</i>				2			2	4	2	1.5
<i>Bromus diandrus</i>	12	8	5	6	7	2	6			5
<i>Bromus hordeaceus</i>	10	8	12	6	12	2	6	11	2	4
<i>Erodium</i> spp.		5					4		5	5
<i>Geranium dissectum</i>	2	10	8	10	4	2	2	2	5	2
<i>Holcus lanatus</i>	4							5		
<i>Hordeum jubatum</i>		2						2		
<i>Hypochoeris radicata</i>	6		1	1			2			
<i>Lolium</i> spp.			2	2	2	6	4			4
<i>Lythrum hyssopifolia</i>	1		5		3	4	2	2		
<i>Plantago coronopus</i>	2									
<i>Plantago lanceolata</i>			1		2	2.5				
<i>Romulea rosea</i>	2				2		1	1.5		
<i>Polygonum arenastrum</i>										
<i>Rumex acetosella</i>	2	4	1	2		5	2	2	5	
<i>Soliva sessilis</i>									3	
<i>Spargula arvensis</i>									5	2
<i>Stellaria media</i>										
<i>Trifolium dubium</i>				2		4	4	4	4	8
<i>Trifolium angustifolium</i>										
<i>Trifolium subterraneum</i>	4	4	10	8	2	3	4	6	4	4
<i>Vicia</i> sp.										
<i>Vulpia myuros</i>		1	1	2	4	6	4	2	2	2
Subtotal Relative Cover (%) (Non-Native Species)	49.0	45.0	48.0	47.5	50.0	41.5	43.0	43.0	42.0	39.5
Total Relative Cover (%) (All Species)	100.0	100.0	100.0	100.5	100.0	99.5	100.0	100.5	100.0	99.5

* = Locally Unique Species

** = Special Status Species

**Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2010 Data (Belts 11 through 20) (Continued)**

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										
<i>Agrostis pallens</i>	25	25	25	25	30	30	35	30	30	35
<i>Brodiaea</i> sp.										
<i>Calandrinia ciliata</i>										
<i>Callitriche verna</i>										
<i>Calochortus luteus*</i>										
<i>Camissonia ovata</i>										
<i>Carex brevissimus</i>	4	6		4	2	4	4	4		
<i>Carex densa</i>				2	2	2		2	2	
<i>Chlorogallum pomeridianum</i>	2		4	2	2	5	3	6	2	2
<i>Danthonia californica</i>	4	4	6	2	2	3	3	4	3	4
<i>Eryngium armatum*</i>										
<i>Grindelia</i> sp.*								2		
<i>Holocarpha macradenia**</i>	3									
<i>Juncus buffonius</i>	3	6	4	4		3	4	2	4	
<i>Juncus patens</i>	4	6	6	4	6					
<i>Juncus phaeocephalus</i>	6	4			1			2		2
<i>Juncus tenuis</i>	2	2	2	4	4	8	12	4	8	5
<i>Lessingia filaginifolia</i>										
<i>Lilaea scilloides*</i>	2									
<i>Lotus formosissimus*</i>										
<i>Montia Fontana</i>										
<i>Nassella pulchra</i>	2									
<i>Perideridia gairdneri**</i>		1				2		5	3	
<i>Plagiobothrys diffusus**</i>										
<i>Ranunculus californicus</i>		4	2	4	4				2	
<i>Rubus ursinus</i>	2	1								
<i>Sidalcea malvaeflora</i>										
<i>Sisyrinchium bellum</i>			2		2	5	2	4	3	5
<i>Vulpia microstachys</i>										
<i>Vulpia octoflora</i>										
Subtotal Relative Cover (%) (Native Species)	54.0	53.0	51.0	51.0	55.0	63.0	63.0	62.0	57.0	53.0

**Table 3. Belt Transects Relative Vegetative Cover by Species
Revegetation Area, April 2010 Data (Belts 11 through 20) (Continued)**

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										
<i>Aira caryophyllea</i>					2			4		
<i>Anagallis arvensis</i>					2					
<i>Avena spp.</i>	4		2		2	1		2		
<i>Briza maxima</i>	5	4	6	6	2	5	4	6	5	6
<i>Briza minor</i>	2	2	2	1		3	2	2		
<i>Bromus diandrus</i>				5		2			2	2
<i>Bromus hordeaceus</i>	2	5		5	2	2	2			5
<i>Erodium spp.</i>	4	4	7	4	4	4	6	3	5	4
<i>Geranium dissectum</i>	4			1	2	2				2
<i>Holcus lanatus</i>				4	2					
<i>Hordeum jubatum</i>		2			1	2	2			
<i>Hypochaeris radicata</i>	3	2			2		1	1	2.5	3
<i>Lolium spp.</i>		2		2	2			4		
<i>Lythrum hyssopifolia</i>	4	4		1	4			4	4	
<i>Plantago lanceolata</i>	3	2			2	2	2	2		3
<i>Vicia sp.</i>					2.5				2	
<i>Romulea rosea</i>	1		1.5				2.5	2		
<i>Rumex acetosella</i>	4	4	2	5	2.5	1				
<i>Soliva sessilis</i>						1	2	2	3	
<i>Spergula arvensis</i>					4		2		2	
<i>Stellaria media</i>							1		2	
<i>Trifolium dubium</i>	6	6	10	8	4	5	8	2	10	10
<i>Trifolium angustifolium</i>										2
<i>Trifolium subterraneum</i>		6	6	4	4	5	2		2	2
<i>Vulpia myuros</i>	4	4	2	2	2	2		4	4	6
Subtotal Relative Cover (%) (Non-Native Species)	46.0	47.0	48.5	49.0	45.5	37.0	36.5	38.0	43.5	47.0
Total Relative Cover (%) (All Species)	100.0	100.0	99.5	100.0	100.5	100.0	99.5	100.0	99.5	100.0

* = Locally Unique Species

** = Special Status Species

LEGEND
COASTAL PRAIRIE SENSITIVE BOTANICAL RESOURCES

- Coast Trefoil Population Areas 2010
- Santa Cruz Tarplant, Population Areas Observed in 2010
- Gairdner's Yampah, Population Areas Observed in 2010
- Grindelia and Gairdner's Yampah
- San Francisco Popcorn Flower, Observed in 2010
- Coyote Thistle and Grindelia, Population Areas Observed in 2010
- Revegetation Area
- Seasonal Wetland Preservation Area
- Burn 9-18-2002
- PS-1 ● Photostation and direction 2010
- ⊠ Santa Cruz Tarplant Field Test Plot Thatch Removal October 2004

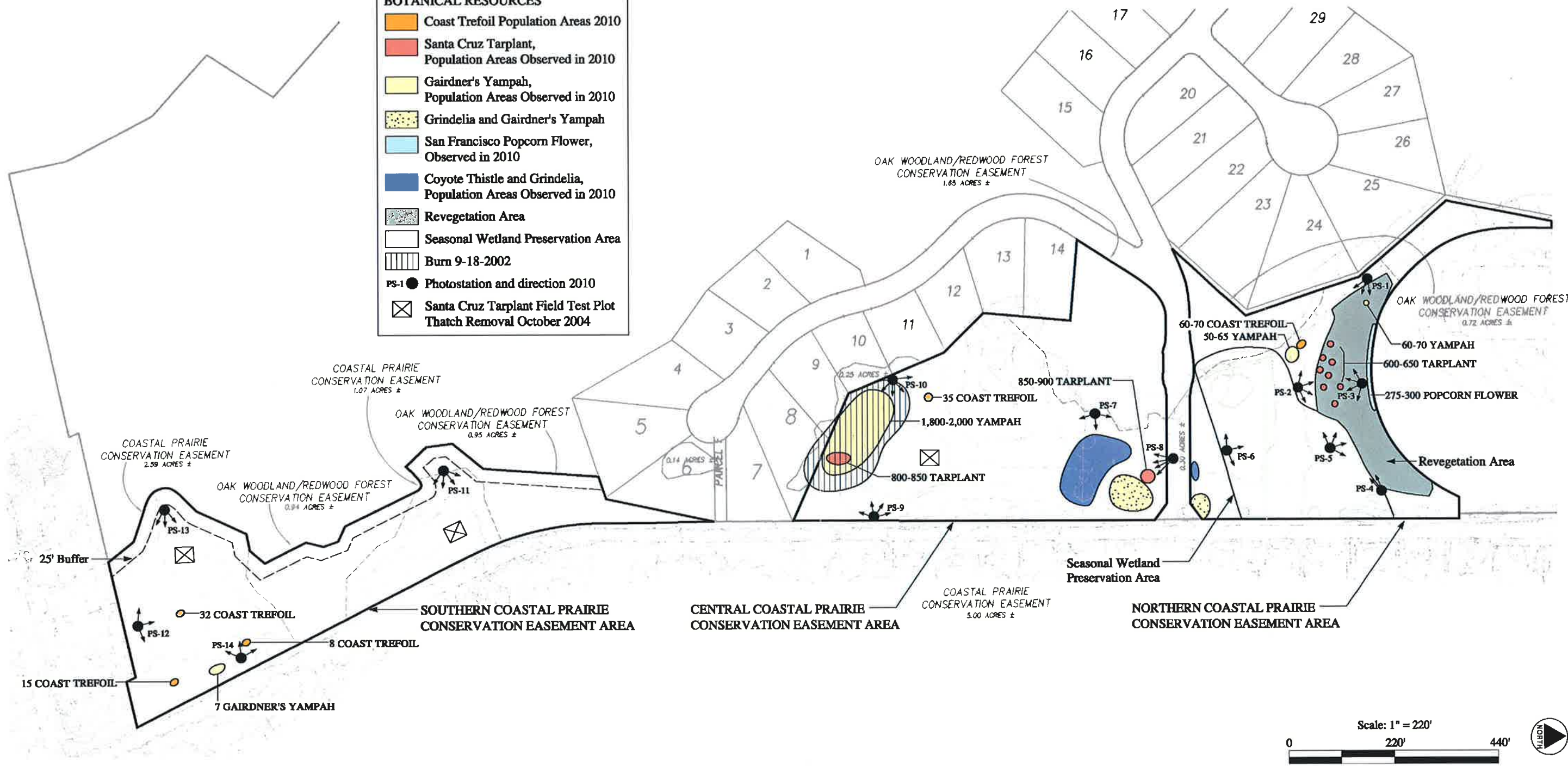




Figure 3. Weed trimming non-native grasses in the revegetation area, spring 2010.



Figure 2. Mowing in the Coastal Prairie Conservation Easement, spring 2010.



Figure 5. Broken Fence along Graham Hill Road (south of Deer Path Road).



Figure 4. Close up of Santa Cruz Tarplant, spring 2010.



Figure 7. Recent fall mowing in southern easement, madrone trees in background.



Figure 6. Large, invasive, non-native black acacia growing adjacent to prairie easement.