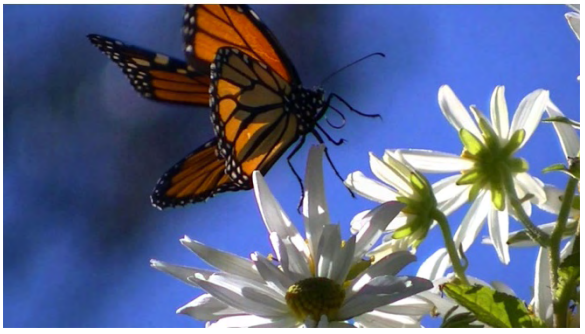
PACIFIC GROVE
LANDSCAPE GUIDELINES & PLANT PALETTE

FINAL VERSION

FEBRUARY 16, 2016



Produced by:

City of Pacific Grove Planning
Oona Johnsen Landscape Architecture, Inc.

PACIFIC GROVE
LANDSCAPE GUIDELINES & PLANT PALETTE

FIGURES AND MAPS

PACIFIC GROVE
LANDSCAPE GUIDELINES & PLANT PALETTE

INDEX

1.0 INTRODUCTION

1. INTRODUCTION

1.1. Purpose of document

Located on the Central California Coast, the City of Pacific Grove provides habitat to special and unique flora and fauna while maintaining a population of 15,504 residents (2013) within 2.9 square miles and being a tourist destination. This small community provides an abundance of coastal access opportunities, outdoor recreational activities such as parks, golfing, and beach sport activities, historical interests, and a quaint, walkable downtown. Residents feel a strong sense of community pride and involvement.

The City was established in the mid-1880s with the arrival of the Southern Pacific Railroad. Houses for year-round occupancy were built, and a summer religious retreat was developed. Many distinct neighborhoods formed as population growth continued and preserving the architectural character of the neighborhoods has been important for the local community. The *Pacific Grove Historical Context Statement*, October 2011, provides a comprehensive overview of Pacific Grove's history with a specific emphasis on historic themes and patterns. It identifies and evaluates historic properties, as well as informs future preservation efforts.

Pacific Grove residents contend with a number of landscaping challenges. Drought conditions restrict availability and use of potable water. Non-native plantings are slowly being replaced with native species to ameliorate coastal erosion. And state and federal regulations of the Monterey Bay Marine Sanctuary limits storm water pollutants discharged into Monterey Bay and the designated Areas of Special Biological Significance.

Landscape design, planting practices, and maintenance can be challenging in this area for residents. Even with the persistent fog layer and cool, coastal temperatures, low rainfall amounts keep the area dry with the same drought conditions that the rest of California is battling. Promoting and providing resources to encourage the proper landscape design and environmentally friendly practices has become increasingly important.

The Pacific Grove Landscape Guidelines and Plant Palette document is a guiding document with recommendations for landscape design, planting practices, and maintenance for the homeowner and to assist landscape and construction professionals. It provides an integrated approach to creating healthy, environmentally friendly landscapes for the Pacific Grove environment.

Note: This document does not include the subject of trees. Information about trees is available on the City of Pacific Grove's web site: http://www.cityofpacificgrove.org/living/community-economic-development/planning/tree-permits

GOALS:

1. Encourage Landscapes That Fit With the Natural Conditions of Pacific Grove
2. Conserve Water
3. Promote Healthy Soils
4. Use Integrated Pest Management
5. Reduce Stormwater Flows and Pollutants
6. Protect and Enhance Native Plant and Wildlife Habitat and Diversity

This document was funded by Proposition 84 to improve the sustainability and livability of California's communities through the Strategic Growth Council's Urban Greening for Sustainable Communities Grant Program. It was written and produced by Oona Johnsen Landscape Architecture, Inc., a local landscape architect in conjunction with the City of Pacific Grove Public Works Department, with community input. Reference documents used are listed at the end of each chapter.

OONA JOHNSEN
LANDSCAPE ARCHITECTURE

1.2. Disclaimer

The information in Pacific Grove Landscape Guidelines and Plant Palette document is provided for consideration by property owners and landscape professionals in the course of designing, planting, and maintaining landscapes. The practices in these Guidelines are

strictly for use on a voluntary basis. They are not a substitute for the exercise of sound judgement and are not intended as recommendations for particular products or services.

1.3. City Planning References

The City of Pacific Grove has planning rules and regulations as well as permit requirements that may be needed for various landscape improvements. Below is a list of few that may be helpful. For more information, refer to the City's web site http://www.cityofpacificgrove.org or contact the City Planning Office, 831-648-3190, located at 300 Forest Avenue, 2nd Floor, Pacific Grove.

Quick Links to Community and Economic Development Department Information:
http://www.cityofpacificgrove.org/living/community-economic-development

All About Fences:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/fences-information-bulletin.pdf

Butterfly Habitat:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/cdd-7-butterfly-habitat.pdf

Coastal Zone:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/cdd-17-coastal-zone.pdf

Environmentally Sensitive Habitat Areas:
http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/cdd-35-esha.pdf

Privacy Design Guidelines:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/information-bulletin-no.35-privacy-design-guidelines.pdf

Post-Construction Requirements for Stormwater:
http://www.cityofpacificgrove.org/living/community-economic-development/planning/stormwater

Tree Permit Facts:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/planning-bulletins-and-handouts/cdd-28-treepermitfaq.pdf

Landscape Trees for Pacific Grove:
http://www.cityofpacificgrove.org/sites/default/files/general-documents/tree-permits/landscape-trees-handout-approved-bnrc-publication.pdf

Landscape Trees Brochure:

http://www.cityofpacificgrove.org/sites/default/files/general-documents/tree-permits/landscape-trees-brochure-approved-bnrc-publication.pdf

Landscape Trees Spreadsheet:
http://www.cityofpacificgrove.org/sites/default/files/general-documents/tree-permits/recommended-landscaping-tree-spreadsheet-one-page.pdf

Watering Guidelines: http://cemarin.ucanr.edu/files/174267.pdf

Tree Ring Irrigation Contraption:
http://ccuh.ucdavis.edu/public/drought/tree-ring-irrigation-contraption-tric-1/tree-ring-irrigation-contraption-tric

How to Help Trees Survive the Drought:
http://saveourwater.com/blog-posts/how-to-help-trees-survive-the-drought/

Rainwater and Graywater Harvesting and Reuse:

To understand the permitting process for rainwater and graywater harvesting and reuse, contact the City of Pacific Grove Planning Office, 831-648-3190, located at 300 Forest Avenue, 2nd Floor, Pacific Grove.

1.3.1. RainScapes

RainScapes is a program of the City of Pacific Grove established in summer of 2015 with funding support from the State Water Resources Control Board. RainScapes are a vital

component of the City's stormwater management efforts required by the Stormwater Permit (under the federal Clean Water Act) and the State of California's ASBS regulations.

A RainScape is a landscape that uses Low Impact Development (LID) techniques to slow down and clean stormwater runoff from individual properties.

RainScapes help to:

1. Reduce and filter stormwater runoff in your neighborhood by capturing rain water and releasing it at a slower rate from your property.
2. Protect our community, fish, and other marine wildlife by keeping pollutants such as oil and grease from driveways and pesticides and fertilizers from lawns from entering the Monterey Bay.
3. Improve water quality by preventing bacterial contamination from bird droppings entering the stormwater system.
4. Provide wildlife habitat for beneficial insects and birds
5. Beautify your home and urban landscape

RainScapes
Landscapes for Healthy Watersheds

RainScapes Program:

http://www.cityofpacificgrove.org/living/green-pg/rainscapes-rebate-program

Design Guidelines for:

1. Roof Downspout Direction
2. Creating Rain Gardens
3. Rain Water Harvesting
4. Replacement of Impervious Surfaces with Pervious Surfaces
5. New Tree Planting
6. Gull Rooftop Deterrents

2.0 ENVIRONMENT OF PACIFIC GROVE

2. THE ENVIRONMENT OF PACIFIC GROVE

Understanding the environmental conditions of Pacific Grove will not only help residents and landscape and construction professionals choose the appropriate plants for local landscapes, it will deepen the appreciation and pride in where we live. The result will be a luscious, boastful garden that is beautiful for the owner, providing value to beneficial wildlife, keeping the Monterey Bay National Marine Sanctuary cleaner, promoting coastal native plant species, using no or little potable water, and less maintenance than typical gardens.

It is difficult to indicate every nature resource that Pacific Grove offers. This section will describe a general sense of the environment, including the significant native plant communities, the general wildlife, climate, geology and soils, watersheds, topography, and urban conditions. This information will help residents learn about their immediate environment and make insightful decisions about landscape design improvements.

If your property is located within the Coastal Zone, as indicated in the map in figure 2.0, specific requirements regarding plant species and other components to landscape improvements must be considered. Contact the Pacific Grove Planning Department for more information: phone: (831) 648-3190; address: 300 Forest Ave (Second Floor), Pacific Grove, CA 93950.

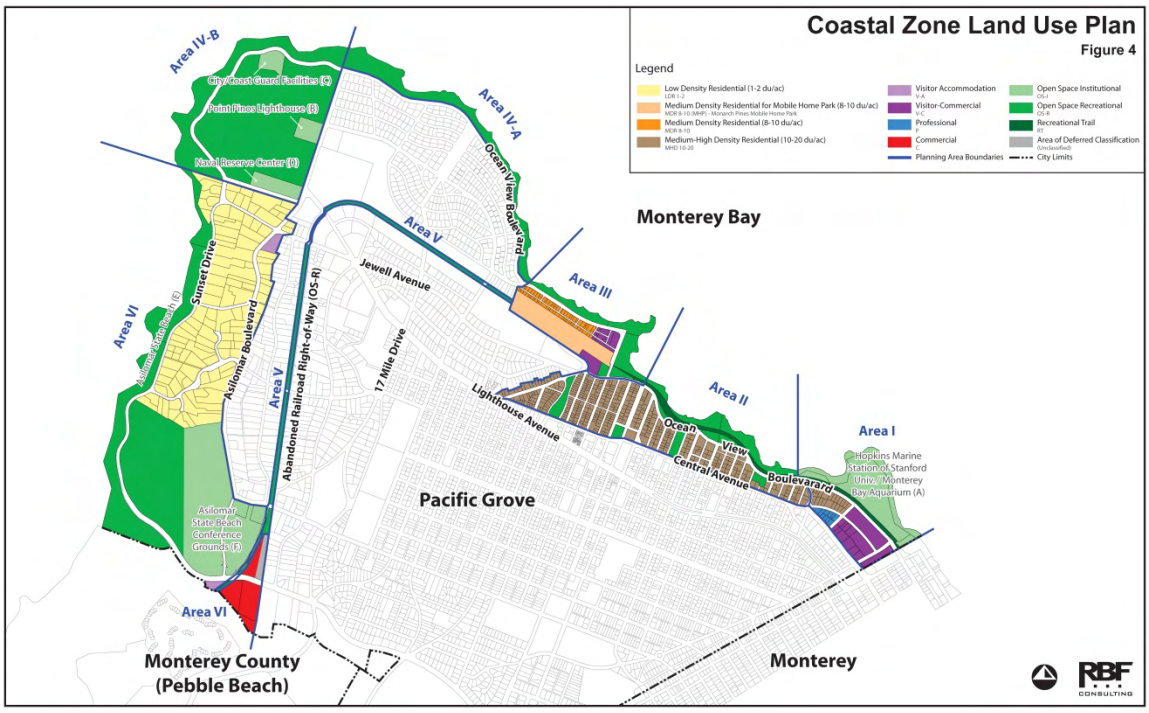


Figure 2.0 – Coastal Zone Area

2.1. Precipitation and Temperature

The climate of Pacific Grove is regulated by its proximity to the Pacific Ocean, culminating in a warm-summer Mediterranean climate (Köppen climate classification: Csb). As a result, Pacific Grove's average high temperature ranges from around 61°F in winter to 72°F during the summer months.

Average annual precipitation is approximately 19.73 inches (501.1 mm), with most rainfall occurring during the wet season between November and April, while little or no precipitation falls during the summer months. There is an average of 70 days with measurable precipitation annually. See Figure 2.1. Summers in Pacific Grove are more likely to be cool and foggy. Landscape plants can be categorized by Sunset Zone 17.

Climate data for Monterey/Pacific Grove													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Record high °F (°C)	90 (32)	86 (30)	85 (29)	93 (34)	95 (35)	101 (38)	98 (37)	96 (36)	101 (38)	104 (40)	95 (35)	89 (32)	104 (40)
Average high °F (°C)	59.9 (15.5)	61.3 (16.3)	61.9 (16.6)	63.1 (17.3)	64.3 (17.9)	66.5 (19.2)	67.5 (19.7)	68.8 (20.4)	71.5 (21.9)	70.1 (21.2)	65 (18)	60.2 (15.7)	65 (18)
Average low °F (°C)	43.4 (6.3)	44.4 (6.9)	45 (7)	45.8 (7.7)	47.9 (8.8)	50.2 (10.1)	51.9 (11.1)	52.8 (11.6)	52.8 (11.6)	50.7 (10.4)	46.9 (8.3)	43.6 (6.4)	48 (9)
Record low °F (°C)	22 (−6)	26 (−3)	32 (0)	35 (2)	35 (2)	41 (5)	43 (6)	45 (7)	41 (5)	35 (2)	30 (−1)	20 (−7)	20 (−7)
Precipitation inches (mm)	4.46 (113.3)	3.32 (84.3)	3.20 (81.3)	1.45 (36.8)	0.5 (13)	0.18 (4.6)	0.06 (1.5)	0.08 (2)	0.24 (6.1)	0.85 (21.6)	2.07 (52.6)	3.32 (84.3)	19.73 (501.1)
Avg. precipitation days (≥ 0.01 in)	11	10	10	6	4	3	2	2	2	4	7	10	70
Source #1: WRCC (temperature 1981–2010, precipitation and extremes 1906–present) http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5795													
Source #2: Weather Channel http://www.weather.com/outlook/health/achesandpains/climatology/monthly/USCA0724?from=36hr_newslinker2													

Figure 2.1 - Climate data for Monterey/Pacific Grove

2.2. Geology and Soils

Sand is the main component of soil in Pacific Grove, refer to Figure 2.2. These soils tend to have high infiltration (fast draining) and are often low in nutrients. See Figure 2.3 to review the range of infiltration characteristics found in Pacific Grove soils. According to the Web Soil Survey from the USDA Natural Resources Conservation Service (NRCS), soils in Pacific Grove range from hydrologic soil group[1] A (higher infiltration potential) in the lower portions of the watersheds near the ocean and D (lower infiltration potential) mainly located in the upper portions of the watersheds. Underlays of sandstone and bedrock layers reduce the infiltration capacity in these areas. Knowing the type of soil and its infiltration rate is important to understanding proper soil amendment. For more detailed information, refer to Section 4.0 Soils, Soil Amendments, and Fertilizers.

[1] Hydrologic soil groups (HSG) refer to soils grouped according to their runoff potential. The soil properties that influence this potential include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. http://websoilsurvey.sc.egov.usda.gov, last accessed September 2013

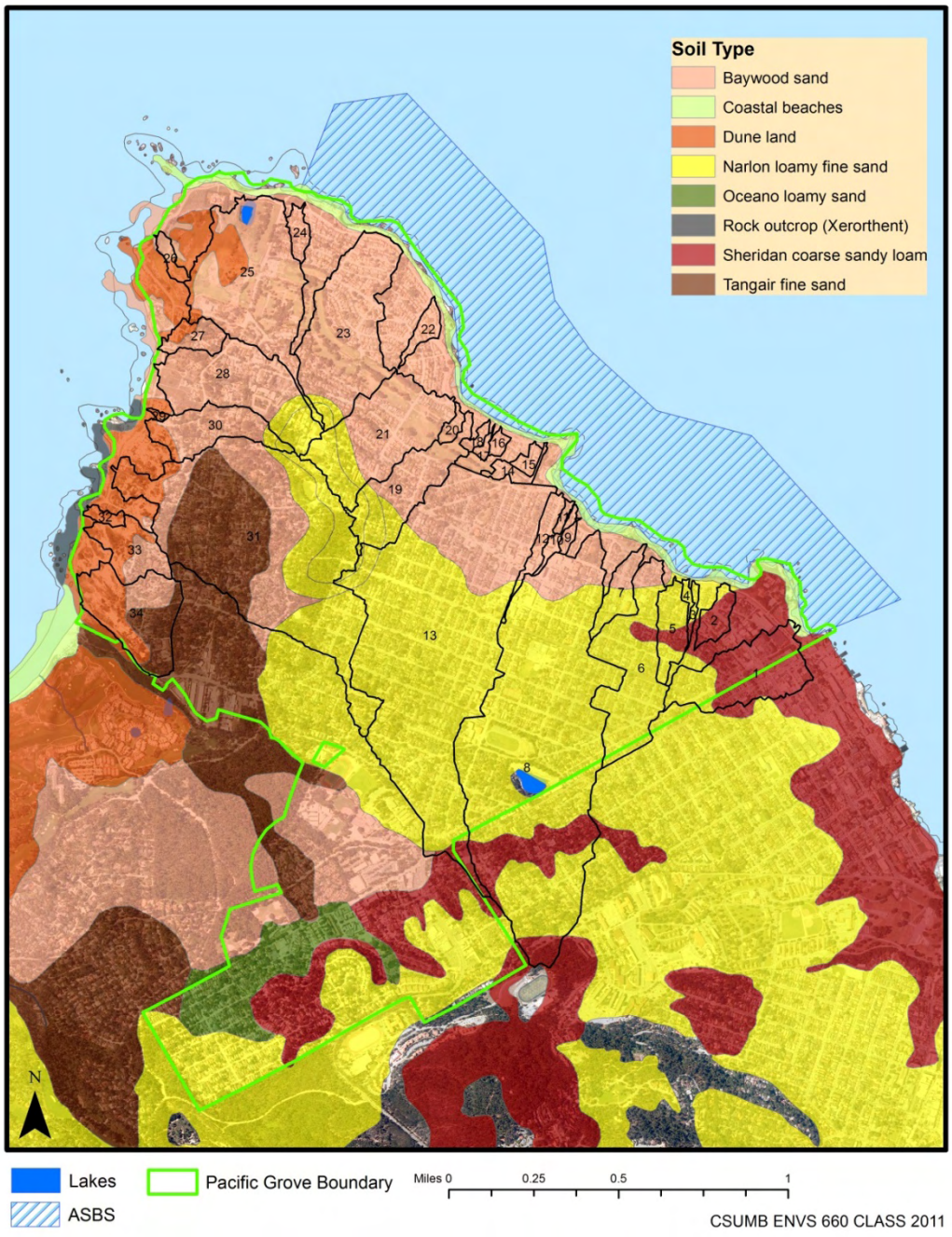


Figure 2.2 - Surface soil types located in the City of Pacific Grove, CA. The dominant soil texture is sand, with variable drainage rates. Stratified layers of less permeable soil may exist below the soil types presented in this map. Soil data source: NRCS, SSURGO 2006.

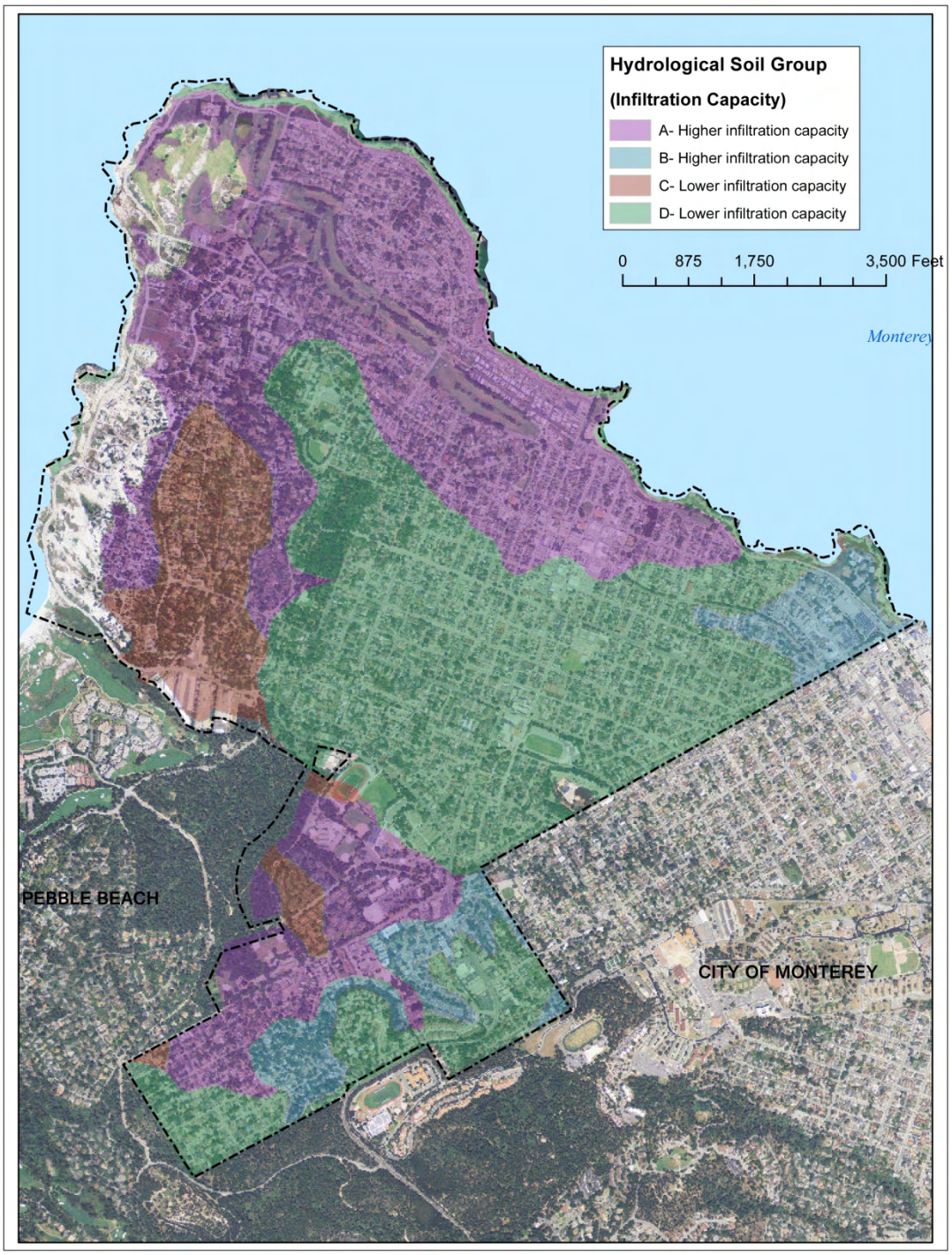


Figure 2.3 - Distribution of Hydrological Soil Groups (infiltration capacity) in the Greenwood Gulch Watershed. Hydrological soil group data: NRCS, SSURGO

2.3. Watersheds

Stormwater runoff in Pacific Grove drains into the Monterey Bay National Marine Sanctuary (MBNMS). And a large area of the City drains into the Area of Special Biological Significance (ASBS), a State designated area within the MBNMS. Refer to Figure 2.4.

The watersheds of Pacific Grove are shown in Figure 2.5. Each colored area indicates a watershed. The red lines inside the watershed indicate the stormwater mainline pipe system. The red dot at the coast represents the storm drain outfall location and size. Understanding where your property drains to will help you be more aware about where your stormwater flows and how it affect the environment.

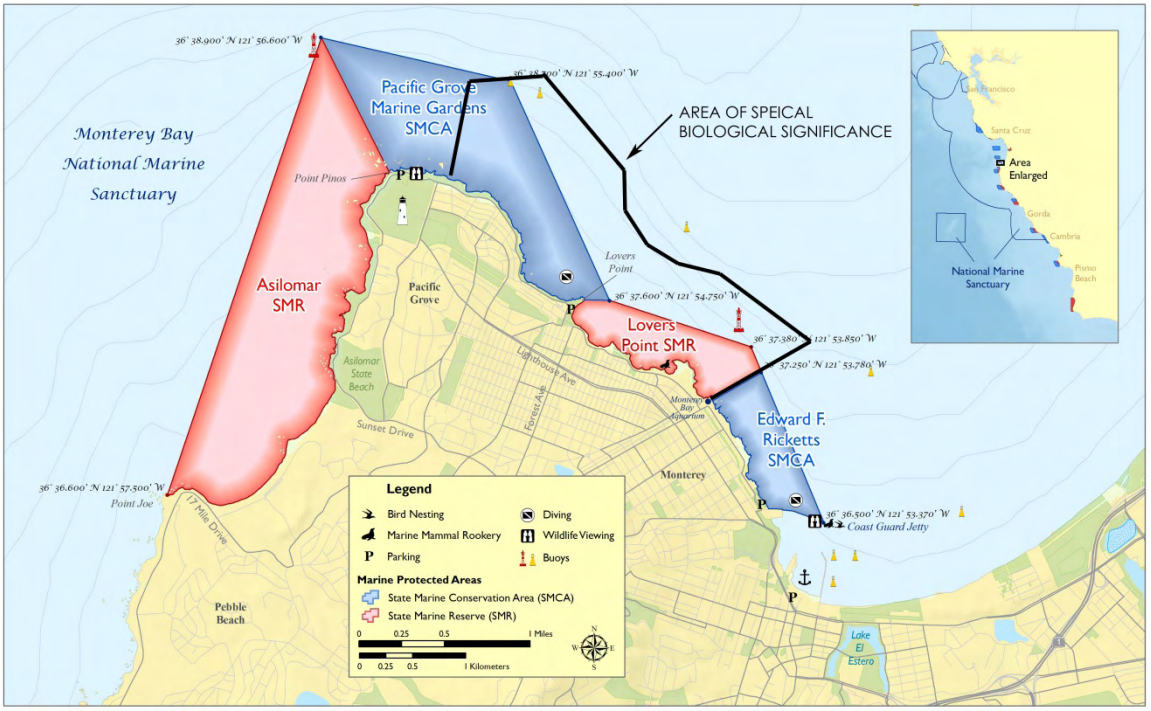


Figure 2.4 - Map of Monterey National Marine Sanctuary and other marine protected areas.

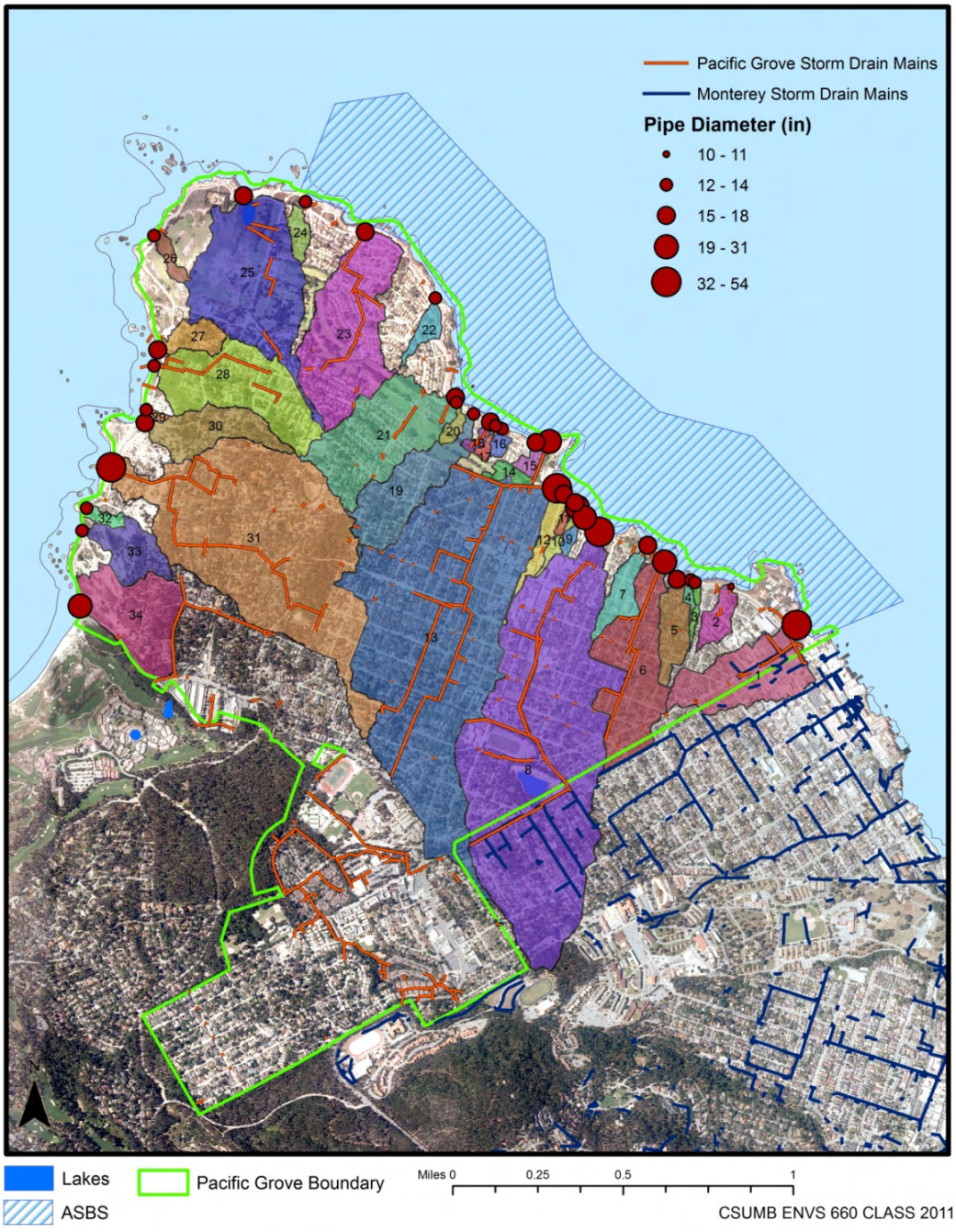


Figure 2.5 - Watershed boundaries in the City of Pacific Grove, CA, shown over aerial imagery. Each watershed terminates at a storm drain outfall along the Pacific Ocean coastline. Watersheds are colored, and numbered east to west based on outfall location. Aerial image source: NAIP 2009.

2.4. Topography

Figure 2.6 shows slope calculations in Pacific Grove. The majority of the watershed slopes range between 3-7% with higher slopes in the urban areas of Pacific Grove. This type of topography indicates positive drainage of stormwater. Depending the residential landscape topographical conditions, not all properties are suitable for every stormwater management design solutions. Refer to the RainScapes Design Guidelines for more information on the feasibility of the different design strategies (http://www.cityofpacificgrove.org/living/green-pg/rainscapes-rebate-program/design-guidelines).

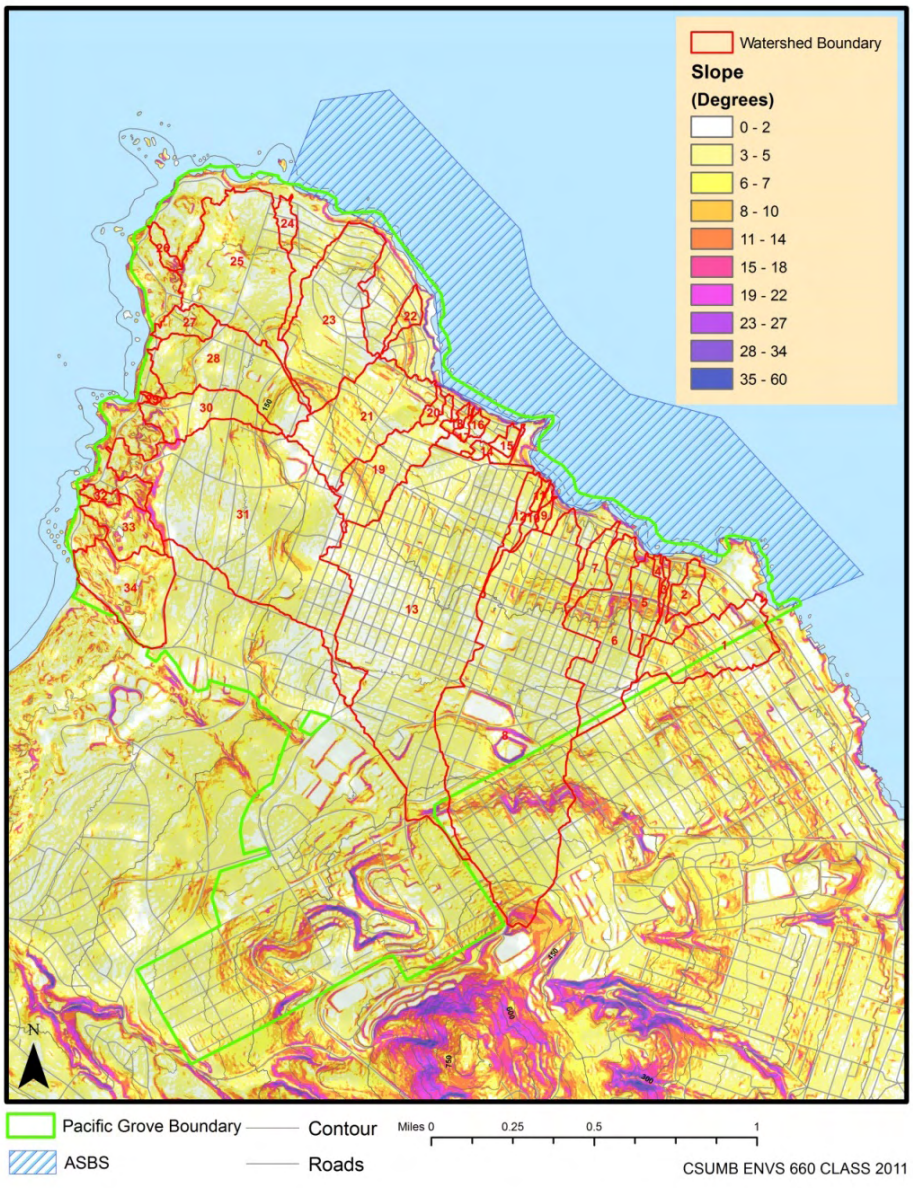


Figure 2.6 - Terrain slope in the City of Pacific Grove, CA, derived from a 3m DEM. Approximately 25% of the land within the Pacific Grove city limits is flat (0-2 degrees). Elevation data source: USGS, NED 2010

2.5. Impervious Surfaces

Figure 2.7 delineates all the impervious surfaces in Pacific Grove. Impervious surfaces are surfaces that do not allow infiltration of stormwater, primarily rooftops, roads, and driveways and, as the map indicates, they are concentrated in the urbanized, downtown areas. Green spaces and green corridors are limited to city parks and open spaces, the municipal golf course, cemetery, school fields, and protected coastal areas and beaches. Some neighborhoods in Pacific Grove have larger lots with more landscape areas towards the northwest and southwest. The more impervious surfaces homeowners can remove and replace with pervious surfaces the better for the environment. Refer to the RainScapes Design Guidelines for more information on how to design more pervious surfaces in your landscape (http://www.cityofpacificgrove.org/living/green-pg/rainscapes-rebate-program/design-guidelines/replacement-impervious-surfaces-pervious).

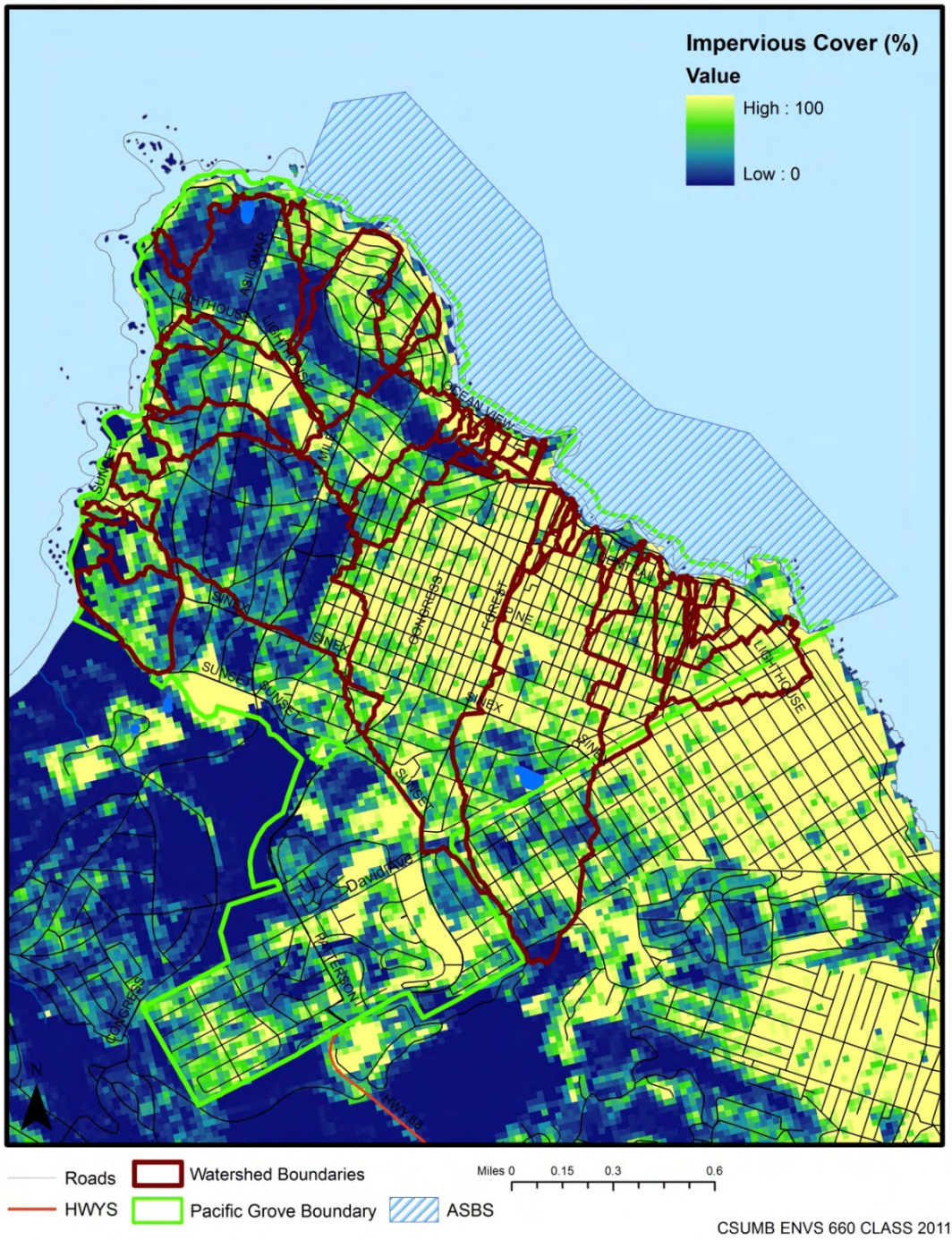


Figure 2.7 - Impervious cover in the City of Pacific Grove, CA. Impervious cover values are higher in areas where urban development is concentrated and are lower towards the northwest and southwest ends of the city. Data source: USGS, NLCD 2006

2.6. Native Plant Communities

There are a variety of native vegetation communities in Pacific Grove. The location of each community depends on soil type, proximity to the ocean, wind exposure, sun aspect, as well as elevation. The significant plant communities are Marine, Coastal Dune, Maritime Chaparral, and Monterey Pine and Bishop Pine Woodlands. There are also riparian communities around drainage ways, water-loving plants around groundwater seeps, and ephemerals ponds throughout watersheds. Each community is briefly described below. If you can relate your residential landscape area to a native plant community, you will be able to realize what plants grow perfectly in your environment.

2.6.1. Marine

There is approximately 4.5 miles of coastline where marine plant communities are located within the ocean tidal zones. These plants are special in that they are able to survive in very harsh and exposed conditions along the ocean coast. Furthermore, most plants are able to tolerate sea spray and/or inundations of salt water and, in the case of seaweed and sea grasses, some species are able to survive the inundation of salt water. These areas also provide habitat for marine biological communities within tide pools, harbor seals, and various birds.

The coastal area waters are protected with the following designations listed below. Refer to Figure 2.8:

- **Area of Special Biological Significance** (ASBS) — 3.2 miles of Pacific Grove shoreline between the Monterey Bay Aquarium and Point Pinos (at Asilomar Avenue) as defined in the California Ocean Plan. This is California State ASBS #19 or the Pacific Grove ASBS.
- **Lovers Point State Marine Reserve** — Marine waters of Monterey Bay adjacent to the shoreline between the Monterey Bay Aquarium and Lovers Point as defined by the California Department of Fish & Game during the first phase of the Marine Life Protection Act Initiative. It covers 0.30 square miles.
- **Pacific Grove Marine Gardens State Marine Conservation Area** — Marine waters of Monterey Bay and the Pacific Ocean adjacent to the shoreline from Lovers Point to Point Pinos as defined by the California Department of Fish & Game during the first phase of the Marine Life Protection Act Initiative. It covers 0.93 square miles.
- **Asilomar State Marine Reserve** — Marine waters from Point Pinos to Point Joe in Pebble Beach as defined by the California Department of Fish & Game during the first phase of the Marine Life Protection Act Initiative. It covers 1.51 square miles.

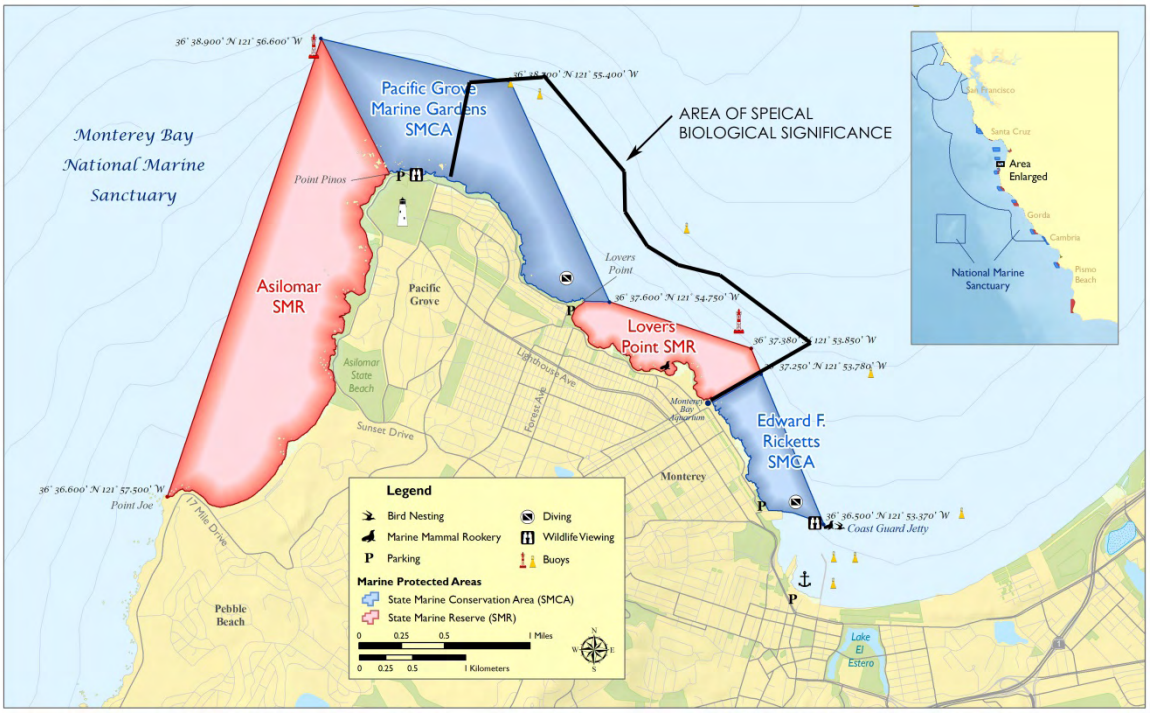


Figure 2.8 - Map of Monterey National Marine Sanctuary and other marine protected areas.

Plants in the marine community are threatened by non-native, invasive species. Removing coastal invasive species, such as ice plant, and replanting with the appropriate native species will help the native marine species establish and thrive. A good example of such efforts can be found along the Asilomar Dunes Natural Preserve across from Asilomar State Beach. For more information visit the California Parks and Recreation website about Asilomar State Beach: http://www.parks.ca.gov/?page_id=566

This is also the zone where stormwater outfall pipes are located. When rain events occur, all stormwater from the suburban areas of Pacific Grove is directly deposited in

the ocean. Urban pollutants and sediments deposited in these locations threaten the health of the environment and the health of waters. Section 5.7 of the Planting Guidelines addresses ways to use landscape design to limit stormwater runoff and protect the Monterey Bay.

For more information on Natural Resource Areas of Pacific Grove, including the Marine environment: http://www.pacificgrovelibrary.org/sites/default/files/general-documents/beautification-and-natural-resources-commission/pg-nr-report-w-maps.pdf

2.6.2. Coastal Dune

The dune landscape community is upland from the marine shore and contains sand dune landforms with lower growing plants. These plants are special in that they are able to survive in very harsh and exposed conditions along the ocean coast, being able to tolerate sea spray, low nutrient availability, and the struggle to anchor roots in unstable/moving soil conditions. The Pacific Grove dunes are home to federally endangered Menzies' Wallflower and Tidestorm's Lupine, and federally threatened Monterey Spineflower. A good example of restoration efforts can be

seen at the Point Pinos Reservation Dunes, managed by the Pacific Grove Municipal Golf Course, the Point Pinos Lighthouse grounds, and the Asilomar State Conference Center grounds.

For more information on Natural Resource Areas of Pacific Grove, including the Coastal Dune environment:
http://www.pacificgrovelibrary.org/sites/default/files/general-documents/beautification-and-natural-resources-commission/pg-nr-report-w-maps.pdf

The Monterey Bay Native Plant Society keeps a list of plant species in various parks and open spaces throughout the region. The plants listed in the Point Lobos State Reserve and Spanish Bay would be characteristic for the Coastal Dune plant community.

List of plants from Point Lobos State Reserve:

http://montereybay.cnps.org/documents/plantlists/PlantList_PointLobosStateReserve_2012.pdf

List of plants from Spanish Bay:
http://montereybay.cnps.org/documents/plantlists/PlantList_SpanishBay_2012.pdf

2.6.3. Maritime Chaparral

Maritime chaparral is a shrub land plant community linking the sea coast to the woodlands. Plants thrive on exposed, windy conditions with nutrient poor soils. Arctostaphylos species (Manzanita) are distinctive to this plant community.

The Monterey Bay Native Plant Society keeps a list of plant species in various parks and open spaces throughout the region. The plants listed in the Fort Ord BLM Lands would be characteristic for the Marine Chaparral plant community.

Refer to the list of plants from Fort Ord BLM Lands:
http://montereybay.cnps.org/documents/plantlists/PlantList_FortOrdBLM_2012.pdf

2.6.4. Monterey Pine Woodlands

The Monterey pine woodland are the forested inland areas overlooking the coast. The Monterey pine stands can be mixed with other tree species, such as Bishop Pine (Pinus muricata), Monterey Cypress (Cupressus macrocarpa), and Quercus agrifolia (Coast Live Oak).

Monterey pine woodlands located in the Monterey area exhibit greater species richness and variety than in other populations. Shrubby species such as manzanitas (Arctostaphylos spp.), huckleberry (Vaccinium ovatum), salal (Gaultheria shallon) ceanothus (Ceanothus spp.), mock heather (Ericameria spp.) and coyote brush (Baccharis pilularis) share the understory with native grasses, sedges, rushes and several special status species of plants in the Monterey population, resulting in a diverse and important ecological resource.

Image Top: Monterey Pine
Image Middle: Bishop Pine
Image Bottom: Coast Live Oak

The Monterey pine is susceptible to a wide range of pests and diseases. Most of these pests and diseases have evolved with the native stands of Monterey pine and do not pose serious threats to the overall health and integrity of Monterey pine forest. These native insects and diseases are important in the maintenance of ecological functions in Monterey pine forests due to their roles in processes such as nutrient cycling and provision of coarse woody debris. However, a relatively recently introduced pathogen, the pitch canker fungus (Fusarium circinatum aka F. subglutinans ssp. pini), has heightened concern for the species.

Source: Biological Resources of the Del Monterey Forest, Monterey Pine and Monterey Pine Forest Habitat, Del Monte Forest Preservation Plan, Prepared by Zander Associates, 2002

The Monterey Bay Native Plant Society keeps a list of plant species in various parks and open spaces throughout the region. The list from the SFB Morse Botanical Reserve and Jacks Peak County Park would be characteristic for the Monterey Pine & Bishop Pine woodland plant community.

Refer to the list of plants from SFB Morse Botanical Reserve:
http://montereybay.cnps.org/documents/plantlists/PlantList_SFB-MorseBotanicalReserve_2012.pdf

Refer to the list of plants from Jacks Peak County Park:
http://montereybay.cnps.org/documents/plantlists/PlantList_JacksPeakCountyPark_2012.pdf

2.7. Wildlife

Pacific Grove provides habitat for a variety of wildlife. It is one of the largest overwintering sites for monarch butterflies, which are present from November to March; the dunes are home to the rare black legless lizard; and the abundance of shoreline nesting habitat attracts seabird and shorebirds, in turn, attracting bird watchers and

ornithologists from all over the world.

Typical urban wildlife is present in Pacific Grove such as raccoons, squirrels, and domesticated animals. There are also groups of black-tailed mule deer that frequent the neighborhoods and eat most landscape plants.

Along with migratory birds there are jays, blackbirds, and Western Gulls. Gulls are most present near the coast, perching and nesting on building rooftops. See http://www.parks.ca.gov/pages/566/files/Bird_List-Asilomar_State_Beach_and_Conference_Grounds.pdf for a list of local birds.

Also present are beneficial birds/insects such as hummingbirds, butterflies, and bees. See http://www.sjgov.org/solidwaste/pdf%20folder/10%20Most%20Wanted%20Bugs%20Brochure.pdf for a list of beneficial garden insects.

Pacific Harbor Seals and a rare sighting of Elephant Seals may be found along the coastal beach rock outcroppings or on the beaches at low tide.

There are rare sightings of black bears and mountain lions. Coyote, Quail, Wild Boar, Wild Turkey, and Bob Cats are typically seen further inland, but may also occasionally be found at the coast.

For more information on the urban effects on wildlands, please refer to the following web site: http://www.parks.ca.gov/pages/23071/files/urbaneffects.pdf

3.0 IRRIGATION

3. IRRIGATION

In California, about half of urban water is used for landscape irrigation. Substantial potable water reduction can be gained by proper design and maintenance of landscapes and irrigation systems. Irrigation water should be applied to the root zone of the plants at a rate that can be absorbed into the soil, at the right time, and in the correct amount for plant health. This section will give an overview of what is needed for an efficient irrigation system and provide pertinent resources for further information.

Irrigation or hand watering will be needed during the first two years of plant establishment. Extra water at the time of planting and for a few months after planting will help the roots adapt from a nursery container condition into the new surrounding soils of your landscape. Once plants are established, irrigation and watering can be reduced or limited to the dry seasons of the year.

Key References:

1. Refer to the Monterey County Irrigation section for irrigation design advice: http://www.montereylandscaping.org/Garden-Resources/IrrigationIntro.php
2. Refer to the Monterey County Watering Guide for basic watering information, tips, device types, irrigation challenges and sample irrigation schedules: http://www.montereylandscaping.org/Watering-Guide/
3. The California Department of Water Resources has developed the Model Water Efficient Landscape Ordinance to help conserve water in landscapes. The revised ordinance was approved by the California Water Commission on July 15, 2015: http://www.water.ca.gov/wateruseefficiency/landscapeordinance/docs/Title%2023%20extract%20-%20Official%20CCR%20pages.pdf. The purpose is to:
    a. Promote the values and benefits of landscaping practices that integrate and go beyond the conservation and efficient use of water
    b. Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by encouraging the use of a watershed approach that requires cross-sector collaboration of industry, government and property owners to achieve the many benefits possible

c. Establish provisions for water management practices and water waste prevention for existing landscapes
d. Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount
e. Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies
f. Encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure
g. Encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance

If you choose to install a new irrigation system or a retrofit an existing system, and you are unsure how to incorporate an irrigation system into a design, consult with an irrigation specialist or licensed landscape contractor.

If you have an existing irrigation system, it is recommended it be audited based on the current conditions of your landscape and the conditions of your new landscape design. Auditors can evaluate your system and your landscape to ensure you are using the settings properly and optimize them. Certified Landscape Irrigation Auditors are available in the Monterey area and California American Water and the Monterey Peninsula Water Management District (MPWMD) provide audits and landscape water budgets free of charge to all residential users of California American. Refer to website:
http://www.montereywaterinfo.org/residentialwateruse.html

3.1. Irrigation Types

The most efficient irrigation systems use low-volume or drip irrigation methods that apply water directly to the root zone, rather than spraying water into the air where it can evaporate before reaching the soil or runoff along pavements. It is recommended to use subsurface irrigation systems which include drip tube, drip emitters, or a micro-spray irrigation system. Some drip tube can be buried underground per manufacturer's recommendations. If using drip emitters, stake firmly in place and situate the emitter at the root ball; not at the plant stem as it will cause rot.

Different types of plants may require a different type of irrigation system, for instance in the case of lawn and trees. Refer to the Monterey County, Other Types of Irrigation

Systems for additional information: http://www.montereylandscaping.org/Garden-Resources/IrrigationType.php

3.2. Hydrozones

Hydrozoing is placing plants with similar water needs within the same irrigation zone or valve area. For example, lawn areas and trees should be on separate valves from the rest of the landscape. The planting design should take this concept into consideration as it helps to conserve water and prevents overwatering of plants.

The Plant Palette in Section 6.0 contains a water use category per the Water Use Classification of Landscape Species (WUCOLS); this category will help identify plants with similar water requirements.

Refer to Monterey County Plant Water Needs for additional information: http://www.montereylandscaping.org/Garden-Resources/WaterNeeds.php

3.3. Controller Scheduling

Inefficient irrigation and incorrect scheduling account for the largest residential potable water waste. It is important to understand your irrigation controller and how to adjust it as needed. If you need assistance, consider having an irrigation auditor evaluate your system. Refer to Section 3.0 for more information.

Plants will need extra water to establish. This is called the Establishment Period. Adjust your irrigation controller to accommodate this growth. Within two growing seasons, or earlier upon observation, adjust your controller settings to reduce the amount of irrigation for your plants.

It is important to continue to monitor and observe the plants so you can continue to adjust the controller settings appropriately. The goal is to achieve plant health with low potable water use.

Monterey County Water Restrictions

- In Monterey County, it is advised to set watering schedules at night between 5 PM and 9:00 AM. This will prevent water loss through evaporation due to hot, dry, or windy conditions.
- Watering days are limited to Wednesday and Saturday

Check the California American Water website for updates or modifications to water restrictions: http://www.amwater.com/caaw/page22725.html#Monterey

3.4. Other Water Saving Devices

3.4.1. Weather-Based Irrigation Controllers

These special controllers use weather-based data to adjust irrigation settings to be more efficient.

Refer to Monterey County Smart Irrigation Controllers for additional information: http://www.montereylandscaping.org/Garden-Resources/SmartControllers.php

3.4.2. Rain Sensors

A rain sensor is a small device that turns off the automated irrigation system when it is activated by rain. Make sure to install the sensor in an area that is clear from overhangs and tree branches.

California American Water and MPWMD offer these devices free of charge. Refer to website: http://www.montereywaterinfo.org/residentialwateruse.html

3.4.3. Soil Moisture Sensors

A soil moisture sensor can be connected to the irrigation controller. It measures the volumetric water content in soil. It senses when your landscape needs moisture, will allow the next scheduled watering cycle. If there is enough moisture, it will prevent the irrigation system from running. These devises are useful for lawns.

3.5. Alternate Water Sources

Using available, non-potable water sources is an excellent way to supplement potable water use or even replace the use of potable water, depending on the design of the system. Residential alternative water sources for landscape irrigation are explained below.

3.5.1. Rainwater

Rainwater harvesting captures, diverts, and stores stormwater runoff for later use. Capturing even a small amount of your roof runoff will have environmental benefits, including reducing demand on your potable water supply and reducing stormwater runoff flowing into storm drains and surface waters. Rainwater can be collected in rain barrels or cisterns and stored for landscape irrigation. The Pacific Grove RainScapes program has design guidelines available for rainwater harvesting systems. Refer to the website: http://www.cityofpacificgrove.org/living/green-pg/rainscapes-rebate-program/design-guidelines/rainwater-harvesting-rain-barrels-and

3.5.2. Graywater

Graywater is wastewater from laundry machines, showers, bathtubs, and bathroom sinks that can be reused for subsurface irrigation. Graywater irrigation has specific design guidelines to protect public health and environmental health. More information about designing code compliant graywater systems can be found at the Central Coast Greywater Alliance: http://centralcoastgreywater.org/

If you are interested in a low-tech solution to collect graywater, some ideas are below. Can you think of other ideas to use wastewater?

- Place a basin in the bottom of your bathroom sink and pour in the landscape when it's full.
- Place a basin in the bottom of your kitchen sink when washing salad, fruits, or vegetables, and pour in the landscape when it's full.
- While you are waiting for your shower water to heat up, place a watering can under the spout and collect the cold water. Water your landscape when it's full.
- The wastewater from your laundry can be routed to your landscape. Refer to this video on how to do this: http://oasisdesign.net/greywater/laundry/index.htm#video

For detailed information regarding required setbacks for greywater tanks, greywater irrigation fields, and greywater disposal fields, see Chapter 16 of the California Plumbing Code: http://www.iapmo.org/2013%20California%20Plumbing%20Code/Chapter%2016.pdf

3.6. References

- Monterey Water Conservation: http://www.montereywaterinfo.org/landscapingWaterUse.html
- Water Use Classification of Landscape Species (WUCOLS): http://ucanr.edu/sites/WUCOLS/
- Monterey County Watering Guide: http://www.montereylandscaping.org/Watering-Guide/
- Water Smart Gardening in Santa Cruz County: http://www.santacruz.watersavingplants.com
- Monterey County Waterwise Landscaping: http://www.montereylandscaping.org
- The Irrigation Association: https://www.irrigation.org/
- The Irrigation Association Landscape Irrigation Best Management Practices: https://www.irrigation.org/uploadedFiles/Standards/BMPDesign-Install-Manage.3-18-14(2).pdf

- Central Coast Greywater Alliance: http://centralcoastgreywater.org/
- Drought Tip: Use of Graywater in Urban Landscapes in California: http://anrcatalog.ucanr.edu/pdf/8536.pdf
- Smart from the Start (Irrigation Design): http://www.h2ouse.org/tour/smart-from-the-start.cfm
- Irrigation Design Tutorials: http://www.irrigationtutorials.com/
- UC Guide to Healthy Lawns: http://www.ipm.ucdavis.edu/TOOLS/TURF/
- California Department of Water Resources Landscape Water Use Conservation Methods: http://www.water.ca.gov/wateruseefficiency/landscape/
- Model Water Efficient Landscape Ordinance (2015) http://www.water.ca.gov/wateruseefficiency/landscapeordinance/docs/Title%2023%20extract%20-%20Official%20CCR%20pages.pdf

4.0 SOILS, SOIL AMENDMENTS & FERTILIZERS

4. SOILS, SOIL AMENDMENTS & FERTILIZERS

4.1. Soil Purpose and Benefits

The goal of incorporating amendments into the soil is to develop healthy soils which foster plant growth. However soil science is complex and variable. The best way to begin to understand the importance of soils in our ecosystem is to describe their major functions and benefits*:

1. Soil supports plant growth by providing a medium for plant roots and supplying nutrient elements that are essential to the plant.
2. Properties of soils are a factor in controlling water in the hydrologic system; water loss, contamination, purification, etc.
3. Soils provide the function of decomposition, nature's recycling system.
4. Soils provide habitat for various organisms, microscopic to insects, small mammals and reptiles.
5. Soil in an engineering medium in human-built environments.

**The Nature and Properties of Soils*, 11th Edition, Brady, Nyle C. & Weil, Ray R., Prentice-Hall, Inc., 1996

There are a few soil conditions that need to be considered and recognized pertaining specifically to the improvement of landscapes. It becomes useful to understand what kind of soils are in the landscape that you will be working with. This is done by considerations of history, location, and soil testing for texture, pH, water-holding capacity and permeability.

4.2. Soils & Testing

Knowing the existing structure of the soil will assist you in amending it properly. Two places to start is to understand the historical land use of the landscape site. For instance, are the soils fill from construction, untouched or native soils, or neglected soil from a previous landscape design? Is the soil located near the coast where sandy soils are prevalent, by a river with rocky or clayey soil, or in a coniferous forest where soils tend to be more acidic? These facts will give you the proper context of your existing soil structure.

As a goal, landscape soils for planting have:

1. A uniform texture
2. Neutral pH
3. Good water-holding capacity: the ability to hold water for root nourishment
4. Good soil permeability: allow access water to drain**

**http://www.santacruz.watersavingplants.com/Garden-Resources/soil.php

<u>Soil Laboratory Testing:</u>
The most precise way to understand your soil and obtain guidance on how to amend it, is to send a sample to a soil testing laboratory. Each lab will have specific instructions on

how to take a sample. The lab will evaluate your soil and provide recommendations on how to amend your soil for optimum plant health.

If you prefer not to get your soil tested at a laboratory, there are some general methods below on how to measure and/or understand soil texture, pH, water-holding capacity, and permeability. A general remedy is presented for each conclusion.

4.2.1. Soil Texture

Understanding the three basic types of soils is helpful: sand (largest particles), silt/loam (medium sized particles), and clay (the finest particles). A mix of these soils are most common and the composition of the mix determines the soil texture. Refer to Figure 4.0.

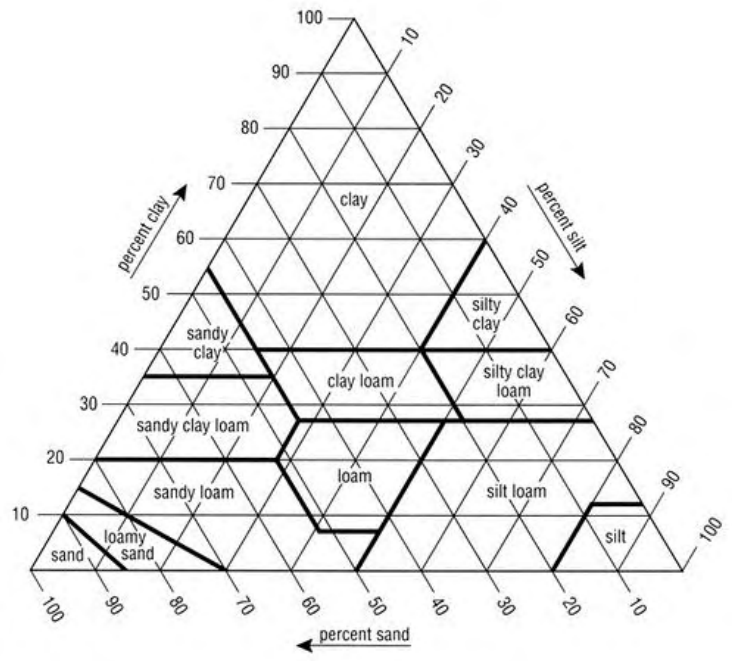


Figure 4.0 - Soil texture triangle: gives names to various combinations of sand, silt, and clay.

Squeeze Test:

A very basic and quick way to understand soil texture is with the squeeze test. Take a scoop of soil from the area to be landscaped, water it, and let it drain and dry. Pick up a handful of that soil and squeeze it firmly in your hand. Refer to Figure 4.1. If it forms a tight shape and has a slippery feel, it is clayey. If it is gritty and doesn't hold shape and crumbles, it is sandy. If is slightly crumbly but still holds the shape of a loose ball or ribbon form, it is loamy.

Figure 4.1 - Squeeze test

4.2.2. pH Levels

The pH level controls the chemical and biological reactions of the soil. pH is measured on a scale of 1 to 14. 7 is neutral, which is optimum for plant growth. Anything lower than 7 is considered acidic and anything higher than 7 is considered alkaline.

pH Meter Test:

Testing the pH of your landscape soil can be done with a pH meter which is available as most home/garden stores. Dig a small hole and break up the soil, removing any twigs or debris. Fill the hole with distilled water until there is a muddy pool at the bottom. Insert the pH meter probe into the mud. Hold it there until the reading is taken.

4.2.3. Water Holding Capacity & Permeability

Properly testing the water holding capacity and permeability of soils is a complex process. A simplified process for landscape soils can be done simply in your landscape.

Pit Test:

First dig a hole in your desired landscape improvement area after a dry period of 3-4 days. The hole should be 2 feet wide and 18" deep. Place a ruler/yard stick in the hole. Then fill the hole to the top with water. With a stopwatch start timing as soon as the hole is full of water and observe the water line on the ruler. Allow the hole to drain for exactly one hour and note the drop in the water's height from start to finish along the ruler. The ideal drainage rate is one to two inches per hour. A dense soil will drain slowly and a loose soil will drain quickly.

4.3. Soil Amendments

Particular amendments and/or practices may be needed to bring your soil back to health. If you did not choose to have a soil analysis done by a testing lab, below are some general remedies and techniques to follow based on the type of landscape soils.

The soil amendments recommended for your soil will be the "amended backfill" when planting plants. Refer to Section 7.0.

4.3.1. Soil Texture

Based on the hand squeeze test, the remedies for improving soil texture are listed below:

Clay Soil: Though clay soils are nutrient rich, the fine particles prevent water from draining out of the soil and may not let air into the root zone. The soil also dries very hard. Remedy: Add 3-4" of organic matter (ie: compost, aged-manure, peat moss, sawdust/wood shavings/ground bark, redwood soil conditioner) or gypsum and till into the top 9-12" of existing soil to cause the clay particle to clump together. In extreme situations, a subsurface underdrain system to carry excess groundwater may need to be constructed.

Silt/Loamy Soil: A mix of clay, silt, and sand particles. These soils are generally considered ideal for plant growth because they contain the right texture and absorb water well.

Sandy Soil: Coarse particles allow water to drain too fast and the soils to dry out quickly. Remedy: Add 3-4" organic matter (ie: compost, aged-manure, peat moss, sawdust/wood shavings/ground bark, redwood soil conditioner) and till into the top 9-12" of existing soil to act as a sponge which will better retain water in the root zone.

4.3.2. pH Levels

Acidic Soil (1-6): If you need to add alkalinity to your soil, add lime (calcium carbonate) typically in the form of ground limestone (follow manufacturer's recommendations for rate and application).

Alkaline Soil (8-14): If you need to add acidity to your soil, add 3-4" organic matter (ie: compost, aged-manure, peat moss, sawdust/wood shavings/ground bark, redwood soil conditioner) and till into the top 9-12" of existing soil. Sulfur and ferrous sulfate are also two other alternatives that can be amended to the soil (follow manufacturer's recommendations for rate and application).

Please be aware that different plants can tolerate different acid/alkaline conditions. For instance plants in dry regions have less tolerance for soil acidity, whereas plants in humid regions prefer acidic soils. Rhododendrons, azaleas, and blueberries prefer acidic soils (4-

5). Kitchen crops such as spinach, carrots, corn, tomatoes prefer moderate to slightly alkaline soils (6-7).

4.3.3. Water Holding Capacity & Permeability

If your soils drains faster than 1-2 inches per hour, add 3-4" of organic matter (ie: compost, aged-manure, peat moss, sawdust/wood shavings/ground bark, redwood soil conditioner) and till into the top 9-12" of existing soil.

If your soils drain slower than 1-2 inches per hour: spread 2-4 inches of compost over the bed, followed by the gypsum (follow manufacturer's recommendations for rate and application). Mix the compost and gypsum in with the existing soil.

4.4. Fertilizers

Soil supplies 13 essential plant nutrients, each with a function for plant growth. The most common nutrient deficiencies found in soil are Nitrogen (N), Phosphorus (P), and Potassium (K). Plants can only take up nutrients in a solution, meaning dissolved in soil water. Fertilizers can supplement the nutrients soils need. There are a few different kinds of fertilizers available. Follow the manufacturer's recommendations for proper rate and application.

Organic Fertilizers: Made from natural materials including plant, animal, and/or mineral materials. Once in the soil, nutrients are released as the plant needs them by heat, water from rain and irrigation, and the general decomposition process from soil microbes. Compared with synthetic/processed fertilizers organic fertilizers usually have a lower concentration of nutrients and release them more slowly. More organic fertilizer is usually required, however the effect lasts longer. This type of fertilizer is encouraged.

Slow-Release Synthetic Fertilizers: Similar to organic fertilizers but made from synthetic materials and nutrients are mainly released by soil microbial activity rather than temperature and water. They are typically available in a granular form.

Synthetic Fertilizers: Quick release processed fertilizers frequently wash through the soil before they are taken up by the plants' roots. They can also damage soil microbes. These types of fertilizers are not encouraged.

4.5. References

- Book: *The Nature and Properties of Soils*, 11th Edition, Brady, Nyle C. & Weil, Ray R., Prentice-Hall, Inc., 1996
- Water-Smart Gardening in Santa Cruz County: http://www.santacruz.watersavingplants.com/Garden-Resources/soil.php
- A Home Gardener's Guide to Soils and Fertilizers, Washington State University Extension, EM063E http://cru.cahe.wsu.edu/CEPublications/EM063E/EM063E.pdf.
- Organic Materials Exchange (source for reusable organic materials on the Central Coast): http://www.omexchange.org/
- Bay-Friendly Guide to Mulch: https://www.bayfriendlycoalition.org/publications.shtml

5.0 PLANTING GUIDELINES AND DESIGN CONSIDERATIONS

5. PLANTING GUIDELINES AND DESIGN CONSIDERATIONS

5.1. Environmentally Friendly Landscapes

An environmentally friendly landscape fits into the climatic conditions it is grown in and gives back to its environment. The goals and objectives for an environmentally friendly landscape in Pacific Grove are listed below.

Goals and Objectives:

7. Encourage Landscapes That Fit With the Natural Conditions of Pacific Grove
    a. Use coastal California native plants to promote sense of place
    b. Use plants that are within the native plant community where you live
    c. Let plants take their own natural form; meaning little to no pruning
8. Conserve Potable Water
    a. Choose to plant coastal California native plants and/or drought tolerant plants
    b. Get your current irrigation system audited by an irrigation professional
    c. Install a high efficiency irrigation system
        i. Install an automatic controller or evapotranspiration (ET) controller
        ii. Install a rain and/or soil moisture sensor to your irrigation system
        iii. Use drip or subsurface irrigation
        iv. Hydrozone similar water needs of plants
    d. Capture and harvest rainwater and/or graywater and reuse it in your landscape
    e. Keep a layer of mulch on your exposed soil and landscape planting areas to prevent evaporation
9. Promote Healthy Soils
    a. Add compost to promote healthy soils
    b. Maintain a layer of mulch on your exposed soil and landscape planting areas
    c. Use organic fertilizers
    d. Aerate compacted soils
10. Use Integrated Pest Management
    a. Choose to plant coastal California native plants that use no/little of herbicides and pesticides
    b. Use non chemical methods first, to address infestation problems
    c. Choose environmentally-friendly herbicides and pesticides
11. Reduce Stormwater Flows and Pollutants
    a. Increase opportunities for stormwater to infiltrate into the soil by providing more planting areas

b. Replace impervious hardscape surfaces with pervious surfaces
c. Harvest the rain water
d. Create rain gardens and vegetated swales to receive stormwater runoff
e. Disconnect roof downspouts and redirect roof runoff into the soil
f. Keep a layer of mulch on your exposed soil and landscape planting areas

12. Protect and Enhance Native Plant and Wildlife Habitat and Diversity
    a. Create biodiversity in your landscape by planting a variety of species
        i. Tubular-shaped flowers attract hummingbirds
        ii. Provide plants that will supply honey bees and butterflies with pollen and nectar year round
        iii. Allow seeds to ripen for birds to eat
    b. Do not plant invasive plants

5.1.1. Landscape Recognition Programs

There are a few landscape certification programs that recognize and award sustainable landscapes in Pacific Grove based on the completion of specific program requirements. These types of programs are encouraged for your landscape design. Details about the programs are in the web site links below.

Monterey Bay Friendly Landscaping: http://green-gardener.org/portfolio/landscape_certification/#

Ocean Friendly Gardens: http://www.surfrider.org/programs/entry/ocean-friendly-gardens

5.2. Landscape Design Principles and Existing Site Conditions

With the environmentally friendly landscape goals and objectives in your mind. The next step is to design and plan out your landscape area. Evaluate your site conditions first to

determine your plant species composition and other site features you may want to include. Section 2.0 has information about environmental conditions in Pacific Grove.

- How much sun and shade will each areas of your landscape receive?
- How are the natural drainage patterns on your property working? Where does the runoff go? Where does the runoff from other hardscape surfaces go (i.e. driveway, patios)?
- Is your home located near the coast, within a Coast Live Oak stand, or upland in the Monterey Pine Forest? Understand the plant community you are living in. Refer to Section 2.0.
- Is there a function you want your landscape to provide, such as to shield wind, control erosion, obscure a view, frame or preserve a view, provide a certain color or texture, provide shade?
- Are there other landscape features you want to include such as a rain garden, water harvesting system, patio or gathering space, kitchen garden, etc.

It helps to have an existing conditions plan or a site plan which is a scalable map of your property, so you can layout your design intentions and compare it with the actual space you have available. This can be done my hand with a ruler/scale or by computer design software. It is a good way to brainstorm your design intentions.

On your site plan, annotate the property lines, any built features on your property, the location of the first level windows and entryways, the location of utilities meters or other infrastructure, as well as utilities above ground and underground.

"Clear and Grub" is the process of clearing all site vegetation prior to site work. A clear and grub plan indicates what landscape plants and features will be removed or altered based on the new landscape design. Figure 5.0 is an example of a simple existing conditions plan.

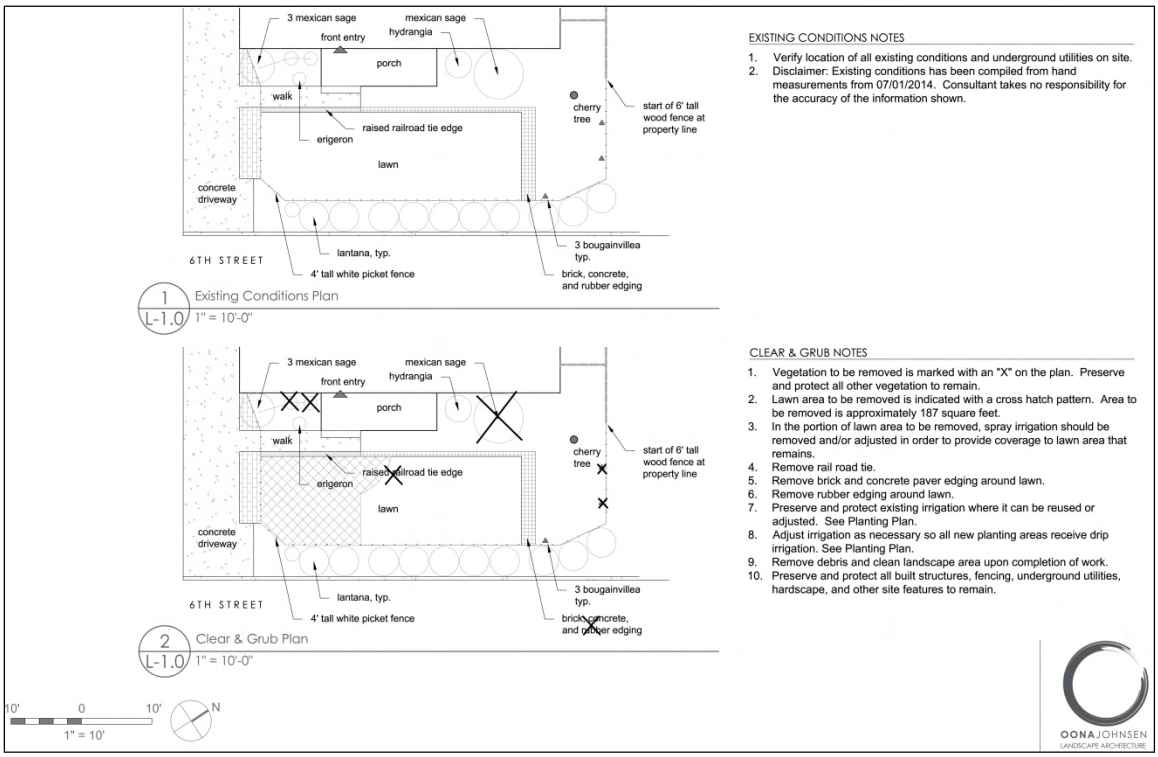


Figure 5.0 - Existing Conditions Plan and Clear & Grub Plan: These simple plan graphics show examples of a simple existing conditions plan and a clear and grub plan. Refer to Figures 5.1 and 5.2 for the associated planting plan and plant legend.

- Dispose of materials properly. Contact the Monterey Peninsula Waste Management District for questions regarding disposal and recycling of materials: (831) 384-5313; http://www.mrwmd.org/contact-us/.
- If you plan on removing trees, contact the City of Pacific Grove Planning Office to see if a permit is required: 831-648-3190, located at 300 Forest Avenue, 2nd Floor, Pacific Grove.
- If you plan on doing some major excavation work, it is the homeowner's responsibility to find out were underground utilities are located. Contact PG&E "call 811 before you dig". Call 811 at least two working days before starting any project that involves digging to have PG&E gas pipelines and other underground utility lines located and marked for free.

If you plan on working with a landscape design professional or a landscape contractor, Monterey County provides some guidance in the documents listed below:

Working with Landscape Architects, Landscape Designers, Landscape Contractors, Horticulturalists, and Arborists:

http://www.montereylandscaping.org/Garden-Resources/GardenGallery.php

5.3. Plant Species Choice

In your landscape, replace plants that require regular watering with drought tolerant and California native plants. It is recommended that 100% of all new planting or replacement planting should be with drought tolerant and native plants. The more variety of plants in your landscape, the more biodiversity you are promoting, enhancing the habitat, pollen and nectar sources for beneficial insects including butterflies, honey bees, and hummingbirds. In additions, these efforts will reduce your potable water consumption, lower your water bills, and in return you will have an easy to maintain, beautiful landscape.

It is important to consider using appropriate Central Coast California native plants in your design because they provide so many benefits. The more native species in your landscape the better! They provide:

- Food and shelter for beneficial birds and insects
- Already adapted to the local climate conditions
- Low to no irrigation after establishment
- Less susceptible to infection/insect damage
- Low maintenance with little to no fertilizer needed
- Adds to a sense of place, enhancing the native character of where you live

Plants that are considered drought tolerant are typically California native, Mediterranean, Australian, and South African plants. A short-list of recommended native and drought tolerant plants are listed in Section 6.0. Also refer to Section 5.9 for recommended references referring to plants and planting design.

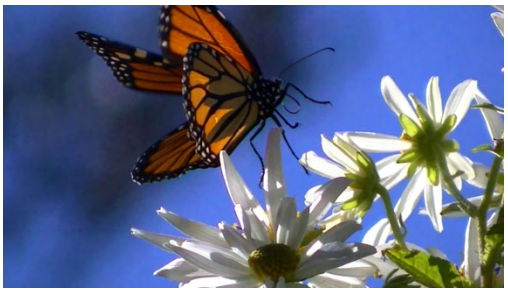
The *Water Use Classification of Landscape Species* (WUCOLS) is a document, provided by the California Department of Water Resources, that classifies the water needs of individual plant species based on region (Pacific Grove is Region 1, North-Central Coastal).

The water use designations are:

VL = very low
L = low
M = medium
H = high

It is encouraged that plants in the VL and L designation are primarily used; it will be listed in the plant palette in Section 6.0. The full document is found at this web site: http://ucanr.edu/sites/WUCOLS/

5.3.1. Milkweed



Milkweed is the only plant monarchs can lay its eggs on. The lack of milkweed is a concern since the monarch population has been in decline. However, the Xerces Society has informed the Pacific Grove Museum of Natural History that milkweed plants should NOT be planted within 10 miles of an overwintering site. Since Pacific Grove has an overwintering site, milkweed should NOT be planted. Instead, include flowering plants in your landscape that provide nectar to monarchs during their overwintering stay in November to late February, early March.

Request free nectar plant seeds from the Pacific Grove Museum of Natural History. http://www.pgmuseum.org/free-seed-distributions/

If you currently have milkweed plants in your landscape, prune them back to the ground every November while the monarchs are overwintering. The milkweed will grow back in spring and provide pollen and nectar to other beneficial insects.

5.4. Developing a Planting Plan

Once you have plant choices in mind which provide the plant characteristics you wish, research the plant's mature size (height & width) to ensure that it will not outgrow the intended space. It is easy to overplant since when you purchase the plant from the nursery, it appears small in the container it comes in. You may think you need more plants in your designated space, but you will not. If you have considered the plant's growth habits, the plant will grow into its intended space within a few growing seasons. The species selected with sufficient plant spacing will allow it to grow to its natural size and shape and reduce the need for regular pruning.

After you have developed your planting area locations, annotate your site plan with the specific plants in your design by referencing the species. This is called a Planting Plan. Do this by drawing a circle that is equal to the mature width of the plant. Don't forget to take into consideration the height of the plant; be sure you are not blocking windows, utility meters or infrastructure, overhead power lines, or other structures. Also draw in any new landscape features, such as elevated berms, depressed features such as rain gardens, and gathering spaces. Refer to Figures 3.1 and 3.3 for a planting plan and plant legend example.

Below are some tips to planting design:

- Place trees on your plan first. Refer to the Pacific Grove tree planting guidelines and recommended tree list. These links can be found in Section 1.4 Pacific Grove Planning References.
- Next, place large shrubs and foundation plants in the positions you think are appropriate. Keep the taller plants in the background and the lower growing plants in the foreground so you can take full advantage of the planting design composition you have created.
- Place lower growing accent plants, groundcovers, and vines next.
- Consider bloom times of species. You may want to alternate bloom times for interest and habitat value.
- Minimize your lawn and use lawn alternatives, Section 5.6. For groundcover plant alternatives, refer to plant palette in Section 6.0. Other non-plant alternatives are a layer of bark or decorative gravel or a permeable hardscape patio.
- Double check you have chosen the correct plant species that can receive the amount of sun or shade you want to place it in.
- Do not plant too close to the house foundation. It is recommended to have the mature width of the plant to be within 18-24" of the house wall. You may want to consider mulch or rock in this 18-24" setback to protect the foundation and provides ease of house maintenance when needed.
- Consider is grouping plants with similar water requirements, called hydrozones. This is addressed in Section 3.0. Essentially, if you plan on installing an automated irrigation system, hydrozoning helps to conserve water and prevents overwatering of plants that don't require it.

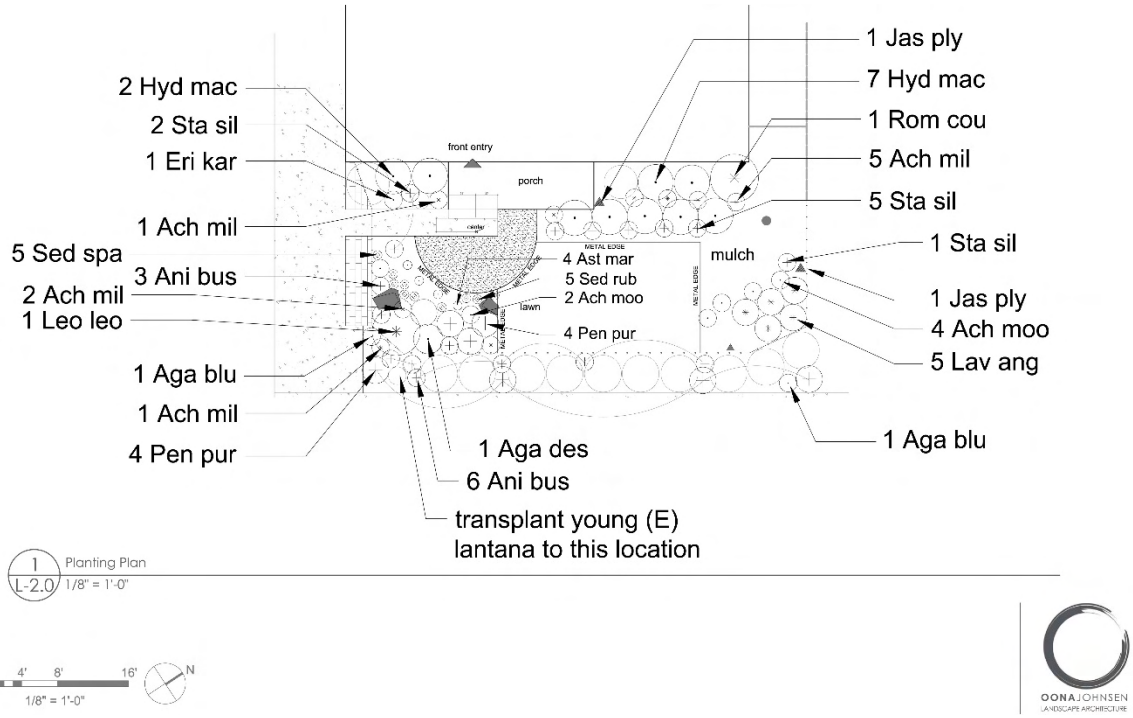
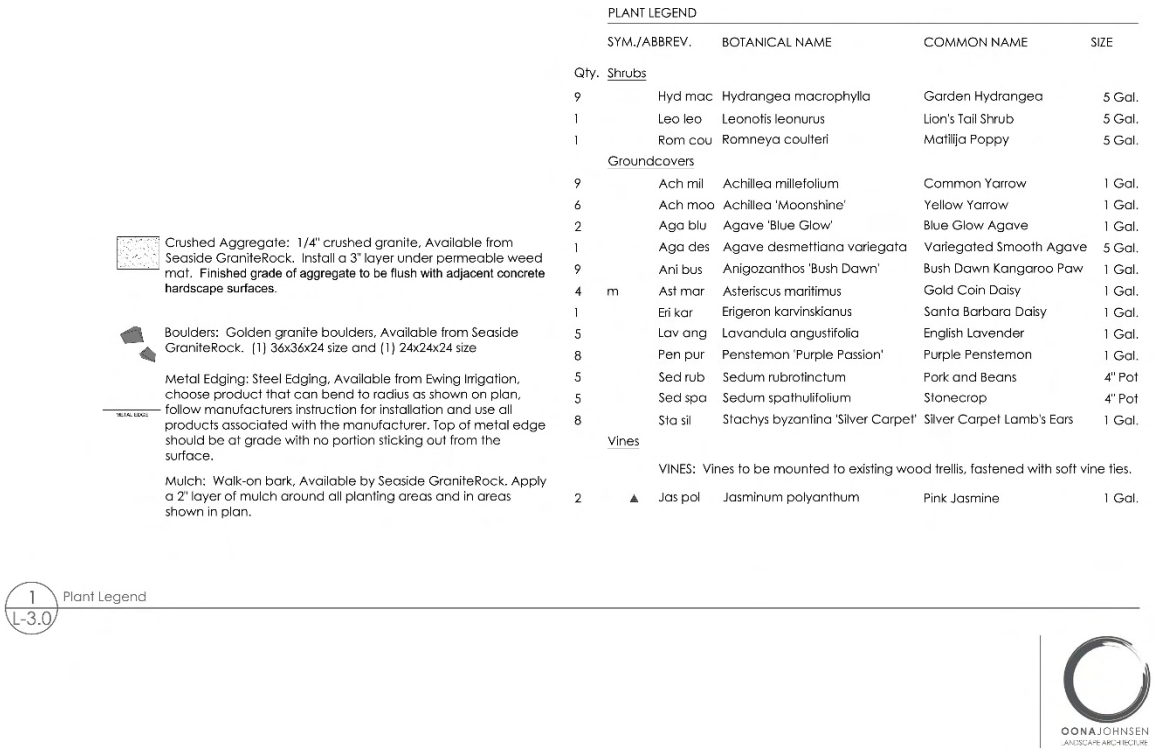


Figure 5.1 – Planting Plan: This is an example of a planting plan, indicating the mature size, location, species, and quantity of the plants as well as other landscape features like the crushed aggregate patio, boulders, metal edging, and mulch.



PLANT LEGEND

Qty.		SYM./ABBREV.	BOTANICAL NAME	COMMON NAME	SIZE
	Shrubs				
9		Hyd mac	Hydrangea macrophylla	Garden Hydrangea	5 Gal.
1		Leo leo	Leonotis leonurus	Lion's Tail Shrub	5 Gal.
1		Rom cou	Romneya coulteri	Matilija Poppy	5 Gal.
	Groundcovers				
9		Ach mil	Achillea millefolium	Common Yarrow	1 Gal.
6		Ach moo	Achillea 'Moonshine'	Yellow Yarrow	1 Gal.
2		Aga blu	Agave 'Blue Glow'	Blue Glow Agave	1 Gal.
1		Aga des	Agave desmettiana variegata	Variegated Smooth Agave	5 Gal.
9		Ani bus	Anigozanthos 'Bush Dawn'	Bush Dawn Kangaroo Paw	1 Gal.
4	m	Ast mar	Asteriscus maritimus	Gold Coin Daisy	1 Gal.
1		Eri kar	Erigeron karvinskianus	Santa Barbara Daisy	1 Gal.
5		Lav ang	Lavandula angustifolia	English Lavender	1 Gal.
8		Pen pur	Penstemon 'Purple Passion'	Purple Penstemon	1 Gal.
5		Sed rub	Sedum rubrotinctum	Pork and Beans	4" Pot
5		Sed spa	Sedum spathulifolium	Stonecrop	4" Pot
8		Sta sil	Stachys byzantina 'Silver Carpet'	Silver Carpet Lamb's Ears	1 Gal.
	Vines				
			VINES: Vines to be mounted to existing wood trellis, fastened with soft vine ties.		
2	▲	Jas pol	Jasminum polyanthum	Pink Jasmine	1 Gal.

Crushed Aggregate: 1/4" crushed granite, Available from Seaside GraniteRock. Install a 3" layer under permeable weed mat. Finished grade of aggregate to be flush with adjacent concrete hardscape surfaces.

Boulders: Golden granite boulders, Available from Seaside GraniteRock. (1) 36x36x24 size and (1) 24x24x24 size

Metal Edging: Steel Edging, Available from Ewing Irrigation, choose product that can bend to radius as shown on plan, follow manufacturers instruction for installation and use all products associated with the manufacturer. Top of metal edge should be at grade with no portion sticking out from the surface.

Mulch: Walk-on bark, Available by Seaside GraniteRock. Apply a 2" layer of mulch around all planting areas and in areas shown in plan.

1 L-3.0 Plant Legend

OONAJOHNSEN LANDSCAPE ARCHITECTURE

Figure 5.2 – Plant Legend: This is an example of a planting legend. It is a key to the planting plan which lists and describes the abbreviated plant labels; their botanical name, their common name, the plant container size, and total quantity of each species needed. Also, it describes the materials for the aggregate patio, boulders and metal edging, and mulch.

On your plan you will be able to calculate the amount of landscape materials you need to purchase. If you choose to hire out your landscape installation, it is recommended to hire a California licensed contractor.

Please note that plant nurseries carry different plant species at different times of year. Call ahead to find out plant availability, so you can determine any plant substitutions that may be needed.

5.5. Invasive Plants

Do not use invasive plant species in your landscape design and remove any invasive plants already existing in your landscape. Invasive plants aggressively spread, reducing biodiversity, invade existing ecosystems, and prevent native habitat environments from establishing.

A comprehensive list of invasive plants from the California Invasive Plant Council (Cal-IPC)

can be found on their website: http://www.cal-ipc.org/.

Also, a concise brochure geared towards the Central Coast, titled: Don't Plant a Pest, is available from Cal-IPC at: http://www.cal-ipc.org/landscaping/dpp/pdf/CCoastDPP.pdf.

5.6. Minimize Turf/Lawn

It is recommended to reduce the amount of turf/lawn in your landscape due to its high water requirements, fertilization requirements, and other maintenance needs. If your lawn is watered from a rainwater harvesting system or gray water system, it can be justified in your landscape. Otherwise follow the recommended lawn reductions measures below:

- Reduce the amount of turf on your property to equal or no more than 25% of the total landscape area. Consider alternative groundcovers or alternative plant species for lawn-like areas. Refer to the plant palette in Section 6.0.
- Do not use turf under trees.
- Do not use turf under densely shaded areas.
- Do not use turf in areas exceeding a slope of 10% (4:1).
- Do not use turf in landscape areas s less than 8 feet wide.
- Do not use turf in medians.

5.7. Stormwater Management Landscape Techniques

The drainage systems of Pacific Grove are engineered to move stormwater to the drainage system and into the nearest water body as quickly as possible. Stormwater picks up pollutants as it travels and enters the drainage system, then it is discharged into the Monterey Bay. These waters are harmful to the natural ecology of the Marine Sanctuary. Though there are city-wide efforts to improve infrastructure and improve the stormwater diversion system, there are landscape design techniques homeowners can install to help clean the stormwater before it discharges into the Monterey Bay.

Landscape areas absorb the stormwater and the soil and root systems filter stormwater pollutants. These areas also slow down and retain the water before it enters the drainage systems, so the more landscape areas the better. Even permeable hardscapes, special hard surfaces that allow stormwater to infiltrate into the ground, can be integrated into the landscape design to assist in this cleansing process.

There are some suggested stormwater management techniques that you can integrate into your landscape. Design guidelines for the techniques listed below can be found through the City of Pacific Grove's RainScapes program.

At least one stormwater management practice should be used in your landscape.

RainScapes
Landscapes for Healthy Watersheds

RainScapes Program: http://www.cityofpacificgrove.org/living/green-pg/rainscapes-rebate-program

Design Guidelines for:

1. Roof Downspout Direction
2. Creating Rain Gardens
3. Rain Water Harvesting
4. Replacement of Impervious Surfaces with Pervious Surfaces
5. New Tree Planting
6. Gull Rooftop Deterrents

5.8. Fire Zone Planting

There are specific areas in the City of Pacific Grove are designated as wildfire zones per CAL FIRE. See Figure 5.3.

Percentage of the City that is within the CalFire Severity Zones:

Very High:	24.55%
High:	13.39%
Moderate:	10.56%

If your landscape is located within the wildfire zone, please provide a fire-safe landscape for your property. The links in this section provide specific information on how to create a fire safe landscape. Basic considerations are explained below*.

Create a 100 foot defensible space around your home.

- Remove all flammable vegetation and combustible materials within 30 feet immediately surrounding your home.
  - Keep trees trimmed at least 10 feet from chimneys and remove dead branches hanging over structures.
  - Remove build-up of needles and leaves from roof and gutters.

  - Remove dead and dying plants, fallen leaves, needles, twigs, bark, cones, pods, small branches, etc.
  - Regular maintenance (pruning, weed control, adequate irrigation) is necessary to maintain the fire resistance of your landscape.
  - Increase spacing between plants.
  - Landscape with fire resistant plans – low growing, open structures, and less resinous.
  - When clearing vegetation, use care in operating equipment such as lawnmowers.
- Create a Reduced Fuel Zone that extends at least an additional 70 feet or to your property line. An even greater defensible zone width is necessary when home are located on a slope or in a windswept area.
  - Maintain open space between plants and trees to improve the chance of stopping a wildfire. There are two options:
    1. Create horizontal and vertical spacing between plants. The amount of space will depend on how steep the slope is and the size of the plants.
    2. Large trees do not have to be cut and removed, but plants growing beneath them that are greater than 4 inches in height should be removed. Remove lower limbs of trees to at least 6 feet, up to 15 feet (or the lower 1/3 branches on smaller trees).

*University of California, Division of Agriculture and Natural Resources, *The California Garden Web, Landscaping for Fire Protection*, 2015. Retrieved from http://cagardenweb.ucanr.edu/General/Landscaping_for_Fire_Protection/.

The Monterey County Fire Safe Council has put together fire-safe and fire-unsafe plant lists: http://www.firesafemonterey.org/plant-lists.html.

For more information on landscaping for fire protection, visit:
http://cagardenweb.ucanr.edu/General/Landscaping_for_Fire_Protection/

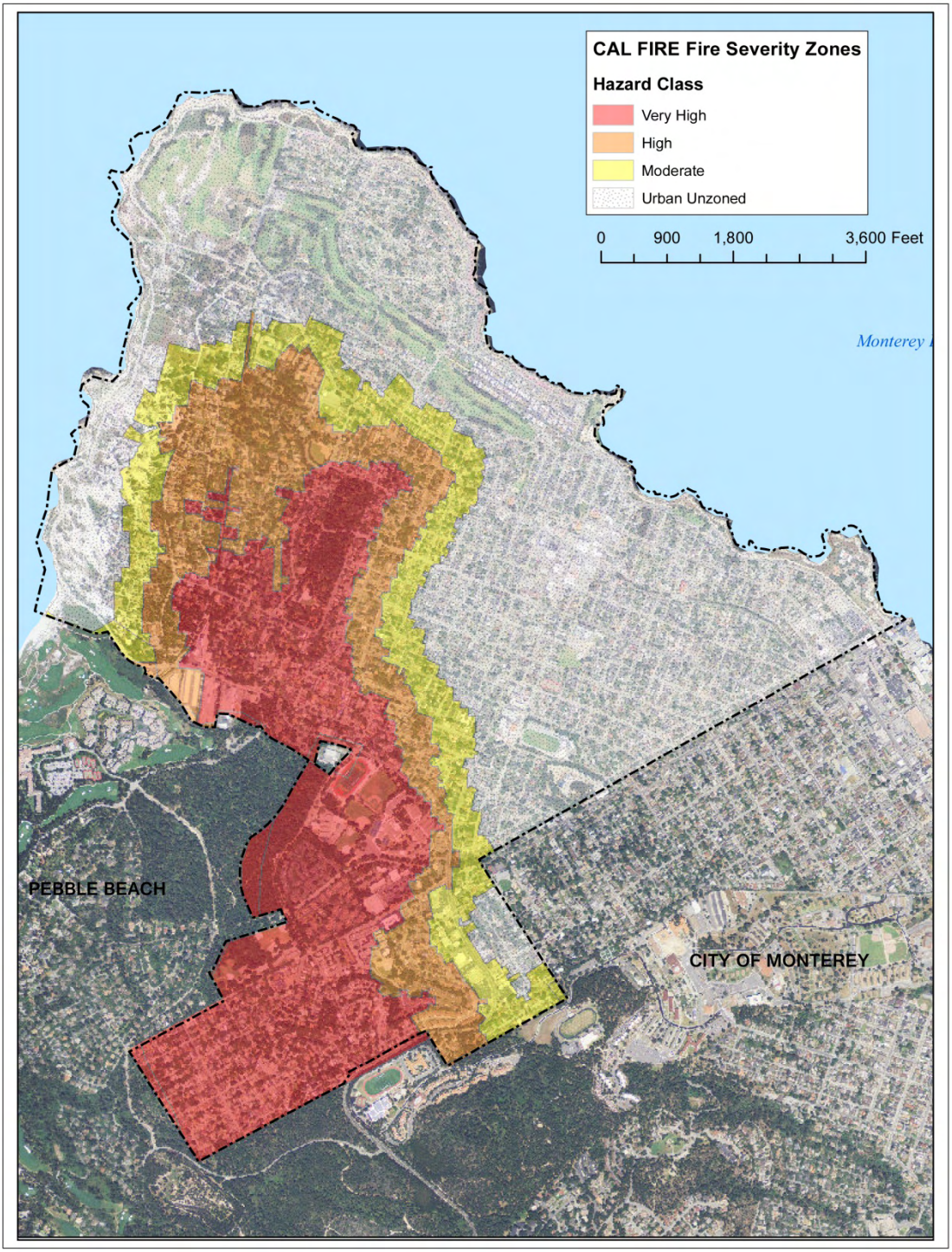


Figure 5.3: Cal-fire designated wildfire severity zones in Pacific Grove - http://www.fire.ca.gov/fire_prevention/fhsz_maps/FHSZ/monterey/FHSZL_c27_PacificGrove.pdf

5.9. References

- Monterey Bay Master Gardeners:
  Gardening Hotline (9am – noon; Mon, Wed, Fri): 831-763-8007
  Email: hotmail@mbmgs.org
  Website: http://mbmg.ucanr.edu/
- Pacific Grove Museum of Natural History, Native Plant Garden Plant List: http://www.pgmuseum.org/museums-native-plant-garden/
- Monterey Bay Chapter of the Native Plant Society, "Local Plants": http://montereybay.cnps.org/local-plan
- California Native Plant Society: Hummingbird Habitat Gardening: http://www.cnps.org/cnps/grownative/habitat/hummingbirds.php
- California Native Plant Society: Bee-friendly Gardening:

  http://grownatives.cnps.org/2010/03/31/bee-friendly-gardening/
- Central Coast Low Impact Development Initiative, LID Plant Guidance for Bioretention and Plant List: http://centralcoastlidi.org/uploads/LIDIPlantList_2015.03.11.pdf
- California Oak Foundation, Compatible Plants Under & Around Oaks: http://www.californiaoaks.org/ExtAssets/CompatiblePlantsUnder&AroundOaks.pdf
- California Invasive Plant Council: http://www.cal-ipc.org/
- California Invasive Plant Council, Don't Plant a Pest: http://www.cal-ipc.org/landscaping/dpp/pdf/CCoastDPP.pdf
- Water Use Classification of Landscape Species (WUCOLS): http://ucanr.edu/sites/WUCOLS/
- Water Smart Gardening in Santa Cruz County: http://www.santacruz.watersavingplants.com
- Monterey County Waterwise Landscaping: http://www.montereylandscaping.org
- Slow it, Spread it, Sink it! A Homeowner's Guide to Greening Stormwater Runoff: http://www.rcdsantacruz.org/images/brochures/pdf/HomeDrainageGuide.v25.pdf
- Book: *Sunset Western Garden Book*
- Book: *Plants and Landscapes for Summer-Dry* Climates, by East Bay Municipal Utility District
- Book: *California Native Plants for the Garden*, by Carol Bornstein, David Fross, Bart O'Brian
- Book: *Reimagining the California La*wn, by Carol Bornstein, David Fross, Bart O'Brian
- Book: *The American Meadow Garden*, by John Greenlee
- Book: *California Bees & Blooms*, by Gordon W. Ranke, Robbin W. Thorp, Rollin E. Coveille, and Barbara Ertter

6.0 PLANT PALETTE

6. PLANT PALETTE

The list of plants located in Appendix A are recommendations for plant species suitable for Pacific Grove which follow the goals of an environmentally friendly landscape. Please note that this does not guarantee plant success as plants need to be situated in appropriate locations, with suitable conditions, and require proper landscape maintenance practices. Refer to Section 5.0 for Planting Guidelines and Design Considerations. In addition, Section 5.8 provides a list of planting references for additional resources.

This palette does not include trees, as a list is already developed and can be found in the Section 1.4 Introduction / City Planning References.

7.0 PLANTING PROCEDURE

7. PLANTING PROCEDURE

After your landscape design has been completed. It is time to prepare the site. Below is a possible order of events when constructing a landscape.

Landscape Construction Process:

1) Develop the Landscape and Planting Design: Plans and documents to construct your landscape improvements with your vision.

Alternative 1:

Obtain construction bids from landscape contractors. They can typically give you a bid if your design plans and documents are somewhat thorough. The rest of the work from this point will be carried out by the contractor per your contract with them.

Alternative 2:

Proceed with the planting procedure yourself.

2) Estimate quantities of plants, soil, mulch, fertilizer, gopher/deer repellent and other materials needed to construct other landscape features.
3) Prepare a cost estimate. This is a good time to refine the design if necessary.
4) Clear and grub your property of unwanted plants or hardscape features. Dispose of materials properly. "Clear and Grub" is the process of clearing all site vegetation prior to site work.
5) Purchase all the materials you need and deliver to your site as needed in the construction timeline. This is a good time to source plant materials from nurseries. However, it is important to deliver the plants as close to the time of planting as possible.
6) Install all underground infrastructure/utilities needed, such as irrigation mainline, drainage features.
7) Grading of soils: stormwater retention features, grading for walls, addition of berms, etc. Ensure runoff is contained property and overflow situations are properly installed.
8) Install all hardscape features: patios, retaining walls, decks, fences, etc.
9) Install the irrigation system and all the associated componentry.
10) Prepare your soil in the planting areas per the research you have done in Section 4.0.
11) Purchase and deliver plants: make sure containerized plants are stored in a shady spot if you do not intend to plant immediately and keep them watered and protected from deer.
12) Before planting commences, position the location of each plant while in its container. This is the chance to accurately visualize what the planting design you created on

paper will look like in the ground. You can adjust placement if necessary. Please keep in mind the full mature form of the plant as you visualize at this point. Plants are small when purchased in containers. As mentioned in Section 5.0, you may think you need more plants in your designated space, but you will not. If you have considered the plant's growth habits, the plant will grow into its intended space within a few growing seasons. The species selected with sufficient plant spacing will allow it to grow to its natural size and shape and reduce the need for regular pruning.

13) Prepare your amended backfill.
14) Plant each plant its location per your layout and refer to Figure 7.0 which shows a cross section of how to plant a plant.
15) Install a gopher basket if necessary.
16) Add fertilizer if necessary.
17) Hand-pack the soil around the plant after placing it in the hole as to remove any air pockets.
18) Remove excess soil from around the stem.
19) Apply a 2-3" mulch layer to all planting areas.
20) Hand water each plant thoroughly after planting.
21) Apply deer deterrent if necessary.
22) Learn how to use your irrigation controller. Initially, set a watering schedule to help establish the plants and their roots. Monitor plants, as once they are established, the watering schedule should be reduced.

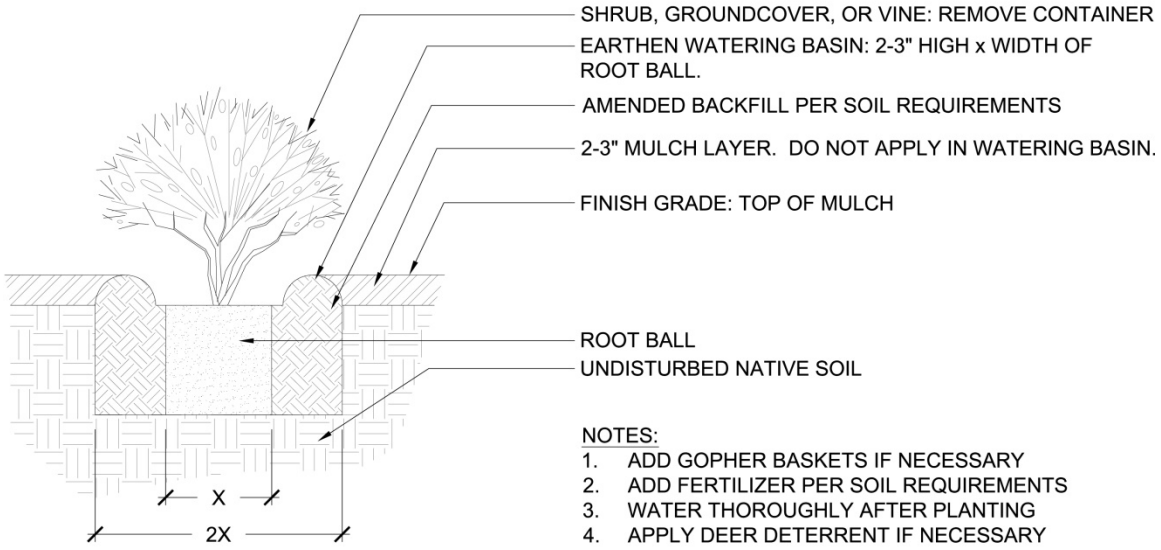


Figure 7.0 - Planting detail: not to scale

8.0 MULCH

8. MULCH

8.1. Purpose and benefits

In general, mulch is a protective layer of material spread on the top soil. In nature, leaves, needles, and branches fall to the ground creating an organic layer that protects and builds the soil. This layer is called "duff". Creating this layer in your landscape has various benefits and is a simple way to enhance a landscape.

Mulch:

- Keeps the soil moist by preventing evaporation of applied water, thus helping in conserving water
- Replenishes organic material in the soil which is beneficial to soil organisms and creates healthy soil
- Prevents erosion as a result of wind and heavy rain events carrying away soil particles/sediment
- Reduces stormwater runoff velocity
- Insulates plant roots from temperature extremes
- Discourages weeds which reduces weed competition for landscape plants and requires less maintenance
- Provides a "finished" look to new planting designs
- Mulching under trees to the drip line minimizes competition for water and nutrients from grass or other plants. Refer to Figure 8.0.

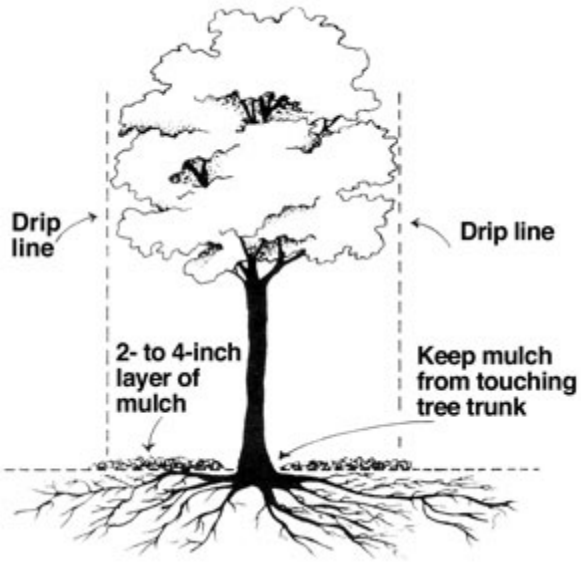


Figure 8.0 – Tree Drip Line: A tree drip line is the outermost circumference of a tree canopy where water drips from onto the ground.

8.2. Types of mulch

There are many kinds of organic mulches. Two recommended kinds are recycled mulch and bark.

Recycled Mulch: Grass clippings, leaves, and tree branches/stumps that have been chipped and shredded. This kind of mulch can come from your own yard waste or obtained from arborists, utility companies, or parks. Make sure these mulches are weed free.

Bark: Bark or wood chips come from lumber and paper mill by products. They can be chipped or shredded in different coarseness and can come in different colors (red, black, brown). Bark is readily available at most plant nurseries and home improvement stores with garden centers. The Monterey Regional Waste Management District has wood chip mulch for sale which comes from untreated, unpainted construction lumber: http://www.mrwmd.org/green-products/

8.3. How to apply

Before applying mulch, remove weeds from the bare soil. Spread, at a minimum, a 2" (2 inch) layer of mulch around planting areas or any other area with bare soil.

Keep mulch 6-12" away from tree trunks and away from the base of shrubs. Tree trunks and woody shrub stems area not suited to wet conditions. Keeping mulch away from the base of trunks and shrub stems will keep the area dry reducing the risk of rot, disease and insects.

In order to determine how much mulch you need, you need to calculate the volume by multiplying the area (in square feet) X depth of mulch desired (in feet, i.e.: 2" mulch equals 0.167 feet) and then dividing by 27 (conversion to get cubic yards) = the total cubic yards needed.

For instance, a planting area of 450 square feet, with a 3" layer of mulch will need just over 4 cubic feet of mulch. See equation below:

450 x 0.25 / 27 = 4.16 cubic feet of mulch

Reapply mulch as needed – once a year or every other year depending on your landscape conditions.

9.0 LANDSCAPE MAINTENANCE

9. LANDSCAPE MAINTENANCE

The final element to a sustainable landscape is ensuring environmentally friendly landscape maintenance practices are in place. Unfortunately, there is no such thing as a maintenance-free landscape. Keeping the landscape thriving in changing conditions is an important task and there are proper maintenance principles to consider. This section will give an overview of environmentally friendly maintenance tasks and considerations that you can implement in your landscape.

9.1. Integrated Pest Management

A major concept included in sustainable landscape maintenance is Integrated Pest Management (IPM). It is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. IPM is important for our area as pesticides and herbicides, when used incorrectly, can flow directly into the Monterey Bay providing detrimental effects to marine wildlife due to poor water quality. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment (definition from University of California IPM).

A good resource for IPM practices is the University of California Integrated Pest Management Program: http://www.ipm.ucdavis.edu/GENERAL/whatisipm.html

9.2. Weed Management

After planting, check garden for weeds and pull immediately. Eventually, as the plants grow, less weeding will be required. Installing new plants with close spacing, where the mature width of the plant will overlap with the next plant 6-12", will cover more bare ground and will provide less room and provide less light for weeds to grow.

To help with the identification of weeds in your landscape a weed photo gallery is available from UC IPM: http://www.ipm.ucdavis.edu/PMG/weeds_intro.html

Pulling weeds by hand is best, but can be a difficult task if there are large areas to weed. Environmentally friendly herbicides can then be an option. A list of some, not all, products that are considered less toxic alternatives to more conventional herbicides are listed in the document from Our Water Our World, under the Weeds chapter: http://www.ourwaterourworld.org/Portals/0/2015%20OWOW%20Less-Toxic%20Product%20List%20-%20by%20pest_revised%20final%20%2002-22-15.pdf

Also http://www.ipm.ucdavis.edu/GENERAL/pesticides_urban.html

9.3. Insects & Disease

Similar to weed management, insect and disease management should be attempted by non-chemical methods first. Depending on the pest and disease, there are alternatives to pesticides. Below are some tactics that might work. A comprehensive list can be found: http://www.ipm.ucdavis.edu/GENERAL/pesticides_alternatives.html

- As a first resort, remove larger insects by hand, such as snails, slugs, and caterpillars.
- Prune and destroy leave or branches infested with pest or diseases.
- Hose off pests from plants with a jet nozzle.
- Place barriers around seedling, such as plant cages or collars can protect them from pests.
- Introduce an appropriate predator, such as ladybugs, to eat the pest.

- Adjust your watering schedule as some plant diseases are brought on by overwatering plants

If the pest or disease if out of control even after you have tried non-chemical IMP methods, environmentally friendly pesticides can then be an option. A list of some, not all, products that are considered less toxic alternatives to more conventional pesticides are listed in the document from Our Water Our World: http://www.ourwaterourworld.org/Portals/0/2015%20OWOW%20Less-Toxic%20Product%20List%20-%20by%20pest_revised%20final%20%2002-22-15.pdf

Also UC IPM provides resources for less toxic pesticides: http://www.ipm.ucdavis.edu/GENERAL/pesticides_urban.html

9.4. Deer

If you don't have deer fencing around your property, you may want to consider a deterrent method to keep deer from eating your newly installed plants. When plants come from a nursery they are lush and extremely appealing to deer, even if the plant is known to be "deer resistant". If you chose deer resistant plants in your landscape planting design, as they grow larger and more woody, they will become less tempting to deer. However, if deer are hungry and have a difficult time finding food, especially in times of drought, deer are most likely going to nibble on your landscape plants.

The preferred methods to deter deer are:

- Temporary fencing – at least 8' tall
- Long term fencing – at least 8' tall. Refer to image.
- Environmentally friendly deer repellents are recommended at the time of planting and during times of drought

9.5. Gophers

Gophers are burrowing rodents that eat the roots of plants and damage plants and lawns by burrowing underground, upheaving roots and soil. Gophers have also been known to gnaw on plastic water lines and irrigation tube.

The preferred methods to deter gophers include:

- Plant your plants within a gopher basket, wire cages that protect the main root systems of plants. Refer to photo.
- There are other trap-contraptions that you can place down the gopher holes which will trap or kill the gophers.

- Sometimes a good hunting cat will keep gophers at bay.

9.6. Pruning & Removal of Plants

Prune shrubs to achieve natural growth patterns to reduce green waste. Achieving a natural form should mean that pruning should be minimal or unnecessary, especially if the plant was chosen based on the mature size of plant growth.

Other pruning/thinning activities include:

- Seasonal deadheading or thinning of spent flower/grass stalks
- Trimming for access along sidewalks and driveways
- Pruning to improve form with the goal to keep a natural form (no shearing!)
- Removing dead or diseased branches

Recommended resources for landscape maintenance of native plants include:

- Book: *California Native Gardening, A Month-By-Month Guide*, by Helen Popper
- Book: *Care and Maintenance of Southern California Native Plant Gardens*, by Bart O'Brien, Betsey Landis, and Ellen Mackey

9.7. Mulch

Keeping a 2-3" layer of mulch and/or around planting areas and bare soils is beneficial. Refer to Section 8.0 Mulch for more information. Reapplication can vary from once a year or every other year depending on your landscape conditions.

9.8. Fertilizing

Fertilize only if needed and avoid over fertilizing. Applying fertilizer is typically done in the autumn months, but it depends on the type of fertilizer used. Organic fertilizers are encouraged to be used over synthetic fertilizers in order to support biologically active soils. Refer to Section 4.0 Soils for more information.

9.9. Composting

Composting is a great way to create your own mulch and soil amendment from your own green waste right on your property. Adding compost to your landscape helps build healthy soil and reduces household waste. It is made with landscape trimmings (referred to as brown waste) and food scraps (referred to as green waste). A list of appropriate browns and greens for composting can be found in the EPA Compost Guide: http://www.epa.gov/waste/conserve/tools/greenscapes/pubs/compost-guide.pdf

In general, you start by designating an area for your compost bin or pile. See Figure 9.0 for various types of compost bins. Then mix three parts brown waste to one part green waste. Over time you turn/mix the pile and once you see the material at the bottom is dark and rich in color, with no remnants of your food or yard waste, your compost is ready to use. The EPA offers more complete information about composting: http://www2.epa.gov/recycle/composting-home.

In addition, the Monterey Regional Waste Management District often has free workshops on how to compost at home. Refer to their website for more information: http://www.mrwmd.org/.

Grasscycling can be used to supplement your compost pile. Grasscycling refers to leaving grass clippings on the lawn after mowing. The clippings then decompose and release nutrients into the soil. These clippings can also be used in the compost pile. More information on grasscycling is available from Bay Friendly Landscaping Coalition: https://www.bayfriendlycoalition.org/download/grasscycle2009.pdf

Figure 9.0 – Types of Compost Bins, image from www.unclejimswormfarm.com

9.10. Irrigation Maintenance

Monitoring your irrigation system should be a regular habit. This will help you identify leaks, emitters that have moved out of place, clogged emitters, and other broken equipment; helping you save water and optimize plant health before it becomes a major issue.

Check also for the following:

- Test your system to see that it is operating correctly
- Observe plants and adjust schedule for less watering as plants mature
- Adjust spray heads or emitter to eliminate overspray or runoff
- Check for overly dry or wet spots in your landscape and adjust accordingly
- Audit your irrigation system to reduce water usage. Refer to Section 3.0 Irrigation.

Other useful resources on irrigation maintenance:

- Monterey County Irrigation Maintenance: http://www.montereylandscaping.org/Garden-Resources/IrrigationMaintenance.php
- UC Maintenance of Microirrigaiton Systems: http://micromaintain.ucanr.edu/

9.11. References

- Book: *California Native Gardening, A Month-By-Month Guide*, by Helen Popper
- Book: *Care and Maintenance of Southern California Native Plant Gardens*, by Bart O'Brien, Betsey Landis, and Ellen Mackey
- UC Pesticide Information: http://www.ipm.ucdavis.edu/GENERAL/pesticides.html

- UC IMP Home, Garden, Turf, and Landscape Pests: http://www.ipm.ucdavis.edu/PMG/menu.homegarden.html
- Our Water Our World: http://www.ourwaterourworld.org/
- Monterey Regional Stormwater Management Program: http://www.montereysea.org/
- Monterey County Irrigation Maintenance: http://www.montereylandscaping.org/Garden-Resources/IrrigationMaintenance.php
- Monterey County Maintenance Tips for Each Month: http://www.montereylandscaping.org/Garden-Resources/MaintainingGarden.php
- UC Maintenance of Microirrigaiton Systems: http://micromaintain.ucanr.edu/

APPENDIX A

PLANT PALETTE

	Botanical Name	Common name	Mature Height & Width	Evergreen / Deciduous	Sun / Shade Tolerance	CA Native Plant / Pollinator Species	*Water Use per WUCOLS (Zone 1)	Plant Image
SHRUBS: over 4' in height	Buddleja davidii Hybrids: 'Black Knight', 'Lochinich'	Butterfly Bush	6-8' x 4-6'	semi-			M	
	Callistemon viminalis 'Little John'	Dwarf Bottlebrush	3-6' x 4-5'				L	
	Carpenteria californica 'Elizabeth'	Elizabeth Bush Anemone	4-6' x 4-6'				M	
	Ceanothus Hybrids: 'Dark Star', 'Julia Phelps'	California Lilac	4-8' x 8-12'				L	
	Choisya ternata	Mexican Mock Orange	6-' x 8'				M	
	Cistus pulverulentus 'Sunset'	Sunset Rockrose	3' x 5'				L	

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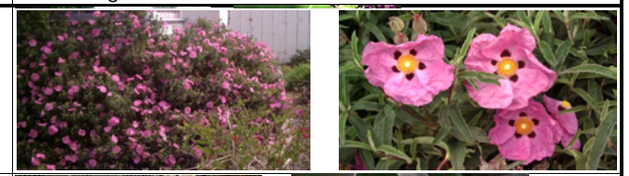
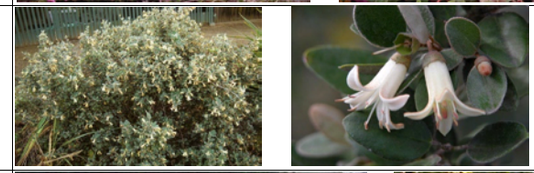
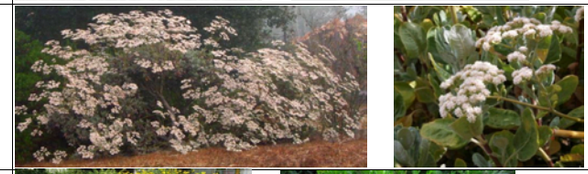
SHRUBS: over 4' in height	Cistus x purpureus	Orchid Rockrose	4-6' x 4-6'				L	
	Correa 'Ivory Bells'	White Australian Fuchsia	5' x 5'				L	
	Eriogonum giganteum	St. Catherine's Lace	4-8' x 6-8'				VL	
	Euryops pectinatus 'Viridis'	Shrub Daiy	5' x 5'				L	
	Fremontodendron californicum 'Ken Taylor'	Ken Taylor Flannel Bush	5' x 8'				VL	
	Grevillea lanigera	Wooley Grevillea	5' x 5'				L	

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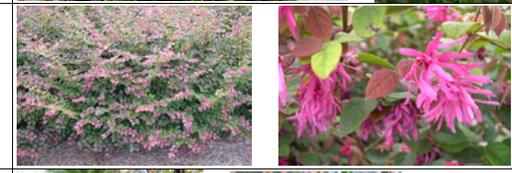
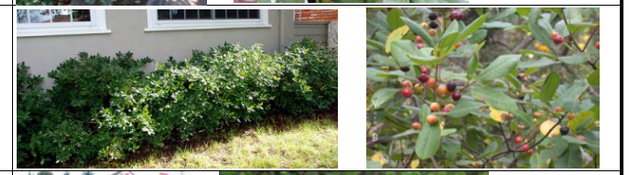
SHRUBS: over 4' in height	Heteromeles arbutifolia	Toyon	10' x 8'				L	
	Leonotis leonurus	Lion's Tail	6' x 5'				L	
	Leucadendron Hybrid: 'Safari Sunset', 'Rising Sun'	Conebush	8-10' x 6-8'				L	
	Leucospermum 'Scarlet Ribbon'	Nodding Pincushion	4-5' x 4-5'				L	
	Loropetalum chinese var rubrum 'Blush'	Chinese Fringe Plant	4-6' x 4-5'				L	
	Phormium 'Maori Chief'	Maori Chief New Zealand Flax	5-6' x 5-6'				L	

	Botanical Name	Common name	Mature Height & Width	Evergreen / Deciduous	Sun / Shade Tolerance	CA Native Plant / Pollinator Species	*Water Use per WUCOLS (Zone 1)	Plant Image
SHRUBS: over 4' in height	Pittosporum tenuifolium 'Marjorie Channon'	Variegated Kohuhu	7-8' x 5-6'				M	
	Pittosporum tobira 'Variegata'	Mock Orange	4' x 4'				L	
	Rhamnus californica 'Eve Case'	Coffeeberry	8' x 8'				L	
	Ribes sanguinium	Flowering Red Currant	6' x 6'				L	
	Romneya coulteri	Matilija Poppy	3-5' x 6-8'				VL	
	Rosmarinus 'Tuscan Blue	Tuscan Blue Rosemary	4-6' x 3-5'				L	

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SHRUBS: over 4' in height	Salvia apiana	White Sage	4' x 5'				VL	
	Saliva leucophylla	Purple Sage	5' x' 5'				L	
	Tecomaria capensis	Red Cape Honeysuckle	12-16' x 6-8'				M	
	Vaccinium ovatum	Evergreen Huckleberry	6' x 4'				M	
	Woodwardia fimbriata	Giant Chain Fern	4-6' x 4-6'				M	
PERENNIALS & GROUNDCOVERS: 6" - 4' in height	Acanthus mollis	Bear's Breech	2-4' x 3-4'				M	

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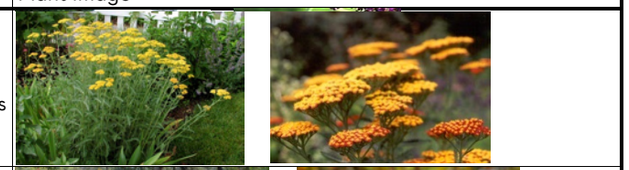
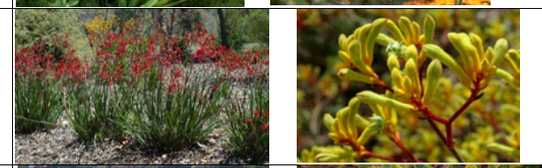
PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Achillea millefolium Hybrids: “Orange”, “Moonshine”	Common Yarrow (White, Orange, Yellow, Pink, Light Purple)	2' x 18"				L - native M - hybrids	
	Anigozanthos Hybrids: 'Big Red' ; 'Bush Dawn'	Kangaroo Paw (Red, Yellow, Orange)	2' x 2' (flw stalks 18" to 6' tall)				M	
	Arctostaphylos 'Emerald Carpet'	Manzanita	12" x 3-6'				M	
	Armeria maritima	Sea Thrift	1' x 1'				M	
	Artemisia 'Powis Castle'		3' x 6'				L	
	Aster chilensis	Coast Aster	3' x 3'				M	
	Baccharis pilularis 'Pigeon Point'	Dwarf Coyote Brush	18" x 10'				L	

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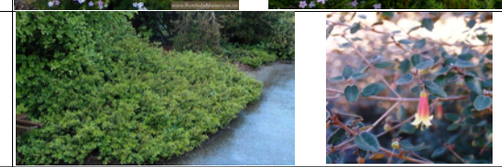
PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Bergenia crassifolia	Winter Blooming Bergenia	2' x 2'				M	
	Ceanothus 'Centennial'	Centennial Ceanothus	1' x 4-6'				L	
	Chondropetalum tectorum	Small Cape Rush	2-3' x 3-4'				L	
	Clivia miniata	Clivia	2' x 2'				M	
	Coleonema pulchrum 'Compacta'	Dwarf Breath of Heaven	2' x 5'				M	
	Correa Hybrids: 'Dusky Bells', 'Ray's Tangerine'	Austrailian Fuchsia	2' x 3'				L	
	Cynara scolymus	Globe Artichoke	3-5' x 2-3'				N/A	

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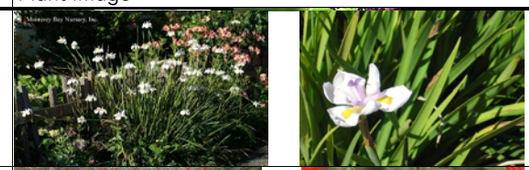
PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Dietes iridioides	Fortnight Lily	3' x 3'				L	
	Epilobium canum 'Catalina'	Catalina California Fuchsia	2.5' x 4.5'	semi-			L	
	Erigeron glaucus	Seaside Daisy	1' x 2'				L	
	Eriogonum fasciculatum	California Buckwheat	4' x 7'				L	
	Eriogonum grande var. rubescens	Red Buckwheat	2' x 2-3'				L	
	Euphorbia characias 'Wulfenii'	Wulfenii Euphorbia	3-4' x 2-3'				L	
	Francoa ramosa	Maiden's Wreath	1' x 2'				M	

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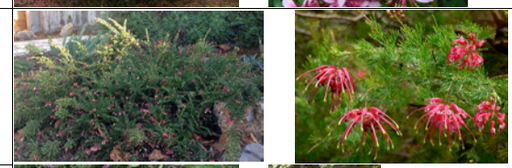
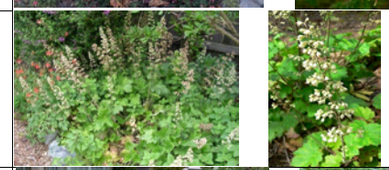
PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Gaura lindheimeri	Gaura	3-4' x 3'				M	
	Grevillea lanigera 'Coastal Gem'	Coastal Gem Grevillea	1' x 4-5'				L	
	Huechera maxima	Island Alum Root	1' x 1.5'				M	
	Heuchera micrantha 'Palace Purple', Santa Ana Cardinal	Coral Bells	2' x 2'				M	
	Iris douglasiana	Douglas Iris	12" x 12"				L	
	Lantana camara 'New Gold'	New Gold Lantana	1' x 3'				L	
	Lantana montevidensis 'Alba'	Trailing Lantana	2' x 10'				L	

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PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Lavandula angustifolia 'Munstead'	Munstead English Lavender	1.5' x 2'				L	
	Lavandula x intermedia 'Alba'	White Lavandin	3' x 3'				L	
	Mimulus auranticus Hybrids: 'Georgie Tanderine', 'Jack', 'Paynes Yellow', 'Trish', Verity White'	Sticky Monkeyflower	2-3' x 3'				VL - native L - hybrids	
	Mimulus guttatus	Seep Monkey Flower	1-2' x 1-2'				H	
	Monardella villosa	Coyote Mint	2' x 2'				VL	
	Nepeta x faassenii	Cat Mint	1' x 4'				L	
	Penstemon Hybrids: 'Purple Passion', 'Firebird', 'Holly's White'	Beard Tongue	3' x 3'				M	

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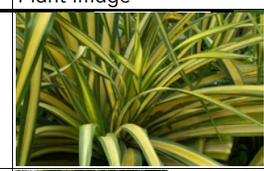
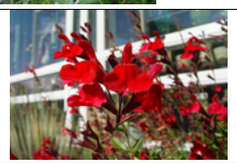
PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Phormium 'Yellow Wave'	Yellow Wave New Zealand Flax	3-4' x 3-4'				L	
	Salvia 'Allen Chickering'	Allen Chickering Sage	3' x 4'				L	 
	Salivia Hybrids: 'Bee's Bliss', 'Mrs Beard'	Creeping Sage	2' x 8'				L	 
	Salvia greggii Hybrids: 'Alba', 'Furman's Red', 'Playa Rosa'	Texas Sage	3-4' x 3-4'				L	 
	Salvia leucantha 'Midnight'	Mexican Sage	3-4' x 5-6'				L	 
	Saliva spathacea	Hummingbird Sage	2' x 4'				L	 
	Santolina chamaecyparissus	Santolina	2-3' x 2-3'				L	 

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PERENNIALS & GROUNDCOVERS: 6” - 4' in height	Senecio cineraria	Dusty Miller	2-3' x 2-3'				L	
	Sisyrinchium bellum	Blue-Eyed Grass	1' x 1'				VL	
	Stachys byzantina	Lamb's Ears	6" x 4-5'				L	
	Teucrium fruticans 'Azureum'	Bush Germander	3-4' x 4-5'				L	
	Tulbaghia violacea 'Silver Lace'	Siliver Lace Society Garlic	1' x 1'				L	
ORNAMENTAL GRASSES	Calamagrostis x acutiflora ‘Karl Foerster’	Feather Reed Grass	3' x 5'	semi-			M	
	Carex buchananii	Leatherleaf Sedge	18"-2' x 12-18"				M	

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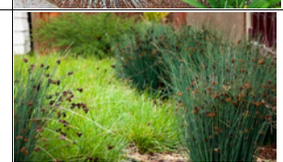
ORNAMENTAL GRASSES	Carex divulsa	Berkeley Sedge	1-2' x 1-2'				L	
	Deschampsia cespitosa holciformis	Pacific Hair Grass	3' x 3'				L	
	Festuca 'Siskiyou Blue'	Siskiyou Blue Fescue	18" x 18"				M	
	Helictotrichon sempervirens	Blue Oat Grass	2' x 3'				L	
	Juncus patens 'Elk Blue'	Elk Blue California Rush	1-2' x 1-2'				L	
	Leymus condensatus 'Canyon Prince'	Canyon Prince Wild Rye	2-3' x 2-3'				L	
	Muhlenbergia rigens	Deer Grass	4' x' 4'				L	

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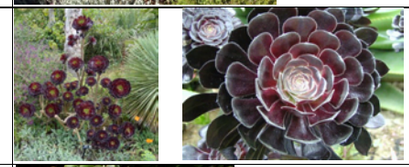
ORNAMENTAL GRASSES	Muhlenergia lindheimeri	Lindheimer's Muhly	4' x 4-6'				L	
	Pennisetum setaceum 'Rubrum'	Purple Fountain Grass	2-4' x 2-3'				L	
SUCCULENTS	Aeonium arboreum 'Zwartkop'	Zwartkop Aeonium	2' x 12"				L	
	Aeonium 'Mint Saucer'	Mint Saucer Aeonium	2-3' x 2-3'				L	
	Agave attenuata 'Nova'	Nova Agave	3.5' x 3.5'				L	
	Agave 'Blue Glow'	Blue Glow Agave	2' x 3'				L	
	Agave desmettiana 'Variegata'	Variegated Smooth Agave	2.5' x 3.5'				L	

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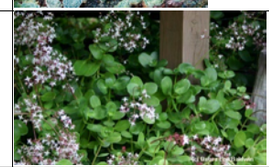
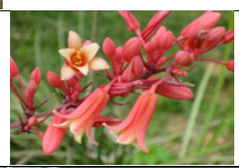
SUCCULENTS	Agave parryi truncata	Artichoke Agave	2.5' x 3.5'				L	
	Agave 'Sharkskin'	Sharkskin Agave	2.5' x 3.5'				L	
	Crassula multicava	Fairy Crassula	1' x 5'				L	
	Dudleya pulverulenta	Chalk Dudleya	12" x 12"				L	
	Echeveria elegans	Mexican Snowball	6" x 12"				L	
	Fascicularia pitcairnifolia var bicolor	(No Common Name)	2' x 2'				L	
	Hesperaloe parviflora	Red Yucca	2-4' x 3-4'				L	 

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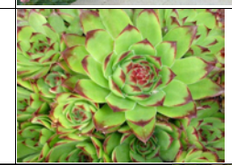
SUCCULENTS	Sedum spectabile 'Autumn Joy'	Showy Stonecrop	2' x 2'				L	
	Sempervivum tectorum	Hens and Chickens	6" x 1'				L	
VINES	Akebia quinata	Five-Leaf Akebia	climbing, spreading	semi-			M	
	Bougainvillea hybrids 'Barbara Karst', 'San Diego Red', specatbilis	Bougainvillea	climbing, spreading				L	
	Distictis buccinatoria	Red Trumpet Vine	climbing, spreading				M	
	Ficus pumila	Creeping Fig	climbing, spreading				M	
	Hardenbergia violacea	Purple Lilac Vine	climbing, spreading				M	

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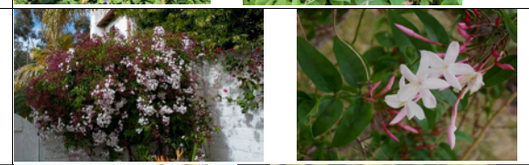
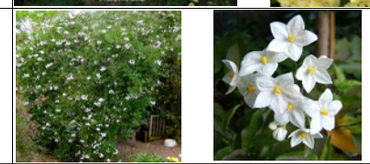
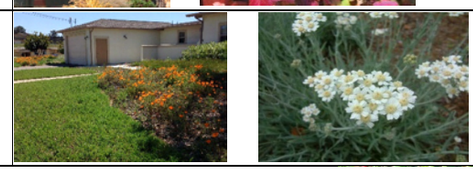
VINES	Ipomoena indica	Blue Morning Glory	climbing, spreading				L	
	Jasminum polyanthum	Pink Jasmine	climbing, spreading				M	
	Rosa banksiae 'Lutea'	Lady Bank's Yellow Rose	climbing, spreading				L	
	Solanum laxum	Potato Vine	climbing, spreading				M	
	Thunbergia alata	Black-Eyed Susan Vine	climbing, spreading				M	
	Vitus californica 'Roger's Red'	California Grape	climbing, spreading				L	
LAWN ALTERNATIVES	Achillea x kellereri	Yarrow	8" x 12"				M	

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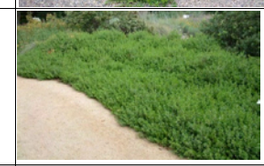
LAWN ALTERNATIVES	Arctostaphylos uva-ursi	Manzanita	6" x 12'				L	 
	Mix: Baccharis pilularis 'Pigeon Point' & Asteriscus maritimus	Mix: Pigeon Point Coyote Bush & Gold Coin Daisy	18" x10 & 12" x 4'				L & M	 
	Mix: Carex divulsa & Sisyrinchium bellum	Mix: Berkeley Sedge & Blue-Eyed Grass	18" x 2' & 12" x 12"				L & VL	 
	Carex pansa	California Meadow Sedge	10" x 6"				M	 
	Ceanothos gloriousus 'Anchor Bay'	Anchor Bay Ceonothus	2.5' x 5'				L	 
	Dymondia margaretae	Silver Carpet	2" x 2'				L	 
	Epilobium canum 'Everett's Choice'	Everett's California Fuchsia	10" x 4-5'	semi-			L	 

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LAWN ALTERNATIVES	Festuca rubra 'Molate'	Creeping Red Fescue	12-18" x spreading				L	
	Fragaria chiloensis	Beach Strawberry	6" x 2'				M	
	Myoporum parvifolium	Myoporum	12" x 10-15'				L	
	Mix: Nassella pulchra & Escholzia californica	Mix: Purple Needlegrass & Calfornia Poppy	18" x 12" & 12" x 12"	semi-			VL & VL	
	Mix: Savlia sonomensis & Eschscholzia californica	Mix: Creeping Sage & California Poppy	24" x 8' & 12" x 12"				L