

HABITAT RESTORATION PLAN FOR WHITE POINT LANDSLIDE REPAIR

MITIGATION

OCTOBER 30, 2014

1 INTRODUCTION

This habitat restoration plan was prepared for the White Point Nature Preserve, for 1.5 acres that were previously restored but subsequently impacted by the Paseo del Mar landslide repair activities. Two habitat types--coastal sage scrub and coyote bush grassland--will be restored based on the original restoration plans. The sites to be restored by this plan are shown in Figure 1.

The restoration activities recommended for the site include, but are not limited to, site preparation, planting, weed management, and remedial planting, if necessary. The following sections discuss general methods of recommended restoration actions.

2 RESTORATION HABITATS

This plan describes restoration plans for two areas. The habits proposed for restoration are coastal sage scrub (CSS) and coyote bush (*Baccharis*) grassland.

COASTAL SAGE SCRUB

The species selected for restoration represent the more common and abundant species observed in coastal sage scrub habitat (Table 1). Typical vegetation of the CSS restoration areas will consist of California sagebrush, California buckwheat, toyon, and bush sunflower. CSS is recommended to create suitable habitat for the California gnatcatcher.

Table 1. Plant Palette for Coastal Sage Scrub (0.6 acre).

Species	Container Size	Plant Quantity
<i>Artemisia californica</i>	1 G	362
<i>Brickellia californica</i>	1 G	11
<i>Encelia californica</i>	1 G	90
<i>Epilobium canum</i>	1 G	15
<i>Eriogonum cinereum</i>	1 G	66
<i>Eriogonum fasciculatum</i>	1 G	300
<i>Eriophyllum confertiflorum</i>	1 G	40

<i>Gnaphalium californica</i>	1 G	16
<i>Hazardia squarrosa</i>	1 G	30
<i>Heteromeles arbutifolia</i>	1 G	1
<i>Horkelia cuneata</i>	1 G	16
<i>Isocoma menziesii</i>	1 G	18
<i>Leymus condensatus</i>	1 G	7
<i>Mimulus aurantiacus</i>	1 G	8
<i>Mirabilis californica</i>	1 G	17
<i>Rhus integrifolia</i>	1 G	1
<i>Salvia leucophylla</i>	1 G	3
<i>Salvia mellifera</i>	1 G	8
<i>Solanum douglasii</i>	1 G	15
<i>Stachys rigida</i>	1 G	35
Total plants for this area		840

COYOTE BUSH GRASSLAND

The coyote bush grassland contains primarily grassland species intermixed with coastal shrub species, particularly coyote bush (Table 2).

Table 2. Plant Palette for Coyote Bush grassland (0.9 acre).

Species	Container Size	Plant Quantity
<i>Baccharis pilularis</i>	1 G	80
<i>Encelia californica</i>	1 G	24
<i>Eriogonum cinereum</i>	1 G	24
<i>Eriogonum fasciculatum</i>	1 G	40
<i>Eriophyllum confertiflorum</i>	1 G	8
<i>Eschscholzia californica var. maritima</i>	1 G	60

<i>Gnaphalium californica</i>	1 G	20
<i>Isocoma menziesii</i>	1 G	80
<i>Melica imperfecta</i>	4"	500
<i>Nassella lepida</i>	4"	500
<i>Salvia mellifera</i>	1 G	40
Total plants		1376

SOURCES OF PLANT MATERIAL

To the extent possible, all plant material for the restoration shall be obtained from native plant communities growing within the Palos Verdes Peninsula. The PVPLC has in house capabilities for seed collection. For those species that do not exist in large enough quantities within the specified seed collection area, it will be necessary to either use seed that is commercially grown or extend the collection area on a species by species basis.

2 SITE PREPARATION

FENCING

Protective fencing delineating the perimeter of the restoration area is recommended to keep pedestrians out during plant establishment is recommended. Installation of the protective fencing should occur prior to any restoration activities and should consist of metal T-bar posts at 30-foot intervals with nylon rope attached at a height of approximately four feet. This type of fence is strong and simple enough to be an effective barrier to humans, while not being an impediment to wildlife movement. The fencing material can also be easily removed without damage to the vegetation at the end of the vegetation establishment period. All-weather and graffiti protected signs should be placed at a few key locations along the fencing with information explaining the sensitivity of the restoration area, a no trespassing request, and a contact phone number for further inquiries about the project.

TRAIL GRUBBING

Unauthorized trails that have developed in the restoration sites have compacted soil that will need to be broken down manually or by machine prior to planting.

EXOTIC SPECIES CONTROL

The restoration areas will require site preparation and weed control. Methods used for site preparation will vary depending on the type and density of exotic species present, and density of native species.

Regular monitoring during site preparation will be required for successful weed management. Monitoring is necessary to guide scheduling and particular control methods according to the phenology of each target weed species. Areas should be evaluated after each weeding event to assess the progress of site preparation and to plan the next step.

The following methods will be employed in various combinations based on an adaptive management approach for site preparation.

- Cutting for annual grasses and mustard plants;
- Hand pulling of seedlings where feasible;
- Specific herbicide application for target weeds such as sweet fennel and grasses;

Weeds shall be controlled before seed production to limit accumulation of the weed seed bank on the site. Weed control will include a combination of the following methods based on the conditions of the restoration areas.

For efficient control of exotic invasive species, weeds must be controlled before they produce viable seed and are therefore no longer contributing to the seed bank. Methods of control will depend on the target species, the density of the target species, the area of infestation, and the ecological sensitivity of the existing habitat. Weed removal will employ hand pulling as well as mechanical methods, such as mowing and weed whipping. Limited use of selected herbicides is specified when no other effective alternative is feasible to remove and control the high priority invasive exotic species. Herbicide treatment is specified for mainly invasive weed species that may re-sprout from tap-roots or stumps. Only herbicides registered for use in California wildlands would be used judiciously.

PHYSICAL CONTROL METHODS

Physical methods of weed control that are recommended in the restoration areas to use during site preparation are mechanical methods such as weed whipping/mowing and hand-pulling. Pulling can be accomplished by hand or with tools to treat isolated individuals of exotic species.

Mowing/Weed Whipping

Repeated mowing or weed whipping treatments prior to seeding is in general the most efficient and least disruptive site preparation method to use in areas dominated by annual grasses and mustards. Mowing can be accomplished by machine on gentler terrain, or by hand-operated mowers on steeper terrain. Weed whipping can be accomplished with a gas operated weed whip fitted with a brush blade, or similar implement. Hand operated mowers and weed whips should be used in areas with a high density of native species present. Fire prevention measures must be taken to avoid accidental fires from sparks during machinery operation and these measures may be extensive during the dry season.

Raking and removal of the weed biomass after mowing or weed whipping is not necessary after each control event unless the weed species has set seed. Removal of the controlled weed material is recommended prior to seeding to ensure good seed to soil contact.

Hand/Mechanical Pulling

Isolated individuals of select invasive species can be pulled by hand or with a tool such as the Weed Wrench™. Pulling of weeds is one of the least disruptive methods of site preparation, but is not an efficient method of weed control in dense stands of weed species. The hand-pulling should be reserved for controlling isolated individuals, in areas that are not accessible by equipment, or when high densities of native species are present. When pulling is the weed control method used, as much of the root as possible should be removed, especially weed species with a long tap root such as mustard.

CHEMICAL CONTROL METHODS

Herbicide treatment is specified mainly for high priority invasive weed species that may re-sprout from taproots or rhizomes. Limited use of selected herbicides is specified when no other effective alternative is feasible to remove and control the high priority invasive exotic species. For efficient control of exotic invasive species, these weeds must be controlled before they produce viable seed. Most herbicides are not selective for weeds only; in other words, herbicides must be applied with the least harmful effect to non-target native species.

Only herbicides registered for use in wildlands should be used judiciously within the restoration areas. Herbicides that are registered for use in California for natural areas are recommended for particular weed species at specific rates noted on the labels. The recommended herbicides registered for use in California that are proposed in this restoration plan are glyphosate, a non-specific herbicide registered for use on almost all weed species, clopyralid for the treatment of thistles in the rosette stage, and fluazifop-p-butyl to control grasses.

PVPLC maintains a pest control business license which requires that at least one individual employed by the business be in possession of a qualified applicator's license. All licenses must be issued by the State of California and be currently registered in Los Angeles County. If a qualified applicator is not present during the herbicide treatment, all applicators must have undergone documented herbicide application training. Personnel must wear all protective clothing required by law and follow all label directions and precautions. All re-entry times specified on an herbicide label shall be observed and posted. Herbicide preparation shall be allowed only in approved staging areas more than 100 feet from a stream course or body of water.

A brightly colored dye is recommended in all herbicide applications to aid the applicator in achieving good coverage of the target species. The material shall be a non-toxic material such as Blazon®, Turf Mark® or the equivalent. The dye shall be mixed with the herbicide at no more than half the rate specified on the label.

Herbicide treatment shall be conducted only when weather conditions are conducive to effective uptake of the herbicide by the target species (e.g. sunny, dry with ambient temperatures 65 degrees Fahrenheit) and when plants are at the specified growth stage. Wind conditions should be five mph or less to minimize herbicide drift. Treated plants or stumps shall not be disturbed until the applied herbicide has had time to take effect per the manufacturer's instruction.

3 PLANT INSTALLATION

The Palos Verdes Peninsula Land Conservancy maintains its own nursery to grow plants. Container plant palettes were based on the plant palette used in the initial restoration of the site. Container plants consist of dominant shrubs and 40 to 60 plants will be planted in groups of mixed species throughout the restoration area. The layout for container

plants will be determined for each area based on micro topographic features and planting sites will be marked on the site using different colored pin flags under the supervision of the restoration ecologist or PVPLC biologist. Spacing of plants within the groups will follow the specifications presented in the tables for container plant palettes. Groups of container plants will be spaced in a natural looking mosaic in each area.

All container plants are to be planted to the following specifications:

- Planting holes shall be made with the minimum disturbance to accommodate the containers.
- Prior to planting, the planting hole shall be filled with water, and allowed to drain.
- Plants shall be set in the planting hole so that the crown of the root ball is approximately 0.25 inch above finish grade. Under no circumstance should the plant crown be buried.
- A watering basin shall be provided around each plant from 18 – 24 inches in diameter.
- Watering basins shall be filled with water after planting, at least twice.
- The irrigation system should be tested to ensure that all emitters are functioning.

4 IRRIGATION SYSTEM

A temporary irrigation system will be installed at the western restoration site. The eastern site will be watered by hand. Plants will be watered as necessary to supplement the annual rainfall during the establishment period. The temporary irrigation system will be installed prior to planting.

The temporary above ground irrigation system will be used in the early fall and late spring seasons. The irrigation system will slightly lengthen the growing season to maximize the development of the habitat. Depending on rainfall, irrigation likely will be required for the first two growing seasons for establishment.

Irrigation of Container Plants

Irrigation will be used in the first two seasons from planting to extend the rainy season and establish the shrubs, as necessary. The timing of irrigation events will depend on evapotranspiration between irrigation events and soil moisture. The following management scheme is anticipated as a guideline for water management of native trees and shrubs:

- Irrigate soil to full field capacity to the desired depth (approximately 18 inches after planting; and 18–24 inches during plant establishment).
- Allow soil to dry down to approximately 50-60 percent of field capacity in the top 6-12 inches before the next irrigation cycle. Depth of soil dry down between irrigation events will depend on development of container plants.
- Wetting of the full root zone and drying of the soil between irrigation events is essential to the maintenance of the plants and the promotion of a deep root zone that will support the vegetation in the years after establishment. A soil probe or shovel should be used to examine soil moisture and rooting depth directly.

5 SITE MAINTENANCE

One of the goals for the restoration is to provide self-sustaining habitats. However, initially, maintenance of the restoration area will be necessary to establish the newly planted areas. Maintenance will include any activities required to meet the performance standards set forth in this plan, in the estimation of the restoration specialist or PVPLC biologist.

These include the following:

- Weed control;
- Irrigation for the container plants;
- Replacement of container plants in areas with less than 80 percent survival in years two and three, based on visual observations of substantial mortality; and
- Pest and disease control, if necessary.

The establishment maintenance period is generally three years duration with the most intense maintenance in the first and second year, and only seasonal weeding activities in the third year.

The amount of maintenance each year will depend on weather conditions and how well the site develops. The following specifications for maintenance may require adjustments as determined by the restoration specialist or PVPLC biologist over the three-year maintenance period.

Weed Control

During the active maintenance period, the target cover from exotic weed species will be generally 20 percent or less. Control of annual grasses is especially important because annual grasses have been shown to compete with shrub species in restoration. Weeds will be controlled during late winter through early summer, as necessary, before they set seed and/or before they reach approximately 12 inches in height. Three weeding events should be estimated for a normal rainfall season, with more or less as dictated by rainfall. Weeds, such as purple false brome will be removed from the site if seeds have set prior to weeding. Since removal of weeded material is expensive, weeded material may be left on site as organic mulch material if seeds have not yet set. Removal of herbicide treated material is not an issue. Weed control will mainly employ hand pulling, mechanical methods, and spot spraying of herbicides for certain species such as fennel as described in Section 2.

Plant Replacement

Target values for relative cover of the native vegetation, including nurse and erosion control species, will be as follows with at least 20 percent cover in Year 1, 30 percent in Year 2, and 40 percent in Year 3. Actual cover values will depend mainly on weather conditions (seasonal rainfall and temperature) during the establishment period.

Survival of the container plants within the first growing season should be 80 percent. Plants shall be replaced if survivorship falls below 80 percent in the first season. Replacements will be planted as previously specified and maintained for one growing season, as necessary. As sites develop, it is impractical to implement direct counts of all the container plants. Replacement planting after the first season shall only be specified if the visual estimate indicates substantial mortality and the function of these species has not been replaced by seeded material and natural recruitment.

Table 4 summarizes the timing and activities for the implementation, maintenance, and monitoring of the habitat restoration. The timing is described in general terms by season. Exact dates for each phase of implementation and maintenance will depend on the onset and duration of seasonal rainfall as well as other factors such as the temperatures prior to, during and following rain events. However, it is important to plan for the site to be ready to seed by early fall. Rainfall and temperature will define the type and the density of weed species as well as native species that will germinate in any given year and season.

Table 3. Summary of Implementation and Maintenance Schedule.

RESTORATION TASKS	SITE PREP & INSTALLATION				YEAR 1 MAINTENANCE				YEAR 2 MAINTENANCE				YEAR 3 MAINTENANCE			
	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F
Site Preparation Weeding				X	X											
Plant Installation					X											
Maintenance Weeding					X	X	•	X	X	X	•		•	•		
Remedial Planting								•	•							
Horticultural Monitoring				W	W	W	W	W	W	M	M	M	Qt	Qt	Qt	Qt
Annual Performance Monitoring						X				X				X		
•= If necessary W=Weekly oversight M= Monthly oversight unless conditions require more oversight Qt= Once per quarter unless conditions require more oversight																

7 RESTORATION MONITORING

Monitoring of the restoration site serves to assess the progress of the restoration areas by assessing native plant cover relative to the established performance standards; and to inform maintenance activities and determine remedial actions. The monitoring will be performed by the project’s restoration ecologist.

Qualitative monitoring should consist of a general description of site conditions including the community structure composition and plant health along with a qualitative evaluation of native plant cover for the restoration areas. Additionally, a summary of the site maintenance performed to date and recommendations for future maintenance activities should be included.

Photo-documentation will consist of establishing permanent photo points in the restoration area to collect photos and track the development of the site over the 3 year maintenance period. The photo point locations should be established at appropriate representative locations within the restoration site.

The restoration area will be visually assessed using the CNPS rapid vegetation assessment methodology. Assessments will estimate native plant cover, weed cover, and plant composition to evaluate the progress and success of the restoration areas.

Annual performance monitoring should take place each year in mid-spring or as close to mid-spring as each year's rainy season permits to capture the majority of annual as well as perennial species. Results from the annual performance monitoring will be used to evaluate the progress of each habitat toward the ultimate goals of the project. Performance monitoring should be conducted by qualified plant ecologists.

8 RESTORATION GOALS

Performance standards have been established for the habitat restoration area based on expected vegetative development relative to undisturbed habitat of the same type. Interim performance standards are provided for each of the three years (Table 4).

Table 4. Performance Standards.

Year	Percent Cover of Native Species (%)
Year 1	>10%
Year 2	>20%
Year 3	>30%

These performance standards will be utilized to assess the annual progress of the restoration areas, and are regarded as interim project objectives designed to reach the final goals. Fulfillment of these standards will indicate that the restoration areas on the project site are progressing toward the habitat types and functions that constitute the long-term goals of the plan. If the restoration efforts fail to meet the performance standards in any year, the project's restoration ecologist may recommend remedial action to be implemented the following year with the intent to enhance the vegetation to a level of conformance with the original standard. These remedial actions may include re-planting, additional weed control measures, or adjustments to the watering and maintenance practices.

Figure 1. White Point Restoration Sites.

