

Arroyo Mocho at Stanley Boulevard Revegetation Concept Proposal

Urban Creeks Council (UCC) is pleased to provide this concept for the restoration of native riparian vegetation for Arroyo Mocho along its Stanley Blvd reach. The reach is defined as the approximately 5,000 LF section of Arroyo Mocho between Isabel Avenue and North Murrietta Boulevard.

Goals

The Stanley project site is an artificial flood-control channel designed to carry stormwater and urban runoff from throughout the watershed, as well as to convey releases from the South Bay Aqueduct to the Chain of Lakes area to recharge the groundwater basin. Historically, the Arroyo Mocho in this region likely did not convey water except in the wettest years. The channel design consists of a straight earthen channel with trapezoidal sloped banks with minimal vegetation. The current stream channel and associated riparian vegetation are therefore completely artificial constructs both in form and function.

The goals of the proposed restoration project are to a) construct a stable channel providing water/sediment conveyance capacity and fish passage, b) determine if it is possible to create coldwater aquatic habitat in this reach through channel modification and vegetation restoration, c) create functional riparian habitat.

To address these goals we propose a somewhat novel species palette that is based generally on existing habitat types as defined in the *Manual of California Vegetation*, but does not strictly replicate any known past or present assemblage. We arrived at this proposed palette using a tiered vegetation analysis that has been advocated by ecologists as a more robust alternative to strict reliance on “reference ecosystems,” since reference sites typically have already endured considerable anthropogenic modification, and because climate change is likely to exacerbate those changes even further.

Because reduced water temperatures are desired, a high level of canopy cover will be necessary. This can be provided through a vegetation design incorporating multilevel stands of riparian trees. Variation of tree species and placement will simultaneously allow the site to meet flood capacity demands.

Methods

To prepare this proposal, UCC focused on a tiered analysis of native vegetation for the project reach. The analysis considered the following temporal/spatial models:

- a) *Same place, same time:* What is the current vegetation profile on the site?
- b) *Same place, different time:* What is the historical vegetation profile of streams in this area?
- c) *Different place, same time:* What vegetation profiles are currently present in similar sites nearby?

UCC first carried out a rapid, informal survey of the existing plant community on the site to identify dominant native and non-native species and to assess which appeared to be doing well and which were struggling.

Second, we speculated as to what conditions were present in the project area before the channel was modified to its current condition. While there is very little information on the historical vegetative composition, the area was most likely dominated by perennial grasslands with an intermittent shrub community. It is also possible that a sycamore-alluvial woodland community was present.

We then conducted an analysis using CalFlora's online plant database of native species currently found within 10 miles of the project area. This presented us with a profile of what species might perform well on the Stanley site.

Recommended Approach

Many nurseries focus on collecting and propagating stock from local sources, and the majority of the plants in our palette are commercially available. However, most commercial nurseries do not offer locally-native stock, and most locally native plant species are not readily available in large quantities. In addition, stock propagated from locally adapted seed instead of from cuttings or common nursery stock has been shown to demonstrate better adaptation to environmental changes, especially climate change. Therefore, we strongly recommend a contract collection and propagation project for the Stanley reach. This will ensure that the stock is of the highest quality possible and will reduce concerns associated with vigor, survivorship and suitability for the site. A local nursery specializing in propagation contracts would be able to best assist in this project.

A contract-grow revegetation method aligns well with the ideal timeline for restoring a functional plant community. It is not advised to attempt to plant out an entire plant community all at once; a far more effective method is a top-down method whereby the revegetation is begun with the species of largest mature size and the site gradually filled in with shade-tolerant and mid-to-late-seral species. This method is the most efficient and cost-effective as it offers the best protection against mortality, favoring locally adapted and robust genetic stock.

Plant Palette

As described above in the Methods section, the proposed plant palette is based primarily on two plant lists: native species already present on the site, and species native to Alameda County and confirmed within 10 miles of the site. This preliminary assessment yielded a list of over 400 taxa (species and subspecies), so in order to reach our target of 50-75 species we eliminated any species that require conditions, such as serpentine or highly alkaline soil, that are not characteristic of the site. We also confined ourselves to those that are commercially available or known to be possible to propagate commercially, though we recommend that propagation experiments be conducted with other species to determine the feasibility of diversifying the plant community over time.

The range of conditions within the site also was a factor in the consideration of plant species. The reach is fairly incised, with a steep slope - quite a different topography than had been present historically, and one not likely to support re-establishment of sycamore alluvial woodland, for example. Consequently, the plant community will reflect a gradient of soil moisture from streamside to top of bank. Riparian-obligate species will be confined to lower elevations where the water table is readily accessible. Plants located in top of bank areas will need to be able to withstand extreme summer-dry conditions after the establishment period.

Conceptual Species Palette for Arroyo Mocho, Stanley Blvd Reach

<i>Botanical Name</i>	<i>Common Name</i>
TREES	
1 <i>Acer macrophyllum</i>	Bigleaf maple
2 <i>Acer negundo</i> var. <i>californicum</i>	California box elder
3 <i>Aesculus californica</i>	California buckeye
4 <i>Alnus rhombifolia</i>	White alder
5 <i>Cercocarpus betuloides</i> var. <i>betuloides</i>	Mountain mahogany
6 <i>Cornus glabrata</i>	Brown dogwood
7 <i>Juglans hindsii</i>	N. California black walnut
8 <i>Platanus racemosa</i>	Western sycamore
9 <i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont cottonwood
10 <i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	Black cottonwood
11 <i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i>	Hollyleaf cherry
12 <i>Prunus virginiana</i> var. <i>demissa</i>	Western chokecherry
13 <i>Quercus agrifolia</i> var. <i>agrifolia</i>	Coast live oak
14 <i>Quercus lobata</i>	Valley oak
15 <i>Quercus kelloggii</i>	California black oak
16 <i>Salix gooddingii</i>	Goodding's willow
17 <i>Salix laevigata</i>	Red willow
18 <i>Salix lasiandra</i> var. <i>lasiandra</i>	
19 <i>Salix melanopsis</i>	Dusky willow
SHRUBS	
20 <i>Baccharis salicifolia</i>	Mulefat
21 <i>Cercocarpus betuloides</i> var. <i>betuloides</i>	Mountain mahogany
22 <i>Cornus glabrata</i>	Brown dogwood
23 <i>Cornus sericea</i> ssp. <i>sericea</i>	Creek dogwood
24 <i>Eriogonum fasciculatum</i> var. <i>polifolium</i>	California buckwheat
25 <i>Eriogonum nudum</i> var. <i>auriculatum</i>	Nude buckwheat
26 <i>Eriogonum wrightii</i> var. <i>trachygonum</i>	Wright's buckwheat
27 <i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	Golden yarrow
28 <i>Frangula californica</i> ssp. <i>tomentella</i>	California buckthorn
29 <i>Holodiscus discolor</i>	Oceanspray
30 <i>Lonicera subspicata</i> var. <i>denudata</i>	Santa Barbara honeysuckle
31 <i>Physocarpus capitatus</i>	Ninebark
32 <i>Rhamnus californica</i> ssp. <i>californica</i>	California coffeeberry
33 <i>Rhamnus ilicifolia</i>	Hollyleaf redberry
34 <i>Ribes californicum</i>	Hillside gooseberry
35 <i>Rosa californica</i>	California wild rose
36 <i>Rubus ursinus</i>	California blackberry
37 <i>Sambucus mexicana</i>	Blue elderberry
GRASSES	
38 <i>Carex barbarae</i>	Santa Barbara sedge
39 <i>Carex nudata</i>	Dudley's sedge
40 <i>Carex praegracilis</i>	Clustered field sedge
41 <i>Cyperus eragrostis</i>	Tall flatsedge
42 <i>Danthonia californica</i> var. <i>californica</i>	California oatgrass

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43	<i>Deschampsia cespitosa</i> var. <i>cespitosa</i>	Tufted hairgrass
44	<i>Elymus multisetus</i>	Big squirreltail
45	<i>Hordeum brachyantherum</i>	Meadow barley
46	<i>Hordeum brachyantherum</i> ssp. <i>californicum</i>	California meadow barley
47	<i>Juncus articulatus</i>	Jointed rush
48	<i>Juncus bufonius</i> var. <i>congestus</i>	Toad rush
49	<i>Juncus occidentalis</i>	Western rush
50	<i>Juncus patens</i>	Common rush
51	<i>Juncus phaeocephalus</i> var. <i>paniculatus</i>	Brownhead rush
52	<i>Juncus xiphioides</i>	Iris leaf rush

ANNUALS

53	<i>Eschscholzia californica</i>	California poppy
54	<i>Castilleja densiflora</i> ssp. <i>densiflora</i>	Denseflower ow's clover
55	<i>Galium aparine</i>	Common bedstraw
56	<i>Gilia achilleifolia</i> ssp. <i>achilleifolia</i>	California gilia
57	<i>Gilia tricolor</i> ssp. <i>diffusa</i>	Bird's-eye gilia
58	<i>Layia chrysanthemoides</i>	Smooth tidytips
59	<i>Mimulus guttatus</i>	Seep-spring monkeyflower

PERENNIALS

60	<i>Achillea millefolium</i>	Yarrow
61	<i>Anemopsis californica</i>	Yerba mansa
62	<i>Artemisia douglasiana</i>	Mugwort
63	<i>Asclepias fascicularis</i>	Narrow Leaf milkweed
64	<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	Soap plant
65	<i>Scrophularia californica</i> ssp. <i>floribunda</i>	California figwort