2014 ANNUAL RESTORATION REPORT

FOR THE
EDGEWOOD COUNTY PARK RESTORATION PROJECT
GAS LINE 132 AT MILE POST 25.05

San Mateo County, California

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Executive Summary

In keeping with the *Restoration and Monitoring Plan for the Edgewood County Park Restoration* (GANDA 2013), Garcia and Associates (GANDA) completed site investigations and annual vegetation monitoring for two restoration sites covering 0.34 acre, which were disturbed during pipeline safety work on an existing Pacific Gas and Electric Company (PG&E) pipeline located in Edgewood County Park in San Mateo County. The restoration activities occurred on the western edge of Edgewood County Park. The majority of the restoration area is situated on San Francisco Public Utilities Commission (SFPUC) property within the park, and the remainder is on County Park property.

In 2014, GANDA collected plant cover data at representative locations from each restoration site for comparison with the performance criteria, addressing native plant and noxious weed cover. The performance criterion for native plant cover is based on cover conditions as collected from a nearby reference site.

The native plant cover data from restoration site 1 (0.325 acre) exceeded the first year performance criteria. The native plant cover data from restoration site 2 (0.015 acre) did not exceed the first year performance criteria. With this assessment, 95% of the restoration area has exceeded the first year performance criteria. The native vegetation establishment pattern is somewhat variable throughout the sites, as evidenced by the higher native cover recorded in the larger restoration site 1 compared to the lower native cover recorded in the smaller restoration site 2. This is in part due to thorough weeding efforts throughout the 2014 year as well as the drought conditions present throughout the year. Supplemental seeding performed in November 2014 should facilitate greater uniformity of native plant cover throughout both sites.

Noxious weeds were absent from both the reference site and the restoration sites at the time of the survey. The intensive non-native plant removal efforts in March, April, May, and June and, to a limited degree, in July and September successfully removed the non-native vegetation to the extent feasible.

Given the severe drought conditions of 2014, the sites are making good progress in meeting the performance criteria. Weeding efforts in 2015 will focus on the removal of non-native grasses before seed set in April and May.

1.0 INTRODUCTION

This report presents and evaluates the annual quantitative monitoring efforts, summarizes the site inspections and maintenance efforts, and provides recommendations as needed to meet the performance criteria. Appendix A includes photographs of each sampling transect.

1.1 PURPOSE

The purpose of the restoration effort is to restore approximately 0.340 acre of serpentine bunchgrass grassland.

1.2 PROJECT LOCATION

The restoration activities take place in Edgewood Park, within San Mateo County west of Redwood City. Figure 1 provides the regional location of the restoration sites, which are located in close proximity to each other. Restoration site 1 covers 0.325 acre and is situated between Edgewood Trail and State Route 280. Restoration site 2 covers 0.015 acre, and is immediately adjacent to the Franciscan Trail (Figure 2).

1.3 SITE DESCRIPTION

Prior to the pipeline project disturbance, both restoration sites supported serpentine bunchgrass grassland (Holland 1986) dominated by native tussock-forming purple needle grass (*Stipa pulchra*), as well as non-native rye grass (*Festuca perennis*), soft chess (*Bromus hordeaceus*), and wild oat (*Avena sp*.). This grassland also contained concentrations of native perennial blue wildrye grass (*Elymus glaucus*) and scattered small to large concentrations of native hayfield tarweed (*Hemizonia congesta* ssp. *luzulifolia*). The community also supported trace occurrences of California poppy (*Eschscholzia californica*), golden-carpet wild buckwheat (*Eriogonum luteolum* var. *luteolum*), soap plant (*Chlorogalum pomeridianum*), and yarrow (*Achillea millefolium*).

1.4 PROJECT BACKGROUND

PG&E completed required Pipeline Safety work late in 2013. Prior to construction activities, biologists and botanists grubbed approximately 50 pounds of seed and native plants from the work sites. At each dig site, crews also excavated and stockpiled the topsoil. Following completion of installation activities, crews backfilled the excavations with subsoil and spread topsoil over the surface. PG&E subsequently replaced the grubbed seed and plants on the recontoured soil surface. The sites were seeded with a mixture of California poppy, yarrow, purple needle grass, and blue wildrye grass. PG&E applied a 1- to 2-inch layer of weed-free rice straw mulch over the soil surface following seeding to stabilize the soil and provide protection for the seeds.

Figure 1
Project Location
Edgewood County Park
Restoration and Monitoring
Project
San Mateo County, CA
November 2013

GANDA

Project Location

0 50 100 150 200 ft

0 15 30 45 60 m

USGS 7.5' Quad: WOODSIDE (1991)
NE 1/4, SW 1/4, Sec 27, T05S R04W; PULGAS land grant
Aerial Imagery: November 2010

1:1,200
One In = 100 Ft

Figure 2
Restoration Sites
Edgewood County Park
Restoration and Monitoring Project
San Mateo County, CA
December 2013

2.0 METHODS

Vegetation Ecologist Andy Mieske conducted the field monitoring on April 19, 2014 as directed by the *Restoration and Monitoring Report for the Edgewood County Park Restoration* (GANDA 2013). Mr. Mieske used the line-intercept method to determine percent native plant cover and noxious weed cover for each site (BLM 1998). The cover associations used were native species, non-native species, and bare ground (which included thatch). The establishment of fixed transects and line-intercept sampling allows for more direct comparison of monitoring data from year to year. The transects were established to capture representative conditions within the restoration sites as well as the reference site.

Mr. Mieske collected cover data for native and non-native plant associations and bare ground along four transects within the restoration sites, and one transect within the reference site. The three transects in restoration site 1 are oriented parallel to the southern boundary of the site and evenly spaced from north to south. The transect in restoration site 2 is centered within the site. The field investigator established the transect in the reference site at a random location between the two restoration sites. The transect end points are marked onsite with t-posts and iron rebar.

The field investigator identified plant species using Baldwin (2012); plant nomenclature follows the Jepson online interchange (UC Berkeley 2014). Appendix A contains photographs of transects taken from permanently established photograph stations.

3.0 RESULTS

3.1 PERFORMANCE CRITERIA

GANDA compared the performance criteria listed in the *Restoration and Monitoring Report for the Edgewood County Park Restoration* (GANDA 2013) with attributes measured in the field on April 19, 2014. The performance criteria for the restoration sites in the first year include two components: a minimum of 30 percent of the native plant cover present at the reference site and a maximum of 5 percent noxious weed cover. Based on the 2014 native plant cover measured at the reference site, the first year native plant cover performance criterion for the restoration sites is a minimum of 10.7 percent native plant cover. Table 3-1 below lists the specific 2014 performance criteria for the restoration sites based on the results of the 2014 reference transect sampling.

Table 3-1 2014 Performance Criteria

Performance Criteria	Year 1: 2014
Percent Native Plant Cover[1]	10.7%
Percent Noxious Weed Cover[2]	5%

Performance Notes:

1. Minimum target percent native plant cover of each restoration site, as per reference transect.
2. Maximum target noxious weed cover will be measured at each restoration site as the percentage of cover composed of noxious weed species rated as "high" from the California Invasive Plant Inventory Database (Cal-IPC 2013).

3.2 2014 MONITORING RESULTS AND PERFORMANCE EVALUATION

Vegetation data was collected from five transects to characterize and compare cover and species composition from two restoration sites and one control site. Within restoration site 1, the native cover ranged from 4 to 25.5 percent over the three transects, with an average of 17.8 percent. Non-native cover at restoration site 1 ranged from 32.5 to 64.5 percent over the three transects, with an average of 47.3 percent. Bare ground along the restoration site 1 transects ranged from 31 to 42 percent, and averaged 34.8 percent. At restoration site 2, 4 percent native cover, 10 percent non-native cover, and 86 percent bare ground were recorded along one transect. At the control site, 35.5 percent native cover, 35 percent non-native cover, and 29.5 percent bare ground were recorded on the final transect. No noxious weeds were observed within the restoration sites or the reference site. Monitoring data for each transect is summarized in Table 3-2.

Non-native cover over both restoration sites ranged from 10 to 64.5 percent over the four transects, with an average of 38 percent. The average non-native cover approximates the 35 percent cover observed in the reference site.

Table 3-2 2014 Cover by Transect

Transects	Native Association Cover (%)	Non-native Association Cover (%)	Bare Ground (%)	Noxious Weed Cover (%)
Restoration Site 1				
Transect 1	4	64.5	31.5	0
Transect 2	25.5	32.5	42	0
Transect 3	24	45	31	0
Restoration Site 2				
Transect 4	4	10	86	0
Reference Site				
Transect 5	35.5	35	29.5	0

3.2.1. Native Plant Cover

The native cover first-year success criterion is 30 percent of the native cover observed on the reference site. Based on these monitoring results, restoration sites should achieve the threshold success criterion of 10.7 percent native cover. Restoration site 1 exceeds the threshold success criterion for this year. Restoration site 2 does not meet this threshold success criterion.

3.2.2. Noxious Weed Cover

The restoration sites met the performance criterion for weed cover which prescribes a maximum of 5 percent noxious weed cover with species rated as "high" from the California Invasive Plant Council (Cal-IPC) Inventory Database (Cal-IPC 2013). GANDA observed that there were no noxious weeds with a high Cal-IPC rating in the restoration sites or the reference site at the time of the survey.

3.3 2014 PERFORMANCE SUMMARY

Given the drought conditions of 2014, the overall performance of the revegetation program to date is considered to be successful. Restoration site 1 met the native plant cover and noxious weed cover criteria in 2014. The much smaller restoration site 2 did not meet the native plant cover criterion, but did meet the noxious weed cover criterion in 2014. The aggressive weeding efforts in 2014 effectively reduced the presence of weeds within the restoration sites.

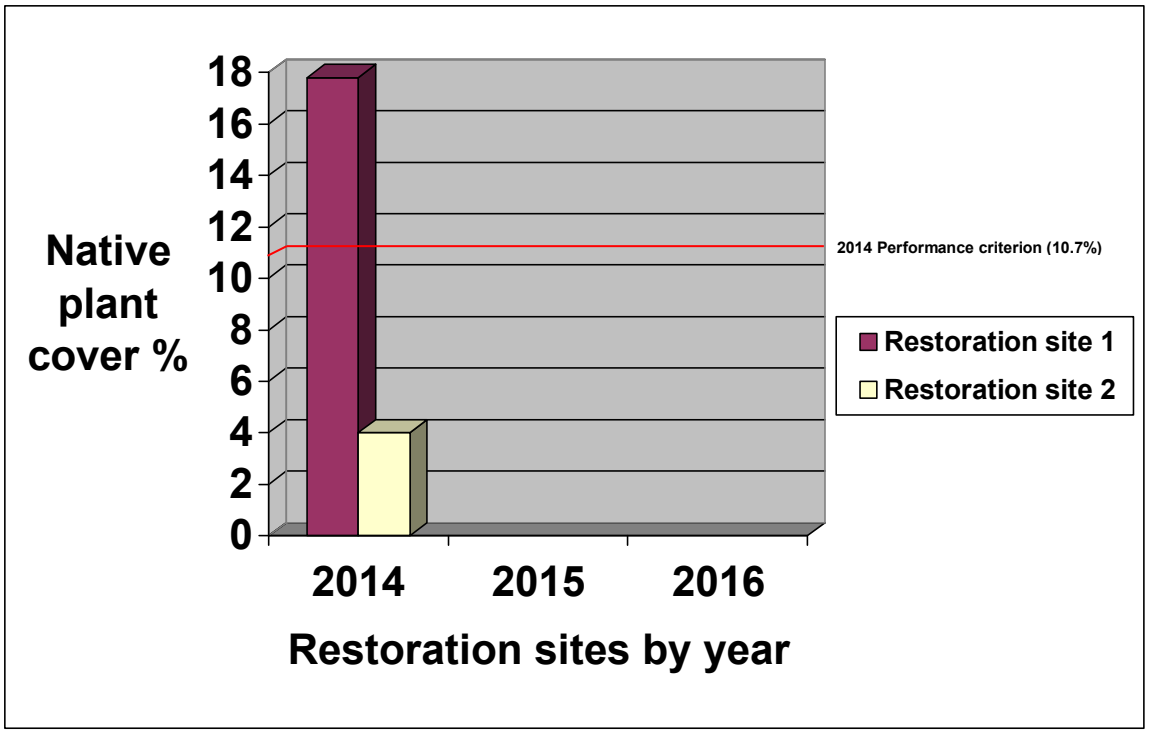

Figure 3 2014 Native Plant Cover in Restoration Sites

4.0 DISCUSSION

The following summarizes observations recorded during onsite inspections and is followed by an assessment of the overall revegetation trend for the effort.

4.1 2014 OBSERVATIONS

A diverse assemblage of native and non-native vegetation germinated and occupied the two restoration sites following re-contouring and seeding. PG&E scattered supplemental seed on the restoration sites on March 11, 2014. Contractors removed non-native vegetation by hand over approximately 160 hours on March 11 and 27; April 3, 7, 8, 11, and 13; May 12; June 30; July 25; and September 16, 2014. Non-native plant removal efforts focused on removal of annual grasses, especially hare barley (*Hordeum murinum* ssp. *leporinum*), Italian ryegrass (*Festuca perennis*), ripgut brome (*Bromus diandrus*), and wild oats (*Avena fatua*). These efforts also focused on the removal of two broad-leaved species: redstem filaree (*Erodium cicutarium*) and willow lettuce (*Lactuca saligna*). Field investigators observed low levels of non-native vegetation in the restoration sites following site visits as a result of intensive weeding efforts.

Restoration efforts in the third quarter of 2014 included hand removal of non-native yellow star-thistle (*Centaurea solstitialis*), the only noxious weed species rated as "high" from the Cal-IPC that was encountered in the restoration sites. This species only occurred in trace amounts in restoration site 1 and germinated following the annual monitoring. Only four plants of this species were present in restoration site 1, and there was no seed source of yellow star-thistle in the adjacent undisturbed areas.

On July 25, 2014 and September 16, 2014, Nomad Ecology surveyor Brian Peterson observed native vegetation in restoration site 1 consisting of abundant amounts of hayfield tarweed, purple needle grass, and yarrow, common amounts of big squirreltail grass (*Elymus multisetus*) and California poppy, and infrequent amounts of blue wildrye grass. Mr. Peterson also observed native vegetation in restoration site 2 consisting of abundant amounts of hayfield tarweed and purple needle grass, common amounts of California poppy, infrequent amounts of blue wildrye, and a few yarrow seedlings.

On November 24, 2014, Nomad Ecology Botanist Erin McDermott and Biologist Annemarie Abbondanzo seeded restoration site 2 and portions of restoration site 1 with 14.3 pounds of supplemental native plant seed purchased from Hedgerow Farms in Winters and Pacific Coast Seed in Livermore. Seed sources included genotypes from Crystal Springs Reservoir in San Mateo County. The seed mix included blue wildrye grass, foothill needle grass (*Stipa lepida*), purple needle grass, and yarrow. The biologists broadcast the seed by hand throughout restoration site 2 and portions of restoration site 1, pressed seeds into the ground, and covered restoration site 2 with 600 pounds per acre of weed-free rice straw mulch.

4.2 VEGETATION ESTABLISHMENT TRENDS

Based on the observed conditions and the reported monitoring results, the restoration sites are making significant progress toward establishment as expected in the restoration plan (GANDA 2013). The establishment pattern is somewhat varied, with higher native cover reported in the larger restoration site 1 than the smaller restoration site 2. The intensive non-native plant removal efforts in March, April, May, and June and to a limited degree in July and September have been successful in removing the non-native vegetation to the extent feasible. The supplemental seeding in November 2014 is anticipated to increase native plant cover especially in restoration site 2.

5.0 MANAGEMENT IMPLICATIONS

Continued non-native plant removal efforts are merited in 2015 in both restoration sites. Removal of non-native plants before seed set should be a priority over the course of the next year. GANDA recommends conducting the next non-native plant removal effort in April and May 2015 before native grasses set seed.

6.0 REFERENCES CITED

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Appendix A
Photograph Documentation - April 19, 2014

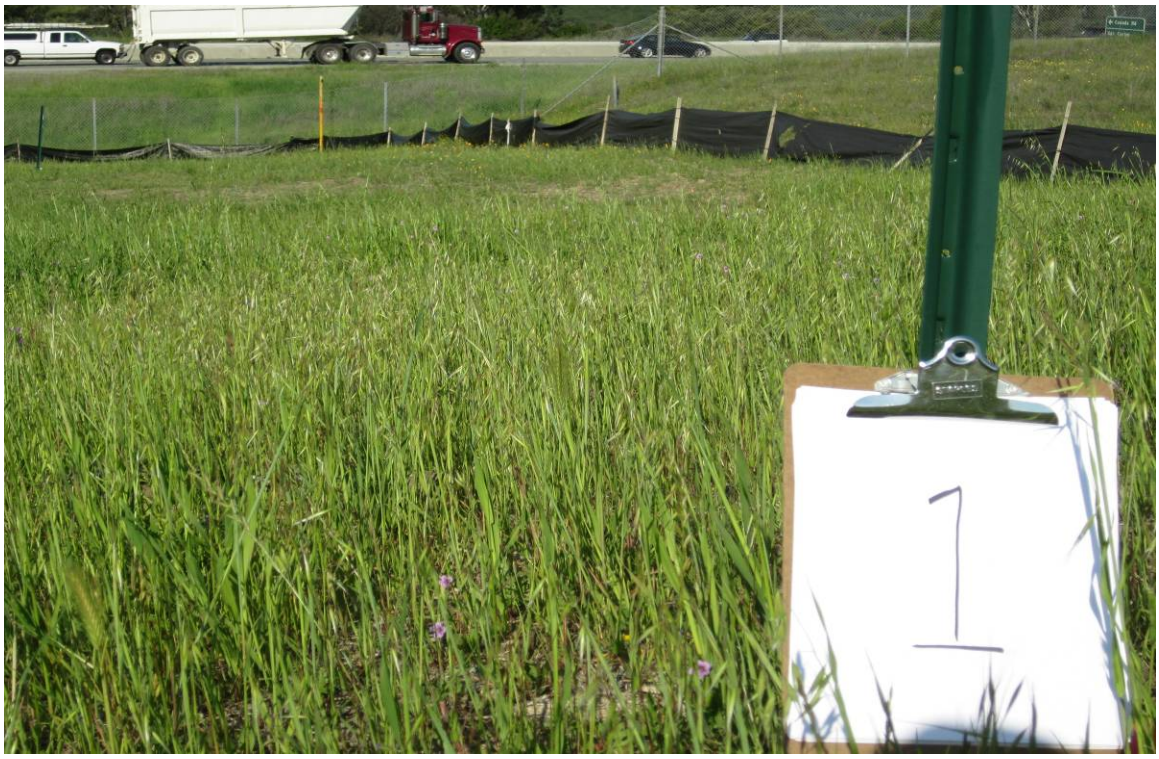

Photo 1 Transect 1 in restoration site 1

Photo 2 Transect 2 in restoration site 1

Photo 3 Transect 3 in restoration site 1

Photo 4 Transect 4 in restoration site 2

Photo 5 Transect 5 in the reference site