

Water & Power

## Pasadena Water and Power & Pasadena Public Library

Presents:

# Pasadena Grows Building Healthy Soil



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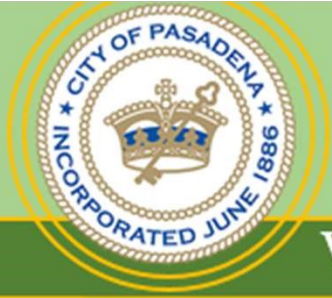


PASADENA  
PUBLIC  
LIBRARY



# Pasadena Grows at Pasadena Public Library

- **Hill Avenue Library branch**
  - 55 South Hill Avenue, Pasadena, CA 91106
  - <https://www.cityofpasadena.net/library/branches/hill-avenue-branch/>
- **Free seed lending library**
- **Gardening book collection**
  - FREE to borrow with Pasadena Public Library card!
- **Pasadena Grows program series**
  - For upcoming events: <https://www.cityofpasadena.net/library/calendar/>
- **Questions? Want more info?**
  - Call Hill Avenue Library at 626-744-7264
  - Email [jroth@cityofpasadena.net](mailto:jroth@cityofpasadena.net)



# Workshops

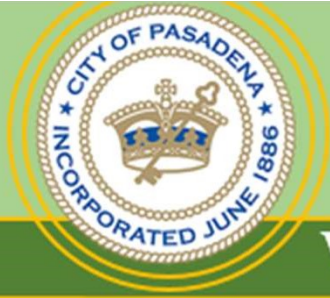
## Water & Power

### Conservation Events & Workshops



[www.Pwpweb.com/events](http://www.Pwpweb.com/events)



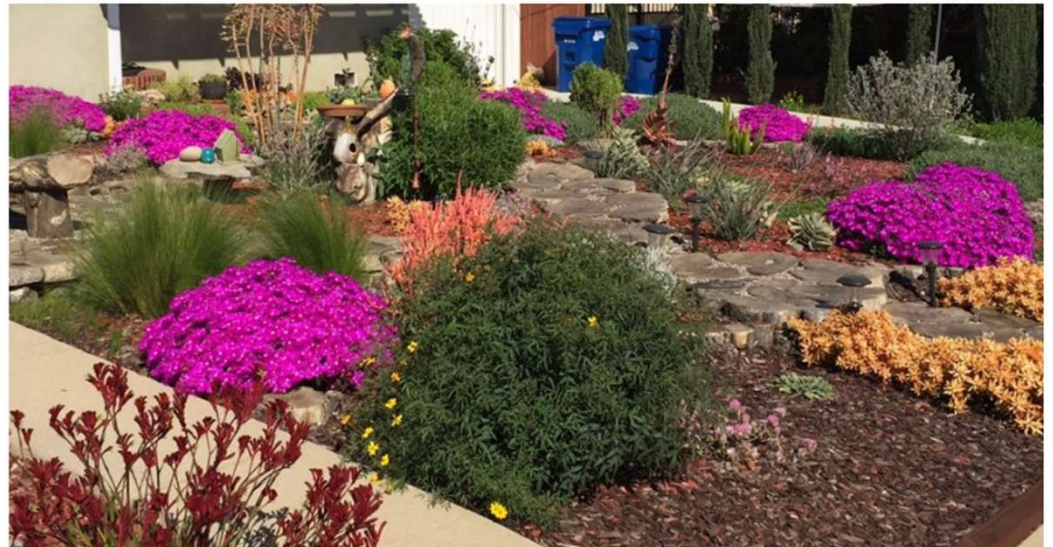


# \$2/Sq Ft Turf Rebate

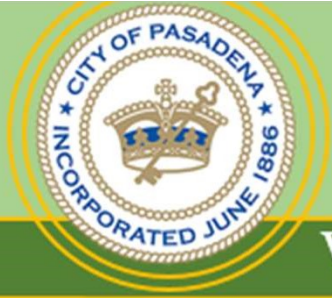
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- **Program Guidelines**

- minimum of 250 square feet of turf removed
- Residential customers can remove up to 5,000 square feet
- Completed project area must be covered by at least three (3) plants per 100 square feet.
- Must have rainwater capture feature
- Convert over-head sprays to drip, micro-spray, bubblers, or rotating nozzle or cap sprinkler heads or remove irrigation equipment and hand-water.
- No synthetic turf, plants that appear to be turf, or plants categorized as invasive are allowed.



[www.cityofpasadena.net/turfreplacement/](http://www.cityofpasadena.net/turfreplacement/)

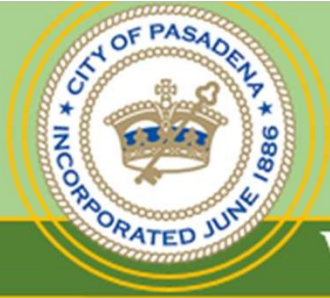


# Spray to Drip Retrofit Program

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- FREE Drip retrofit kits offered by PWP
- For residential customers only
- Up to 400 sq ft. conversion
- Must submit an application
  - [www.PWPweb.com/spray2drip](http://www.PWPweb.com/spray2drip)
  - [Water@cityofpasadena.net](mailto:Water@cityofpasadena.net)
- 2 kits per household





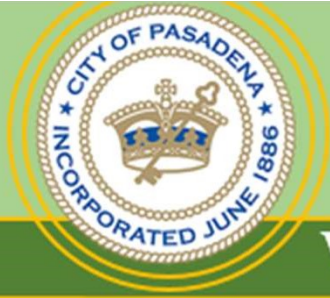
# What is Soil Health ?

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- Soil health refers to the condition of the soil and its ability to:
  - Sustain biological function
  - Promote plant health
  - Maintain environmental quality





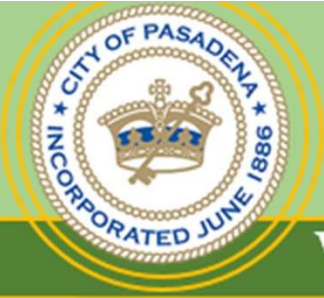


# Characteristics of a Healthy Soil

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- Minimal compaction
- Balanced soil fertility
- Water is optimized
  - Low energy application
  - Storage
  - Adequate supply
- Optimal soil biology

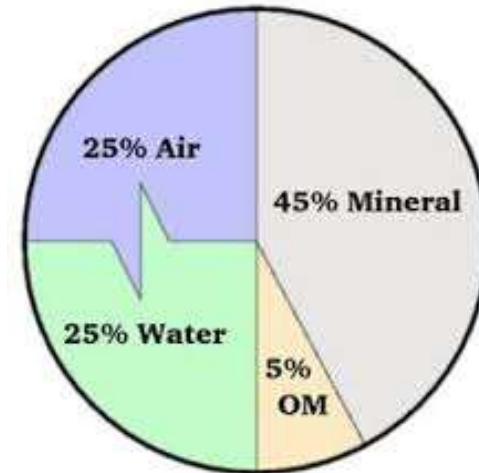




# The Ideal Soil Composition

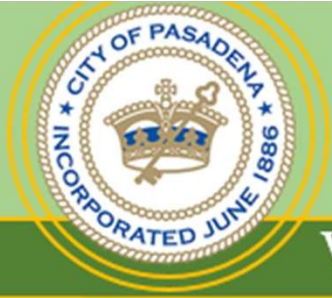
## Water & Power

- A goal rarely achieved
  - ...a “moving target”
- Urban soils usually suffer from inadequate...
  - Organic material
  - Air



Wheeler Company







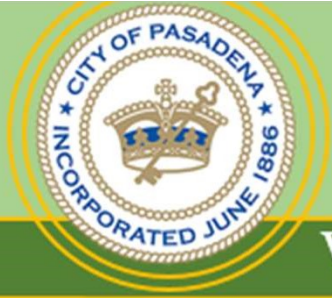


# Types of Soil

## Water & Power

Soils are classified according to particle size

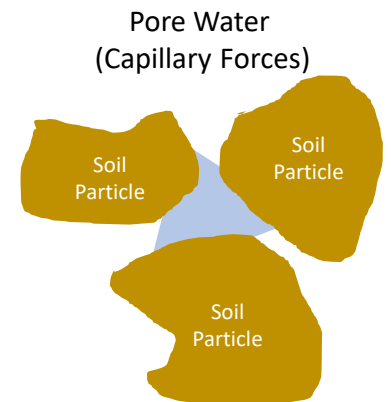
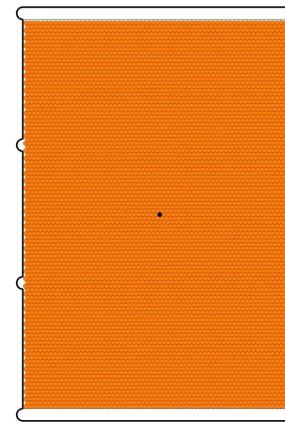
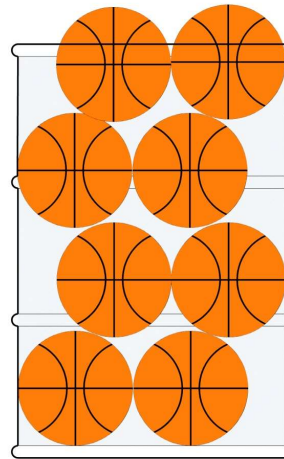
Soil Type	Size	Relative Size	Characteristics
Clay	1/12,500 of an inch	BB	
Silt	1/500 of an inch	Baseball	
Fine Sand	1/250 of an inch	Basketball	
Coarse Sand	1/50 of an inch	7.5" Balloon	



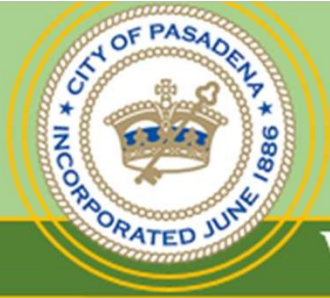
# Soil Type (particle size) influences pore space

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- Pore space is a critical factor in managing air and water!
  - Sandy (basketballs)
  - Clay (BBs)



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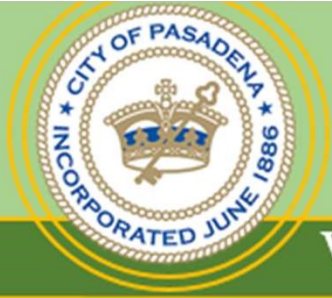


# What is Your Soil Type?

## Water & Power

- Soil type is an important part of choosing plants
- “Well drained”
- “Typical” Pasadena soil type?.....
  - By observation, seems to be Clay Loam, but...
- Observations will help you determine
  - Runoff (yes/no)
  - Soil always wet (dry)
  - Poor growth, small root system
  - Soils smells “rotten”





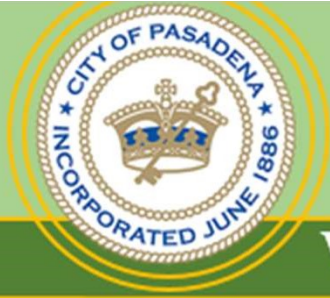
# Managing Pore Space

## Water & Power

- Adequate pore space is critical to balancing air and water in the soil
- Pore space is affected by –
  - Soil type
  - Compaction
  - Biological activity
- Adding organic matter helps improve and maintain soil structure



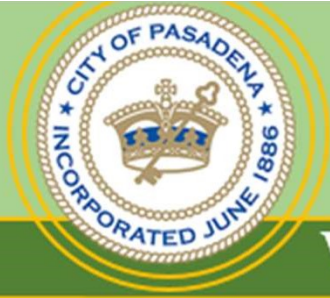




# Balanced Soil Fertility

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- Plants remove nutrients from the soil
  - Nitrogen – Photosynthesis
  - Phosphorous – Roots, Shoots and Flowers
  - Potassium – “the Regulator”
- Nutrient “additions” should match “removal”
  - Native plants – low removal rate
  - Vegetables – high removal rate
- Addition of organic matter can naturally replace nutrients
  - Compost
  - Mulch
  - Nutrient cycling
  - “Grass cycling”

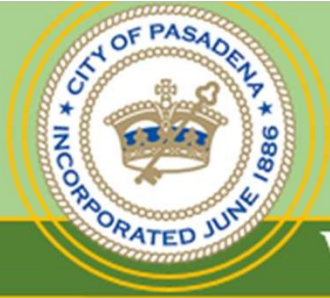


# Reading a Fertilizer Label

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- All fertilizers must have three numbers on the label which are minimum guaranteed percentage of nutrients.
  - amount may exceed the listed percentage
- To be considered a fertilizer, the sum of the three numbers must at least equal 5
- Label must have a guaranteed minimum analysis and show the source of each nutrient

	Nitrogen	Phosphorus	Potassium
Nutrient Symbol	N	P	K
% of Nutrient	10	6	4



# Enhancing Soil Biological Function

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- Organisms in the soil perform beneficial functions
  - Help plants absorb water, oxygen and nutrients
  - Convert and release nutrients into usable forms
    - Nitrate, Iron, Phosphorous
  - Convert soil organic matter into nutrients usable by the plant material
    - “Nutrient Cycling” – earthworms, “pill” bugs, bacteria, fungi
- Degrade pesticides and chemicals
- Suppress pathogenic microorganisms
  - Natural pest and disease control



# Benefits of Building Soil Organic Matter

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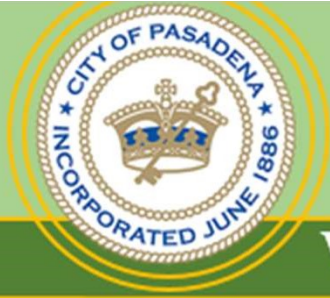
- Provides food for beneficial organisms
- Improves water retention capacity
- Improves soil structure
- Increases nutrient retention capacity
  - Organic matter is the main storehouse of Nitrogen
  - Beneficial organisms convert organic Nitrogen to a form of inorganic nitrogen that the plant roots can absorb

### “Nitrogen Cycle”

Organic Nitrogen > Ammonia > Nitrite > Nitrate

Nitrates are the form used by plants

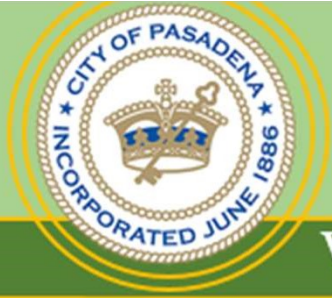




# Types of Soil Amendments

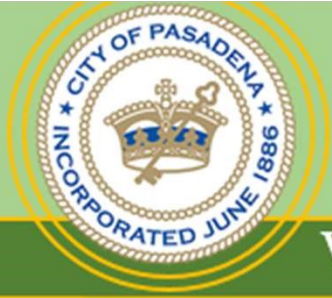
## Water & Power

- Organic
  - Wood Shavings – NOT Sawdust. Select wood that breaks down slowly such as redwood (several years) as opposed to pine (months)
    - Inexpensive source to add bulk to the soil
    - 1-5 yards of shavings per 1000 sq. ft. of soil
    - Nitrogen should be added to prevent soil depletion if shavings are NOT nitrified
    - In most cases with long term decaying wood, a regular fertilizer program suffices
  - Bark Products
    - Redwood or Fir
    - More expensive than shavings but decompose more slowly
    - Used in soils mixes that are used with more expensive plants



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- Peat Moss
  - Holds 10-15 it's weight in water and nutrients
  - Will lower pH levels
  - Expensive, so generally limited to artificial soil mixes or as planting mix for acid loving plants
- Steer Manure
  - High in salts and contains only 1% nitrogen
  - Many times, weed seed will germinate to produce weeds
  - Often, ground so fine that it is the size of clay particles
- Activated Sludge
  - By-product of sewage processing
  - Excellent for introducing soil bacteria for nitrogen fixation especially in sandy soils
  - Do not use on edible plants



# Sheldon Reservoir & Sheet Mulching

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[PWPweb.com/Sheldon](http://PWPweb.com/Sheldon)



# Vegetable Garden - Improving Native Soils Through Amendments

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- The recipe is based on amending soil in a 10 foot by 10 foot garden 6 inches to 8 inches deep. This method will see improved results as it is repeated year after year.
- Organic Material –
  - Processed (fine) – 6ea - 1 cu.ft bags of a vegetable garden labeled product like Kellogg Amend for Flowers and Vegetables, Gromulch (organic), or Super Soil
    - Steer manure is not recommended due to high salt content
  - Course Organic – 3 cu.ft. of course organic material like green waste, shredded bark (not “walk-on” bark), straw, or peat moss
- Gypsum – 10 lbs.
  - Many soil amendment products already contain gypsum, so adding additional may not be necessary. It may take two or three growing seasons to begin to see the effects of using gypsum
- Fertilizer - 1 lb of a general purpose 10-10-10 fertilizer w/ iron
  - Till fertilizer into soil the soil with the rest of the amendments, additional fertilizer may be needed mid-growing season, and it can be applied to the soil surface.

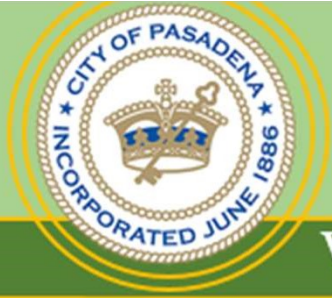




# Vegetable Garden - Garden Soil from Scratch

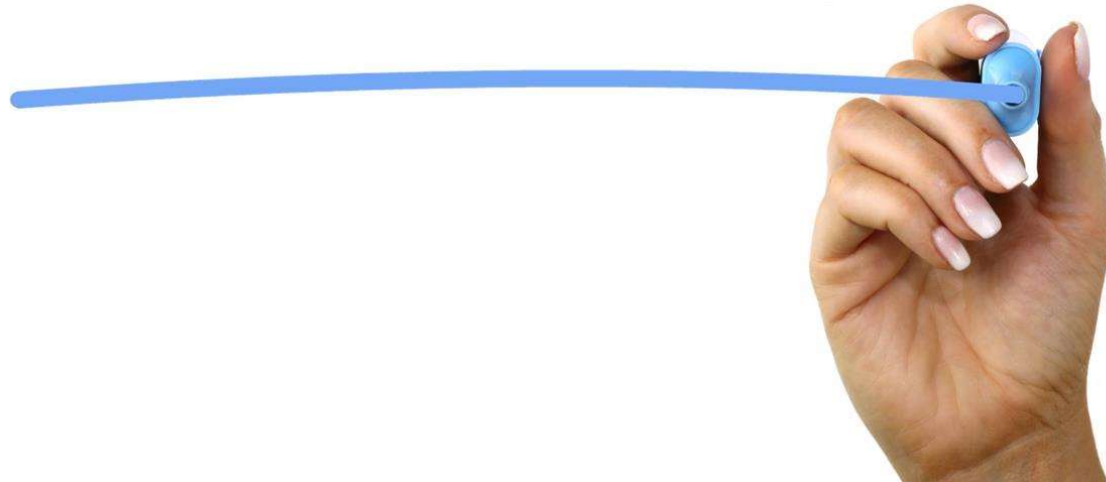
## Water & Power

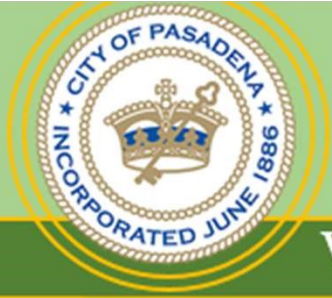
- Good for a small garden like raised beds, pots, or “gardening by the foot. Its advantages include total control over the mix, lighter weight, and less chance of soil borne diseases. In pots and containers, this soil should be made fresh every year, and the old soil recycled into the landscape.
- **10 ft x 4 ft x 6 in deep bed - adjust quantities as necessary:**
  - Organic Material – Processed (fine) -6ea. 1 cu ft bags of a vegetable garden labeled product like Kellogg Amend for Flowers and Vegetables, Gromulch (organic), or Super Soil
  - Soil – 10 ea. 1 cu ft bag of “top soil”, 2 ea. 1 cu ft bag of sand, 2 ea. 1 cu ft bag of perlite
  - Fertilizer - 1 lb. of a general purpose 10-10-10 fertilizer w/ iron
- **Container Garden – pots, raised beds, etc.**
  - Soil – 10 ea. 1 cu ft bag of “top soil”, 2 ea. 1 cu ft bag of sand, 2 ea. 1 cu ft bag of perlite
  - Fertilizer - 1 lb. of a general purpose 10-10-10 fertilizer w/ iron
  - Additional fertilizer may be needed mid-growing season, and it can be applied to the soil surface.
  - If soil is to be used in pots or containers, apply fertilizer to soil surface only
  - Planting beds are going to require additional organic material annually



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# QUESTIONS





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Presents:

# Pasadena Grows Firewise Landscaping



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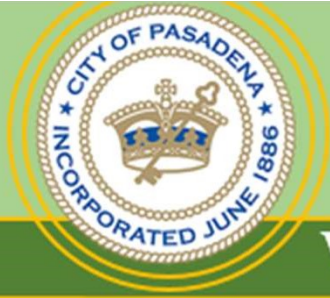
# What is Firewise Landscaping?

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- Using best practices to reduce the flammability of your landscape
  - Create Defensible Space
  - Watering and Mulching
  - Yard Maintenance
  - Plant Selection





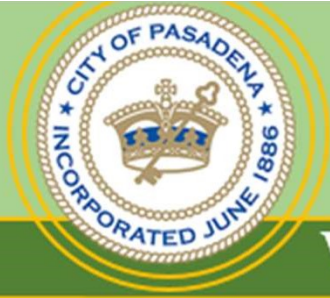


# Fire Resistant Plants?

## Water & Power

- Fire Resistant does not mean **Fire Proof**
  - All plant material will burn if it gets hot enough
- Fire Resistant plants don't readily ignite
- Foliage and stems do not significantly contribute to the fuel



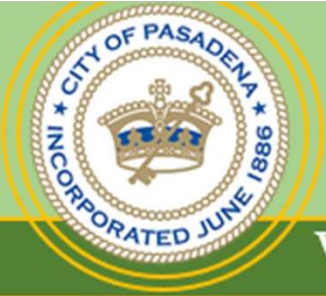


## Other Contributing factors....

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- Fire characteristics of plants
  - Plant moisture
  - Age
  - Dead material
  - Chemical content
  - Natural oils and waxes





# Defensible Space

## Water & Power

- The area between you and an oncoming fire
- Consider - plant material, breaks, and physical barriers
- Firewise Landscapes include creating a series of “Zones” – each with its own purpose







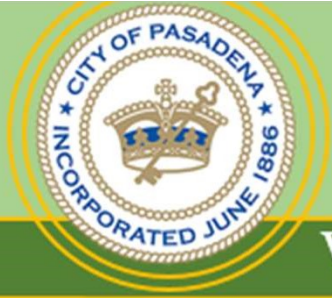
## Zone 1

### Water & Power

*The objective is to reduce or eliminate windblown embers from landing near a home and causing significant damage*

#### **House plus 5 feet**

- Keep flammable materials away from this zone
  - NO – pine needles, leaves, shrubs, trees, dead vegetation
  - Trim vegetation within 10 feet of chimney
  - No debris accumulation on roof or in rain gutters
- Move wood piles 30 feet or more from all structures
  - 1 cord of firewood contains the same energy as 160 gallons of gasoline



## Zone 2

### Water & Power

*The objective is to create and maintain a landscape that, if ignited, will not readily transmit fire to the home*

- *Zone 1 limit plus 30 feet*
  - *Very little flammable vegetation*
  - *Avoid planting shrubs planted under trees (“understory”)*
  - *Remove all dead vegetation (branches, leaves, etc.)*
- *Raise all plant canopies so you can rake under them*
- *Plants should be planted in well-spaced groupings*
- *Water regularly during fire season*
- *Apply a thin layer of mulch 1 time per year in Spring*





## Zone 3

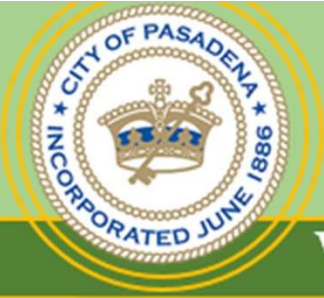
### Water & Power

*The objective is to decrease the energy and speed of the fire by eliminating continuous, dense vegetation both vertically and horizontally*

*Prevent “Fuel Ladder” development*

Zone 2 limit out to the edge of the property

- At least 10' horizontal separation between plant material trees and shrubs (more on slopes)
  - *Small groupings of plants are allowed*
- Vertical separation 3 times the height of the lower plant
  - This needs to be maintained at all times
- Large trees should have branches removed at least 10' up from the ground level



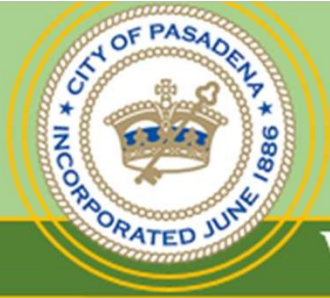
# Mulching

## Water & Power

Mulch can be used sparingly

- Course texture mulch tends to resist ignition better than fine or stringy textured mulch
- Cover the root zone only
- Mulch layer should be no more than 2" thick
- Wood chips tend to smolder





# Mulching

## Water & Power

- Zone 1 (5')
  - Rock, pavers, cement, decomposed granite
- Zone 2 (5' to 30')
  - Apply mulch not thicker than 2" to the root zone of individual plants
  - Use a low flammability groundcover (succulents etc.) between plants and/or  
use hardscape like gravel, DG and or porous pavers between plants
- Zone 3 (30' to the edge of the property)
  - Little to no organic matter under or between plants

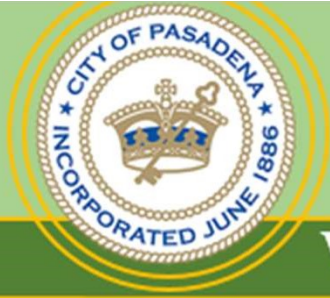


# Watering

## Water & Power

- High water content plants should be used in Zone 2 if possible
  - Succulents
  - Cacti
  - Turf (in moderation)
  - Evergreen Trees and Shrubs
- Water Deep but Infrequently
  - Drip irrigation is best for applying deep water
    - No erosion, no spray drift
    - Works well in high wind
    - Works well with low water pressure
- Water as needed during fire season to keep plant moisture levels high
  - **At least one time per month**





# Firewise Landscape Maintenance

## Water & Power

- **Ongoing** – Keep the yard clean
  - No ground fuel debris, no dead plant material, keep ground covers trimmed
- **Annual** – Keep the yard clean
  - Mow grasses and weeds to 3” or less (string trimmers best)
    - Before 10:00 am, never on a hot or windy day
  - Cover wood piles
  - Clean roofs and gutters
- **Every few years** – keep the.....
  - Thin and raise tree canopies
  - Maintain spacing between plants







# Sheldon Reservoir (Coniston Garden) Firewise Plant Palette

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[PWPweb.com/Sheldon](http://PWPweb.com/Sheldon)



FIREWISE LANDSCAPE  
PLANT PALETTE

## FIREWISE PLANTS



*Lantana Speciosa*  
Lantana



*Baccharis pilularis* 'Twin Peaks'  
Dwarf Coyote Brush



*Limnium perezii*  
Sea Lavender



*Rhamnus californica*  
India Hawthorn



*Lamproanthus speciosus*  
Ice Plant



*Myoporum parvifolium* 'Peach Creek'  
Creeping Myoporum



*Agave attenuata*  
Foxtail Agave



*Cotoneaster dumosus*  
Bearberry Cotoneaster



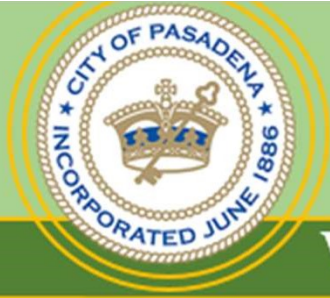
*Prunella hirsuta*  
Holly Leaf Cherry



*Eriola californica*  
California Britchbush



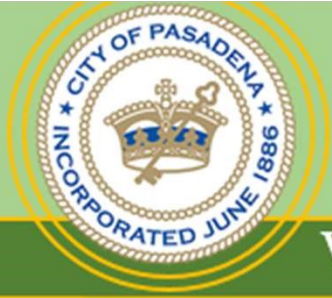
*Senecio mandarinicus*  
Blue Chalksticks



# Firewise Plants

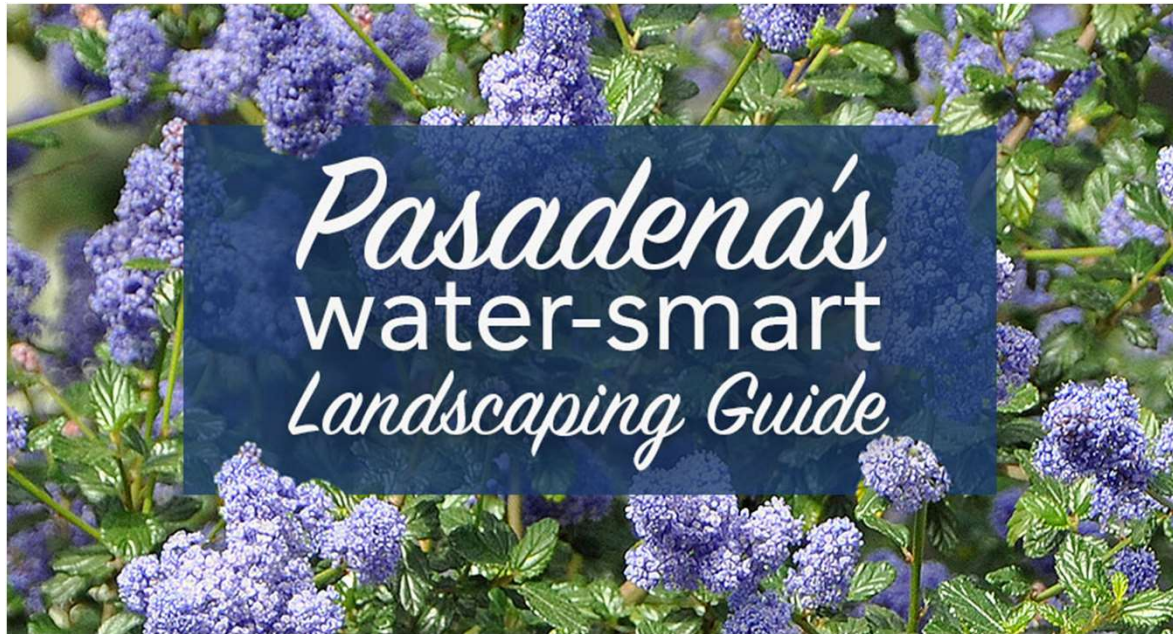
## Water & Power

- *The challenge is balancing water use, soil erosion and fire fuel*
- Plants that are fire resistant tend to have the following characteristics:
  - Leaves are moist and supple
  - Plants have little dead wood and tend not to accumulate dry, dead material within the plants
  - Sap is water-like and does not have a strong odor
- A good source for plant information
  - [firesafesdcounty.org](http://firesafesdcounty.org) – Comprehensive-Fire-Resistant-Plant-List



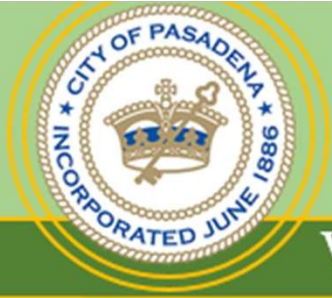
# Pasadena Landscaping Guide

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- <http://pasadena.watersavingplants.com/>





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# QUESTIONS

