Ecological Horticulture at the Presidio

PREPARED FOR
The Presidio of San Francisco

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A PRODUCT OF THE **RESILIENT LANDSCAPES PROGRAM,** SFEI

APRIL 2022

SAN FRANCISCO ESTUARY INSTITUTE PUBLICATION #1080

SUGGESTED CITATION

Baumgarten, S., Lee, V., Bazo, M., Spotswood, E. Ecological horticulture at the Presidio. Prepared for the Presidio of San Francisco. SFEI Publication #1080, San Francisco Estuary Institute, Richmond, CA

Version 1.0, April 19, 2022

REPORT AVAILABILITY

Report is available on SFEI's website at www.sfei.org/projects/ecological-horticulture-presidio

COVER IMAGE CREDITS

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ACKNOWLEDGEMENTS:

This document was funded by the Presidio of San Francisco. We thank all of the Presidio staff who contributed to the report including Lew Stringer, Michael Boland, Marion Anthonisen, Eric Love, Genevieve Bantle, Dionisio Gamoso, Jose Hernandez, Michael Lamb, Kristin Maravilla, Rania Rayes, and Brett Stevenson. We are grateful for the support of SFEI staff members who contributed to this effort, including Robin Grossinger and Megan Wheeler.

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1 Introduction

The Presidio of San Francisco—the nation's largest urban national park—is located in an area of exceptional ecological diversity. Historically, many different habitat types thrived in the mix of wind-swept dunes, riparian forests, and curious dwarf oak woodlands that characterized this landscape. Many of these habitat types are rare today (and some were even rare in the region historically), and together they harbor a host of unique plants and animals.

The Presidio Trust, the federal agency that manages most of the park and is charged with its preservation and stewardship, is a leader in cutting edge urban conservation and restoration. Through its work in urban wildlife reintroduction, urban ecological restoration, and conservation of rare species, the Presidio is creating national models for how to reconcile biodiversity conservation with community priorities in a highly public and dense urban setting.

Viewed for many decades as biological deserts, cities are only just recently being recognized for the biodiversity they harbor, and even today, the opportunity to focus conservation efforts specifically on biodiversity support in urban contexts is largely overlooked. While the Presidio is already filling this gap through native habitat restoration in its open spaces, the landscaping around the residential and commercially rented buildings in the Presidio generally does not draw from the native habitat types that were once found across the northern tip of San Francisco. This project will help to fill this gap, providing the guidance needed to design for ecologically supportive urban landscaped areas that draw from and are inspired by the unique habitats that once thrived in the Presidio. The creation of spaces inspired by this work will help the Presidio establish its place at the forefront of innovation around ecologically designed urban spaces.

Left top: Presidio, ca 1888. Photograph from the U.S. Marine Corps archives, courtesy of CC 2.0. Left bottom: Presidio buildings and landscape. Photograph by Nathan Yergler, courtesy of CC 2.0.

WHY ECOLOGICAL HORTICULTURE?

Look at any urban landscape in the Bay Area and the imprint of horticulture can be readily seen: plants bred to grow well in urban conditions, to require little maintenance, and to fulfill a design aesthetic. Horticultural plantings often feature showy flowers or a wide variation in colors, as in cultivars of Lantanas *(Lantana camara)* and African lily (*Agapanthus* spp.). These plants are a triumph of the success of plant propagation. Yet they often have little connection to local ecosystems, and they do not necessarily yield the best support for native biodiversity (Berthon et al., 2021). Local pollinator species, for instance, often specialize on a small number of native plant species that are not the focus of horticultural plant palettes, and studies have found that urban green spaces dominated by native plant species support a greater abundance and diversity of insects than areas dominated by exotic plants (Burghardt et al., 2009; Pardee and Philpott, 2014; Pawelek et al., 2009; Salisbury et al., 2015; Threlfall et al., 2017). In addition, the planting structure of horticultural design tends to favor aesthetics and programs, without necessarily providing suitable habitats for local wildlife.

Combining the tools and expertise of ecology and horticulture into a new discipline of **ecological horticulture** (eco-horticulture) has the potential to provide functional, aesthetically pleasing urban landscapes that also benefit native biodiversity. However, while ecologists know Lantanas, Hydrangea (*Hydrangea* spp.), and Agapanthus are unlikely to provide much benefit to biodiversity in California, there are significant barriers to promoting different planting choices in urban landscaping. One key gap in current knowledge and practice is the need for design information

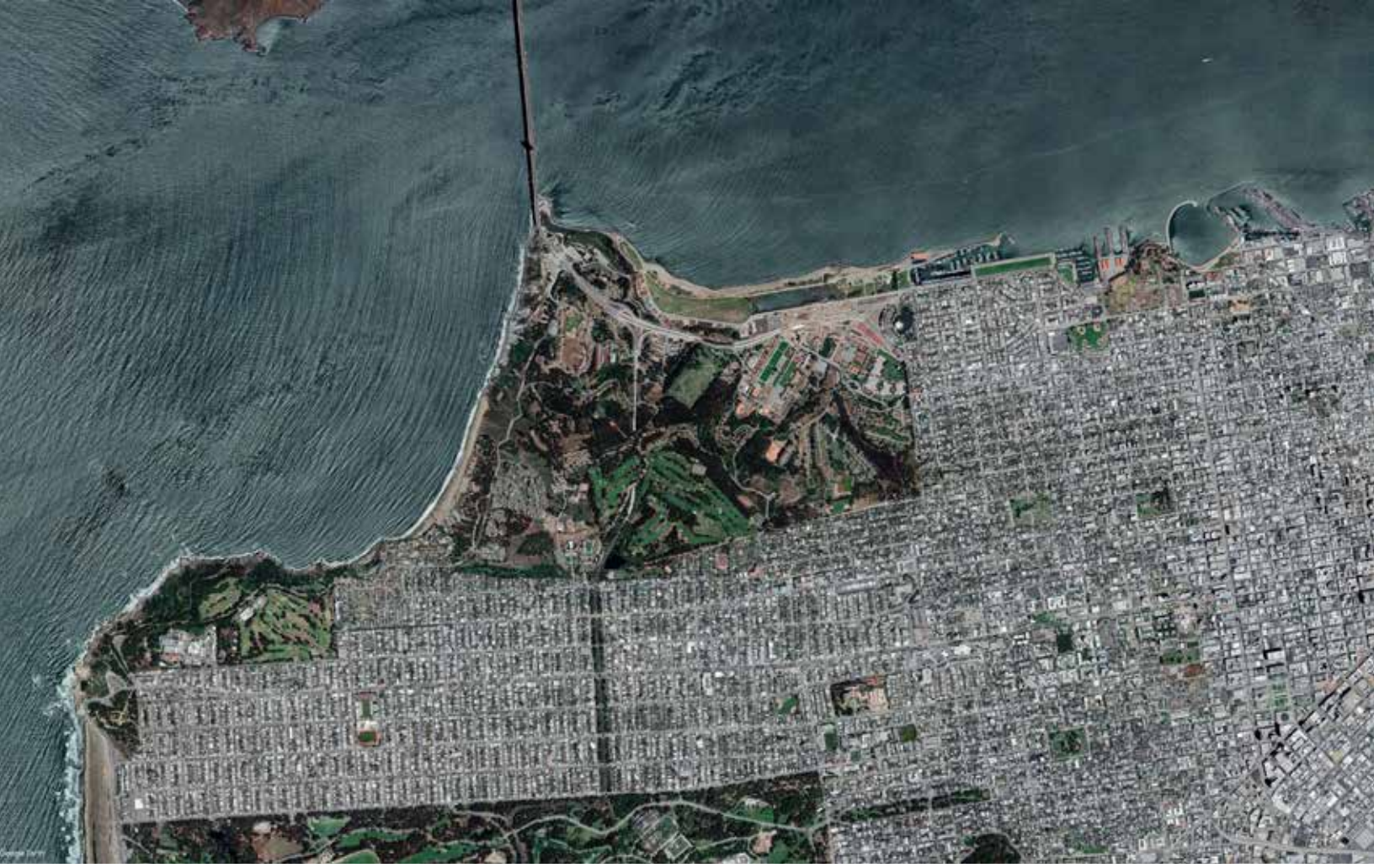
View from the Presidio. Photograph by Topher, courtesy of CC 2.0.

that draws specifically on ecological information to inform the design of biodiversity-supporting urban landscaping.

Natural habitats are made up of assemblages of plants that tend to occur together, forming predictable physical structure and resources that are used by wildlife. In designed landscapes, however, plantings also need to respond to the different functions, intended uses, and physical conditions of different landscape settings. This raises significant design questions: What is the best way to design with a local plant palette that is tailored to specific landscape settings to simultaneously achieve aesthetic, functional, and ecologically supportive outcomes? What would it look like to mimic key aspects of native ecosystems in a horticultural application?

This first phase of the project addresses the design gap by combining urban ecology, urban biodiversity science, historical ecology, and landscape architecture to develop eco-horticultural design guidance for a range of landscape settings in the Presidio. The resulting design guidance includes sample planting plans, other visuals of potential designs, planting palettes with information about locally appropriate native species, design specifications, and maintenance considerations. Future phases of the project can build on this research to address other knowledge gaps (e.g., around maintenance requirements) and apply findings to other geographic areas.

The eco-horticulture concepts presented here will need to be tested and refined in a variety of on-the-ground applications. In this regard the Presidio has a unique opportunity. Because of its large size, combination of cultural landscapes and more natural and restored areas, and staff of trained practitioners, the Presidio can deploy and test the principles of ecological horticulture at scale in a way few organizations can.



The Presidio in imagery, courtesy of Google Earth.

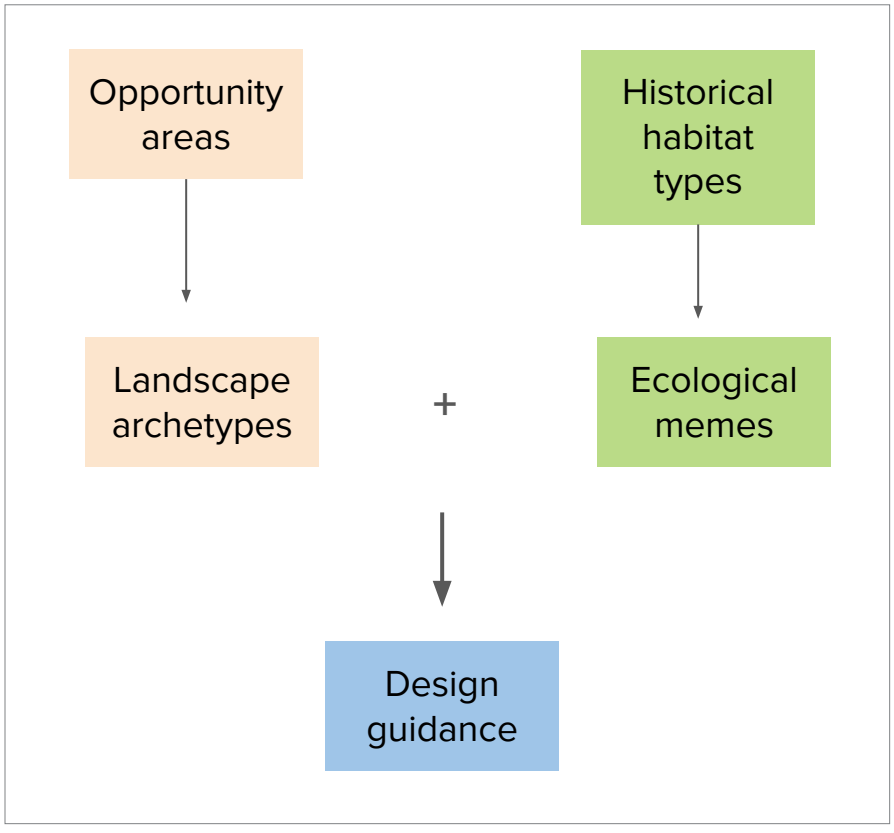


Fig.1. Project Concept. To create ecological horticultural design guidance for the Presidio, opportunity areas were identified and used to generate a typology of landscape archetypes. Historical habitat types appropriate to the Presidio landscape were identified and used to create ecological memes to inspire design. These elements were then combined to create design guidance by identifying appropriate habitat types for each landscape archetype.

2
Approach

In order to create ecological horticulture concepts for the Presidio, it was necessary to identify the types of spaces that would be appropriate for incorporating biodiversity-supporting urban design as well as the habitat types that could be appropriate as references for design in urban spaces.

First, near-term landscape conversion planning for the Presidio was used to identify locations likely to be available for ecologically designed landscapes. These opportunity areas were used to create a typology of landscape archetypes, or generalizable and repeatable types of spaces that occur frequently at the Presidio and have similar sets of opportunities, ecological conditions, and constraints (Fig.2).

Historical ecology research was used to identify appropriate habitat types that are both likely to succeed in the Presidio and likely to provide maximum biodiversity support. The most common historical habitat types were used to create ecological memes, or visual representations of historical habitat types that can be used to inform design. These ecological memes are intended to both provide inspiration for design in urban landscapes, and to provide design-specific information such as the height and canopy cover of vegetation that can help designers mimic non-urban habitat types in urban settings. Finally, an appropriate habitat type was selected for each landscape archetype, and design guidance was created for each landscape archetype that provides recommendations, design specifications, and plant palettes needed to inform ecological design in common urban settings found at the Presidio.

Opportunity areas

In the near-term, the spaces where there is an opportunity to convert existing landscaping to more natural habitat assemblages include areas which the Presidio Trust has identified for potential landscape renewal projects or turf conversion (see Fig. 2). These include sites with upcoming deferred maintenance scheduled between 2020-2029. Opportunity areas are summarized according to their current functions, historical habitats, and their adjacency of historic buildings.

The adjacency of these opportunity areas to historic buildings—those constructed prior to 1971 (see Fig.3)—creates constraints from a horticultural perspective. In these areas, the historic designed landscape character also needs to be taken into consideration. However, there is a general consensus that the goal of historic preservation is to rehabilitate, rather than to restore the exact same appearance of the past. As landscapes have evolved through time, there is a significant need to create more biodiverse, ecological friendly and sustainable landscapes that can respond to the present and future climatic conditions.

Fig.2. Opportunity Areas Identified by the Presidio Trust.

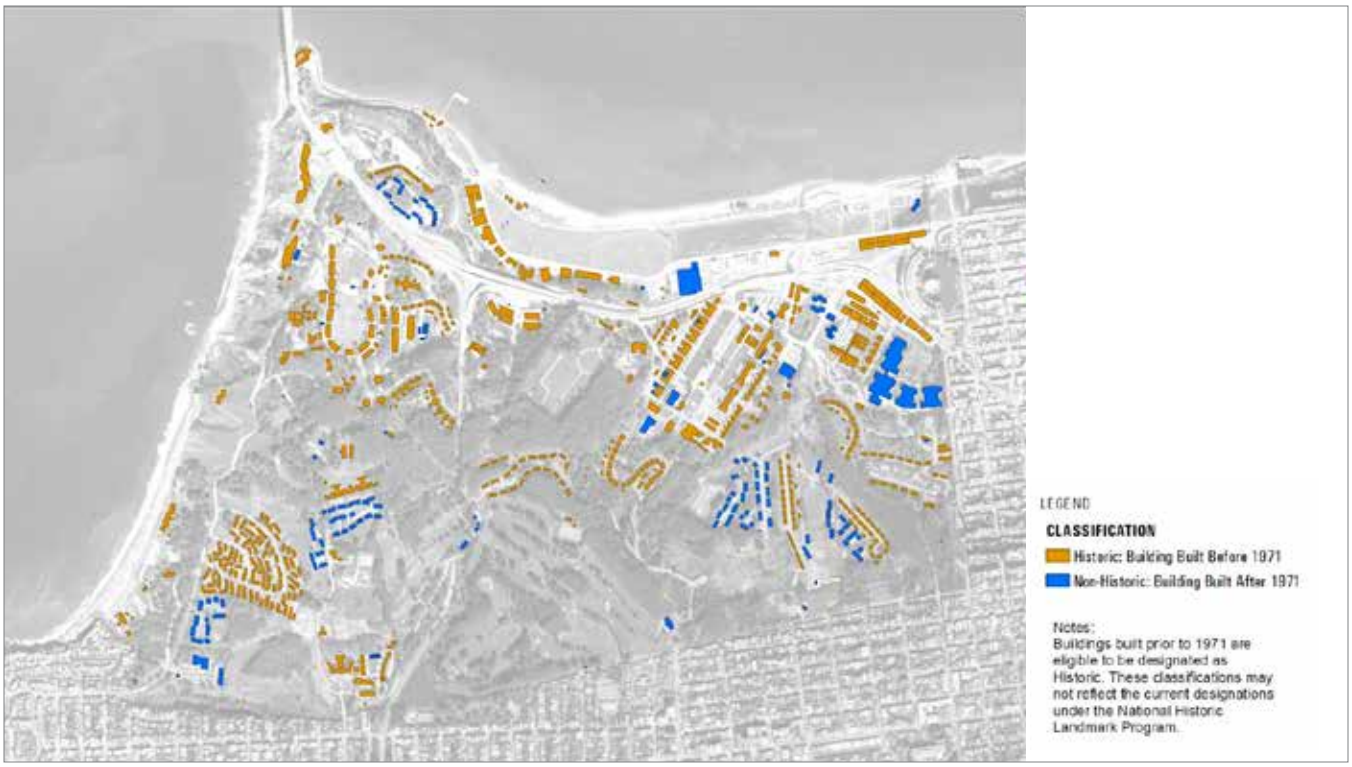


Fig.3. Historic Building Classification of Presidio, San Francisco, courtesy of the Presidio Trust.

The Presidio Hospital, circa 1888. Constructed during the Civil War, the Post Hospital is one of the oldest standing buildings on the Presidio, courtesy of the USMC archives and CC 2.0.

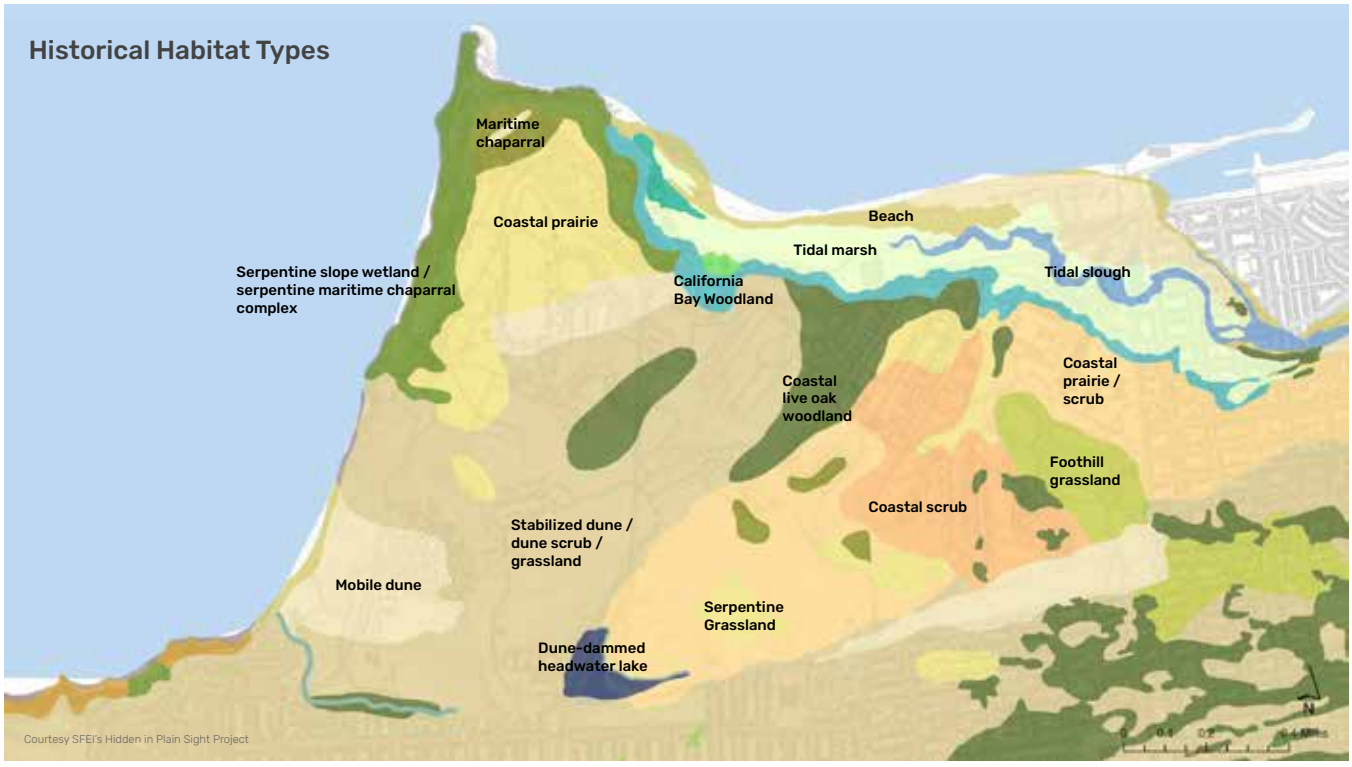
Historical ecology and ecological memes

Information about the historical ecology of the Presidio and surrounding areas in San Francisco can be used to identify natural assemblages of plants and wildlife that could flourish in these opportunity areas (Fig.4). While numerous constraints preclude the full restoration of these historical habitats in many areas, key characteristics of the historical habitats—including native plant species assemblages and more natural vegetation structure—can be incorporated into horticultural plantings to enhance support for native biodiversity.

Historical ecology research was conducted by SFEI and local partners as part of the Hidden Nature SF project (hidden-nature.org), the first phase of which was completed in 2021. The research synthesizes hundreds of historical maps, photographs, and textual documents into a single map depicting historical habitat types and waterways in the northern portion of San Francisco prior to major Euro-American modification (late 18th to early 19th centuries). Findings from the historical ecology research provide insight into historical habitat distribution, structure, composition, wildlife support, and relationship to physical controls.

The wild nature that once thrived on the San Francisco Peninsula is remarkably unique. The area now encompassed by the Presidio included a variety of habitat types, including dune scrub and grassland, coastal

Fig.4. Historical Habitats in Presidio, San Francisco
(mapping from SFEI's Hidden Nature SF Project).



scrub and coastal prairie, coast live oak woodland, foothill grassland, serpentine maritime chaparral and serpentine slope wetlands, freshwater lakes, riparian forest, and a number of other habitat types.

The five most prevalent historical habitats that overlap with the opportunity areas include dune scrub / grassland, coastal prairie, coastal scrub, coast live oak woodland, and foothill grassland (Figs.5&6). Their area of coverage ranges from around 7 acres to 17 acres (9-23% of the total opportunity area). For each of these habitat types, historical ecology information was used to develop an **ecological meme** (see chapter 3), which distills key elements of the historical habitat type (such as dominant plant species, vegetation height, and canopy cover) into guidance that can inform landscape design to mimic native habitat types in urban contexts. Although it was not one of the most prevalent historical habitats within the opportunity areas, a sixth ecological meme was developed for riparian habitats, which may be appropriate in a number of wetter sites with full or partial shade.

Snowy Plover in a Presidio wildlife protection area, photograph by [check], courtesy of CC 2.0.

Fig.5. Distribution of Historical Habitats within the Opportunity Areas

Fig.6. The five dominant historical habitats that overlap with the opportunity areas.

		Acres	Percent Area
Most dominant historical habitats within opportunity areas	**Stabilized Dune / Dune Scrub / Grassland**	**17.31**	**23%**
	Coastal Prairie / Scrub	**15.14**	**20%**
	Coastal Scrub	**14.19**	**19%**
	Coast Live Oak Woodland	**12.01**	**16%**
	Foothill Grassland	**7.08**	**9%**
	Coastal Prairie	4.42	6%
	Mobile Dunes	3.65	5%
	California Bay Woodland	0.75	1%
	Maritime Chaparral	0.52	1%
	Tidal Marsh	0.23	0%
	Serpentine Grassland	0.14	0%
	Dune-Dammed Headwater Lake	0.02	0%

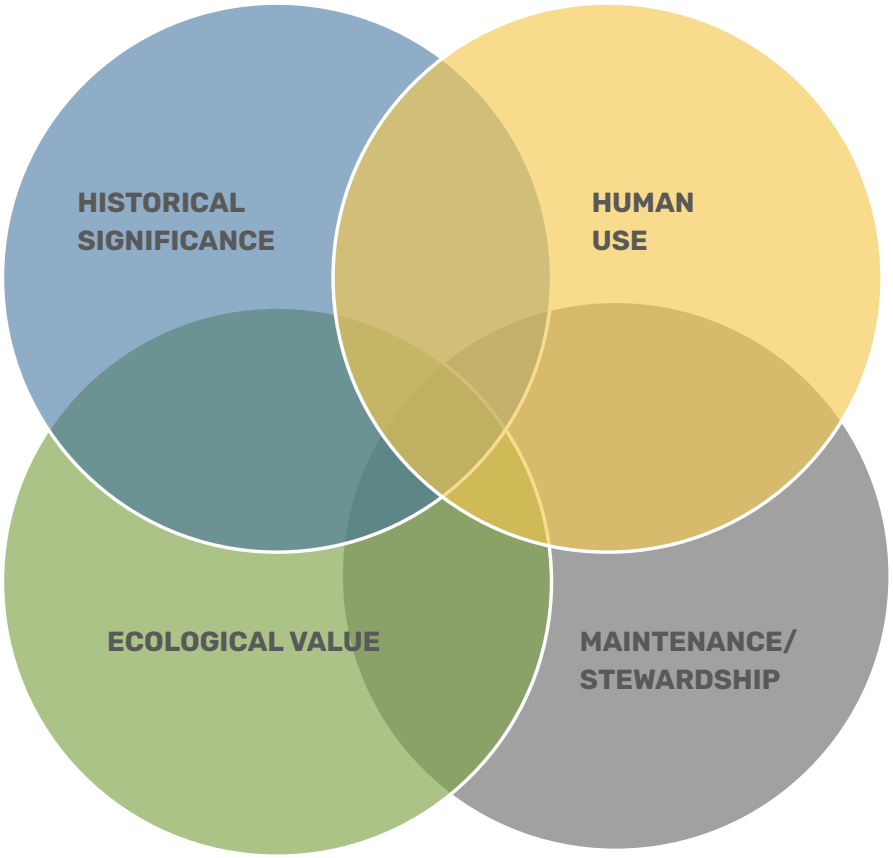
Decreasing

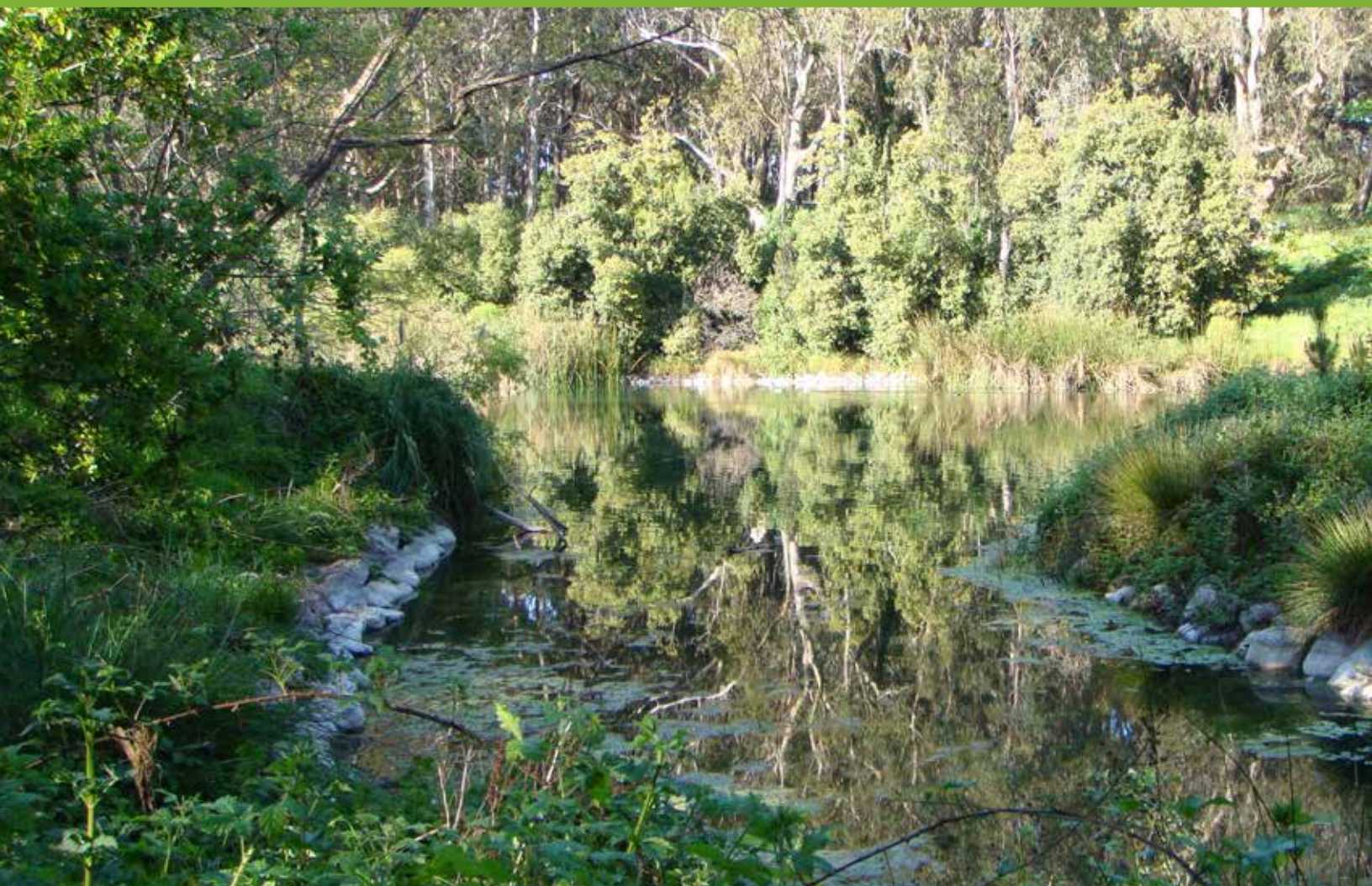
Landscape archetypes and design guidance

In consultation with the Presidio natural resources team and other experts, opportunity areas within the Presidio were categorized into six classes or landscape archetypes, which define common urban forms thought to share similar characteristics. These include visual amenity lawns, heavily used lawns, foundation plantings, roadside/parking lot plantings, buffer plantings, and large open spaces (see chapter 4). For the purposes of developing design guidance, a single historical habitat type was paired with each of the landscape archetypes.

Design guidance was developed to provide practical recommendations for maximizing the ecological benefits of the opportunity areas while also achieving other horticultural objectives (see chapter 4). Presidio staff defined four key design principles or considerations to guide horticulture design in these areas: ecological value, historical significance, human functions, and maintenance/stewardship (Fig.7). The design guidance includes recommendations for how to achieve each of these design principles, as well as sample planting plans and planting palettes, for each archetype-habitat combination.

Fig.6. Four key design principles used to guide eco-horticultural design.





3 Ecological Memes

The purpose of the ecological memes is to distill key elements of historical habitat types into a format that can be incorporated into landscape architecture. The memes were developed for each of the six dominant historical habitats within Presidio opportunity areas. Each meme includes a cross section illustrating the structure and composition of a historical habitat. It also includes summary information about vegetation height, canopy layers, percent closure, soil types, and other characteristics.

Left top: Presidio. Photograph by Guilhem Vellut, courtesy of CC 2.0. Left bottom: Presidio buildings and landscape. Photograph by Lawrence's Lenses, courtesy of CC 2.0.

I. Dune Scrub / Grassland

Dune scrub/grassland consists of shrub- and grass- dominated communities which occur on older, stabilized dune soils. It was commonly found in valleys and lower hill slopes of the Presidio in areas with dune sand geology. The soils are usually composed of well-drained sands, with low organic matter and nutrients. Dune scrub and grassland historically existed in a dynamic mosaic, with early successional grasses and forbs colonizing gaps created by dune blowouts within the surrounding matrix of dune scrub (U.S. Fish and Wildlife Service, 2003).

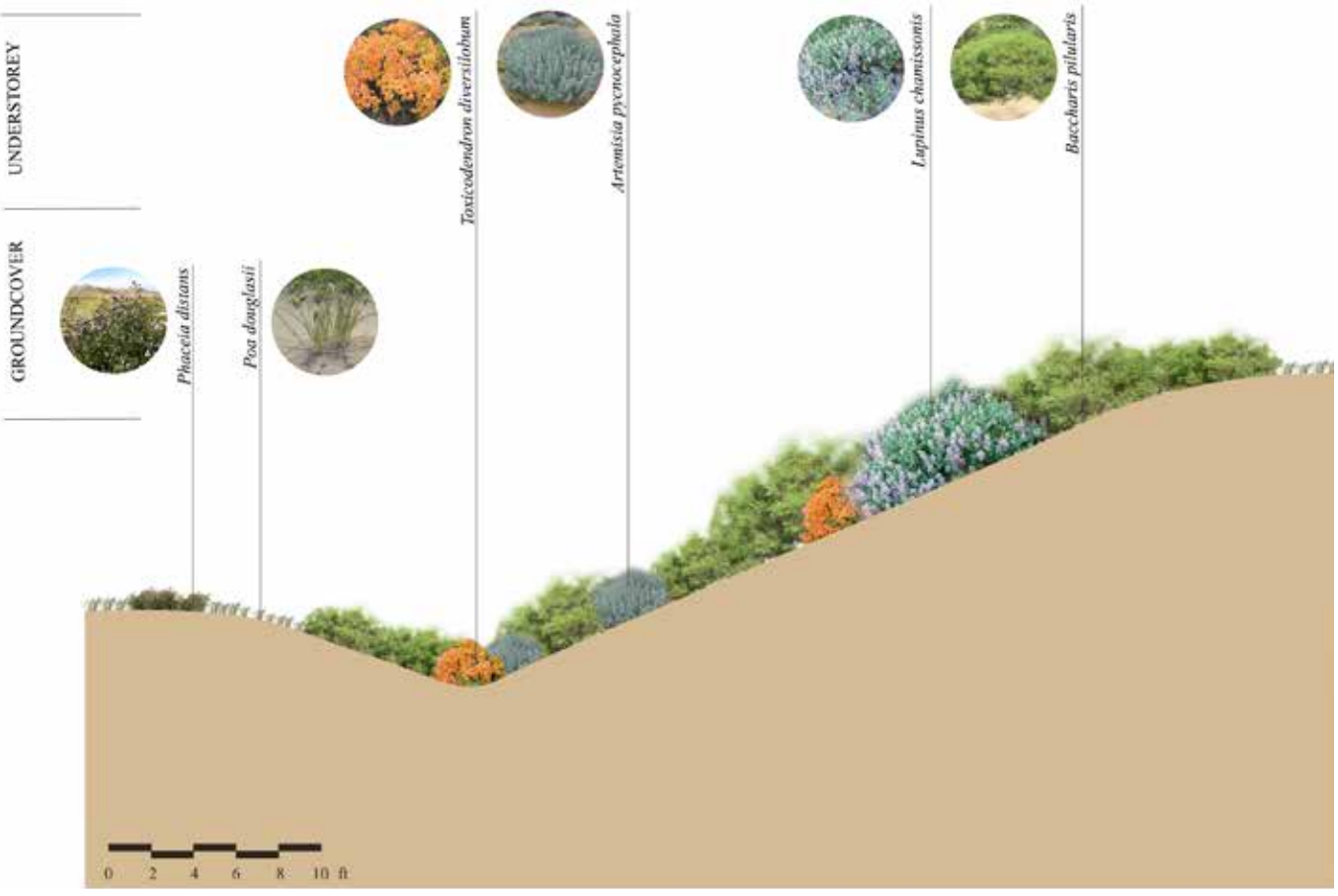
Vegetation Height: approx. 3-6 ft

Canopy Closure: continuous, near 100% (except areas affected by dune blowouts)

Layers: dune grassland as groundcover interspersed with taller over-story of dune scrub

Soil Type: dune sand

Fig.8. The Historical Section of Dune Scrub / Grassland in Presidio.



II. Coastal Prairie

Coastal prairie consists of early successional grass- and forb- dominated communities which were commonly found along the coast. The soils can be variable, ranging from rocky to fine-textured. While the composition and relative abundance of plants in pre-colonization coastal prairie is not fully known, historical evidence suggests that it was typically dominated by perennial bunchgrasses such as California oatgrass (*Danthonia californica*) and purple tussockgrass (*Stipa pulchra),* along with a wide variety of wildflower species (Stromberg et al., 2001; The Sonoma-Marin Coastal Prairie Working Group, n.d.).

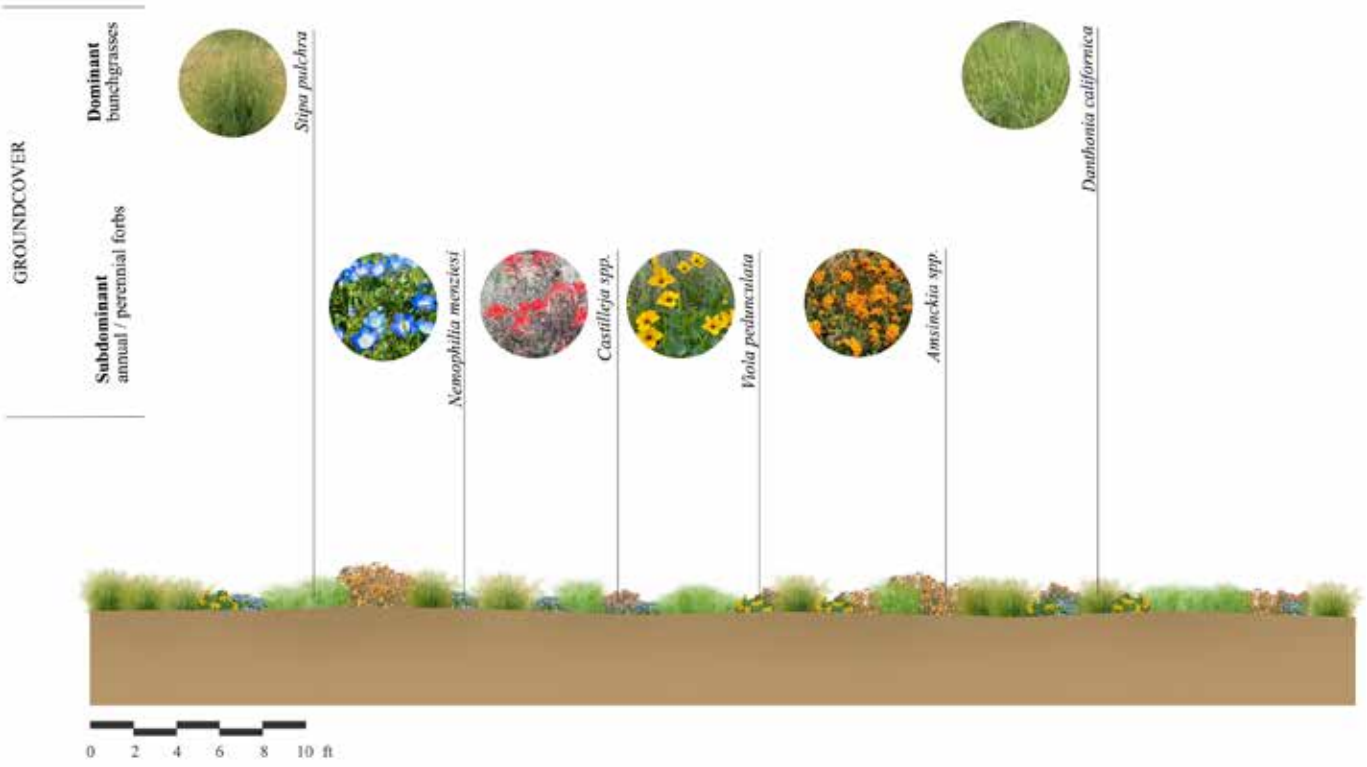
Vegetation Height: generally less than 3 ft

Canopy Closure: continuous, near 100% (except where a disturbance like fire created temporary openings)

Layers: grasses and forbs as groundcover

Soil Type: variable, non-sand

Fig.9. The Historical Section of Coastal Prairie in Presidio.



III. Coastal Scrub

Coastal scrub is characterized by relatively soft-stemmed, low-growing shrubs and succulents and a prominent herbaceous understory. This drought tolerant plant community occupies a variety of substrates, and often occurs in a patchwork with earlier successional coastal prairie. Coastal scrub provides habitat for a wide variety of wildlife species, including resident and migratory birds such as California quail (*Callipepla californica*), white-crowned sparrow (*Zonotrichia leucophrys*), wrentit (*Chamaea fasciata*), and Allen's hummingbird (*Selasphorus sasin*).

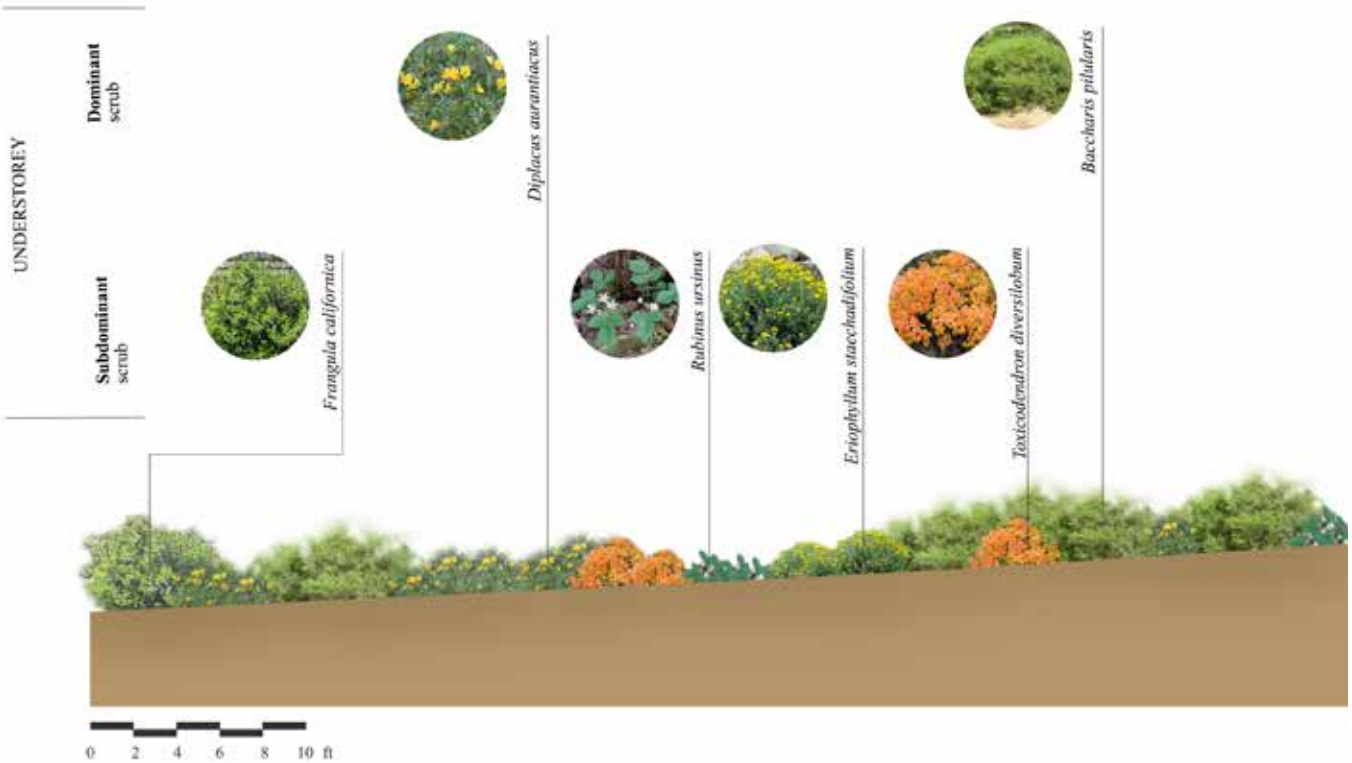
Vegetation Height: generally less than 3 ft; may be up to 6-7 ft

Canopy Closure: continuous, near 100%

Layers: grasses and forbs as groundcover and dominated by taller overstory of coastal scrub

Soil Type: variable

Fig.10. The Historical Section of Coastal Scrub in Presidio.



IV. Coast Live Oak Woodland

Coast live oak woodland in San Francisco was historically dominated by a dwarf form of coast live oak (*Quercus agrifolia*), whose growth was stunted by a combination of strong winds, relatively infertile soil, and partial burial under shifting sands. It occurred on old, highly weathered, nutrient-poor dunes, usually with permanent soil moisture at depth. It was commonly found on slopes, with stunted and sparse savanna on south-facing slopes and dense growth of shrubby coast live oaks and large shrubs on north-facing slopes.

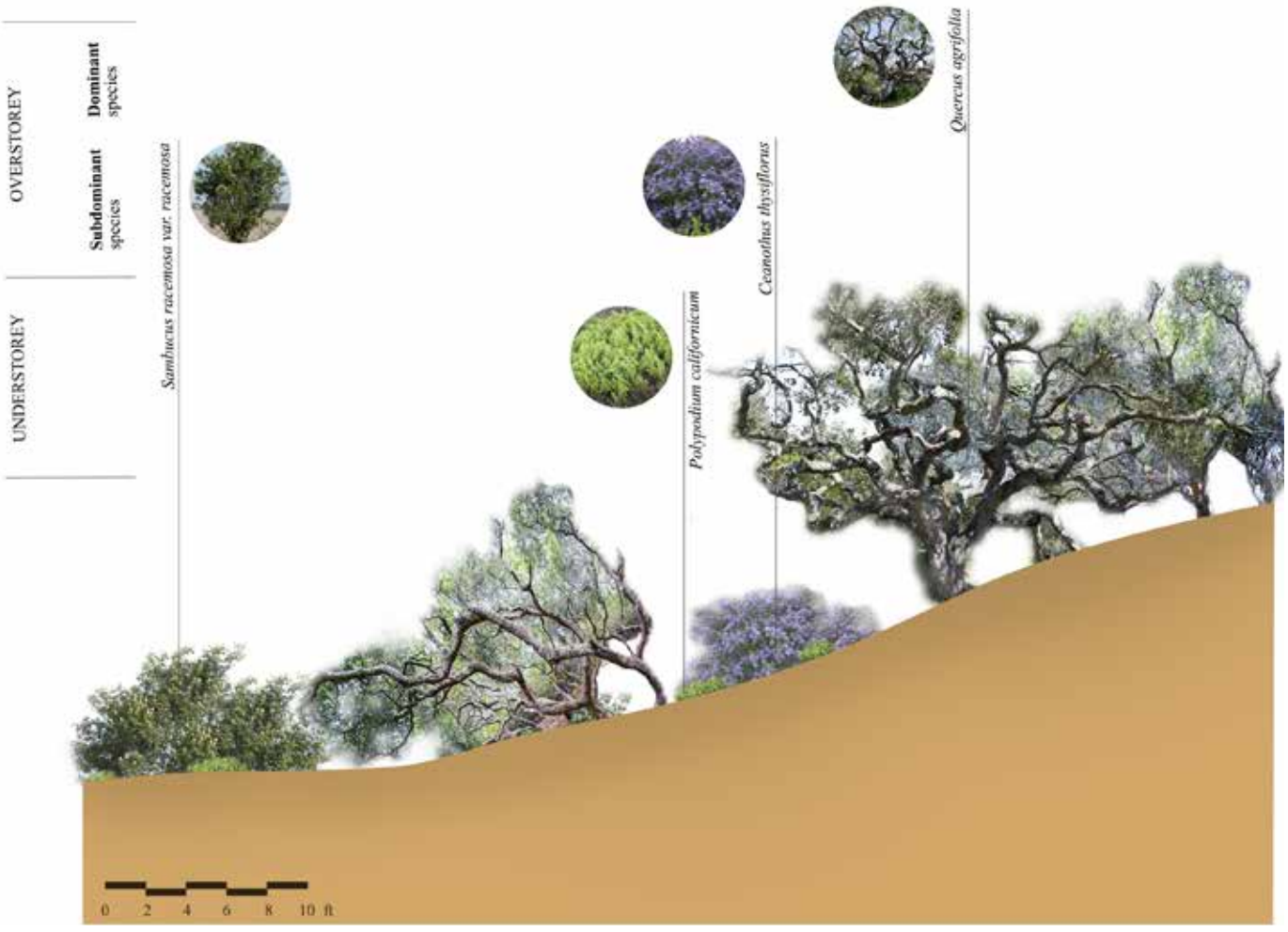
Vegetation Height: generally 15-18 ft

Canopy Closure: relatively complete canopy closure on north-facing slopes; more open (less complete canopy cover) on south-facing slopes

Layers: At least two: oak canopy and herbaceous / shrub understory

Soil Type: primarily older dune soils with more organic matter, more weathered, more stabilized

Fig.11. The Historical Section of Coast Live Oak Woodland in Presidio.



V. Foothill Grassland

Foothill grassland is an inland grassland type that occurs on hillslopes with well drained, rocky soils. It was historically dominated by perennial bunchgrasses such as purple tussockgrass (*Stipa pulchra*), blue fescue (*Festuca idahoensis*), and California melic (*Melica californica*), as well as a wide variety of forbs.

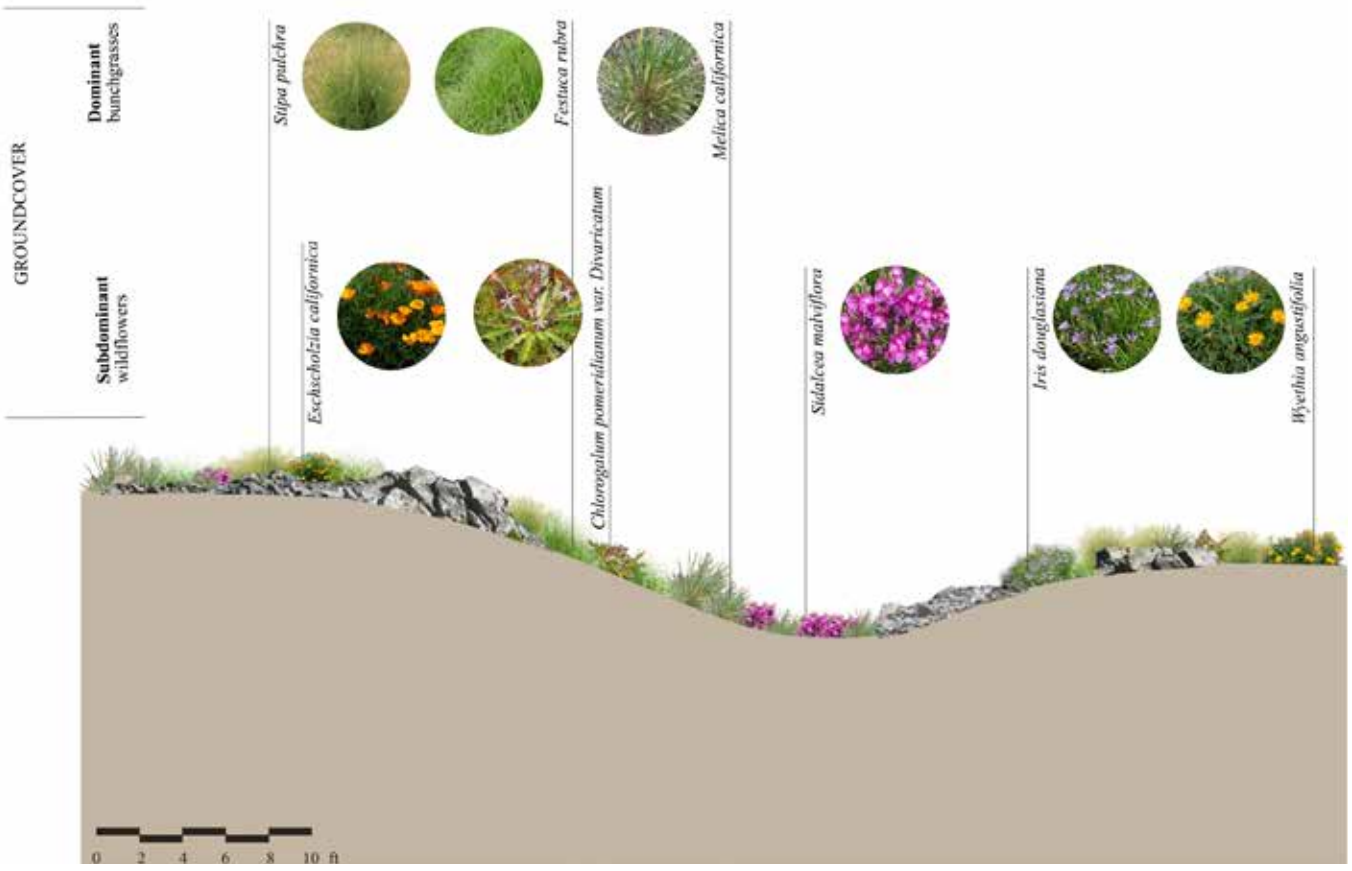
Vegetation Height: generally < 3 ft

Canopy Closure: continuous, near 100%

Layers: a single layer of groundcover

Soil Type: rocky, well-drained soils

Fig.12. The wwwHistorical Section of Foothill Grassland in Presidio.



VI. Riparian Habitat

Riparian habitat consists of communities of trees and shrubs associated with flowing water bodies. Riparian habitat occurs on mixed alluvial soils, generally with high organic matter content. Evidence suggests that some of the larger streams in San Francisco, like Lobos Creek, historically supported ~25-75 m-wide riparian corridors dominated by willows (*Salix* spp.), coast live oak, and California wax myrtle *(Morella californica)*. Smaller, more ephemeral drainages likely supported lower-growing cover of riparian scrub and/or herbaceous species like rushes and sedges.

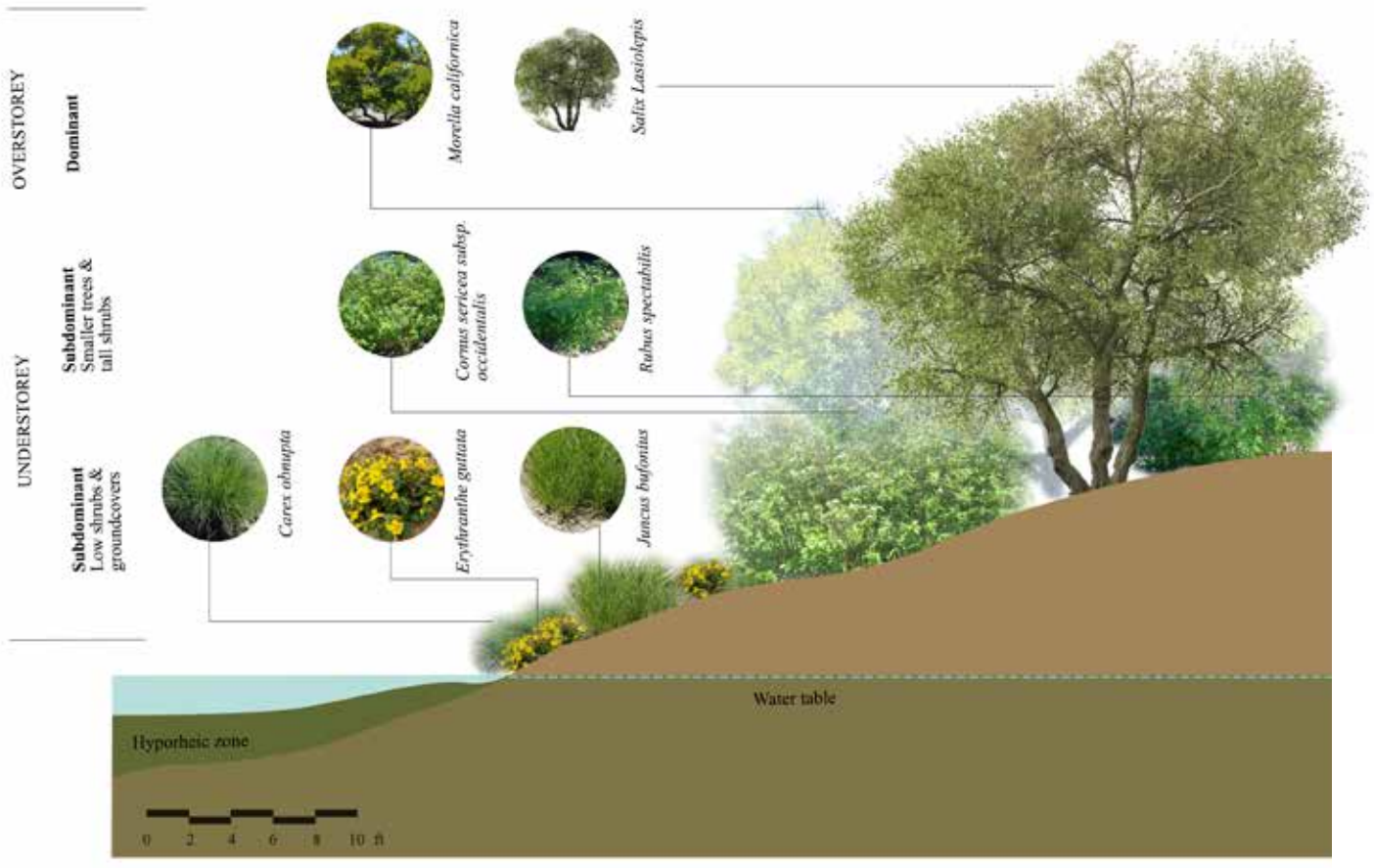
Vegetation Height: generally 30-40 ft

Canopy Closure: continuous, around 90% - 100%

Layers: ~3 layers along larger streams like Lobos Creek; smaller / ephemeral drainages likely to have 1-2 layers

Soil Type: alluvium, soils with rich organic matter

Fig.13. The Historical Section of Riparian Habitat in Presidio.



4

Landscape Archetypes and Their Design Guidelines

Landscape archetypes, in general terms, refer to the conceptual categories of landscapes. While landscape setting is unique in many ways, this conceptual framing allows complex, heterogeneous landscapes to be understood and analyzed as discrete classes with similar spatial structure / typology, dimensions, human uses, and planting conditions. In this project, they are not only a way to identify the diversity of common landscape typologies in Presidio, but also to facilitate formulation of non-site specific design recommendations for spaces with similar spatial, functional, and ecological characteristics. In this chapter, each of the six common landscape archetypes in the Presidio is paired with the most appropriate historical habitat to suggest how they can better support native ecosystems and biodiversity.

Left top: Presidio. Photograph by Mystery Cat, courtesy of Unsplash. Left bottom: Presidio buildings and landscape. Photograph by eneta-frevert, courtesy of Unsplash.

The practical guidance for incorporating native habitat elements into planting design takes into consideration four key design principles: ecological value, historical significance, human use, and maintenance/ stewardship. Each section of the recommendations is tailored for an archetype-habitat combination (Fig.14) and includes guidelines for each principle. Aside from archetype-specific guidelines, the historic building classifications of the Presidio should be referenced in the design process; particular attention should be given to areas with high historical significance in order to preserve the specific character, planting structure, or function of the landscape.

	Dune Scrub / Grassland	Coastal Prairie	Coastal Scrub	Foothill Grassland	Coast Live Oak Woodland	Riparian Habitat
Visual Amenity Lawn		■				
Heavily Used Lawn				■		
Foundational Planting						■
Roadside / Parking Lot Planting	■					
Buffer Planting			■			
Large Open Spaces				▨	■	

Fig.14. Habitat-Archetype Matrix.

I. Lawns (Visual Amenity Type)

DEFINITION: lawns that are less actively used and mostly function as a visual amenity

CONVERSION OPPORTUNITIES: **Coastal Prairie**

SPECIFICATIONS

Vegetation structure: a single layer of low-stature plants

Vegetation height: less than 3 ft

Canopy closure: continuous, near 100%

Soil type: variable, non-sand

1809 Wyman Ave

765 Portola St

756 Portola St

Main Post (Mesa St)

786 Sanches St

519 Simonds Loop

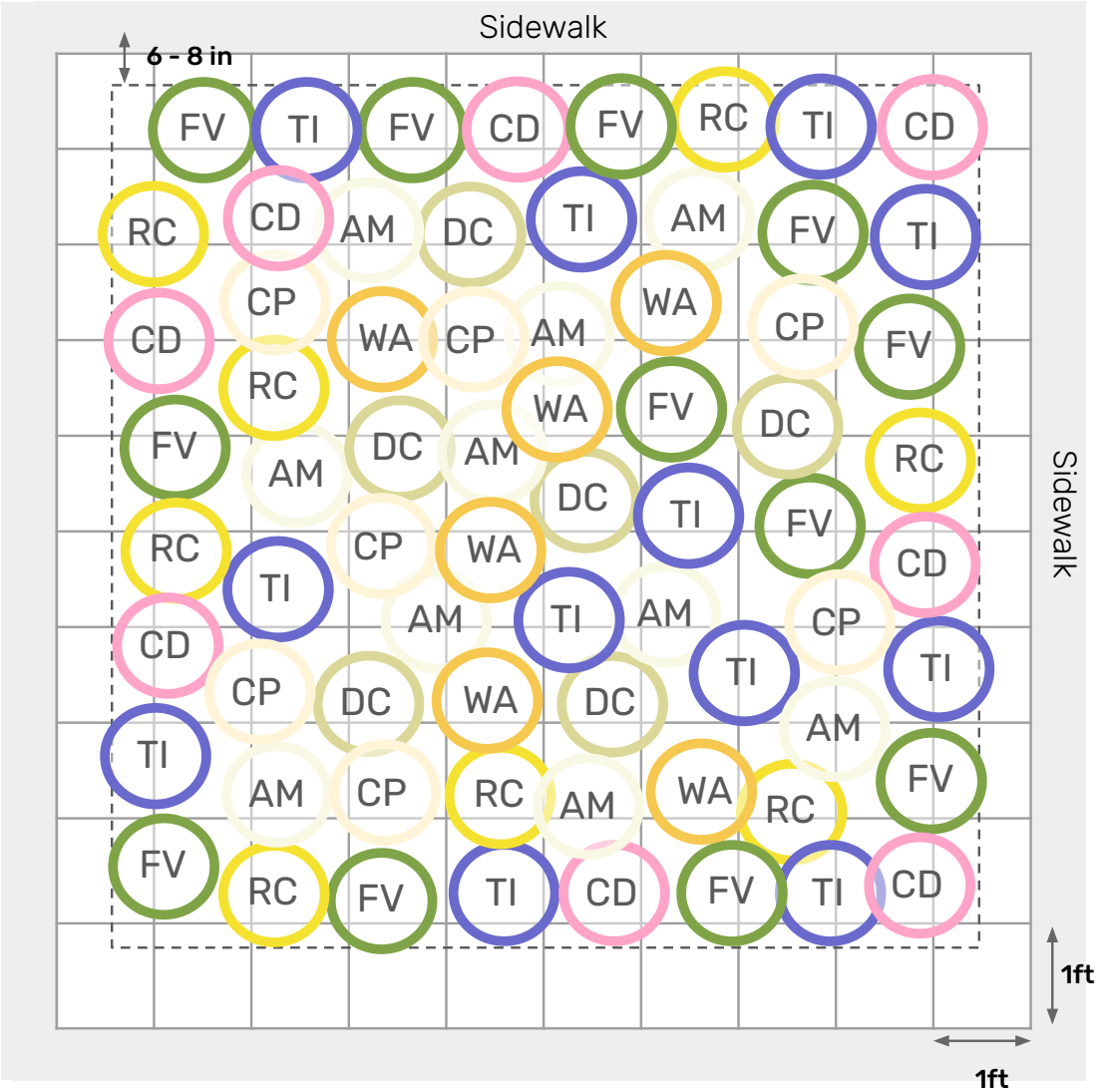
Fig.15. Examples of visual amenity type lawns in Presidio.

ECOLOGICAL RECOMMENDATIONS:

Primary ecological function: Support for insects, including native ground nesting bees and wasps, butterflies & moths, and other pollinators.

1. Create **dense planting** with low stature species to mimic coastal prairie, providing recognizable habitat for small mammals (e.g., western harvest mouse [*Reithrodontomys megalotis*], California vole [*Microtus californicus*]), reptiles, birds, bats, and other wildlife;
2. Prioritize species composition that maintains **pollinator resources** across seasons; and
3. Consider maintaining areas of **bare ground**, or place paver-stones with decomposed granite in between, for ground nesting bees. Consider maintaining **water features** like puddling sites for butterflies or natural-looking stone depressions to capture irrigation water and serve as watering holes for bees and other pollinators.

Fig.16. Sample planting plan for visual amenity lawns.



Sample planting palette for visual amenity lawns using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
DC	*Deschampsia cespitosa* ssp. *holciformis*	Coastal hairgrass	Jul	Butterflies & moths	Grass
CD	*Castilleja densiflora*	Denseflower Indian paintbrush	Mar - May	Butterflies & moths	Annual forb
AM	*Achillea millefolium*	Common yarrow	Apr - Aug	Bees, butterflies and birds	Perennial forb
CP	*Chlorogalum pomeridianum*	Soap plant	May - Aug	Bees, butterflies and moths	Perennial forb
FV	*Fragaria vesca*	Woodland strawberry	Feb - May	Butterflies, moths, some birds and mammals	Perennial forb
RC	*Ranunculus californicus*	California buttercup	Feb - May	Butterflies, bees & moths	Perennial forb
WA	*Wyethia angustifolia*	Narrow leaf mule ears	Apr - Jul	Butterflies, bees & moths	Perennial forb
TI	*Triteleia laxa*	Ithuriel's spear	Apr - Jul	Bees, butterflies and other insects, some mammals	Geophyte

Fig.17. Sample visual amenity lawn section (Mar).

Fig.18. Sample visual amenity lawn section (Jul).

MAINTENANCE RECOMMENDATIONS:

1. Select short and dense ground covers and vining forbs to reduce weed growth. In early years following initial planting, seed with annual forbs to fill in bare spaces and suppress weeds.
2. Select species that require little water and full / partial sun;
3. Leave 6 to 8 inches of margin from planting edge to allow vegetation growth while reducing mowing needs at the edges during the establishment phase; and
4. Consider irrigating once per week over the summer to reduce mortality and keep plants more beautiful.

AESTHETIC RECOMMENDATIONS:

1. Design the planting palette to provide seasonal interests;
2. Consider the color, texture and live form of plants to correspond to the character and function of the building; and
3. Provide open viewsheds towards the principal front or other facades of the building.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Consider the selection and combination of plants, especially in terms of their form, texture and color, to design landscaped areas that complement the existing environment; and
2. Use low-statured planting wherever possible to maintain a similar vegetation height as the amenity lawns.

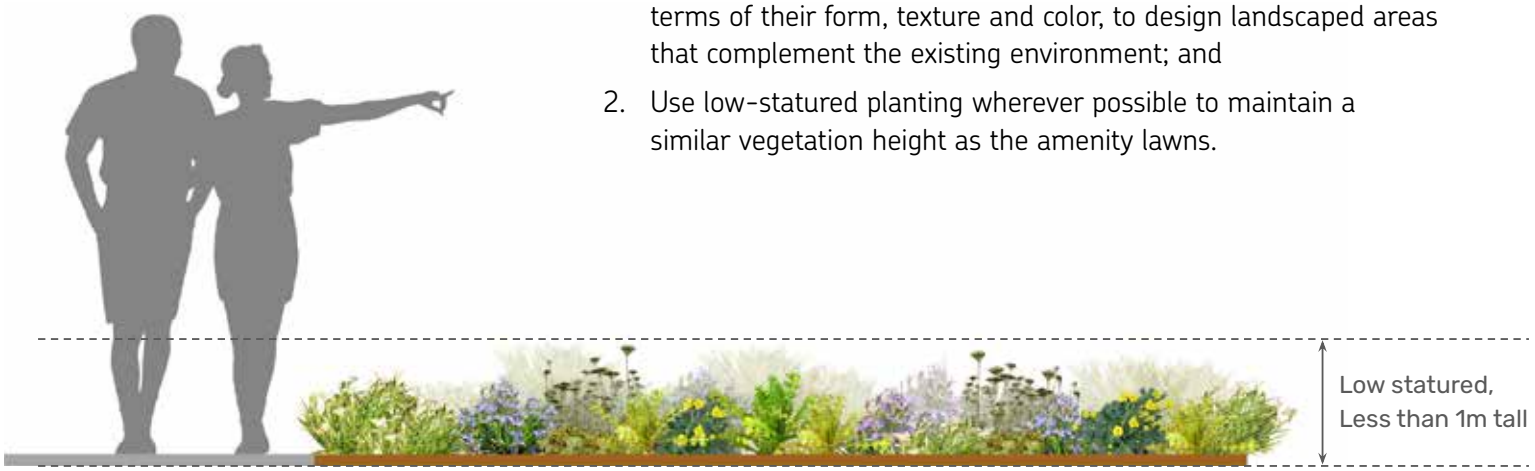


Fig.19. Sample visual amenity lawn section (Feb).

II. Lawns (Heavily-Used Type)

DEFINITION: lawns that are heavily used for various human activities

CONVERSION OPPORTUNITIES: **Foothill Grassland**

SPECIFICATIONS:

Vegetation structure: a single layer of groundcover

Vegetation height: generally less than 3 ft

Canopy closure: continuous, near 100%

Soil type: rocky, well-drained soils

Main Post (Montgomery St)

Intersection of Graham St & Sheridian Ave

732 Liggett Ave (also known as Liggett Circle)

Fig.20. Examples of heavily-used type lawns in Presidio.

ECOLOGICAL RECOMMENDATIONS:

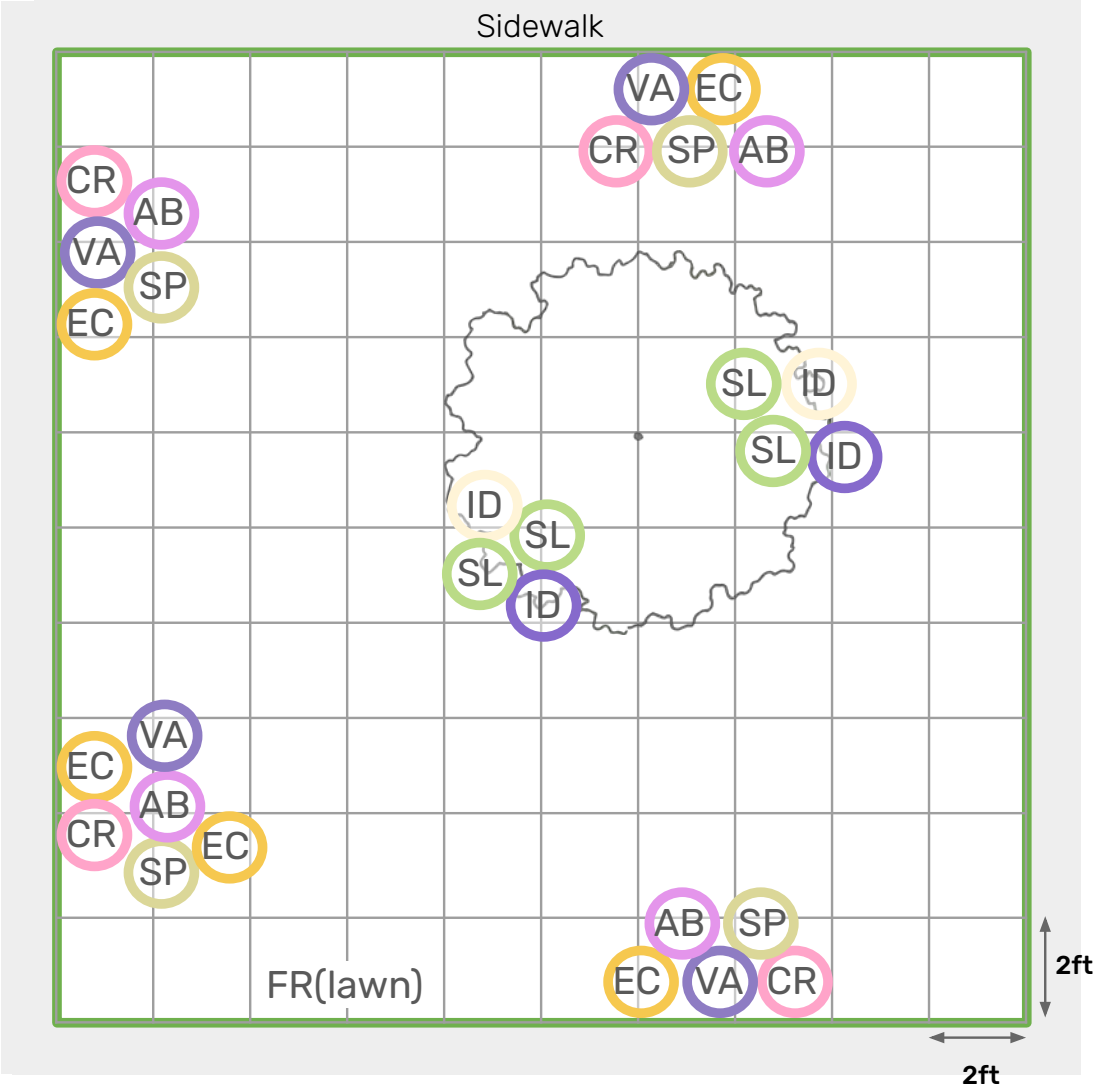
Primary ecological function: Support for insects, including native ground nesting bees and wasps, butterflies & moths, and other pollinators.

1. In heavily used areas, use **trampling resistant native grass** such as red fescue (*Festuca rubra*) to provide some habitat value while reducing irrigation requirements;
2. In less heavily used areas (e.g., around trees, in corners of site), create more diverse plantings of **native grasses and forbs** to mimic foothill grassland, providing recognizable habitat for wildlife;
3. Prioritize species composition that maintains pollinator resources across seasons; and
4. Maintain areas of **bare ground**, or place paver-stones with decomposed granite in between, for ground nesting bees. Maintain **water features** like puddling sites for butterflies or natural-looking stone depressions to capture irrigation water and serve as watering holes for bees and other pollinators.

MAINTENANCE RECOMMENDATIONS:

1. For primary lawn areas, select trampling resistant species that can withstand heavy foot traffic;
2. Depending on the intensity of human use, the mowing frequency can be slightly adjusted. Less frequent mowing can create taller groundcover to prevent weed growth and shade the ground;
3. Plant grasses and forbs densely to reduce weed growth and to mimic the continuous canopy closure of the historical foothill grassland habitat; and
4. Provide irrigation once per month to the heavily-used lawns established with species from the recommended species list.

Fig.21. Sample planting plan for heavily-used lawns.



Sample planting palette for heavily-used lawns using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
FR	*Festuca rubra*	Red fescue	Apr - May	Butterflies & birds	Grass
SP	*Stipa pulchra*	Purple tussockgrass	Mar - May	Insects, birds & small mammals	Grass
SL	*Stipa lepida*	Small flower tussockgrass	Mar - May	Bees, butterflies and moths	Grass
CR	*Clarkia rubicunda*	Ruby chalice clarkia	Jun-Jul	Butterflies & moths	Annual forb
EC	*Eschscholzia californica*	California poppy	All year	Butterflies, moths, some birds and mammals	Annual / perennial forb
AB	*Arabis blepharophylla*	Coast rockcress	Feb - May	Butterflies & moths	Perennial forb
ID	*Iris douglasiana*	Douglas iris	Feb - Apr	Butterflies & moths	Perennial forb
VA	*Viola adunca*	Dog violet	Apr - Aug	Butterflies, moths and many other insects	Perennial forb

BEFORE

Main Post (Montgomery St)

AFTER

Main Post (Montgomery St)

Fig.22. Simulated addition of heavily-used lawn planting palette to Main Post.

AESTHETIC RECOMMENDATIONS:

1. Install grasses and low-stature forbs at the lawn edges and beneath tree canopies, while leaving the majority of the lawn for human activities;
2. Provide sufficient gaps (e.g. at least 10ft) between edge plantings to facilitate human access; and
3. Consider the color, texture and life form of plants to correspond to the character and function of the building frontage.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Reference historic building classifications of Presidio. Areas of high historical significance should be given more attention to preserve specific character, structure and functions of the landscape;
2. Wherever possible, preserve the low-statured planting of the heavily-used lawns using native (foothill grassland) species; and
3. Use low-stature forbs at some lawn edges to create pollinator habitats without imposing significant impacts on the existing building functions and circulation.

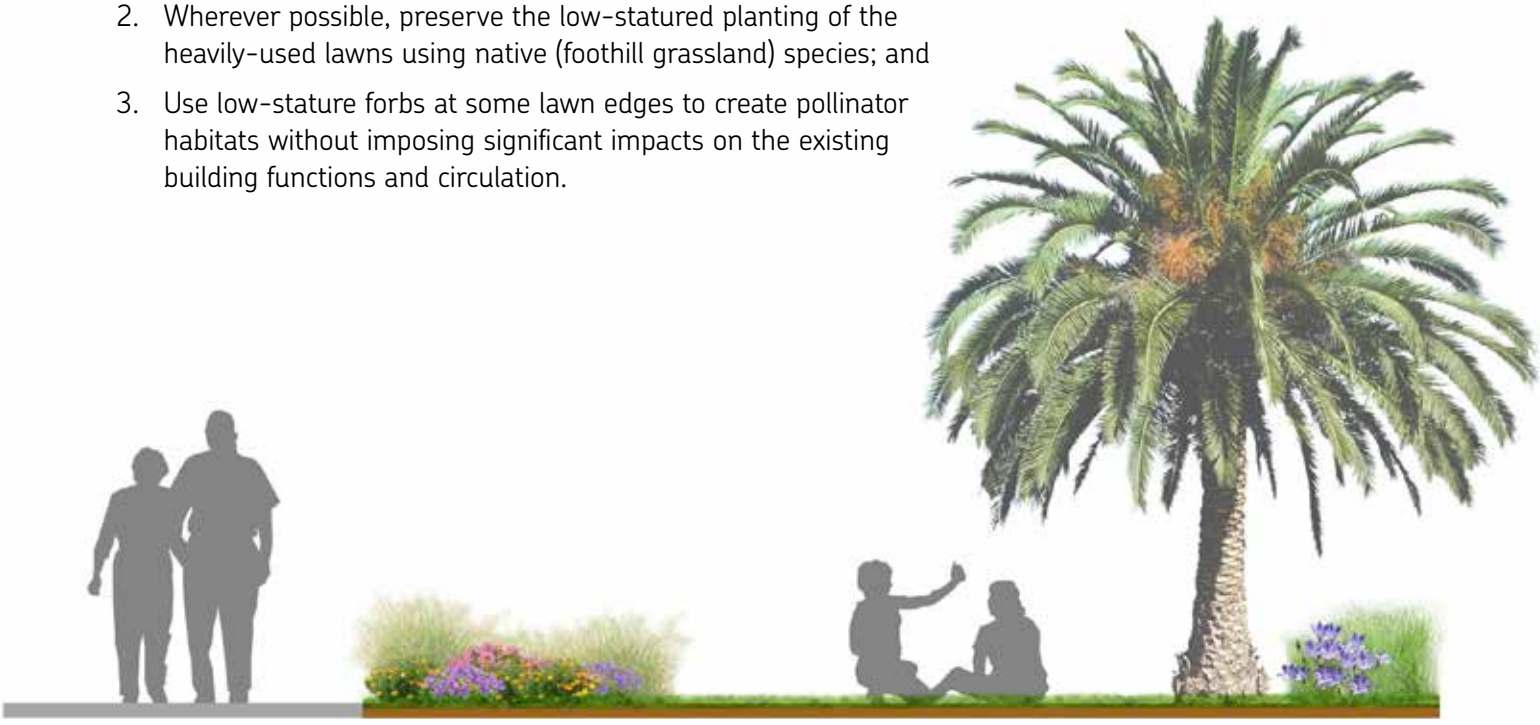


Fig.23. Sample heavily-used lawn section (Apr-May)

III. Foundational Planting

DEFINITION: planting around building edges usually with limited active human use

CONVERSION OPPORTUNITIES: **Riparian Habitat**

SPECIFICATIONS:

Vegetation structure: ~3 layers along larger streams like Lobos Creek; smaller / ephemeral drainages likely to have 1-2 layers

Vegetation height: generally 30-40 ft

Canopy closure: continuous, around 90% - 100%

Soil type: alluvium, soils with rich organic matter

747 Portola St | 719 Sibley Rd | 511 Simonds Loop

726 Liggett Ave | 276 Presidio Blvd | 729 Liggett Ave

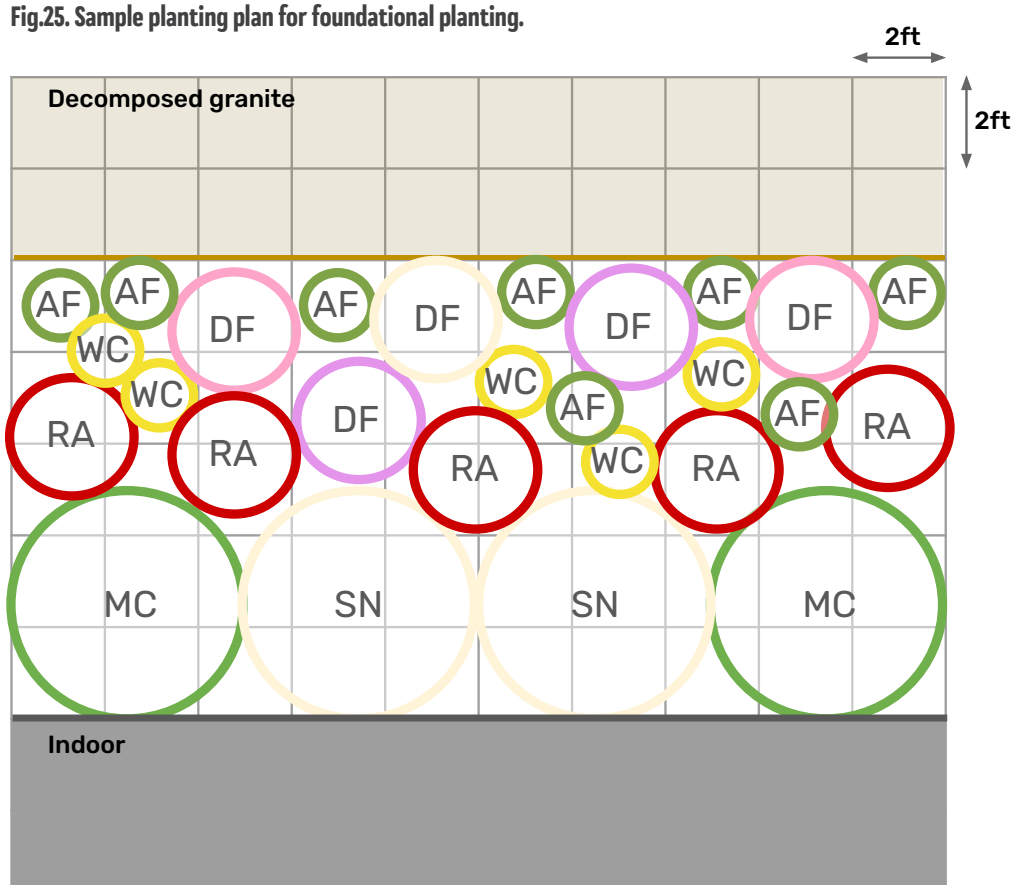
Fig.24. Examples of foundational planting in Presidio.

ECOLOGICAL RECOMMENDATIONS:

Primary ecological function: Support for insects, and provision of nectar, fruit, seeds and nest sites for birds, particularly during the breeding season, as well as for ground-dwelling animals.

1. **Leaf litter & downed logs** supports soil health and provides cover for insects, newts and other ground-dwelling wildlife. Consider placing log benches or wooden rail fencing to add **dead wood** for cavity nesting bees;
2. **Multi-layered canopy** provides structure and complexity that increases wildlife support;
3. **Understory shrubs** such as currants (*Ribes* spp.), California wax myrtle, willows, and blue elderberry (*Sambucus nigra* spp. *caerulea*) provide nectar, support gall-forming insects, and provide fruit, supporting insects, birds, and pollinators across seasons; and
4. **Nest boxes** support cavity nesting birds (e.g., Bewick's wren [*Thryomanes bewickii*], Nuttall's woodpecker [*Dryobates nuttallii*], and western bluebird [*Sialia mexicana*]).

Fig.25. Sample planting plan for foundational planting.



Sample planting palette for foundational planting using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
AF	*Athyrium filix-femina* var. *Cyclosorum (AF)*	Lady Fern	N/A	Grizzly bears, elk and deer	Fern
WC	*Aquilegia formosa (WC)*	Western Columbine	Apr - Aug	Butterflies & moths	Perennial forb
DF	*Dicentra formosa*	Bleeding Heart	Jun-Aug	Butterflies	Perennial forb
RA	*Ribes amarum*	Bitter Gooseberry	Apr-May	Bees, butterflies, moths and birds	Shrub
MC	*Morella californica*	California Wax Myrtle	May-Jun	Butterflies & moths	Shrub/Tree
SN	*Sambucus nigra* ssp. *caerulea*	Blue Elderberry	Mar-Jun	Bees, butterflies, moths and birds	Shrub/Tree

MAINTENANCE RECOMMENDATIONS:

1. The riparian plant species selected are suitable for north-facing facade / other locations with partial or full shade;
2. Plant densely to reduce weed growth and to mimic the continuous canopy cover of the historical riparian habitat;
3. Provide regular irrigation during the dry (summer) periods (e.g. once to twice a month) to maintain soil moisture; and
4. Pruning once to twice a year is recommended to maintain the form of the foundational planting.

Fig.26. Sample foundational planting section (Jun).

AESTHETIC RECOMMENDATIONS:

1. Provide layered planting beds along house foundations to soften the transition zone between the building and the ground plane;
2. Consider the color, texture and live form of plants to correspond to the character and function of the building; and
3. Provide open viewsheds towards the principal front or other facades of the building.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Reference historic building classifications of Presidio, where areas of high historical significance should be given more attention to preserve specific character, structure and functions of the landscape; and
2. Imitate the existing structure of the foundational plantings around historic buildings. For instance, the creation of dense tall hedges using suitable riparian species such as California wax myrtle (*Morella californica*).

Fig.27. Simulated addition of California wax myrtle as hedge to historic building at 276 Presidio Boulevard.

IV. Roadside / Parking Lot Planting

DEFINITION: small patches of planting strips along roadside / parking lots, usually surrounded by paving on both sides

CONVERSION OPPORTUNITIES: **Dune Scrub / Grassland**

SPECIFICATIONS:

Vegetation structure: ~2 layers: overstory of dune scrub interspersed with dune grassland as groundcover

Vegetation height: approx. 3-6 ft

Canopy closure: continuous, near 100%

Soil type: dune sand

781 Sanches St

717 Sibley Rd

Main Post (Montgomery St)

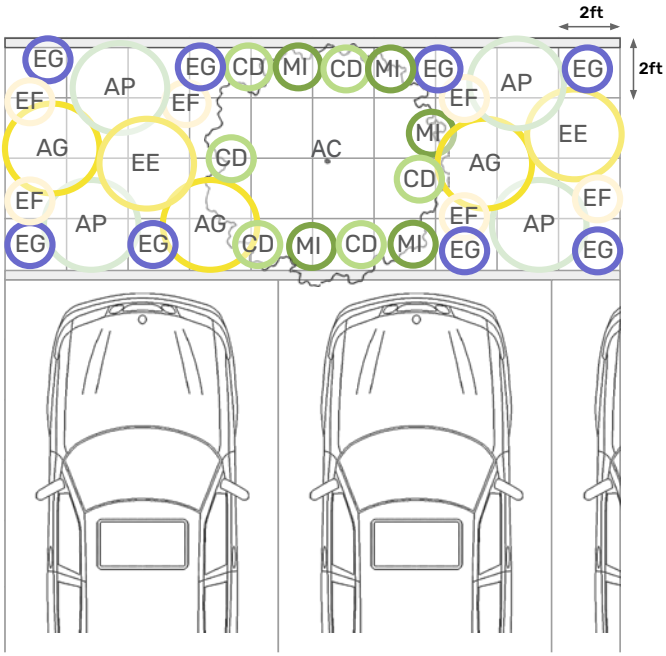
Fig.28. Examples of roadside / parking lot planting in Presidio.

ECOLOGICAL RECOMMENDATIONS:

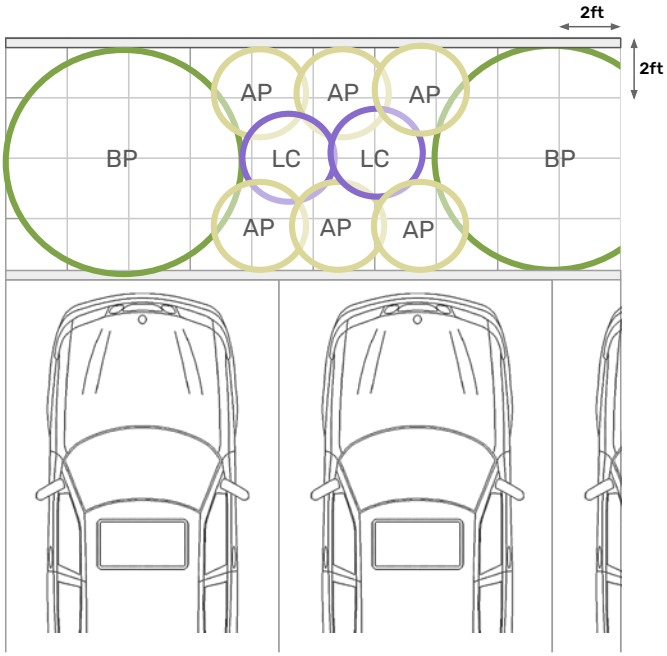
Primary ecological function: Shelter, nesting habitat, and food resources for birds, reptiles, and small mammals; host and nectar plants for butterflies and other insects

1. Create **dense, multi-layered plantings** with a diversity of native shrub and forb species to mimic dune scrub / grassland habitat, providing food and shelter for resident and migratory birds (e.g., white-crowned sparrow, wrentit, and Allen's hummingbird, California quail), reptiles (e.g., western fence lizard [*Sceloporus occidentalis*], northern alligator lizard [*Elgaria coerulea*]), mammals (e.g., brush rabbit [*Sylvilagus bachmani*]), and other wildlife;
2. Create **patches of grassland** within the surrounding matrix of shrubs to provide early successional habitat and increase habitat complexity and heterogeneity;
3. Incorporate **nectar and host plants** for native bees, butterflies, and other insects; and
4. Maintain areas of **bare ground**, or place paver-stones with decomposed granite in between, for ground nesting bees. Maintain **water features** like puddling sites for butterflies or natural-looking stone depressions to capture irrigation water and serve as watering holes for bees and other pollinators. Consider placing log benches or wooden rail fencing to add **dead wood** for cavity nesting bees.

Fig.29. Sample planting plan for roadside / parking lot planting.



Option 1: Tree and understory



Option 2: Understory only

Sample planting palette for roadside / parking lot planting using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
Option 1: Tree and understory					
MI	*Melica imperfecta*	Smallflower melicgrass	Feb - Mar	Butterflies & moths	Grass
AG	*Acmispon glaber*	Common deerweed	Mar - Aug	Hummingbirds, bees, butterfly larvae, deer, etc.	Perennial forb
AP	*Artemisia pycnocephala*	Beach wormwood	May - Aug	Native bees	Perennial forb
CD	*Clinopodium douglasii*	Yerba buena	May - Jul	Butterflies, moths and bees	Perennial forb
EG	*Erigeron glaucus*	Seaside fleabane	Jan - Aug	Native bees, butterflies and other insects	Perennial forb
EF	*Erysimum franciscanum*	San Francisco wallflower	Mar - Jun	Butterflies & moths	Perennial forb
EE	*Ericameria eriocoides*	California goldenbush	Sept - Nov	Many beneficial insects	Shrub
AC	*Aesculus californica*	California buckeye	May - Jun	Hummingbirds, butterflies and native bees	Tree
Option 2: Understory only					
AP	*Artemisia pycnocephala*	Beach wormwood	May - Aug	Native bees, butterflies, moths, and birds	Perennial forb
BP	*Baccharis pilularis*	Coyote bush	Sept - Jan	Native bees, parasitoid and predatory insects and butterflies	Shrub
LC	*Lupinus chamissonis*	Chamisso bush lupine	Apr - Jun	Butterflies, native bees and hummingbirds	Shrub

BEFORE

AFTER

Fig.30. Simulated addition of roadside planting palette at 717 Sibley Road.

MAINTENANCE RECOMMENDATIONS:

1. Plant densely to reduce weed growth and to mimic the continuous canopy cover of the historical dune scrub / grassland habitat;
2. Consider including trees from other historical habitat types, such as the coast live oak woodland or riparian habitat, to reduce surface heat of parking lots and roads;
3. Install shade tolerant dune grasses, such as California canarygrass (*Phalaris californica*) and smallflower melicgrass (*Melica imperfecta*), underneath trees (if any);
4. Dune scrub / grassland species generally have low water needs. Consider irrigating once per month in the summer to reduce mortality and keep plants more beautiful; and
5. Pruning once to twice a year is recommended to remove overgrown branches extended beyond planter curbs to maintain aesthetics and user safety.

AESTHETIC RECOMMENDATIONS:

1. Install dune shrubs and other large perennial forbs wherever possible to imitate the densely packed, undulating profile of stabilized dunes;
2. While most native dune forbs and shrubs are intolerant of shade, a few dune grass species are shade tolerant and can be used for planting beneath tree canopies;
3. In terms of the selection of shade trees for parking lots, consider native trees such as those from the historical riparian habitat; and
4. Consider the color, texture and live form of plants to correspond to the character and function of the building frontage.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Reference historic building classifications of Presidio. Areas of high historical significance should be given more attention to preserve specific character, structure and functions of the landscape; and
2. Use creative combinations of forb, grass and/or tree species, such as those illustrated in this chapter, to imitate the original planting structure near historic buildings. In new parking lots, shade trees should be planted to ameliorate urban heat.

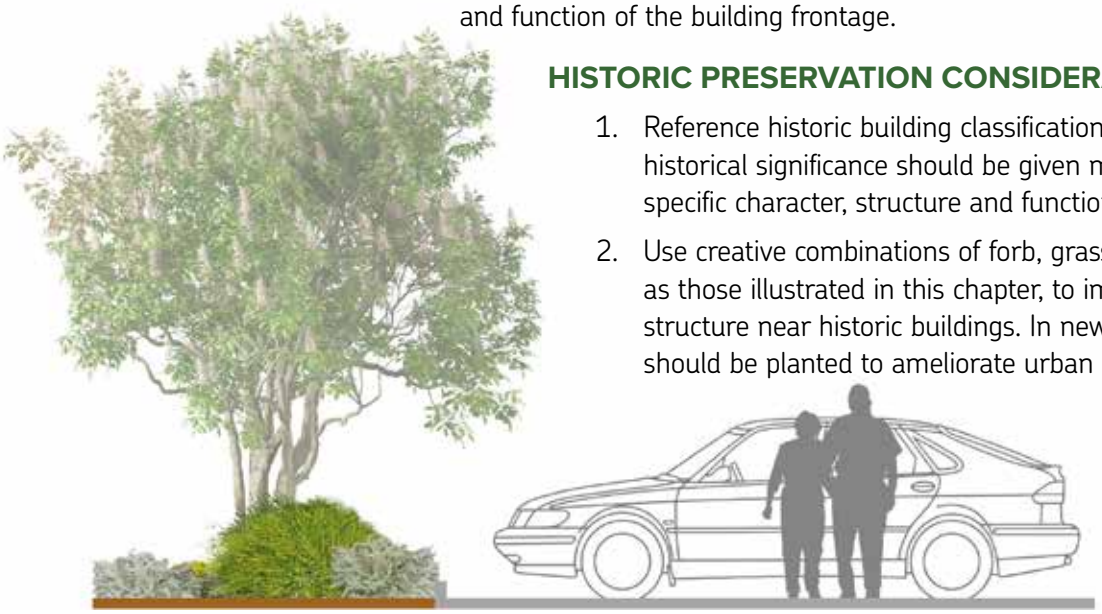


Fig.31. Sample parking lot planting section (May).

V. Buffer Planting

DEFINITION: transitional spaces such as rough roadsides, forest edges and roadway margins

CONVERSION OPPORTUNITIES: **Coastal Scrub**

SPECIFICATIONS:

Vegetation structure: ~2 layers: overstory of coastal scrub, with grasses and forbs as groundcover

Vegetation height: generally less than 3 ft; may be up to 6-7 ft

Canopy closure: continuous, near 100%

Soil type: variable


3925 W Pacific Ave


Arguello Blvd near the intersection with W Pacific Ave


Intersection of Hays St & Brown St


733 Sibley Rd


700 Sanches St


715 Liggett Ave

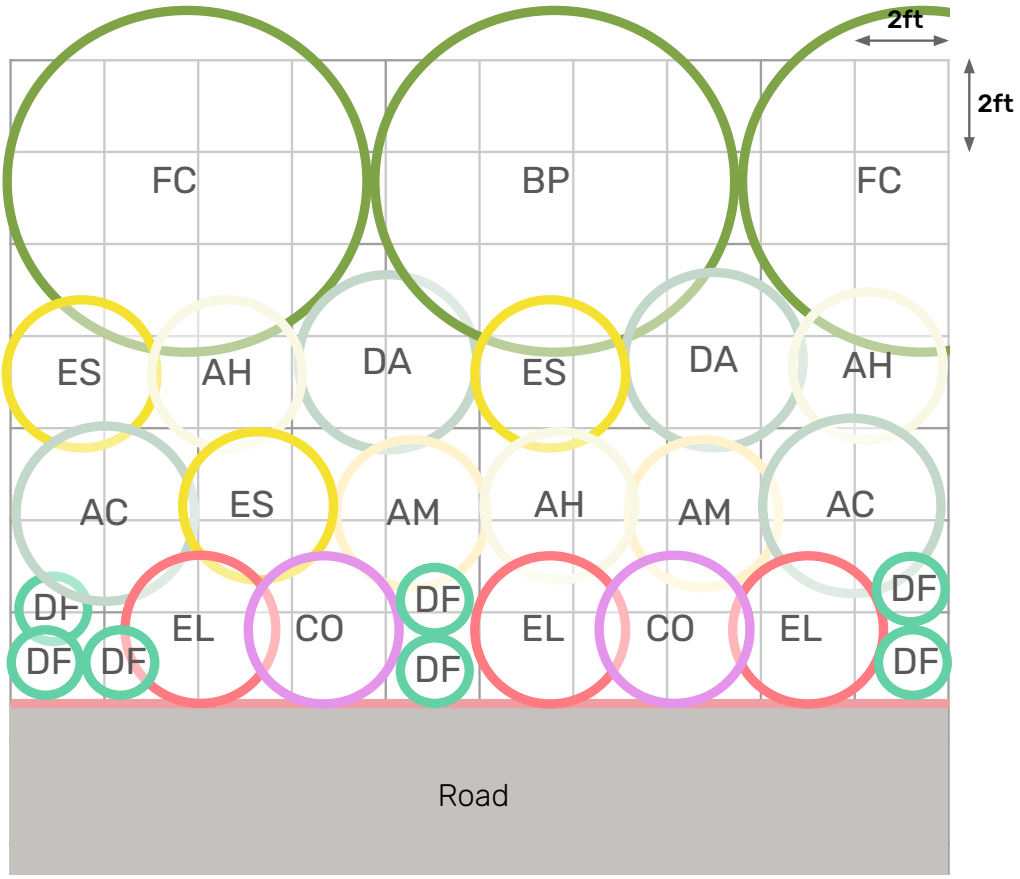
Fig.32. Examples of buffer planting in Presidio.

ECOLOGICAL RECOMMENDATIONS:

Primary ecological function: Shelter, nesting habitat, and food resources for birds, reptiles, and small mammals; host and nectar plants for butterflies and other insects

1. Create **dense, multi-layered plantings** with a diversity of native shrub and forb species to mimic coastal scrub habitat, providing food and shelter for resident and migratory birds (e.g., white-crowned sparrow, wrentit, and Allen's hummingbird, California quail), reptiles (e.g., western fence lizard, northern alligator lizard), mammals (e.g., brush rabbit), and other wildlife;
2. Incorporate **nectar and host plants** for native bees, butterflies, and other insects; and
3. Maintain areas of **bare ground**, or place paver-stones with decomposed granite in between, for ground nesting bees. Maintain **water features** like puddling sites for butterflies or natural-looking stone depressions to capture irrigation water and serve as watering holes for bees and other pollinators. Place log benches or wooden rail fencing to add **dead wood** for cavity nesting bees.

Fig.33. Sample planting plan for buffer planting.



Sample planting palette for buffer planting using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
BP	*Baccharis pilularis*	Coyote brush	Sept - Jan	Native bees, butterflies and other insects	Shrub
DA	*Diplacus aurantiacus*	Bush monkey flower	Mar - Aug	Butterflies, moths, other insects, and birds	Shrub
ES	*Eriophyllum staechadifolium*	Seaside woolly sunflower	May - Aug	Butterflies & bees	Shrub
FC	*Frangula californica*	California coffeeberry	Jun - Aug	Native bees, butterflies and other insects	Shrub
LA	*Lupinus albifrons* var. *collinus*	Silver lupine	Apr - Jul	Native bees, butterflies and hummingbirds	Shrub
AM	*Anaphalis margaritacea*	Western pearly everlasting	Jun - Aug	Many beneficial insects	Perennial forb
AH	*Angelica hendersonii*	Henderson's angelica	May - Aug	Butterflies & moths	Perennial forb
CO	*Cirsium occidentale* var. *Occidentale*	Cobwebby thistle	May - Jul	Bees, butterflies and many birds	Perennial forb
DF	*Dudleya farinosa*	Powdery liveforever	Jun - Aug	Hummingbirds, butterflies & moths	Perennial forb
EL	*Eriogonum latifolium*	Coast buckwheat	Jul - Sept	Butterflies, honey bees and other insects	Perennial forb
AC	*Artemisia californica*	California sagebrush	Apr-Oct	Bees, butterflies, and moths.	Shrub

Fig.34. Simulated addition of buffer planting palette along Arguello Boulevard, near the intersection with West Pacific Avenue.

MAINTENANCE RECOMMENDATIONS:

1. Plant densely to reduce weed growth and to mimic the continuous canopy cover of the historical coastal scrub habitat;
2. Install California sagebrush (*Artemisia californica*) on more exposed, south-facing slopes and coyote brush (*Baccharis pilularis*) on less exposed, north-facing slopes;
3. Consider irrigating once to twice per month in the summer to reduce mortality and keep plants more beautiful; and
4. Pruning can generally happen on an ad hoc basis, depending on the intensity of human use and any safety concerns along the buffer edges.

AESTHETIC RECOMMENDATIONS:

1. Include tall coastal scrub species, such as California coffeeberry (*Frangula californica*) and coyote brush, to screen more natural areas from the road;
2. Intersperse different large coastal scrub and forb species and design interesting visual transitions both across and along the strip;
3. Design with the plant heights and forms. For instance, consider mixing plants with dense foliage and those with sporadic stem forms and sparse foliage to create interesting contrasts; and
4. Design the planting palette to provide seasonal interests.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Compared to foundational plantings and lawns, buffer plantings are usually further away from historic buildings, allowing them to be designed with more natural coastal scrub character; and
2. Reference historic building classifications of Presidio. Areas of high historical significance should be given more attention to preserve specific character, structure and functions of the landscape.

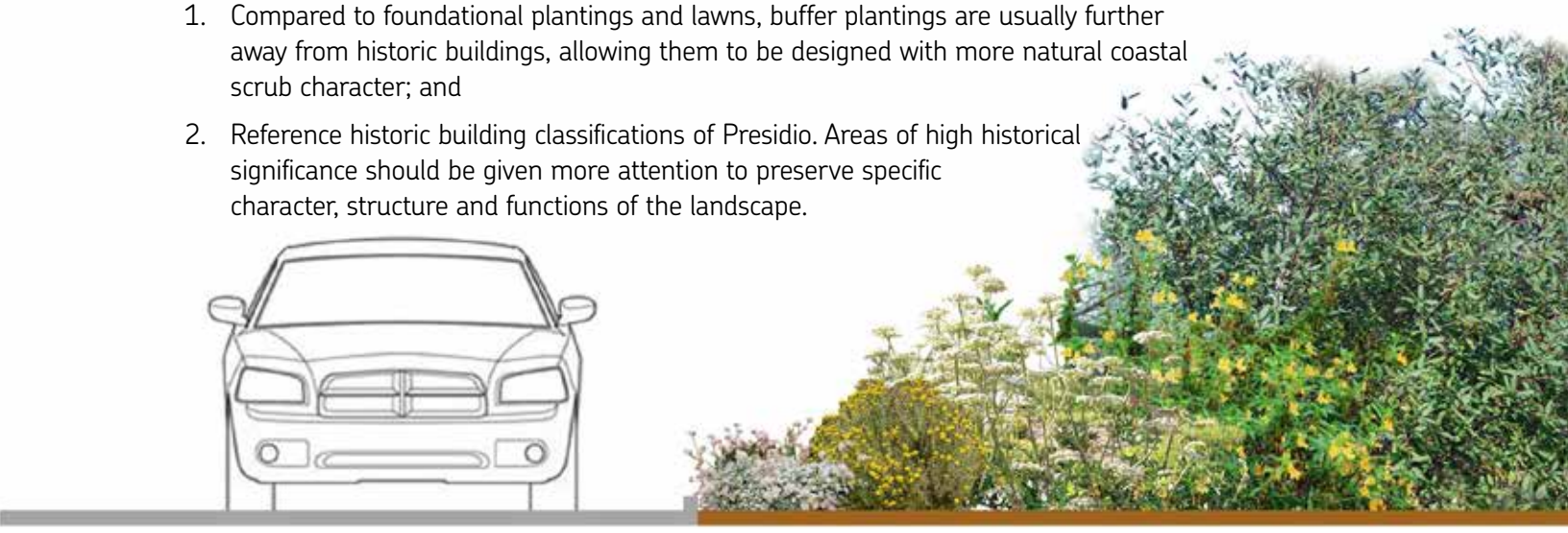


Fig.35. Sample buffer planting section (Jul).

VI. Large Open Spaces

DEFINITION: large patches of vegetated area for active / inactive human use

CONVERSION OPPORTUNITIES: **Coast Live Oak Woodland**

SPECIFICATIONS:

Vegetation structure: at least two layers: oak canopy and herbaceous / shrub understory

Vegetation height: generally 15-18 ft

Canopy closure: relatively complete canopy closure on north-facing slopes; more open (less complete canopy cover) on south-facing slopes.

Soil type: primarily older dune soils with more organic matter, more weathered, more stabilized


Letterman Dr


Intersection of Lombard St & Ruger St


1201 Ralston Ave


Golden Gate Club


Hamilton School


Intersection of Lombard St & Letterman Dr

Fig.36. Examples of large open spaces in Presidio.

ECOLOGICAL RECOMMENDATIONS:

Primary ecological function: oaks are keystone species that provide habitat for a wide range of birds, mammals, reptiles, amphibians, and insects.

1. **Multi-layered canopy** provides structure and complexity that increases wildlife support. Shade-tolerant herbaceous species like grasses, ferns, and perennial forbs will be most appropriate in the immediate understory of oaks; subdominant shrubs or trees may be planted adjacent to oaks;
2. Oaks provide **cover** and nesting habitat for numerous species, such as oak titmouse (*Baeolophus inornatus*), western bluebird (*Sialia mexicana*), and Bewick's wren (*Thryomanes bewickii*);
3. **Acorns** are an important food source for many wildlife species, such as acorn woodpecker (*Melanerpes formicivorus*) and scrub jay (*Aphelocoma californica*), while **oak leaves** are browsed by species like black-tailed deer (*Odocoileus hemionus*), rodents, and lagomorphs;

4. **Dead trees and snags** provide habitat for cavity nesting birds, while downed logs and leaf litter support rodents, insects, and other ground-dwelling animals. Consider placing log benches or wooden rail fencing to add **dead wood** for cavity nesting bees; and
5. Maintain areas of **bare ground**, or place paver-stones with decomposed granite in between, for ground nesting bees. Maintain **water features** like puddling sites for butterflies or natural-looking stone depressions to capture irrigation water and serve as watering holes for bees and other pollinators.

Fig.37. Sample planting plan for large open spaces (infill amongst existing trees).

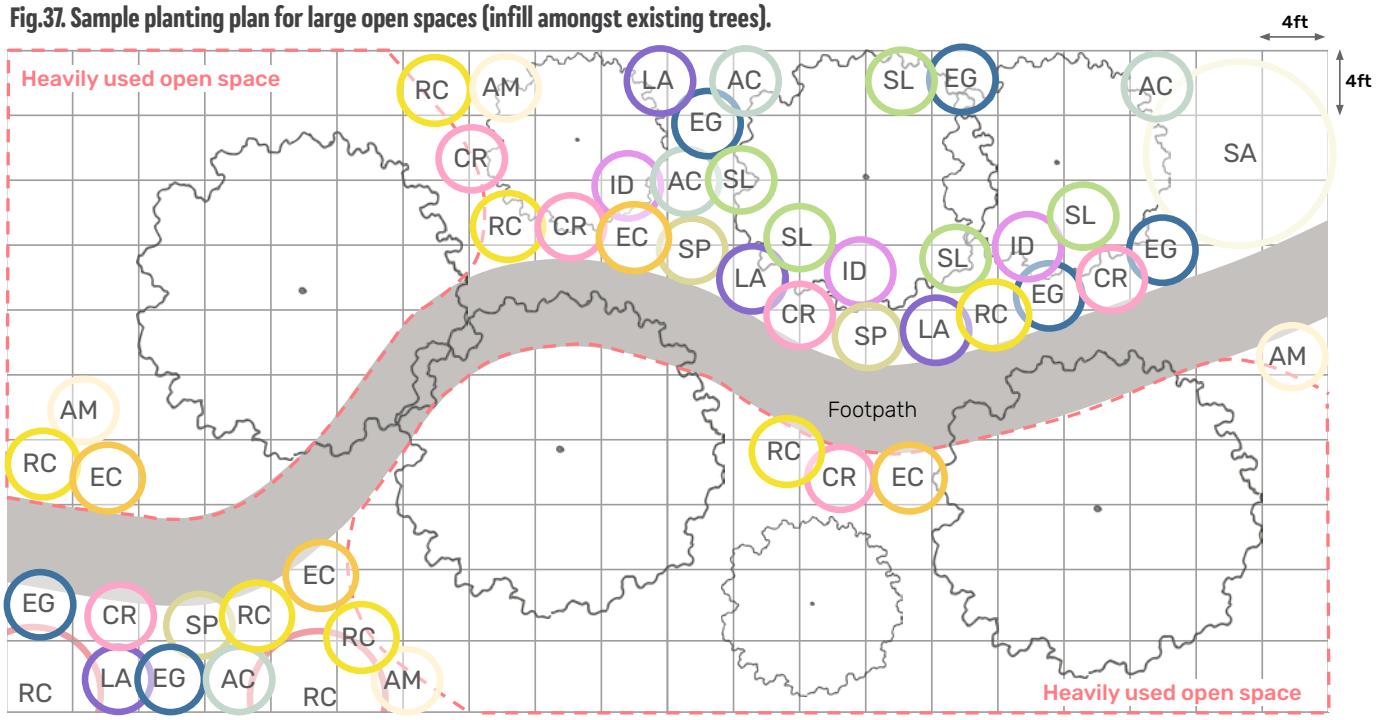
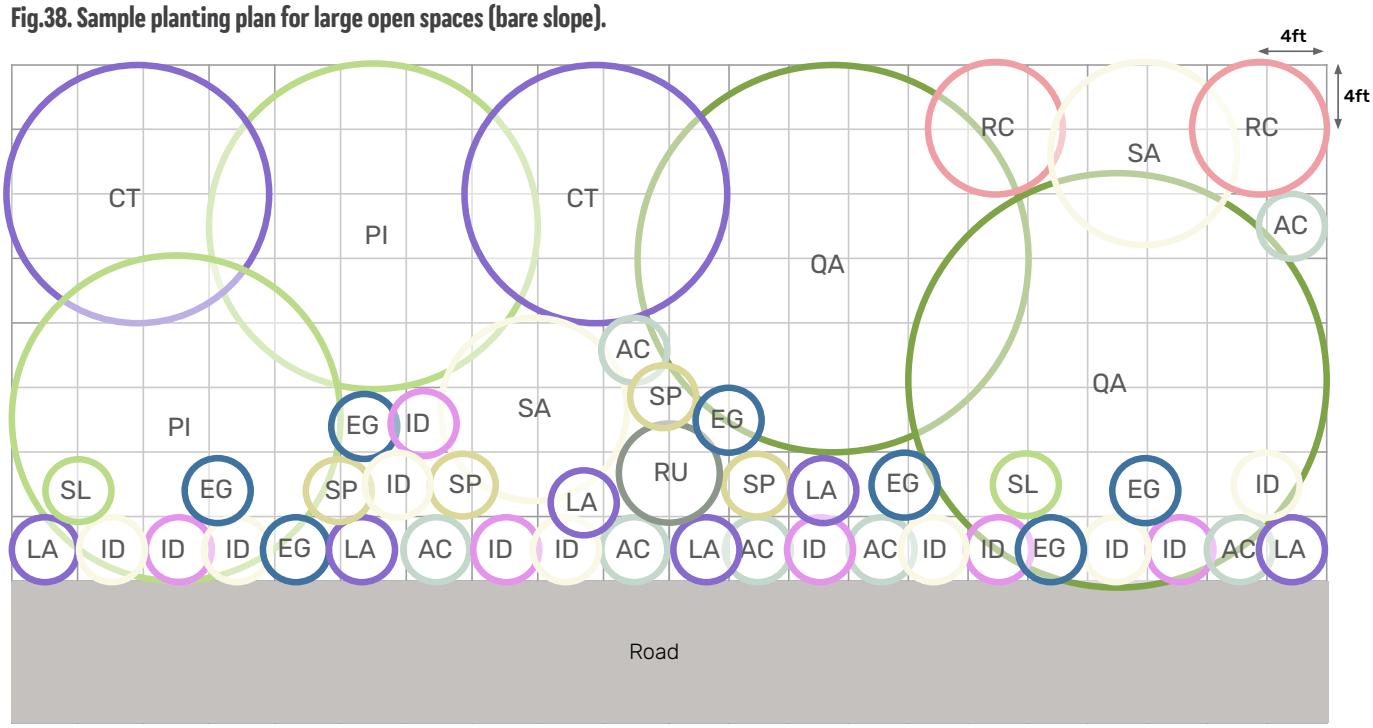


Fig.38. Sample planting plan for large open spaces (bare slope).



Sample planting palette for large open spaces using historical habitat indicator species

(For substitutes, refer to Appendix)

Code	Botantical name	Common Name	Flower Season	Wildlife Association	Life Form
Foothill grassland habitat					
SP	*Stipa pulchra*	Purple tussockgrass	Mar - May	Insects, birds & small mammals	Grass
SL	*Stipa lepida*	Small flower tussockgrass	Mar - May	Bees, butterflies and moths	Grass
CR	*Clarkia rubicunda*	Ruby chalice clarkia	Jun-Jul	Butterflies & moths	Annual forb
EC	*Eschscholzia californica*	California poppy	All year	Butterflies, moths, some birds and mammals	Annual / perennial forb
AM	*Achillea millefolium*	Common yarrow	Apr - Aug	Bees, butterflies and birds	Perennial forb
RC	*Ranunculus californicus*	California buttercup	Feb - May	Butterflies, bees & moths	Perennial forb
Coast live oak woodland habitat					
PL	*Prunus ilicifolia*	Hollyleaf cherry	Mar - May	Butterflies, moths, bees & birds	Tree
QA	*Quercus agrifolia*	Coast live oak	Feb - Apr	Butterflies, birds, small mammals and deers	Tree
AC	*Artemisia pycnocephala*	California sagewort	Apr - Oct	Native bees, butterflies and moths	Shrub
CT	*Ceanothus thyrsiflorus*	Blue blossom	Mar - May	Native bees, butterflies and other insects	Shrub
LA	*Lupinus albifrons* var. *collinus*	Silver lupine	Apr - Jul	Native bees, butterflies and hummingbirds	Shrub
RC	*Rosa californica*	California wild rose	May - Aug	Native bees, bumble bees and butterflies	Shrub
SA	*Symphoricarpos albus* var. *laevigatus*	Common snowberry	May - Jul	Butterflies, moths, bees and birds	Shrub
ID	*Iris douglasiana*	Douglas iris	Feb - Jun	Butterflies & moths	Perennial forb
EG	*Elymus glaucus*	Blue wildrye	Jun - Aug	Butterflies & moths	Rye

MAINTENANCE RECOMMENDATIONS:

1. Plant trees approximately 20-30 ft apart, depending on their canopy size at maturity;
2. Infrequent irrigation of young trees may be necessary, especially during drought conditions; irrigation of mature trees is generally not necessary; and
3. Summer watering, especially within the root protection zone near the base of the oak trees, can cause root rot and should be avoided.

Fig.39. Sample large open space planting section (May-Jun).

AESTHETIC RECOMMENDATIONS:

1. Vary the planting density (or percent of canopy closure), vegetation height and structure across a large open space to visually guide visitors towards heavily used sections and away from inactive areas which can provide better wildlife shelter and pollinator habitats. For instance, heavily used open space can be mostly occupied by groundcover with sparse, low-stature forbs while inactive areas can be densely planted with taller overstory of shrubs and forbs; and
2. Carefully position shrubs and forbs to aesthetically complement the existing trees which are often present in these large open spaces, including the combination of plants along various visual corridors.

HISTORIC PRESERVATION CONSIDERATIONS:

1. Compared to foundational plantings and lawns, large open spaces are usually further away from historic buildings, allowing them to be designed with more natural coast live oak woodland character; and
2. Carefully position trees and adjust the tree proportion in a landscaped area to orientate visitors to a building. For instance, consider the use of planting to hide and reveal the building at various locations along an access corridor.

Fig.40. Simulated addition of large open spaces planting palette at Hamlin School.


LODGE

5 Conclusions

The design information presented here is intended to inspire and guide the creation of ecologically supportive and biodiverse urban landscaped areas. The creation of spaces inspired by this work will help the Presidio establish its name at the forefront of innovation around ecologically designed urban spaces. Yet the work is not complete with design information alone, and there are other gaps and challenges that have not been addressed here.

This project is envisioned as a multi-year, collaborative effort to address gaps and challenges by synthesizing scientific information and identifying guiding principles for ecological horticulture, and then applying these concepts to horticultural practices at the Presidio of San Francisco. Future phases will address gaps in scientific knowledge and maintenance that are also essential to creating and maintaining ecologically functional urban landscaped areas:

The knowledge gap. While the benefits of ecological horticulture are potentially huge, they are also to some extent uncertain. Insects are the base of the food chain, and impacts to insects cascade up to affect higher trophic levels. But how much would ecological horticulture landscaping really do to support insects? While the evidence from elsewhere appears strong that native plants can help, how true is this in our landscape?

Left top: Presidio. Photograph by Lawrence's Lenses, courtesy of CC 2.0. Left bottom: Presidio buildings and landscape. Photograph by Loren Chipman, courtesy of CC 2.0.

Future phases of the project can address the knowledge gap by synthesizing existing scientific evidence regarding the benefits of native plants in supporting insects and food webs more broadly. Insights from this research can be used to create experimental designs for monitoring and tracking the impacts of ecological horticulture at the Presidio.

The maintenance gap. Maintenance regimes for common horticultural plants are well understood, and many plants chosen in traditional landscaping settings are hardy and easy to maintain. In contrast, maintenance requirements for native plants are often unknown, and may require a different type and schedule of maintenance that is unfamiliar to those that tend and care for landscaped areas. While it is rare to deploy native plants at scale in urban settings, those that have tried can help us understand the barriers and chart a path forward.

Future phases of the project could convene practitioners from around the Bay Area with experience cultivating and maintaining native landscapes, and create a workshop series where practitioners can share their experiences. The combined knowledge generated through these workshops can be synthesized into a catalog of maintenance principles and lessons learned specific to the region.

Presidio at Mt. Trail. Photograph by Rocor courtesy of CC 2.0.

Presidio view. Photograph by Frank Farm, courtesy of CC 2.0.

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Appendix: Planting Palettes

Left top: Presidio. Photograph by Doug Kerr, courtesy of CC 2.0. Left bottom: . Yerba buena plant *(Clinopodium douglasii)*. Photograph by J. Maughn, courtesy of CC 2.0.

Planting Palette: COASTAL PRAIRIE

COASTAL PRAIRIE						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Achillea millefolium	Common yarrow	Perennial forb	Apr-Aug	1-3ft tall, 0.5-1.5ft wide	Full sun	Dry to medium
Acmispon glaber	Common deerweed	Perennial forb	Mar-Aug	1.6ft - 3ft tall, 3ft wide	Part sun to full sun	Low to none; max once per month once established
Agoseris apargioides var. *apargioides*	Coast dandelion	"Perennial forb "	May-Aug	1.5ft tall	"N/A "	N/A
Agrostis exarata	Spike bentgrass	Perennial grass	May-Jun	1-3.3ft tall	Full sun to part shade	N/A
Allium dichlamydeum	Coastal onion	Perennial forb	May-Jun	N/A	Full sun	N/A
Bromus carinatus	California brome	Perennial grass	Feb-Mar	1-5ft tall, 1ft wide	Part sun to full sun	Low
Bromus maritimus	Maritime brome	Perennial grass	Apr-Jul	5ft tall	Full sun	Low to none
Carex brevicaulis	Shortstem sedge	Perennial rush/ sedge	Apr-May	6in tall	Shade	N/A
Carex subbracteata	Smallbract sedge	Perennial rush/ sedge	Apr-Jun	N/A	Full sun to part shade	N/A
Castilleja densiflora	Denseflower Indian paintbrush	Annual forb	Mar-May	0.33-1.3ft tall	N/A	N/A
Chlorogalum pomeridianum	Soap plant	Perennial forb	Spring-summer	3ft tall, 1.5ft wide	Full sun to part shade	Extremeley low
Clarkia rubicunda	Ruby chalice clarkia	Annual forb	Jun-Jul	2.5ft tall, 2.5ft wide	Full sun	Very low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Nearly any type except very wet. Because of its deep roots it has been used to control erosion.. Soil PH: 4 - 8	Sun: full; Water: dry to medium; used in landscaping; said to attract beneficial insects and repel pests	Nectar and pollen for native bees, nectar for butterflies; some birds use LVS for nest material; said to inhibit growth of parasites	Applied to wounds as an antiseptic and pain reliever, inhaled in smoke or steam to relieve headaches and brewed in a tea to reduce fevers and aid in restful sleep; used to induce sweating and appetite; used to treat colds, respiratory ailments, swelling, snake bites, venereal diseases, sores, labor pains, hemorrhages and bowel complaints, nausea, chest pain, kidney and liver disorders, diarrhea, rheumatism; burned ceremonially
N/A	Sun: part to full; Water: low to none; very drought tolerant; attracts wildlife; builds soil through fixing nitrogen	"Food source for numerous wildlife including hummingbirds, bees, butterfly larvae, and deer; host plant for Acmon Blue butterfly"	Plant used to treat coughs to and to strengthen the blood; leaves used for food and house thatching; roots used for soap
N/A	N/A	Hosts butterflies and moths	N/A
Adaptable	Sun: full; reproduces mainly by seed, but can also spread	Provides forage for birds and grazing animals	N/A
Does well on dry clay soil or sea cliffs	Sun: full; Does well on dry clay soil or sea cliffs	N/A	Greens and bulb eaten raw or cooked
Tolerates most soil types but especially good in clay.	Sun: part to full; Water: low; Soil: Tolerates most soil types but especially good in clay. Can be used as a lawn.	"Various insects and seed-eating birds are attracted to this plant. It is a host plant for the Umber Skipper butterfly."	Used as groundcovers and butterfly gardens; seeds were feared by the some Native Americans to be poisonous if swallowed; seeds were dried and ground into flour to make bread and other foods; can be important forage species for livestock; sometimes planted as pasture grass.
Sandy	Sun: full; Water: low to none; Soil: sandy	Hosts butterflies and moths	N/A
N/A	N/A	N/A	N/A
N/A	N/A	Hosts butterflies and moths	N/A
N/A	N/A	Hosts butterflies and moths	N/A
Tolerates a variety of soils. Soil PH: 5.5 - 8.0	Full sun to part shade; Extremely low water; no summer water; variety of soils; medium drainage; deer resistant	Pollination is by evening- or night-flying insects (often wasps)	Bulb used to stun and poison fish, make a multi-use soap, a hair wash to treat dandruff, and a starch/glue for baskets; bulbs used to treat gas, cramps, rheumatism, sores, stomach ache; bulb used as a diuretic and a laxative; bulbs and leaves were eaten as food; bulb husk fibers used to make brushes
Adaptable	N/A	Butterflies & moths such as White-lined Sphinx, Pacific Green Sphinx Moth, Clark's Day Sphinx Moth, Mariposa Forester	N/A

COASTAL PRAIRIE

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Claytonia perfoliata ssp. *perfoliata*	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Clinopodium douglasii	Yerba buena	Perennial forb	May-Jul	3.6-7.2in, 3ft wide	Part shade to full shade	Dry, light to moderate; max once per week once established
Danthonia californica	California oatgrass	Perennial grass	Feb-Mar	2-3.3ft tall	Full sun	Low to high
Deschampsia cespitosa ssp. *holciformis*	Pacific hairgrass	Perennial grass	Jul-Jul	12in wide	Full sun to part shade	Low to high
Dichelostemma capitatum	Blue dicks	Perennial forb	Winter-spring	1.5-2ft tall, 2in wide	Full sun	Low
Dichondra donelliana	Dichondra	Perennial forb/ vine	N/A	N/A	Full sun	Low, moderate to high
Elymus glaucus	Blue wildrye	Perennial grass	May-Jul	1-5ft tall, 1ft wide	Part sun to full sun	Low; max twice per month once established
Erigeron glaucus	Seaside fleabane	Perennial forb	Jan-Aug	0.16-1ft tall, 2ft wide	Part sun to full sun	Low to none
Eschscholzia californica	California poppy	Annual or perennial forb	Spring, winter, summer, fall	0.16-2ft tall, 1-2ft wide	Full sun	Low to medium
Festuca rubra	Red fescue	Perennial grass	Apr-May	1.3-2.6ft tall	Part to full sun	Low (when used as a lawn, water it 1-2 times per month during the dry season)
Fragaria vesca	Woodland strawberry	Perennial forb	Feb-May	0.1-1ft tall, 3ft wide	Part shade to full shade (will tolerate full sun)	Dry, light to moderate
Horkelia californica	California horkelia	Perennial forb	Apr-Jul	0.33-4ft tall	Part sun to full sun	Low
Iris douglasiana	Douglas iris	Perennial forb	Feb-Jun	0.6-2.6ft tall, 2-4ft wide	Part to full shade	Low; max once per month once established

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	N/A	Hosts bufferflies and moths	N/A
Adaptable	Sun: part to full shade; Water: dry, light, moderate; deer resistant	Hosts butterflies, moths and bees	Used to make tea; plant is aphrodisiac, blood purifier, mildly digestive, febrifuge, sedative and tonic; infusion used to treat insomnia, colic, upset stomachs, kidney problems, colds and fevers; used in cooking in place of other savouries; oils used for perfumes/potpourris
Prefers loamy or clay soils. Grows poorly in sandy soils.	Sun: full; Water: low to high; deer resistant and used in butterfly gardens	Attracts butterflies; seeds food source for rodents and birds	Seeds were eaten and used to make inole (flour)
Tolerate sand and clay soil	Sun, Part Shade; tolerate sand and clay soil; Water low to high; direct seeding can be successful; deer resistant and used in butterfly gardens	Attracts native bees; butterflies including the Umber Skipper	Seeds were eaten and used to make pinole (flour); can provide good to excellent forage for all classes of livestock and is often cut for hay from native meadow
Adaptable	Sun: Full; Water: Low; deer resistant, used in butterfly gardens	Attracts hummingbirds, butterflies and other insects.	Bulbs and flowers used for food; corms used to make and adhesive for seed gathering baskets
N/A	N/A	N/A	N/A
Well-drained soils	Sun: part to full; Soil: well-drained soils; seeds itself very well; deer resistant	Hosts butterflies: Woodland Skipper; provides forage for grazing animals; provides nesting material for native bees	Seeds were used to make flour
Clay soils on steep slopes, sandy soils on flats	Sun: part to full; Water: low to none can work as ground cover	Nectar (pollen) feeds honey bees; attracts predatory or parasitoid insects and butterflies	N/A
Prefers sandy, infertile, well-drained soils.. Soil PH: 5 - 8	Sun: full; Water: low to medium; direct seeds successfully	Attracts native bees and insects	CAUTION: Can be poisonous; used for insomnia, aches, nervous agitation, bed-wetting in children, diseases of the bladder and liver, and to promote relaxation
Tolerates many soil types. Soil PH: 5.6 - 6.9	Sun: part to full; when used as a lawn, water it 1-2 times per month during the dry season	Attracts butterflies and birds	Excellent soil binder and useful for stabilizing waterways, slopes, banks, cuts, and fills; used as turf grass; used as a cover crop in orchards; drought resistant; useful in phytoremediation of soils contaminated by industrial activities and heavy metals
Clay, loam, sand	Sun: part to full shade (will tolerate full sun); Water: dry, light to moderate; Soil: clay, loam, sand	Attracts many beneficial insects; eaten by a variety of mammls and birds that also help to distribute the seeds in their droppings	Fruits eaten raw or preserved; leaves brewed in a tea; leaf powder applied to sores; roots used to treat dysentery and stomach ailments
Prefers sandy or well drained soil	Sun part to full; Water: low; Soil: Prefers sandy or well drained soil	Attracts many beneficial insects	Root used to make a blood purifier
Prefers heavy soils with organic matter. Tolerates Serpentine Soil. Soil PH: 5.0 - 8.0	N/A	Attracts butterflies and moths such as American Ear Moth, Verbena Bud Moth	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough

COASTAL PRAIRIE

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Iris longipetala	Coast iris	Perennial forb	Mar-May	2ft tall, 2ft wide	Part to full shade	Low to high
Juncus bufonius	Toad rush	Annual rush/ sedge	Mar-May	1ft tall	Full sun	Moderate to high
Juncus occidentalis	Western rush	Perennial rush/ sedge	Mar-Jul	1-2ft tall	Full sun	Moderate to high
Juncus patens	Spreading rush	Perennial rush/ sedge	Jun-Jul	1-3ft tall, 3ft wide	Full sun to part shade	Moderate to high
Lasthenia californica	California goldfields	Annual forb	Feb-Jun	0.5-1.3ft tall, 0.5ft wide	Part sun to full sun	Low
Lasthenia minor	Coastal goldfields	Annual forb	Mar-Jun	1.2ft tall	N/A	N/A
Layia platyglossa	Coastal tidytips	Annual forb	Feb-May	0.5-2ft tall, 0.5-2ft wide	Full sun	Low
Lomatium caruifolium	Alkali desertparsley	Perennial forb	Mar-May	0.49-1.5ft tall	Full sun	N/A
Lomatium dasycarpum	Woollyfruit desertparsley	Perennial forb	Mar-Jun	1.6ft tall	Full sun	Extremeley low to very low
Lupinus nanus	Sky lupine	Annual forb	Mar-May	0.33ft-2ft tall, 1ft wide	Full sun	Very low to low; max twice per month once established
Lupinus variicolor	Manycolored lupine	Shrub	N/A	0.7-1.6ft tall	N/A	N/A
Monardella villosa	Coast tarweed	Annual forb	May-Aug	0.7-8ft tall	Full sun	N/A

Soil	Horticultural Value	Wildlife associations	Cultural uses
Prefers clay soil. Soil PH: 5.0 - 8.0	Sun: part to full sun; Water: low to high; Soil: perfers clay; this Iris is a good garden performer with large flowers and a pleasant fragrance.	Attracts many beneficial insects	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough
Tolerant of variety of soils as long as moist	Full sun; moderate to high water; moderately easy care; tolerant of variety of soils as long as moist; rarely used; often appears at wet sites after disturbance	Provides habitat for aquatic animals; provides forage for grazing animals; seeds feed small birds and mammals	Used to make an emetic for runners and athletes
N/A	Used in erosion control, sediment accretion and stabilization, nutrient uptake and transformation, restoration and creation of wetland ecosystems, and wastewater treatment applications	Provides habitat for aquatic animals; provides forage for grazing animals; seeds feed small birds and mammals	N/A
Adaptable	Full sun to part shade; moderate to high water; deer resistant; commonly available; easy care; can cut individuals into pieces to propagate on site; used in erosion control, sediment accretion and stabilization, nutrient uptake and transformation, restoration and creation of wetland ecosystems, and wastewater treatment applications	Provides habitat for aquatic animals; provides forage for grazing animals; seeds feed small birds and mammals	N/A
Variable	Sun: part to full; Water: Low; direct seeding can be successful.	Nectar (pollen) feeds native bees and butterflies.	Seeds were ground into flour
N/A	N/A	Attracts butterflies and moths	N/A
Prefers clay or loamy soil, tolerates sandy soil	N/A	Sun: Full; Water: low; Soil: Prefers clay or loamy soil, tolerates sandy soil	Seeds ground to make pinole (flour)
N/A	N/A	Attracts many beneficial insects	N/A
N/A	N/A	Hosts butterflies: Anise Swallowtail; nectar (pollen) feeds native bees; attracts predatory or parasitoid insects	N/A
Tolerates sandy or clay soils	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
N/A	N/A	Hosts butterflies including the endangered mission blue butterfly, bees, moths and birds	N/A
N/A	N/A	Seeds feed birds and small mammals; nectar (pollen) feeds native bees; attracts many beneficial insects	Seeds used as food and were ground into flour; oil from seeds used for cooking

COASTAL PRAIRIE

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Nemophila menziesii	Baby blue eyes	Annual forb	Spring	6in tall, 0.5in wid	Full shade to part shade	Low; max twice per month once established
Phacelia californica	California phacelia	Perennial forb	Mar-Aug	0.5-1.5ft tall, 1-2ft wide	Full sun	Low; water tolerant
Plantago erecta	Dotseed plantain	Annual forb	Mar-Apr	N/A	Full sun to part shade	Very low
Prunella vulgaris var. *lanceolata*	Lance leaf self heal	Perennial forb	Jul-Aug	0.33-1.6ft tall	Full sun to part shade	Moderate to high
Ranunculus californicus	California buttercup	Perennial forb	Feb-May	0.6-2.3ft tall, 6in wide	Part shade to full sun	Moderate - High, Low (never irrigate in the summer once established)
Sanicula bipinnatifida	Purple sanicle	Perennial forb	Mar-May	2ft tall	Part shade	Sun: part shade
Sidalcea malviflora	Checkerbloom	Perennial forb	May-Aug	0.3-1.5ft tall, 3-6in wide	Part sun to full sun	Low; max once per month once established
Sisyrinchium bellum	Western blue-eyed grass	Perennial forb	Mar-May	1-2ft tall, 3in wide	Full sun to part shade	Low; max twice per month once established
Stachys ajugoides	Ajuga hedge nettle	Perennial forb	Apr-Sept	0.33-1ft tall	Full sun	N/A
Stipa lepida	Smallflower tussockgrass	Perennial grass	Mar-May	1.7-3.3ft tall, 2ft wide	Full shade to part shade	Very low
Stipa pulchra	Purple tussockgrass	Perennial grass	Mar-May	3.3ft tall, 1.5ft wide	Full sun	Low to very low
Symphyotrichum chilense	California aster	Perennial forb	Jun-Oct	1.1-3.3ft tall, 3ft wide	Part shade to full sun	Very low to low
Trifolium barbigerum	Bearded clover	Annual forb	Feb-May	N/A	N/A	N/A
Trifolium macraei	Chilean clover	Annual forb	Mar-May	N/A	N/A	N/A
Triteleia laxa	Ithuriel's spear cultivar	Pernnial forb	Apr-Jul	1-2ft tall, 0.5-1ft wide	Full shade to sull sun	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Sandy to loamy	N/A	Numerous insects including butterflies are attracted to the flowers	N/A
Well-drained	Sun: full; Water: low water tolerant; Soil: well-drainaed	Source of pollen/nectar for bees and the endangered Mission Blue Butterfly	The Pomo used the fresh, crushed leaf juice to treat skin diseases; the Ohlone boiled roots for a tea to treat fevers and colds
Adaptable	Direct seeding can be successful; grows in variable habitats from grasslands to dunes	Hosts butterflies: Common Buckeye	N/A
N/A	Sun: part to full; cool to mild temperatures; prone to vigorous spreading	Source of pollen/nectar for native bees and bumble bees	The Cherokee cooked and ate the young leaves; drank as a cold infusion of the whole plant as a common beverage; contains vitamins A, C, and K; Prunella has long history of medicinal use globally
Adaptable	N/A	A variety of insects are attracted to the flowers, especially native bees	Seeds ground into flour and used to make mush and flour
N/A	N/A	Attracts many beneficial insects	Plant used to treat snakebites and other ailments
Adaptable	Sun: part to full; Water: low; deer resistant, groundcover	Attracts bees, butterflies (West Coast Lady) and other insects	Leaves used for food
Tolerant of sand and clay	N/A	N/A	Plant used to treat stomachaches, chills, heartburn, ulcers and asthma
N/A	N/A	Attracts butterflies, bees, moths, hummingbirds and other birds	N/A
Adaptable but often found in clay loam	Full Shade, Part Shade, Sun Soil Description -Adaptable but often found in clay loam; Water: very low	Nectar (pollen) feeds native bees	Seeds ground to make pinole (flour)
Found in virtually every type of soil. Tolerates Serpentine Soil,Tolerates Sodic Soil. Soil PH: 6.0 - 8.0	Stipa pulchra tolerates alkaline soil, clay and seasonal flooding. Full Sun; low water;	Native bees use it for nesting material	Seeds ground to make pinole (flour)
Prefers loamy clay soil	N/A	Attracts butterflies, bees, moths, and birds	N/A
N/A	N/A	Hosts butterflies: Orange Sulphur, Greenish Blue, Northern Cloudywing, Southern Dogface	N/A
N/A	N/A	Hosts butterflies: Orange Sulphur, Greenish Blue, Northern Cloudywing, Southern Dogface	N/A
Does well in clay soil but can also tolerate garden soil	Sun: full shade to full sun; Water: low; Soil: Does well in clay soil but can also tolerate garden soil	Nectar (pollen) feeds native bees, mammals feed on corms; deer feed on the flowers	Corms used for food, raw or cooked; flowers used in dance wreaths

COASTAL PRAIRIE

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Wyethia angustifolia	Narrow leaf mule ears	Perennial forb	Mar–Jul	3ft tall, 3ft wide	Full sun	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Tolerates a variety of soils as long as adequate drainage is provided. Soil PH: 5.8 - 7.0	Sun: full; Water: low; Soil: Tolerates a variety of soils as long as adequate drainage is provided	Numerous insects, including bees and butterflies	"Raw stems used for food; seeds used for pinole (food) and dried for winter use; decoction of leaves used to reduces fever and induce perspiration; decoction of roots taken as an emetic;poultice of root lather used for lung problems and to draw blisters; young leaves can be eaten raw; lemon-yellow dye is obtained from the flowers; gold to brass dye is obtained from the flowers, leaves and stems.""

Planting Palette: COASTAL SCRUB

COASTAL SCRUB						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Acmispon strigosus	Strigose bird's-foot trefoil	Annual forb	Feb-Jun	0.1-1.6ft tall	Full sun	N/A
Agoseris grandiflora	California dandelion	Perennial forb	Mar-May	1.8-3.3ft	Full sun to part sun	Low
Anaphalis margaritacea	Western pearly everlasting	Perennial forb	Jun-Aug	3-4ft tall; 4ft wide	Part shade to full sun	Very low; max 2 times per month once established
Angelica hendersonii	Henderson's angelica	Perennial forb	May-Aug	3.3-7ft tall	Full sun to light shade	Very low
Artemisia californica	California sagebrush	Shrub	Apr-Oct	1-8ft tall, 4ft wide	Full sun	Extremely low watering; no summer watering; max once per month once established
Baccharis pilularis	Coyotebrush	Shrub	Sept-Jan	1.5-10ft tall, 12ft wide	Part sun to full sun	1/week until established, then 1/month or not at all
Bromus carinatus	California brome	Perennial grass	Feb-Mar	1-5ft tall, 1ft wide	Full sun	Low
Bromus maritimus	Maritime brome	Perennial grass	Apr-Jul	5ft tall	Full sun	Low to none
Calystegia purpurata	Morning glory	Perennial forb/ vine	Apr-Sept	2ft tall	Full sun to part shade	Low to occasional watering

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	N/A	Hosts butterflies: Persius Duskywing, Acmon Blue	Leaves used for food
Adaptable	N/A	Hosts butterflies and moths	N/A
Tolerates sandy or clay soils	N/A	Attracts many beneficial insects	Boiled leaves used in a poultice to treat burns; infusion of plant inhaled or applied for sores, headache, rheumatism and paralysis, cold, stomach problems and respiratory ailments; used to give horses spirit and endurance, used for protection from danger before battle and in spiritual offerings
Adaptable	Full sun to light shade; very low water; ease of care moderately easy; tolerates a variety of soils; fast drainage	Attracts butterflies	Plant used to treat mussel poisoning; young stems eaten raw
Sandy soil with low nutrient content, although it is said to tolerate clay	Commonly available at nurseries; full sun; extremely low watering; no summer watering; usually found on sandy soil with low nutrient content, although it is also said to tolerate clay; variable drainage; often south facing	Provides nesting material for native bees; hosts butterflies and moths	"Can be used in cooking as a spice; made into tea or tea bath; chewing leaves believed to fight coughs/colds; ease menstruation cramps and to ease labor; Ohlone used it as pain reliever for wounds or teeth; recent research has shown a liniment and sesquiterepens present in plant that provide pain relief than opiods but much safer, used to treat pain from broken bones, arthritis, sprains and strains"
tolerates poor soils	Sun: part to full; Water: 1/week until established, then 1/month or not at all; Soil: tolerates poor soils; drought tolerant; deer resistant; useful for hedges or fence lines	Attracts native bees, parasitoid and predatory insects and butterflies (Common buckeye butterfly, Purplish Copper butterfly, Gray Hairstreak butterfly); great habitat plant providing cover and food for wildlife; important plant for pollinators due to its abundant production of pollen and nectar and the bloom period, which occurs during the fall and winter	Infusion of plant used as a general remedy; wood made into arrows
Tolerates most soil types but especially good in clay	Sun: part to full; Water: low; Soil: Tolerates most soil types but especially good in clay. Can be used as a lawn.	Various insects and seed-eating birds are attracted to this plant. It is a host plant for the Umber Skipper butterfly.	Used as groundcovers and butterfly gardens; seeds were feared by the some Native Americans to be poisonous if swallowed; seeds were dried and ground into flour to make bread and other foods; can be important forage species for livestock; sometimes planted as pasture grass.
Sandy	Sun: full; Water: low to none; Soil: sandy	Hosts butterflies and moths	N/A
N/A	Full sun to part shade; low to occasional watering; care moderately easy; commonly available at nurseries	Attracts bees, hummingbirds, butterflies and other pollinators	N/A

COASTAL SCRUB

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Carex subbracteata	Smallbract sedge	Perennial rush/ sedge	Apr-Jun	N/A	Full sun, part shade	N/A
Castilleja affinis	Indian Paintbrush	Perennial/annual forb	Feb-May	2ft tall	Full sun	N/A
Ceanothus thyrsiflorus	Blue blossom	Shrub	Mar-May	2-30ft tall, 2-40ft wide	Part sun to full sun	Water needed for establishment, water deep and infrequently after establishment
Cirsium occidentale var. *occidentale*	Cobwebby thistle	Perennial forb	May-Jul	N/A	Part sun to full sun	None to low
Claytonia perfoliata ssp. perfoliata	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Clinopodium douglasii	Yerba buena	Perennial forb	May-Jul	3.6-7.2in, 3ft wide	Part shade to full shade	Dry, light to moderate; max once per week once established
Daucus pusillus	Rattlesnake weed	Annual forb	Apr-Jun	3ft tall	Part shade	N/A
Diplacus aurantiacus	Bush monkeyflower	Shrub	Mar-Aug	3.9-5ft tall, 5ft wide	Part shade to full sun	Very low; max 2 times per month once established
Dudleya farinosa	Powdery liveforever	Perennial forb	Jun-Aug	3.6-8.4in tall, 8-12in wide	Shade to part shade	None to low; max once per month once established
Erigeron glaucus	Seaside fleabane	Perennial forb	Jan-Aug	0.16-1ft tall, 2ft wide	Part sun to full sun	Low to none
Eriogonum latifolium	Seaside buckwheat	Perennial forb	Jul-Sep	1.7-2.3ft tall, 3ft wide	Part sun to full sun	Low to none

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	N/A	N/A	N/A
Rocky soil with sand	N/A	Non-specific host to Leanira Checkerspot (Chlosyne leanira) and Chalcedon Checkerspot (Euphydryas chalcedona) butterflies; also attracts many native bees.	N/A
Well-drained	Sun: part to full; Water: needed for establishment, water deep and infrequently after establishment; Soil: well-drained; not deer resistant	Attracts native bees, parasitoid and predatory insects and butterflies (Spring Azure, Echo Blue, Pacuvius Duskywing, California Tortoiseshell, Pale Swallowtail, Hedgerow Hairstreak; Ceanothus silk moth)	Native people used the flowers mixed with water as a lathery soap
N/A	Sun: part to full; Water: none to low	Pollen/nectar source for bees/butterflies; host plant for Painted Lady, Mylitta & California Crescent; seeds are great food source for many birds	Stems peeled and eaten raw
N/A	N/A	Hosts bufferflies and moths	N/A
Adaptable	Sun: part to full shade; Water: dry, light, moderate; deer resistant	Hosts butterflies, moths and bees	Used to make tea; plant is aphrodisiac, blood purifier, mildly digestive, febrifuge, sedative and tonic; infusion used to treat insomnia, colic, upset stomachs, kidney problems, colds and fevers; used in cooking in place of other savouries; oils used for perfumes/potpourris
Prefers rocky and sandy places	Sun: part shade; Soil: perfers rocky and sandy places	N/A	Plant used medicinally to treat colds, itching, fevers, snake bites and to clean the blood; roots eaten raw or cooked
Adaptable	N/A	Hosts butterflies, moths, other insects, and birds	N/A
Rocky cliffs, very well draining rocky slopes	Sun: part to full; Water none to low; plant at angles to avoid water accumulation and microbial decay	Nectar feeds hummingbirds	N/A
Clay soils on steep slopes, sandy soils on flats	Sun: part to full; Water: low to none can work as ground cover	Nectar (pollen) feeds honey bees; attracts predatory or parasitoid insects and butterflies	N/A
Tolerates clay but prefers fast draining rocky or sandy soil	Sun: part to full; Water: low to none	Hosts butterflies: Acmon Blue, Green Hairstreak, Mormon Metalmark +more; nectar (pollen) feeds honey bees; attracts predatory or parasitoid insects	Plant used to treat coughs, colds, stomach pains, headaches and sore eyes; young stems used as food

COASTAL SCRUB

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Eriophyllum confertiflorum	Golden yarrow	Perennial or annual forb/shrub	Feb-Aug	1.6-2.3ft tall, 1.5ft wide	Full sun (shade tolerant)	Low
Eriophyllum staechadifolium	Seaside woolly sunflower	Shrub	May-Aug	2-5ft tall, 5ft wide	Part sun to full sun	Very low; max 2 times per month once established
Festuca rubra	Red fescue	Perennial grass	Apr-May	1.3-2.6ft tall	Part to full sun	Low (when used as a lawn, water it 1-2 times per month during the dry season)
Frangula californica	California coffeeberry	Shrub	Jun-Aug	6-15ft tall, 5-15ft wide	Part sun to full sun	Low to very low; max 2 times per month once established
Gaultheria shallon	Salal	Shrub	Mar-May	1-7ft tall, 7-12ft wide	Full shade to part shade	Moderate to high; max once per month once established
Heracleum maximum	Cow parsnip	Perennial forb	Jun-Aug	4-8ft tall	Part shade	Low
Holodiscus discolor	Cream bush	Shrub	May-Aug	3-16.4ft tall, 10-15ft wide	Shade to part shade	Moderate to high; max twice per month once established
Iris douglasiana	Douglas iris	Perennial forb	Feb-Jun	0.6-2.6ft tall, 2-4ft wide	Part to full shade	Low; max once per month once established)
Lathyrus vestitus var. *vestitus*	Pacific pea	Perennial forb	Mar-May	N/A	Part shade to full shade	Low
Leptosiphon grandiflorus	Largeflower linanthus	Annual forb	Apr-Aug	6in tall	Full sun	Low
Lonicera hispidula	Hairy honeysuckle	Shrub/vine	Apr-Jul	4ft tall, 8ft wide	Part shade	Low; max once per month once established)
Lonicera involucrata	Twinberry	Shrub	Jun-Jul	1.6-16.4ft tall, 3-4ft wide	Part shade to full sun	Moderate to high; once per week once established
Lupinus albifrons var. *collinus*	Silver lupine	Shrub	Apr-Jul	3-5ft tall, 2ft wide	Full sun	Low; max once per week once established

Soil	Horticultural Value	Wildlife associations	Cultural uses
Well-drained	Sun: full (shade tolerant); Water: low water tolerant; Soil: well-drained; cold tolerant	Many beneficial insects, especially attractive to butterflies	Native Americans boiled plant and applied this decoction as an atringent cleanser
Sandy soil	Sun: part to full; relatively short lived	Attracts butterflies and bees (nectar)	Seeds were ground into make flour (pinole)
Tolerates many soil types. Soil PH: 5.6 - 6.9	Sun: part to full; when used as a lawn, water it 1-2 times per month during the dry season	Attracts butterflies and birds	Excellent soil binder and useful for stabilizing waterways, slopes, banks, cuts, and fills; used as turf grass; used as a cover crop in orchards; drought resistant; useful in phytoremediation of soils contaminated by industrial activities and heavy metals
Adaptable	Sun: part to full; Water: dry, light, moderate	Attracts native bees, predatory or parasitoid insects, butterflies (Pale Swallotail); flowers attract hummingbirds and native bees in spring; berries consumed by birds.	Bark used to treat toothaches, kidney problems, and as a laxative; leaves used for poision oak dermatitis; berries eaten fresh and used to treat burns, sores and bleeding
Prefers sandy soil with organic material	N/A	Attracts hummingbirds, various insects, birds and mammals	N/A
Adaptable	N/A	Attracts butterflies and moths	N/A
Adaptable	N/A	Attracts butterflies and moths	N/A
Prefers heavy soils with organic matter. Tolerates Serpentine Soil. Soil PH: 5.0 - 8.0	N/A	Attracts butterflies and moths such as American Ear Moth, Verbena Bud Moth	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough
Semi-moist sand or clay	Sun: part to full shade; Water: low water tolerant; Soil: semi-moist sand or clay; spreads and climbs with tendrils	Hosts butterflies: Silvery Blue, Northern Cloudywing; nectar feeds hummingbirds; attracts many beneficial insects	Greens used for food by the Miwok tribe
Prefers sand or sandstone	N/A	Hosts butterflies, moths and bees	N/A
Adaptable	N/A	Attracts butterflies, moths, hummingbirds and other birds	N/A
Prefers moist, sandy soil	N/A	Attracts butterflies, bees, moths, hummingbirds and other birds	N/A
Prefers well drained soil	N/A	Hosts butterflies: Mission blue, Arrowhead Blue, Northern Cloudy-Wing; nectar (pollen) feeds native bees, bumble bees and hummingbirds	Used in a steambath for stomach troubles

COASTAL SCRUB

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Lupinus nanus	Sky lupine	Annual forb	Mar-May	0.33ft-2ft tall, 1ft wide	Full sun	Very low to low; max twice per month once established
Lupinus variicolor	Manycolored lupine	Shrub	N/A	0.7-1.6ft tall	N/A	N/A
Madia sativa	Coast tarweed	Annual forb	May-Aug	0.7-8ft tall	Full sun	N/A
Marah fabacea	California manroot	Perennial forb	Mar-Apr	18ft tall	Full sun	Very low to low
Microseris paludosa	Marsh silverpuffs	Perennial forb	Apr-Jun	N/A	N/A	N/A
Morella californica	California wax myrtle	Shrub	Jun-Jul	6-33ft tall, 20ft wide	Part sun to full sun	Very low; max once per week once established
Oemleria cerasiformis	Oso berry	Shrub	Mar-May	4.9-20ft tall	Part shade	Low
Oenothera elata	Hooker's evening primrose	Perennial forb	Jul-Oct	5ft tall, 3ft wide	Part shade to full sun	Low
Phacelia californica	California phacelia	Perennial forb	Mar-Aug	0.5-1.5ft tall, 1-2ft wide	Full sun	Low; water tolerant
Phacelia distans	Distant phacelia	Annual forb	Mar-Jun	0.16-2.6ft tall, 2.6ft wide	Full sun	None to low
Phacelia malvifolia	Stinging phacelia	Annual forb	Apr-Jul	0.7-3.3ft tall	Full sun	None to low
Plantago erecta	Dotseed plantain	Annual forb	Mar-Apr	N/A	Full sun to part shade	Very low
Pteridium aquilinum var. *pubescens*	Bracken fern	Perennial pteridophyte	N/A	3.3ft tall	Full sun to part shade	N/A

Soil	Horticultural Value	Wildlife associations	Cultural uses
Tolerates sandy or clay soils	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
N/A	N/A	Hosts butterflies including the endangered mission blue butterfly, bees, moths and birds	N/A
N/A	N/A	Seeds feed birds and small mammals; nectar (pollen) feeds native bees; attracts many beneficial insects	Seeds used as food and were ground into flour; oil from seeds used for cooking
N/A	N/A	Hosts butterflies & moths	Applied to scalp to prevent hair loss; roots used to poison and catch fish
N/A	N/A	N/A	N/A
Adaptable	Used in tree strips for windbreaks and erosion control	Sun: Part to full; Water: very low	Used by Native American groups as a remedy for stomach upset, respiratory conditions, sore throat and to clean blood for pneumonia patients; it may also be steeped into a mint tea.
Adaptable	Part shade; Low water; ease of care moderately easy; tolerates variety of soils; fast drainage; commonly available; can plant by staking live cuttings in the rainy season	Nectar (pollen) feeds native bees, butterflies, moths, and hummingbirds; fruits feed birds, small mammals, foxes and coyotes	Used as a laxative; used to treat soreness and tuberculosis; fruits used as food
Adaptable	N/A	Attracts butterflies and moths	N/A
Well-drained	Sun: full; Water: low water tolerant; Soil: well-drainaed	Source of pollen/nectar for bees and the endangered Mission Blue Butterfly	The Pomo used the fresh, crushed leaf juice to treat skin diseases; the Ohlone boiled roots for a tea to treat fevers and colds
N/A	Sun: full; Water: none to low	Nectar (pollen) feeds native bees	Leaves were steamed and eaten
N/A	Sun: full; Water: none to low	Attracts native bees, butterflies and moths	N/A
Adaptable	Direct seeding can be successful; grows in variable habitats from grasslands to dunes	Hosts butterflies: Common Buckeye	N/A
N/A	Direct seeding can be successful; grows in variable habitats from grasslands to dunes	Hosts butterflies and moths	Plant used used as a tonic, antiseptic, antiemetic and hair rinse for hair growth; used to treat rheumatism, cholera-morbus, cancer of the womb, diarrhea, troubles after birth, tuberculosis, chest pain, weakness, burns, toothaches, headaches, stomach cramps, colds, sores, poison-oak rash, broken bones; young fiddlenecks and rhizomes used for food (plant can be poisonous); roots used in basketry; fronds used for bedding, to clean fish, and as lining for cooking

COASTAL SCRUB

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Ribes sanguineum	Blood currant	Shrub	Jan-Mar	6.5-13ft tall, 7ft wide	Part shade	Low; max three times per month once established
Rubus parviflorus	Thimbleberry	Shrub	Mar-May	4-8.2ft	Part shade	Moderate to high
Rubus ursinus	California blackberry	Shrub	Feb-May	2-6ft tall, 6ft wide	Part sun to full sun	Moderate to high; max once per month once established
Scrophularia californica	Bee plant	Perennial forb	Feb-May	2-4ft tall, 6-12in wide	Part shade	Low; max once per month once established
Senecio aronicoides	Rayless ragwort	Perennial forb	Apr-Jul	3ft tall	Part shade	Low
"Solanum umbelliferum "	Bluewitch nightshade	Shrub	Jan-Jun	3.3ft tall, 3ft wide	Full sun to part shade	Very low; max once per month once established
Stachys ajugoides	Ajuga hedge nettle	Perennial forb	Apr-Sept	0.33-1ft tall	Full sun	N/A
Symphoricarpos albus var. *laevigatus*	Common snowberry	Shrub	May-Jul	4-6ft tall, 8-12ft wide	Shade to part shade	Low
Symphyotrichum chilense	California aster	Perennial forb	Jun-Oct	1.1-3.3ft tall, 3ft wide	Part shade to full sun	Very low to low
Vicia gigantea	Giant vetch	Perennial forb	Apr-Jun	3.3-6.6ft tall	Full sun to part shade	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Adaptable; tolerates poor soils/drought once established	N/A	Hosts butterflies: Tailed Copper, Hoary Comma, Oreas Comma; nectar (pollen) feeds native bees and hummingbirds; fruits feed birds and small mammals	N/A
Prefers moist, fertile soil with good drainage	N/A	Nectar (pollen) feeds native bees, bumble bees and hummingbirds; fruits feed birds and mammals	Berries were a food source and used in dyes; leaves used for food wrapping and storage; roots made into a tonic; young sprouts were eaten and used to fight scurvy; leaves used in a poultice for swelling, burns and wounds; concoction of leaves used for diarrhea, stomach ailments, anemia, and as an emetic; diviners gave berries to patients with chest disorders
Adaptable	Sun: part to full; Water: light, moderate; good creek-side for erosion control	Nectar (pollen) feeds native bees, honey bees, bumble bees and hummingbirds; fruits feed birds and mammals	Plant used to treat diarrhea, stomach troubles, vomiting; fruits used for food; leaves used to make tea
Adaptable	N/A	Hosts butterflies, bees, moths, hummingbirds and other birds	Plant used to treat boils, sores, swellings, sore eyes, fevers and infections; used as an eyewash for poor vision
N/A	Sun: part shade (shade tolerant); Water: low water tolerant; found in dry, open places;	Hosts butterflies: Common Buckeye; nectar (pollen) feeds native bees, honey bees and hummingbirds	N/A
Adaptable; fast-medium drainage	Full sun to part shade; very low water, no summer watering or at most 1x/month; variety of soils; fast-medium drainage; commonly available; deer resistant	Attracts many beneficial insects	Not available; in general Solanum species are poisonous but some species do have some medicinal values
N/A	N/A	Attracts butterflies, bees, moths, hummingbirds and other birds	N/A
Adaptable	N/A	Hosts butterflies, moths, bees and birds	Berries eaten to settle the stomach, used in a wash for sore eyes, applied to underarms as anit-perspirant and rubbed on the skin as treatment for burns, rashes, and sores; plant used for inability to urinate, colds, menstrual disorders, stomach ache, venereal diseases, tuberculosis, fevers associated with teething sickness and to clear up afterbirth; used for an antiseptic wash; stems used to make brooms and arrows
Prefers loamy clay soil	N/A	Attracts butterflies, bees, moths, and birds	N/A
N/A	Sun: shade tolerant; Water: low water tolerant	Hosts butterflies: Orange Sulphur, Western Sulphur, Eastern Tailed Blue, Silvery Blue, Northern Cloudy-Wing ; nectar (pollen) feeds native bees	Plant used as a hair wash and laxative; rubbed on body to mask odor when hunting; fruits used for food; whole roasted seed pods used as food source for native tribes throughout North America

Planting Palette: FOOTHILL GRASSLAND

FOOTHILL GRASSLAND						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Achillea millefolium	Common yarrow	Perennial forb	Apr-Aug	1-3ft tall, 0.5-1.5ft wide	Full sun	Dry to medium
Agrostis exarata	Spike bentgrass	Perennial grass	May-Jun	1-3.3ft tall	Full sun	N/A
Anaphalis margaritaceae	Pearly everlasting	Perennial forb	Summer	3-4ft tall, 4ft wide	Part shade to full sun	Very low; max twice per month once established
Arabis blepharophylla	Coast rockcress	Perennial forb	Feb-May	N/A	Part sun to full sun	Low
Brodiaea elegans	Harvest brodiaea	Perennial forb	Spring, summer	1.6ft tall, 0.5ft wide	Full sun to part shade	Low
Chlorogalum pomeridianum	Soap plant	Perennial forb	Spring-summer	3ft tall, 1.5ft wide	Full sun to part shade	Extremeley low
Clarkia rubicunda	Ruby chalice clarkia	Annual forb	Jun-Jul	2.5ft tall, 2.5ft wide	Full sun	Very low
Claytonia perfoliata ssp. *perfoliata*	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Clinopodium douglasii	Yerba buena	Perennial forb	May-Jul	3.6-7.2in, 3ft wide	Part shade to full shade	Dry, light to moderate; max once per week once established
Dichelostemma capitatum	Blue dicks	Perennial forb	Winter-spring	1.5-2ft tall, 2in wide	Full sun	Low
Dichondra donelliana	Dichondra	Perennial forb/ vine	N/A	N/A	Full sun	Low, moderate to high

Soil	Horticultural Value	Wildlife associations	Cultural uses
Nearly any type except very wet. Because of its deep roots it has been used to control erosion.. Soil PH: 4 - 8	Sun: full; Water: dry to medium; used in landscaping; said to attract beneficial insects and repel pests	Nectar and pollen for native bees, nectar for butterflies; some birds use LVS for nest material; said to inhibit growth of parasites	Applied to wounds as an antiseptic and pain reliever, inhaled in smoke or steam to relieve headaches and brewed in a tea to reduce fevers and aid in restful sleep; used to induce sweating and appetite; used to treat colds, respiratory ailments, swelling, snake bites, venereal diseases, sores, labor pains, hemorrhages and bowel complaints, nausea, chest pain, kidney and liver disorders, diarrhea, rheumatism; burned ceremonially
Adaptable, tolerant of sand, loam and clay	Sun: full; reproduces mainly by seed, but can also spread rhizomatously	Butterflies & moths such as Common Ringlet, Sandhill Skipper, Common Roadside-Skipper, Armyworm moth	N/A
Tolerates sandy or clay soils	N/A	Hosts butterflies, moths and many other insects	N/A
Well-drained	Sun: part to full; Water: low; Soil: well-drained	Hosts butterflies and moths	N/A
Does well in clay soil but can also tolerate garden soil	N/A	N/A	N/A
Tolerates a variety of soils. Soil PH: 5.5 - 8.0	Full sun to part shade; Extremely low water; no summer water; variety of soils; medium drainage; deer resistant	Pollination is by evening- or night-flying insects (often wasps)	Bulb used to stun and poison fish, make a multi-use soap, a hair wash to treat dandruff, and a starch/glue for baskets; bulbs used to treat gas, cramps, rheumatism, sores, stomach ache; bulb used as a diuretic and a laxative; bulbs and leaves were eaten as food; bulb husk fibers used to make brushes
Adaptable	N/A	Butterflies & moths such as White-lined Sphinx, Pacific Green Sphinx Moth, Clark's Day Sphinx Moth, Mariposa Forester	N/A
N/A	N/A	Hosts bufferflies and moths	N/A
Adaptable	Sun: part to full shade; Water: dry, light, moderate; deer resistant	Hosts butterflies, moths and bees	Used to make tea; plant is aphrodisiac, blood purifier, mildly digestive, febrifuge, sedative and tonic; infusion used to treat insomnia, colic, upset stomachs, kidney problems, colds and fevers; used in cooking in place of other savouries; oils used for perfumes/potpourris
Adaptable	Sun: Full; Water: Low; deer resistant, used in butterfly gardens	Attracts hummingbirds, butterflies and other insects.	Bulbs and flowers used for food; corms used to make and adhesive for seed gathering baskets
N/A	N/A	N/A	N/A

FOOTHILL GRASSLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Eschscholzia californica	California poppy	Annual or perennial forb	Spring, winter, summer, fall	.16-2ft tall, 1-2ft wide	Full sun	Low to medium
Festuca rubra	Red fescue	Perennial grass	Apr-May	1.3-2.6ft tall	Part to full sun	Low (when used as a lawn, water it 1-2 times per month during the dry season)
Frillillaria affinis	Checker lily	Perennial forb	Spring	0.33-3.9ft tall, 0.5ft wide	Part shade	Low; max once per month once established
Iris douglasiana	Douglas iris	Perennial forb	Feb-Jun	0.6-2.6ft tall, 2-4ft wide	Part to full shade	Low; max once per month once established)
Iris longipetala	Coast iris	Perennial forb	Mar-May	2ft tall, 2ft wide	Part to full shade	Low to high
Lomatium caruifolium	Alkali desertparsley	Perennial forb	Mar-May	0.49-1.5ft tall	Full sun	N/A
Lupinus nanus	Sky lupine	Annual forb	Mar-May	0.33ft-2ft tall, 1ft wide	Full sun	Very low to low; max twice per month once established
Lupinus variicolor	Manycolored lupine	Shrub	N/A	0.7-1.6ft tall	N/A	N/A
Madia sativa	Coast tarweed	Annual forb	May-Aug	0.7-8ft tall	Full sun	N/A
Monardella villosa	Coast tarweed	Annual forb	May-Aug	0.7-8ft tall	Full sun	N/A
Phacelia californica	California phacelia	Perennial forb	Mar-Aug	0.5-1.5ft tall, 1-2ft wide	Full sun	Low; water tolerant
Prunella vulgaris var. *lanceolata*	Lance leaf self heal	Perennial forb	Jul-Aug	0.33-1.6ft tall	Full sun to part shade	Moderate to high

Soil	Horticultural Value	Wildlife associations	Cultural uses
Prefers sandy, infertile, well-drained soils.. Soil PH: 5 - 8	Sun: full; Water: low to medium; direct seeds successfully	Attracts native bees and insects	CAUTION: Can be poisonous; used for insomnia, aches, nervous agitation, bed-wetting in children, diseases of the bladder and liver, and to promote relaxation
Tolerates many soil types. Soil PH: 5.6 - 6.9	Sun: part to full; when used as a lawn, water it 1-2 times per month during the dry season	Attracts butterflies and birds	Excellent soil binder and useful for stabilizing waterways, slopes, banks, cuts, and fills; used as turf grass; used as a cover crop in orchards; drought resistant; useful in phytoremediation of soils contaminated by industrial activities and heavy metals
Prefers well-drained soils on open slopes	N/A	N/A	N/A
Prefers heavy soils with organic matter. Tolerates Serpentine Soil. Soil PH: 5.0 - 8.0	N/A	Attracts butterflies and moths such as American Ear Moth, Verbena Bud Moth	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough
Prefers clay soil. Soil PH: 5.0 - 8.0	Sun: part to full sun; Water: low to high; Soil: perfers clay; this Iris is a good garden performer with large flowers and a pleasant fragrance.	Attracts many beneficial insects	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough
N/A	N/A	Attracts many beneficial insects	N/A
Tolerates sandy or clay soils	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
N/A	N/A	Hosts butterflies including the endangered mission blue butterfly, bees, moths and birds	N/A
N/A	N/A	Seeds feed birds and small mammals; nectar (pollen) feeds native bees; attracts many beneficial insects	Seeds used as food and were ground into flour; oil from seeds used for cooking
N/A	N/A	Seeds feed birds and small mammals; nectar (pollen) feeds native bees; attracts many beneficial insects	Seeds used as food and were ground into flour; oil from seeds used for cooking
Well-drained	Sun: full; Water: low water tolerant; Soil: well-drainaed	Source of pollen/nectar for bees and the endangered Mission Blue Butterfly	The Pomo used the fresh, crushed leaf juice to treat skin diseases; the Ohlone boiled roots for a tea to treat fevers and colds
N/A	Sun: part to full; cool to mild temperatures; prone to vigorous spreading	Source of pollen/nectar for native bees and bumble bees	The Cherokee cooked and ate the young leaves; drank as a cold infusion of the whole plant as a common beverage; contains vitamins A, C, and K; Prunella has long history of medicinal use globally

FOOTHILL GRASSLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Ranunculus californicus	California buttercup	Perennial forb	Feb-May	.6-2.3ft tall, 6in wide	Part shade to full sun	Moderate - High, Low (never irrigate in the summer once established)
Sanicula bipinnatifida	Purple sanicle	Perennial forb	Mar-May	2ft tall	Part shade	N/A
Sidalcea malviflora	Checkerbloom	Perennial forb	May-Aug	0.3-1.5ft tall, 3-6in wide	Part sun to full sun	Low; max once per month once established
Sisyrinchium bellum	Western blue-eyed grass	Perennial forb	Mar-May	1-2ft tall, 2in wide	Full sun to part shade	Low
Stipa lepida	Smallflower tussockgrass	Perennial grass	Mar-May	1.7-3.3ft tall, 2ft wide	Full shade to part shade	Very low
Stipa pulchra	Purple tussockgrass	Perennial grass	Mar-May	3.3ft tall, 1.5ft wide	Full sun	Low to very low
Symphyotrichum chilense	California aster	Perennial forb	Jun-Oct	1.1-3.3ft tall, 3ft wide	Part shade to full sun	Very low to low
Viola adunca	Dog violet	Perennial forb	Apr-Aug	1ft tall	Part shade	Low, moderate to high; Found in dry to moist meadows
Wyethia angustifolia	Narrow leaf mule ears	Perennial forb	Mar-Jul	3ft tall, 3ft wide	Full sun	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Adaptable. Soil PH: 5 - 8	N/A	A variety of insects are attracted to the flowers, especially native bees	Seeds ground into flour and used to make mush and flour
N/A	Sun: part shade	Attracts many beneficial insects	Plant used to treat snakebites and other ailments
Adaptable	Sun: part to full; Water: low; deer resistant, groundcover	Attracts bees, butterflies (West Coast Lady) and other insects	Leaves used for food
Tolerant of sand and clay. Soil PH: 5 . 0 - 8 . 0	N/A	N/A	Plant used to treat stomachaches, chills, heartburn, ulcers and asthma
Adaptable but often found in clay loam; Water: very	Full Shade, Part Shade, Sun Soil Description -Adaptable but often found in clay loam; Water: very low	Nectar (pollen) feeds native bees	Seeds ground to make pinole (flour)
Found in virtually every type of soil. Tolerates Serpentine Soil,Tolerates Sodic Soil. Soil PH: 6.0 - 8.0	Stipa pulchra tolerates alkaline soil, clay and seasonal flooding. Full Sun; low water;	Native bees use it for nesting material	Seeds ground to make pinole (flour)
Prefers loamy clay soil	N/A	Attracts butterflies, bees, moths, and birds	N/A
Loamy to organic	Sun: part shade; Water: found in dry to moist meadows; Soil: loamy to organic	Host to the Unsilvered Fritillary, Callippe Fritillary, Coronis Fritillary, and other Speyeria butterflies, many beneficial insects	Decoction of entire plant taken for stomach pain, flowers used as a blue dye, poultice used for pain relief
Tolerates a variety of soils as long as adequate drainage is provided. Soil PH: 5.8 - 7.0	Sun: full; Water: low; Soil: Tolerates a variety of soils as long as adequate drainage is provided	Numerous insects, including bees and butterflies	"Raw stems used for food; seeds used for pinole (food) and dried for winter use; decoction of leaves used to reduces fever and induce perspiration; decoction of roots taken as an emetic; poultice of root lather used for lung problems and to draw blisters; young leaves can be eaten raw; lemon-yellow dye is obtained from the flowers; gold to brass dye is obtained from the flowers, leaves and stems.""

Planting Palette: DUNE SCRUB / GRASSLAND

DUNE SCRUB / GRASSLAND						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Acmispon glaber	Common deerweed	Perennial forb	Mar-Aug	1.6ft - 3ft tall, 3ft wide	Part sun to full sun	Low to none; max once per month once established
Agoseris apargioides var. *apargioides*	Coast dandelion	"Perennial forb "	May-Aug	1.5ft tall	"N/A "	N/A
Amsinckia spectabilis	Seaside fiddleneck	Annual forb	Apr-May	0.7-3.9ft tall	Part sun to full sun	Low to none
Artemisia pycnocephala	Beach wormwood	Perennial forb	May-Aug	1.6ft tall, 3ft wide	Full sun	Very low; max 2x / month once established
Astragalus nuttallii var. *virgatus*	Nuttall's milkvetch	Perennial forb	Jan-Nov	0.7-3.3ft tall	N/A	N/A
Baccharis pilularis	Coyote brush	Shrub	Sep-Jan	1.5-10ft tall, 12ft wide	Part sun to full sun	Once per week until established, then once per month or not at all
Bromus maritimus	Maritime brome	Perennial grass	Apr-Jul	5ft tall	Full sun	Low to none
Calystegia purpurata	Morning glory	Perennial forb/ vine	Apr-Sept	2ft tall	Full sun to part shade	Low to occasional watering
Cardionema ramosissimum	Sandcarpet	Perennial forb	Apr-Aug	1ft tall	Part sun to full sun	None to low
Castilleja affinis	Indian paintbrush	Perennial / annual forb	Feb-May	2ft tall	Full sun	N/A

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	Sun: part to full; Water: low to none; very drought tolerant; attracts wildlife; builds soil through fixing nitrogen	"Food source for numerous wildlife including hummingbirds, bees, butterfly larvae, and deer; host plant for Acmon Blue butterfly"	Plant used to treat coughs to and to strengthen the blood; leaves used for food and house thatching; roots used for soap
N/A	N/A	Hosts butterflies and moths	N/A
Sandy	Sun: part to full; Water: low to none; Soil: sandy; easily spread through direct seeding in sandy areas	Attracts butterflies and beneficial insects; Host plant for Painted Lady butterfly	Young leaves rolled into balls and eaten raw (warning may be toxic)
Prefers sand	Commonly available at nurseries; gen prefers sand; very low watering; very easy to care for	Provides nesting material for native bees	N/A
N/A	N/A	Hosts butterflies: Queen Alexandra's Sulphur, Reakirt's Blue, Arrowhead Blue, Marine Blue	N/A
Tolerates poor soils	Sun: part to full; Water: 1/week until established, then 1/month or not at all; Soil: tolerates poor soils; drought tolerant; deer resistant; useful for hedges or fence lines	Attracts native bees, parasitoid and predatory insects and butterflies (Common buckeye butterfly, Purplish Copper butterfly, Gray Hairstreak butterfly); great habitat plant providing cover and food for wildlife; important plant for pollinators due to its abundant production of pollen and nectar and the bloom period, which occurs during the fall and winter	Infusion of plant used as a general remedy; wood made into arrows
Sandy	Sun: full; Water: low to none; Soil: sandy	Seeds for source for birds; hosts butterflies and moths	Grain used to make pinole
N/A	Full sun to part shade; low to occasional watering; care moderately easy; commonly available at nurseries	Attracts bees, hummingbirds, butterflies and other pollinators	N/A
Sandy	Sun: part to full; Water: none to low; Soil: sandy	N/A	N/A
Rocky soil with sand	N/A	Non-specific host to Leanira Checkerspot (Chlosyne leanira) and Chalcedon Checkerspot (Euphydryas chalcedona) butterflies; also attracts many native bees.	N/A

DUNE SCRUB / GRASSLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Castilleja latifolia	Monterey Indian paintbrush	Perennial forb	Feb-Sep	1.5-2ft tall	Full sun	N/A
Chorizanthe cuspidata var. *cuspidata*	San Francisco Bay spineflower	Annual forb	Apr-Jul	1.9-5.9in tall	Part sun to full sun	Low
Claytonia perfoliata ssp. perfoliata	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Clinopodium douglasii	Yerba buena	Perennial forb	May-Jul	3.6-7.2in, 3ft wide	Part shade to full shade	Dry, light to moderate; max once per week once established
Collinsia bartsiifolia var. *bartsiifolia*	White blued eyed Mary	Annual forb	Mar-Jun	1.33-1.2ft tall	N/A	N/A
Croton californicus	California croton	Perennial forb	Apr-Jul	3.3ft tall	Part sun to full sun	None to low
Cryptantha leiocarpa	Coastal cryptantha	Annual forb	Mar-Aug	1.9-11.8in tall	N/A	N/A
Diplacus aurantiacus	Cherry monkeyflower	Shrub	Mar-Aug	N/A	Sun to part shade	N/A
Elymus pacificus	Pacific wild-rye	Perennial grass	N/A	N/A	N/A	N/A
Ericameria ericoides	California goldenbush	Shrub	Sep-Nov	2-3.5ft tall, 3-4ft wide	Full sun	Low to none
Erigeron glaucus	Seaside fleabane	Perennial forb	Jan-Aug	0.16-1ft tall, 2ft wide	Part sun to full sun	Low to none
Erysimum franciscanum	San Francisco wallflower	Perennial forb	Mar-Jun	1-2ft tall, 1-2ft wide	Part sun to full sun	None to low
Festuca octoflora	Sixweeks fescue	Annual grass	Mar-Jun	2ft tall	Full sun	N/A
Fragaria chiloensis	Beach strawberry	Perennial forb	Feb-Mar	0.49-1ft tall	Part shade to full sun	None to low; max three times per month once established
Frangula californica	Coffeeberry	Shrub	Jun-Aug	6-15ft tall, 5-15ft wide	Part sun to full sun	Dry, light to moderate; max twice per month once established
Heracleum maximum	Cow parsnip	Perennial forb	Jun-Aug	4-8ft tall	Part shade	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	N/A	N/A	N/A
Sandy	Sun: part to full; Water: low; Soil: sandy	N/A	N/A
N/A	N/A	Hosts bufferflies and moths	N/A
Adaptable	Sun: part to full shade; Water: dry, light, moderate; deer resistant	Hosts butterflies, moths and bees	Used to make tea; plant is aphrodisiac, blood purifier, mildly digestive, febrifuge, sedative and tonic; infusion used to treat insomnia, colic, upset stomachs, kidney problems, colds and fevers; used in cooking in place of other savouries; oils used for perfumes/potpourris
N/A	N/A	N/A	N/A
Sandy	Sun: part to full; Water: none to low; Soil: sandy	N/A	Plant used to treat earaches, congestion, and coughs; used to induce abortions (plant poisonous)
Well-drained sand	Well-drained sand; direct seeding has proven successful	Attracts butterflies	N/A
N/A	N/A	Attracts hummingbirds, larval host for Common Checkerspot and Variable Checkerspot butterfly	N/A
N/A	N/A	Hosts butterflies and moths	N/A
Sandy	Sun: full; Water: low to none; Soil: sandy	Attracts many beneficial insects	N/A
Clay soils on steep slopes, sandy soils on flats	Sun: part to full; Water: low to none can work as ground cover	Nectar (pollen) feeds honey bees; attracts predatory or parasitoid insects and butterflies	N/A
N/A	Sun: part to full; Water: none to low	N/A	N/A
Sandy	N/A	Hosts butterflies and moths	Seeds used for food
Sandy	Sun: part to full; Water: none to low	Attracts many beneficial insects	Fruits used as food; leaves used to make tea; poultice of chewed leaves applied to burns
Adaptable	Sun: part to full; Water: dry, light, moderate	Attracts native bees, predatory or parasitoid insects, butterflies (Pale Swallotail); flowers attract hummingbirds and native bees in spring; berries consumed by birds.	Bark used to treat toothaches, kidney problems, and as a laxative; leaves used for poision oak dermatitis; berries eaten fresh and used to treat burns, sores and bleeding
Adaptable	N/A	Attracts butterflies and moths	N/A

DUNE SCRUB / GRASSLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Lessingia germanorum	San Francisco lessingia	Annual forb	Jul-Nov	N/A	N/A	N/A
Lonicera involucrata	Twinberry	Shrub	Jun-Jul	1.6-16.4ft tall, 3-4ft wide	Part shade to full sun	Moderate to high; once per week once established
Lupinus arboreus	Yellow bush lupine	Shrub	Apr-May	3.5-7ft tall, 4ft wide	Part to full	None to low
Lupinus bicolor	Bicolor lupine	Annual forb	Mar-Jun	0.26-1.3ft tall, 1ft wide	Full sun	Low; max once per month once established
Lupinus chamissonis	Chamisso bush lupine	Shrub	Apr-Jun	4.9-7ft tall, 3ft wide	Full sun	Very low; max twice per month once established
Lupinus nanus	Sky lupine	Annual forb	Mar-May	0.33ft-2ft tall, 1ft wide	Full sun	Very low to low; max twice per month once established
Lupinus variicolor	Manycolored lupine	Shrub	N/A	0.7-1.6ft tall	N/A	N/A
Madia gracilis	Slender tarweed	Annual forb	Apr-Jul	3.3ft tall	N/A	N/A
Marah fabacea	Wild cucumber	Vine / perennial forb	Mar-Apr	18ft tall	Full sun	Very low to low
Melica imperfecta	Smallflower melicgrass	Perennial grass	Feb-Mar	3.2-4ft tall, 1ft wide	Full sun to part shade	Very low; max once per month once established
Oemleria cerasiformis	Oso berry	Shrub	Mar-May	4.9-20ft tall	Part shade	Low
Oenothera elata	Hooker's evening primrose	Perennial forb	Jul-Oct	5ft tall, 3ft wide	Part shade to full sun	Low
Phacelia distans	Distant phacelia	Annual forb	Mar-Jun	0.16-2.6ft tall, 2.6ft wide	Full sun	None to low
Phacelia malvifolia	Stinging phacelia	Annual forb	Apr-Jul	0.7-3.3ft tall	Full sun	None to low
Phalaris californica	California canarygrass	Perennial grass	Apr-Jun	1.6-5ft tall	Full shade to part shade	N/A

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	N/A	Hosts butterflies and moths	N/A
Prefers moist, sandy soil	N/A	Attracts butterflies, bees, moths, hummingbirds and other birds	N/A
Sandy	Sun: part to full; Water: none to low; deer resistant	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	Root fibers used as string to make nets
Adaptable	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
Prefers beach sand. Tolerates saline soil	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
Tolerates sandy or clay soils	N/A	Hosts butterflies: Arrowhead Blue; nectar (pollen) feeds native bees, bumble bees and hummingbirds	N/A
N/A	N/A	Hosts butterflies including the endangered mission blue butterfly, bees, moths and birds	N/A
N/A	Useful to help control erosion in areas with disturbed soils that are low in nutrients	N/A	Seeds were ground into pinole
N/A	N/A	Hosts butterflies and moths	N/A
Adaptable	N/A	Butterflies & moths	Used to treat toothache and extract baby teeth; seeds pounded and used for food
Adaptable	Part shade; Low water; ease of care moderately easy; tolerates variety of soils; fast drainage; commonly available; can plant by staking live cuttings in the rainy season	Nectar (pollen) feeds native bees, butterflies, moths, and hummingbirds; fruits feed birds, small mammals, foxes and coyotes	Used as a laxative; used to treat soreness and tuberculosis; fruits used as food
Adaptable	N/A	Attracts butterflies and moths	N/A
N/A	Sun: full; Water: none to low	Nectar (pollen) feeds native bees	Leaves were steamed and eaten
N/A	Sun: full; Water: none to low	Attracts native bees, butterflies and moths	N/A
N/A	N/A	Hosts butterflies: Woodland Skipper	N/A

DUNE SCRUB / GRASSLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Poa douglasii	Douglas bluegrass	Perennial grass	Mar-Jul	11.8in tall	N/A	N/A
Polygonum paronychia	Beach knotweed	Perennial forb	Mar-Sep	0.33-3.3ft tall	Part sun to full sun	None to low
Symphyotrichum chilense	California aster	Perennial forb	Jun-Oct	1.1-3.3ft tall, 3ft wide	Part shade to full sun	Very low to low
Tanacetum bipinnatum	Dune tansy	Perennial forb	Jul-Oct	9.6in tall	Full sun	None to low (twice per month during summer)

Soil	Horticultural Value	Wildlife associations	Cultural uses
Sandy	Grows in sand; uncommon in nursery trade; grows from a long network of rhizomes	N/A	N/A
N/A	Sun: part to full; Water: none to low	Hosts butterflies: Purplish Copper	N/A
Prefers loamy clay soil	N/A	Attracts butterflies, bees, moths, and birds	N/A
Sandy	Sun: full; Water: none to low (twice per month during summer);	Hosts butterflies and moths	N/A

Planting Palette: RIPARIAN HABITAT

RIPARIAN HABITAT						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Artemisia douglasiana	Douglas' sagewort	Perennial forb	May-Oct	8ft tall, 4ft wide	Full sun, part shade to full shade	Low, moderate to high; max once per month once established
Calystegia purpurata	Morning glory	Perennial forb/ vine	Apr-Sept	2ft tall	Full sun to part shade	Low to occasional watering
Carex harfordii	Harford's sedge	Perennial rush/ sedge	Feb-Sep	N/A	Part shade	Moderate to high
Carex obnupta	Slough sedge	Perennial rush/ sedge	Apr-May	3-3.9ft tall	Shade (but will tolerate full sun)	Moderate to high
Claytonia perfoliata ssp. *perfoliata*	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Cornus sericea ssp. *sericea*	Red osier dogwood	Shrub	Mar-May	4-15ft tall, 12ft wide	Part shade	Moderate to high; max once per month once established
Cyperus eragrostis	Tall nutsedge	Perennial rush/ sedge	May-Sep	3ft tall, 30ft wide	Full sun	Moderate to high
Erythranthe guttata	Seep monkey flower	Annual / perennial forb	Mar-Jul	2-5ft tall, 0.6ft wide	Part shade to full sun	Moderate to high; max once per week once established
Euthamia occidentalis	Western goldenrod	Perennial forb	Aug-Oct	3.5-7ft tall	Full sun	Moderate to high
Iris douglasiana	Douglas iris	Perennial forb	Feb-Jun	0.6-2.6ft tall, 2-4ft wide	Part to full shade	Low; max once per month once established)

Soil	Horticultural Value	Wildlife associations	Cultural uses
Adaptable	N/A	Hosts butterflies, moths and birds	N/A
N/A	Full sun to part shade; low to occasional watering; care moderately easy; commonly available at nurseries	Attracts bees, hummingbirds, butterflies and other pollinators	N/A
N/A	N/A	Hosts butterflies and moths	N/A
Tolerates variety of soil as long as wet	Shade (but will tolerate full sun); moderate - high water; deer resistant; tolerates variety of soil as long as wet; very easy to propagate from rhizomes in the field	Birds eat the seeds; small animals use foliage for shelter/nesting	Leaves used to make baskets, hats, insoles of shoes; sharp edged leaves used by men for shaving
N/A	N/A	Hosts bufferflies and moths	N/A
Adaptable	N/A	Plant provides nesting habitat and food (berries) for birds. Larval host of Spring Azure butterfly. Berries are also food source for small mammals. Attracts native pollinators.	Plant (especially bark) used medicinally after childbirth, to make an emetic, treat colds, poison ivy rash, sore eyes, mouth hemorrhages, kidney and liver problems, lung sickness, sores, weakness, paralysis, cough, fever; fruits eaten as food and used in tonic for intestinal worms; sap used to make poison arrows; branches used to make baskets, cradle boards, poles, pipes, arrows and nets; leaves were dried and smoked; plant used to make dye
Tolerates variety of soil as long as wet	Full sun; moderate - high water; tolerates variety of soil as long as wet; seldom used; often aggressive in wet restoration sites for first few years	Hosts butterflies and moths	Tubers used for food and beverage and were ground to make flour and a coffee substitute; bases of stems were used as food; plant used to make coiled basktes and seats
Adaptable	N/A	Hosts butterflies, bees, moths, hummingbirds and other birds	N/A
Adaptable	Full sun; moderate to high water; commonly available; can be planted from division of rhizomes	Nectar (pollen) feeds native bees	While some Euthamia species have noted cultural/medicinal uses none can be found for this species
Prefers heavy soils with organic matter. Tolerates Serpentine Soil. Soil PH: 5.0 - 8.0	N/A	Attracts butterflies and moths such as American Ear Moth, Verbena Bud Moth	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough

RIPARIAN HABITAT

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Juncus bufonius	Toad rush	Annual rush/ sedge	Mar-May	1ft tall	Full sun	Moderate to high
Juncus patens	Spreading rush	Perennial rush/ sedge	Jun-Jul	1-3ft tall, 3ft wide	Full sun to part shade	Moderate to high
Lonicera hispidula	Hairy honeysuckle	Shrub/vine	Apr-Jul	4ft tall, 8ft wide	Part shade	Low; max once per month once established)
Lonicera involucrata	Twinberry	Shrub	Jun-Jul	1.6-16.4ft tall, 3-4ft wide	Part shade to full sun	Moderate to high; once per week once established
Marah fabacea	Wild cucumber	Vine / perennial forb	Mar-Apr	18ft tall	Full sun	Very low to low
Morella californica	California wax myrtle	Shrub	Jun-Jul	6-33ft tall, 20ft wide	Part sun to full sun	Very low; max once per week once established
Persicaria lapathifolia	Pale smartweed	Annual forb	Jul-Sep	0.7-2.6ft tall	N/A	N/A
Phacelia malvifolia	Stinging phacelia	Annual forb	Apr-Jul	0.7-3.3ft tall	Full sun	None to low
Plagiobothrys torreyi var. *diffusus*	Torrey's popcornflower	Annual forb	Apr-Jun	1.9-11.8in tall	N/A	N/A
Quercus agrifolia	Coast live oak	Tree	Feb-Apr	25-82ft tall, 15-35ft wide	Part sun to full sun	Dry, light to moderate (minimal in dry season)

Soil	Horticultural Value	Wildlife associations	Cultural uses
Tolerates variety of soil as long as wet	Full sun; moderate to high water; moderately easy care; tolerant of variety of soils as long as moist; rarely used; often appears at wet sites after disturbance; used in erosion control, sediment accretion and stabilization, nutrient uptake and transformation, restoration and creation of wetland ecosystems, and wastewater treatment applications	Provides habitat for aquatic animals; provides forage for grazing animals; seeds feed small birds and mammals	Used to make an emetic for runners and athletes
Adaptable	Full sun to part shade; moderate to high water; deer resistant; commonly available; easy care; can cut individuals into pieces to propagate on site; used in erosion control, sediment accretion and stabilization, nutrient uptake and transformation, restoration and creation of wetland ecosystems, and wastewater treatment applications	Provides habitat for aquatic animals; provides forage for grazing animals; seeds feed small birds and mammals	N/A
Adaptable	N/A	Attracts butterflies, moths, hummingbirds and other birds	N/A
Prefers moist, sandy soil	Useful for streambank erosion control and restoration; winter dormant branches are useful as live stakes and in other soil bioengineering practices	Attracts butterflies, bees, moths, hummingbirds and other birds	Berries used to make dye, reportedly eaten by some although poisonous; plant used medicinally as a poultice for sores, as an emetic, for body cleansing, dandruff, wounds, sore eyes, infections, sore throats, paralysis, coughs, burns, itches,venereal diseases, stomach troubles, leg and foot pains and arthritis
N/A	N/A	Hosts butterflies and moths	N/A
Adaptable	Used in tree strips for windbreaks and erosion control	Sun: Part to full; Water: very low	Used by Native American groups as a remedy for stomach upset, respiratory conditions, sore throat and to clean blood for pneumonia patients; it may also be steeped into a mint tea.
N/A	N/A	Hosts butterflies and moths	Plant used to treat stomach trouble and fever; used as an emetic; used as ceremonial chant lotion
N/A	Sun: full; Water: none to low	Attracts native bees, butterflies and moths	N/A
N/A	N/A	Hosts butterflies and moths	N/A
Tolerates a variety of soils but prefers a deep, well draining loam which it usually develops over time from leaf drop.	Sun: part to full; Water: dry, light, moderate (minimal in dry season)	Hosts butterflies: California Sister, Propertius Duskywing, Mournful Duskywing, Gold-Hunter's Hairstreak; acorns feed birds, small mammals and deer	Acorns ground into meal as an important food staple; acorns used for necklaces, instruments, toys; wood made a superior charcoal; used to treat newborns with bleeding navels; bark used in a wash for sores

RIPARIAN HABITAT

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Ribes sanguineum	Blood currant	Shrub	Jan-Mar	6.5-13ft tall, 7ft wide	Part shade	Low; max three times per month once established
Rosa californica	California wild rose	Shrub	May-Aug	9-10ft tall, 10ft wide	Sun to full shade	Low to high; 3 times per month in the summer
Rubus ursinus	California blackberry	Shrub	Feb-May	2-6ft tall, 6ft wide	Part sun to full sun	Moderate to high; max once per month once established
Rumex fueginus	Golden dock	Monocarpic forb	May-Aug	0.13-2.3ft tall	N/A	N/A
Rumex salicifolius	Willow dock	Perennial forb	Jun-Sep	1-3ft tall	Full sun to part shade	Moderate to high
Salix lasiandra	Shining willow	Tree	Mar-Apr	3-30ft tall	Part sun to full sun	Moderate to high; keep moist in the summer
Salix lasiolepis	Arroyo willow	Tree	Feb-May	7-35ft tall, 15ft wide	Part sun to full sun	Moderate to high
Sambucus nigra ssp. *caerulea*	Mexican elder	Tree	Mar-Jul	20-30ft tall, 20-30ft wide	Full shade, part shade to full sun	Low; max once per month once established

Soil	Horticultural Value	Wildlife associations	Cultural uses
Adaptable; tolerates poor soils/drought once established	N/A	Hosts butterflies: Tailed Copper, Hoary Comma, Oreas Comma; nectar (pollen) feeds native bees and hummingbirds; fruits feed birds and small mammals	N/A
Tolerates clay but does best in moist loamy soil	Sun to full shade; low-high water; 3x/month summer watering; deer resistant; commony available; can propagate from cuttings	Nectar (pollen) feeds native bees, bumble bees and butterflies	Blossoms used for infant pain; fruits used to treat colds, rheumatism, fevers, kidney ailments, sore throats, indigestion, colic, and sores; seeds used for stomach fevers and painful congestion; blossoms, buds and fruits used for food and beverage; stems used in twined basketry
Adaptable	Sun: part to full; Water: light, moderate; good creek-side for erosion control	Nectar (pollen) feeds native bees, honey bees, bumble bees and hummingbirds; fruits feed birds and mammals	Plant used to treat diarrhea, stomach troubles, vomiting; fruits used for food; leaves used to make tea
N/A	N/A	Hosts butterflies: Coppers	Seeds used for food; plant used to treat bloating
N/A	Full sun to part shade; moderate-high water	Hosts butterflies: Coppers	Plant used to treat swelling, sore limbs, constipation, cuts, stomach ache, chicken pox, burns, sore throats, fever, intestinal disorders, joint pains, jaundice; plant used to regulate menstruation; seeds, stems and leaves used for food; roots used to make dye
Tolerates a variety of soils but prefers alluvial soil	Sun: part to full; Water: moderate, high; can be reproduced by cuttings; very useful in riparian restoration and streambank stabalization; may damage plumbing pipes	"Attracts native bees (pollen / nectar), butterflies/moths (Mourning Cloak, Western Tiger Swallowtail)"	Plant used to treat asthma, bleeding, headache, diarrhea, cramps, colds, sore throats; bark smoked as a substitute for tobacco; leaves used for ceremonial emetic; wood and bark used to make string, baskets, fish weirs, tools, water jugs and used for house construction
Adaptable	Sun: part to full; Water: moderate, high; can be reproduced by cuttings; very useful in riparian restoration and streambank stabalization; may damage plumbing pipes	Hosts butterflies: Dreamy Duskywing, Viceroy, Lorquin's Admiral, Weidemeyer's Admiral, Mourning Cloak, Western Tiger Swallowtail, Sylvan Hairstreak; Nectar (pollen feeds native bees	"Bark used to cause sweating and treat diarrhea, itching, chills, measles, fever; leaves and flowers used to treat colds; shoots used in basketry and thatching; inner bark fibers used to make rope and garments; infusions of the leaves, bark, or flowers were used for several disease remedies; inner bark was used to make rope; branches were used in coiled/twined basketry"
Tolerates a variety of soils but prefers well-drained soils with moisture	Cuttings used for stabilizing stream banks, building waddles for erosion control and preventing sediment runoff in construction and restoration; used in bioengineering for riparian restoration	Hosts butterflies: Dreamy Duskywing, Viceroy, Lorquin's Admiral, Weidemeyer's Admiral, Mourning Cloak, Western Tiger Swallowtail, Sylvan Hairstreak; Nectar (pollen feeds native bees	Bark used to make a repellant for flies and insects, a laxative and an emetic; plant used to treat rheumatism, burns, boils, infection, liver ailments, colic, jaundice, heart disease, swelling, headache, diphtheria, diarrhea, syphilis, colds, lung ailments, measles, mumps, venereal disease, infection, toothache, stomach ache; fruits used to make food and beverage; stems used to make arrows, medicine tubes, whistles, flutes and pipes; wood used for fire spindles; plant used to make dye

RIPARIAN HABITAT

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Sambucus racemosa	Red elderberry	Shrub/tree		6.6-20ft	Full sun to part shade	Moderate to high
Symphyotrichum chilense	California aster	Perennial forb	Jun-Oct	1.1-3.3ft tall, 3ft wide	Part shade to full sun	Very low to low
Vicia gigantea	Giant vetch	Perennial forb	Apr-Jun	3.3-6.6ft tall	Full sun to part shade	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Favors deeper, loamy sands and silts and nutrient rich sites with good drainage	N/A	Attracts butterflies, bees, moths and birds	N/A
Prefers loamy clay soil	N/A	Attracts butterflies, bees, moths, and birds	N/A
N/A	Sun: shade tolerant; Water: low water tolerant	Hosts butterflies: Orange Sulphur, Western Sulphur, Eastern Tailed Blue, Silvery Blue, Northern Cloudy-Wing ; nectar (pollen) feeds native bees	Plant used as a hair wash and laxative; rubbed on body to mask odor when hunting; fruits used for food; whole roasted seed pods used as food source for native tribes throughout North America

Planting Palette: COAST LIVE OAK WOODLAND

COAST LIVE OAK WOODLAND						
Scientific Name	**Common Name**	**Lifeform**	**Flowering time**	**Size**	**Sun**	**Moisture**
Artemisia pycnocephala	California sagewort	Shrub	Apr-Oct	1-8ft tall, 4ft wide	Full sun	Extremely low watering; no summer watering; max once per month once established
Ceanothus thyrsiflorus	Blue blossom	Shrub	Mar-May	2-30ft tall, 2-40ft wide	Part sun to full sun	Water needed for establishment, water deep and infrequently after establishment
Claytonia perfoliata ssp. *perfoliata*	Miner's lettuce	Annual forb	Apr-May	1.3ft tall	N/A	N/A
Corylus cornuta var. *californica*	California hazel	Shrub	Feb-Mar	18ft tall	Part shade	N/A
Dryopteris arguta	Coastal wood fern	Fern	N/A	2ft tall	Full sun, part shade, full shade	Very low
Galium aparine	Bedstraw	Annual forb	Apr-May	10.8in tall	N/A	N/A
Iris douglasiana	Douglas iris	Perennial forb	Feb-Jun	0.6-2.6ft tall, 2-4ft wide	Part to full shade	Low; max once per month once established)
Lathyrus vestitus var. *ochropetalus*	Bolander's Pacific pea	Perennial forb	Jan-Apr	N/A	Part shade to full shade	Low water tolerant
Leptosiphon androsaceus	False babystars	Annual forb	Mar-Jun	0.16-1ft tall	Full sun, part sun, full shade	N/A

Soil	Horticultural Value	Wildlife associations	Cultural uses
Sandy soil with low nutrient content, although it is said to tolerate clay	Commonly available at nurseries; full sun; extremely low watering; no summer watering; usually found on sandy soil with low nutrient content, although it is also said to tolerate clay; variable drainage; often south facing	Provides nesting material for native bees; hosts butterflies and moths	"Can be used in cooking as a spice; made into tea or tea bath; chewing leaves believed to fight coughs/colds; ease menstruation cramps and to ease labor; Ohlone used it as pain reliever for wounds or teeth; recent research has shown a liniment and sesquiterepens present in plant that provide pain relief than opiods but much safer, used to treat pain from broken bones, arthritis, sprains and strains"
Well-drained	Sun: part to full; Water: needed for establishment, water deep and infrequently after establishment; Soil: well-drained; not deer resistant	Attracts native bees, parasitoid and predatory insects and butterflies (Spring Azure, Echo Blue, Pacuvius Duskywing, California Tortoiseshell, Pale Swallowtail, Hedgerow Hairstreak; Ceanothus silk moth)	Native people used the flowers mixed with water as a lathery soap
N/A	N/A	Hosts bufferflies and moths	N/A
N/A	N/A	Hosts bufferflies and moths	Plant used medicinally to treat cuts, intestinal disorders, worms, heart trouble, teething; bark used to make an astringent; nuts used for food and as a trading item; stems used to make arrows, fish traps, baskets and rope; roots used to make blue dye
N/A	N/A	N/A	Plant used to make a hair wash; roots used to induce vomitting and treat internal bleeding; rhizomes used for food; leaves used to clean meats
Prefers loamy or clay soils. Grows poorly in sandy soils	N/A	Hosts bufferflies and moths	Plant used to induce bowel movements, treat skin rash and itch, kidney trouble and venereal disease; used as an emetic, a tonic, horse medicine, and as a hair wash
Prefers heavy soils with organic matter. Tolerates Serpentine Soil. Soil PH: 5.0 - 8.0	N/A	Attracts butterflies and moths such as American Ear Moth, Verbena Bud Moth	Leaf fibers used for fishing nets, string, rope, snares, hairnets, and regalia; leaves used in basketry and used to wrap babies during berry gathering trips; seeds were ground into flour; rhizome used in a poultice for sores; root used as a cathartic, for kidney trouble, cough
Semi-moist sand or clay	Sun: part to full shade; Water: low water tolerant; Soil: semi-moist sand or clay; spreads and climbs with tendrils	Hosts butterflies: Silvery Blue, Northern Cloudywing; nectar feeds hummingbirds; attracts many beneficial insects	Used as an emetic; seeds and leaves used for food
N/A	N/A	Attracts many beneficial insects	N/A

COAST LIVE OAK WOODLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Lonicera involucrata var. *ledebourii*	Twinberry honeysuckle	Shrub	Apr-Jun	10ft tall	Part shade	Moderate to high
Lupinus albifrons	Silver lupine	Shrub	Apr-Jul	3-5ft tall, 2ft wide	Full sun	Low; max once per week once established
Polypodium californicum	California polypody	Perennial forb	N/A	1.5ft tall, 3ft wide	Full shade to part shade	Low to high water; summer water once per week, keep moist
Polystichum munitum	Western swordfern	Perennial pteridophyte	N/A	1.6-5.9ft tall, 2-3ft wide	Full shade to part shade	Low, moderate to high; max once per month once established
Prunella vulgaris var. *lanceolata*	Mountain selfheal	Perennial forb	Jul-Aug	1-2ft tall, 6-9in wide	Part sun to full sun	Low, moderate to high
Prunus ilicifolia	Hollyleaf cherry	Tree	Mar-May	30-49.2ft tall, 20ft wide	Full sun to part shade	Very low; max once a month once established
Quercus agrifolia	Coast live oak	Tree	Feb-Apr	25-82ft tall, 15-35ft wide	Part sun to full sun	Dry, light, moderate (minimal in dry season)
Rosa californica	California wild rose	Shrub	May-Aug	9-10ft tall, 10ft wide	Sun to full shade	Low to high; 3 times per month in the summer

Soil	Horticultural Value	Wildlife associations	Cultural uses
N/A	Useful for streambank erosion control and restoration; winter dormant branches are useful as live stakes and in other soil bioengineering practices	Hosts butterflies: Gillett's checkermallow; berries feed birds and mammals; nectar (pollen) feeds bumble bees and hummingbirds	Berries used to make dye, reportedly eaten by some although poisonous; plant used medicinally as a poultice for sores, as an emetic, for body cleansing, dandruff, wounds, sore eyes, infections, sore throats, paralysis, coughs, burns, itches,venereal diseases, stomach troubles, leg and foot pains and arthritis
Prefers well drained soil	N/A	Hosts butterflies: Mission blue, Arrowhead Blue, Northern Cloudy-Wing; nectar (pollen) feeds native bees, bumble bees and hummingbirds	Used in a steambath for stomach troubles
Adaptable	Full shade to part shade; low to high water; summer watering 1/ week, keep moist; tolerates variety of soils; slow drainage; ease of care moderately easy; commonly available; deer resistant	N/A	Roots used medicinally to treat sore eyes, rheumatism, and sores; rhizomes used as an antibiotic for infections
Adaptable; slightly drought tolerant once established, but best with at least a weekly deep watering	N/A	N/A	Plant used to treat sores, cancer of the womb, burns, dandruff, sore throats or tonsillitis; leaves and rhizomes used for food; leaves used for matresses, bedding and lining cooking pits and drying racks
Prefers damp sandy loam	Sun: part to full; cool to mild temperatures; prone to vigorous spreading; Used for erosion control along roadsides, streambanks and pond edges; ornamental groundcover	Hosts butterflies: Whites, Sulfers, Skippers; foliage feeds gray marvel moth; seeds feed birds; nectar (pollen) feeds native bees and bumble bees	The Cherokee cooked and ate the young leaves; drank as a cold infusion of the whole plant as a common beverage; contains vitamins A, C, and K; Prunella has long history of medicinal use globally
Adaptable but will grow largest and fastest in coarse, fast draining, relatively fertile garden soil	N/A	Hosts butterflies, moths, bees and birds	N/A
Adaptable; prefers a deep, well draining loam which it usually develops over time from leaf drop	Sun: part to full; Water: dry, light, moderate (minimal in dry season); Used for soil stabilization on slopes, landscaping tree	Hosts butterflies: California Sister, Propertius Duskywing, Mournful Duskywing, Gold-Hunter's Hairstreak; acorns feed birds, small mammals and deer	Acorns ground into meal as an important food staple; acorns used for necklaces, instruments, toys; wood made a superior charcoal; used to treat newborns with bleeding navels; bark used in a wash for sores
Tolerates clay but does best in moist loamy soil	Sun to full shade; low-high water; 3x/month summer watering; deer resistant; commony available; can propagate from cuttings	Nectar (pollen) feeds native bees, bumble bees and butterflies	Blossoms used for infant pain; fruits used to treat colds, rheumatism, fevers, kidney ailments, sore throats, indigestion, colic, and sores; seeds used for stomach fevers and painful congestion; blossoms, buds and fruits used for food and beverage; stems used in twined basketry

COAST LIVE OAK WOODLAND

Scientific Name	Common Name	Lifeform	Flowering time	Size	Sun	Moisture
Rubus parviflorus	Thimbleberry	Shrub	Mar-May	4-8.2ft	Part shade	Moderate to high
Rubus ursinus	California blackberry	Shrub	Feb-May	2-6ft tall, 6ft wide	Part sun to full sun	Moderate to high; max once per month once established
Symphoricarpos albus var. *laevigatus*	Common snowberry	Shrub	May-Jul	4-6ft tall, 8-12ft wide	Shade to part shade	Low

Soil	Horticultural Value	Wildlife associations	Cultural uses
Prefers moist, fertile soil with good drainage	N/A	Nectar (pollen) feeds native bees, bumble bees and hummingbirds; fruits feed birds and mammals	Berries were a food source and used in dyes; leaves used for food wrapping and storage; roots made into a tonic; young sprouts were eaten and used to fight scurvy; leaves used in a poultice for swelling, burns and wounds; concoction of leaves used for diarrhea, stomach ailments, anemia, and as an emetic; diviners gave berries to patients with chest disorders
Adaptable	Sun: part to full; Water: light, moderate; good creek-side for erosion control	Nectar (pollen) feeds native bees, honey bees, bumble bees and hummingbirds; fruits feed birds and mammals	Plant used to treat diarrhea, stomach troubles, vomiting; fruits used for food; leaves used to make tea
Adaptable	N/A	Hosts butterflies, moths, bees and birds	Berries eaten to settle the stomach, used in a wash for sore eyes, applied to underarms as anit-perspirant and rubbed on the skin as treatment for burns, rashes, and sores; plant used for inability to urinate, colds, menstrual disorders, stomach ache, venereal diseases, tuberculosis, fevers associated with teething sickness and to clear up afterbirth; used for an antiseptic wash; stems used to make brooms and arrows