

APPENDIX D

Planting Plan for Uplands



Planting Plan for Uplands
Associated with the Poseidon Wetland Mitigation Project
San Diego Bay National Wildlife Refuge
April 7, 2015

1.0 INTRODUCTION

The proposed Poseidon Otay River Estuary Restoration Plan (ORERP) would restore approximately 37 acres on the Otay River floodplain to intertidal wetland under the Intertidal Alternative. Approximately 320,000 to 370,000 yd³ of material would be excavated from the floodplain with 36,000 yd³ placed within the floodplain east of Nestor Creek and the remaining transported to Pond 15 to restore wetland habitat there. The portion of the floodplain east of Nestor Creek, comprising approximately 40 acres, was eliminated from the restoration plan due to the presence of contaminated soils. The 36,000 yd³ of soil place at the site are for future use by the U.S. Fish and Wildlife Service (USFWS). This area is primarily disturbed habitat, supporting crown daisy and non-native grasses and is mowed each year for fire prevention. The purpose of this planting plan is to revegetate the existing floodplain east of Nestor Creek, including the stockpiled soils, with a native hydroseed mix that will provide functional habitat and soil stability while not disturbing the soil profile.

During discussions with the USFWS, owners of the Otay River floodplain site, it was determined that a low-growing shrub community would provide the desired soil stability, provide habitat for wildlife and compliment the adjacent riparian restoration undertaken by the USFWS and River Partners. Accordingly, this plan presents a plant palette composed of Diegan coastal sage scrub species (DCSS). DCSS is characterized by low, woody subshrubs that grow to approximately 1 meter in height (Holland 1986). Common dominant species include coastal sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*) and white sage (*Salvia apiana*).

2.0 PLANT PALETTE AND APPLICATION

Two methods are presented for revegetating the approximately 40 acres east of Nestor Creek. The first involves use of a custom seed mix, collected from the project area and tested for germination and purity. The second involves purchase of a pre-made DCSS seed mix from a commercial seed supplier.

Typically, for smaller scale revegetation projects, it is specified that all seeds should be collected from existing DCSS communities in the project area, in this case south San Diego Bay or nearby Tijuana River Valley. Using this method, it is usually recommended that all seed

be tested by a seed laboratory certified by the Association of Official Seed Analysts or a seed technologist certified by the Society of Commercial Seed Technologists as per the standards of the California Food and Agriculture Code for purity and germination. Seed collection and testing adds substantially to the overall cost of the project, as presented in detail below.

Alternatively, seed companies offer pre-made coastal sage scrub mixes that have been collected in California but not necessarily in San Diego County or south San Diego Bay. Seeds have been tested in house and are available at a set price per pound. The cost to apply the hydroseed mix and irrigate are the same for each option.

Under both options, the hydroseed will be applied as slurry to the entire surface area of the disturbed portion of the approximately 40-acre site. The hydroseed slurry will consist of the required seed species and quantities and an inert wood pulp matrix. Hydroseed will be applied as an even coating over all surfaces. Care will be taken to avoid impacting or hydroseeding the existing alkali marsh and coastal salt marsh within the 40-acre area.

Table 1. Plant Palette for Poseidon Upland Revegetation Plan – Option 1		
Species	% Purity/% Germination	Lbs/acre
<i>Artemisia californica</i> /coastal sagebrush	15/50	2
<i>Encelia Californica</i> /California encelia	40/60	3
<i>Eschsholzia californica</i> /California poppy	98/75	2
<i>Eriogonum fasciculatum</i> /California buckwheat	10/65	12
<i>Isocoma menziesii</i> /coastal goldenbush	20/40	4
<i>Acmispon glaber</i> /deerweed	90/60	8
<i>Lupinus succulentus</i> /arroyo lupine	98/85	4
<i>Salvia apiana</i> /white sage	70/50	2
Total		39 lbs/acre

Option 1. Collect and Test Seed. The proposed plant palette for Option 1 is presented in Table 1. This plant palette includes species common to southern California DCSS, both coastal and inland. These species are drought tolerant and have low water requirements. As stated above, seeds of these species would be collected in the south San Diego Bay area and tested for germination and purity. Cost associated with Option 1 are presented In Section 4.0 Estimated Cost.

Option 2. Pre-made Seed Mix. S&S Seeds, a respected seed supplier in the region, offers a pre-made DCSS mix presented in Table 2. This plant palette, like that in Option1, includes species common to southern California DCSS, both coastal and inland, that are drought tolerant and have low water requirements. S&S states that the mix is intended for non-irrigated areas but establishment and growth is enhanced with irrigation. They do not specify purity/germination but do provide number of live seed/lb by species. While this option includes more species, all are native to California and many were included in Option 1.

Table 2. Plant Palette for Poseidon Upland Revegetation Plan – Option 2	
Scientific Name	Common Name
<i>Acmispon glaber</i>	deerweed
<i>Artemisia californica</i>	coastal sagebrush
<i>Camissoniopsis cheiranthifolia</i>	beach evening primrose
<i>Collinsia heterophylla</i>	Chinese houses
<i>Encelia californica</i>	California encelia
<i>Eriogonum fasciculatum</i>	California buckwheat
<i>Eriophyllum confertifolium</i>	golden yarrow
<i>Eschscholzia californica</i>	California poppy
<i>Lupinus succulentus</i>	arroyo lupine
<i>Festuca microstachys</i>	small fescue
<i>Lasthenia californica</i>	dwarf goldfields
<i>Mimulus aurantiacus puniceus</i>	mission red monkeyflower
<i>Salvia apiana</i>	white sage
<i>Salvia mellifera</i>	black sage
<i>Sysyrinchium bellum</i>	blue-eyed grass
<i>Stipa pulchra</i>	purple needlegrass
Total lbs/acre	51

3.0 IRRIGATION

Irrigation will be provided by a temporary overhead irrigation system that does not disturb the soil profile. Water is available at the Otay River Floodplain and is currently being used by River Partners and the USFWS to establish riparian habitats. This water is being delivered via a well and pipeline from Terra Bella Nursery, located just east of I-5 on the Otay River at a cost of \$2,500/month for their approximately 60-acre riparian restoration. This is considerably less expensive than using City of San Diego potable water, which would likely be an order of magnitude greater. River Partners has agreed to provide additional as-needed services for the well and pump and recently replaced the pressure regulator at the well at no charge to the nursery. Poseidon may be required to provide similar services. It is anticipated that irrigation will be required for at least the first year of the project. Irrigation will be phased out gradually depending on the local weather conditions during the establishment period.

4.0 SUCCESS CRITERIA

Because the proposed revegetation is not mitigation for impacts to other resources, strict success criteria, such as percent cover, are not applicable. However, a goal of at least 50% cover by the end three years is proposed. In order to achieve this goal, initial germination of the hydroseed mix will be estimated and survival and growth will be estimated periodically. It is proposed that germination be estimated through visual analysis supplemented with randomly placed 0.25 m² quadrats. Depending on the timing of hydroseed application, germination could be assessed 1 to 3 months after application and irrigation. The Project Biologist will determine whether sufficient

germination has occurred. Should germination fail to exceed 25 -30%, re-seeding may be required. Should plants that germinate fail to survive, re-seeding may be required.

The Project Biologist will conduct periodic site visits throughout the first three years to assess plant growth and survival. Cover will be estimated visually and supplemented with point intercept transects to quantify cover. Should cover fail to reach 50% after the third year, re-seeding may be required.

5.0 ESTIMATED COST

Option 1. The estimated cost to collect, test, apply and irrigate hydroseed under Option 1 is presented in Table 3. The rationale for this estimate is based on: 1) past seed collection and testing for similar, but smaller scale projects; 2) commercial hydroseed application rates; and 3) irrigation with water supplied by the same entity that is currently supplying water to River Partners on the Otay River floodplain.

In 2000, S&S Seeds was contracted to collect and test seed for a 4.3-acre maritime succulent scrub restoration in the Tijuana River Valley. Thirteen species were collected in quantities similar to those presented in Table 1. Total cost was approximately \$12,000. Accounting for inflation it is estimated that cost today for 13 species would be approximately \$15,000. Given that Option 1 proposes only 8 species, it is estimated that the cost to collect 8 species for a 4.3-acre restoration would be approximately \$9,230. Assuming no economy of scale, the cost to collect and test seed for a 40-acre site would be about \$369,230.

Commercial hydroseed companies reviewed on the internet advertise rule-of-thumb application costs of approximately \$3,500/acre. Using this cost per acre, it is estimated that the cost to apply 39 lbs of seed per acre under Option 1 would be \$140,000.

Should Poseidon procure the same arrangement with Terra Bella Nursery for water, the cost to irrigate for one year, based on \$2,500/month would be \$30,000. Because the River Partners project is riparian habitat which requires substantial watering and is 60 acres in size, a conservative estimate for 40 acres of more drought resistant DCSS is \$1,700/month. Adding a contingency for maintenance of the well and pipeline it is estimated that water would cost \$2,000/month or \$24,000/year. For the purpose of estimating cost, it is assumed that one year for irrigation will be sufficient to establish the hydroseeded plants.

Total cost under Option 1 would be approximately \$533,320. That cost could increase to around \$749,230 if City water is provided at a rate of \$20,000/month.

Table 3. Estimated Cost – Option 1	
Item	Cost
Collect and Test Seed	\$369,230
Apply Hydroseed	\$140,000
Irrigate	\$24,000
Total	\$533,230

Option 2. The estimated cost to purchase pre-made DCSS from S&S Seeds, apply and irrigate, is presented in Table 4. S&S recommends 51 lbs/acre of DSCC mix at \$45/lb for a cost of \$91,800 to procure seed for 40 acres, a considerable savings over collecting a custom seed mix. The cost for application and irrigation would be the same as Option 1 resulting in a total cost of \$255,800. That cost could increase to around \$471,800 should City water be used at a rate of \$20,000/month.

Table 4. Estimated Cost – Option 2	
Purchase Pre-made Seed Mix (\$45 X 40 acres)	\$91,800
Apply Hydroseed	\$140,000
Irrigate	\$24,000
Total	\$255,800

Based solely on cost, Option 2 provides a reasonable method for accomplishing the goal of revegetating the Otay River floodplain. However, the USFWS must concur that the use of seed collected from sites other than south San Diego Bay is appropriate for this portion of the San Diego Bay National Wildlife Refuge.

