TREE NOTES

CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

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Fire Safe Landscaping

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Fire Risk in California

Wildfire is a continual threat to many homeowners in California. Fire severity can be largely attributed to California's mediterranean climate, vegetation composition, and varied topography. Population growth and development within wildland areas have been substantial and continue to increase. Developed rural areas, with individual homes or housing tracts, are referred to collectively as the urban/wildland interface. Homeowners must accept the risks of living within this interface and take the appropriate measures to protect their homes, property, and surrounding natural resources from devastating wildland fires.

Judicious landscape planning can help to save homes and property in a wildfire. The purpose of this *Tree Note* is to provide the homeowner with information on fire safe landscaping and offers suggestions for appropriate plant selection, spacing and maintenance.

The Greenbelt

Taking steps to protect the home and the area immediately surrounding it can dramatically reduce wildfire damage to homes. In developing a fire safe house, it is especially important to establish and maintain a greenbelt around the structure. A greenbelt is an area of irrigated landscaping consisting of fire retardant vegetation. It is a buffer zone between homes, or a group of homes, and the surrounding native vegetation, which slows or stops the advancement of ground fires.

To firefighters, a greenbelt serves as a "defensible space". Research has shown that vegetation clearance can substantially increase structure survival in a wildfire. Provisions under Section 4291 of the Public Resources Code require a "clearance of flammable vegetation for a minimum distance of 100 feet around any structure located in a fire hazardous area." On hillsides, a clearance of up to 200 feet should be maintained because of greater slope exposure to convective and radiant heat. The 30 foot area immediately surrounding a home serves as a fire break and should be maintained with low-growing plants, preferably combined with other features such as concrete pathways, border plantings or rock gardens to provide additional protection.

While serving as an integral part in structure protection, the greenbelt can also be aesthetically pleasing. Greenbelts should be established in late winter or early spring to take advantage of high soil moisture from winter rains. This allows for more rapid root establishment and less summer watering. Drip irrigation works best to establish fire safe landscapes.

Irrigated landscapes do not tend to burn or carry fire as readily as unirrigated ones, since higher plant moisture is maintained. However, if leaf litter and other fuels are allowed to accumulate in irrigated areas, the fire hazard increases: Horticultural practices are an additive process; thus keeping the greenbelt irrigated helps to reduce fire hazard, but is far more effective when coupled with practices such as appropriate species selection, pruning out dead branches from shrubs and trees, clearing leaf litter from the ground, and pruning lower branches to increase clearance above the ground.

Fire hazard reduction can also be accomplished by removing or thinning out native vegetation, especially those with fine, dry fuels and litter such as chamise, sugar bush, and California sagebrush. Other natives such as ceanothus, toyon and manzanita are a desirable form of landscaping which can be retained, but should also be kept widely spaced from one another and properly maintained by thinning and pruning out dead branches. Favor sprouting plants when selecting native vegetation to retain. Resprouting ability and deep rooting are important plant characteristics, which will help to maintain slope stability after a fire. Burned plants without the ability to resprout and with roots insulated by soil can offer some landslide protection until those roots eventually decompose. Choose landscape plants for fire retardance, drought tolerance, and erosion protection. The Public Resources Code allows single specimen trees to be retained within the greenbelt provided they are properly maintained. Prune back at least 10 feet from a chimney or stovepipe and 20 feet away from other tree canopies. Prune tree limbs a minimum of 6 to 10 feet above the ground but no greater than one-third of the tree's height. Shrubs will

produce flames approximately four times their height. Therefore, shrubs should not be planted below trees, unless there is adequate clearance to prevent the "ladder fuel" effect which can carry fire from shrubs up into the tree's canopy.

Pyrophytic Plant Characteristics

It is important to note that all plants burn during extreme fire weather conditions such as low relative humidity, high temperatures, and strong winds. This is when other factors that can be controlled, such as fuel load (amount of live and dead material) and vegetation selection and placement become critical.

Periodic fires have been closely linked to ecosystem evolution of plant communities in California and are important in their successional cycle. Fire dependent communities are even-aged and spaced to create a continuous body of fuel.

Plants within these communities, called pyrophytes (literally, a flammable plant), have adapted to the presence of fire over time. Pyrophytes have developed physical, chemical and physiological characteristics to maximize their flammability and ensure successful regeneration after a fire. Specific pyrophytic characteristics include: a high proportion of chemical extractives, e.g. resins, oils, terpenes, waxes; multiple stems (for large surface area per unit of woody volume); rapid accumulation of dead wood and debris; crown sprouting; rapid seed dispersal in burned-over areas; heat-induced germination of hard-coated seeds; and closed cones that open during periods of intense heat.

Fire retardant plant species are less flammable than other species having the same volume of fuel. Inherent characteristics related to oil and mineral content of foliage, percent fuel moisture and fine fuel content determine fire retardance of plants. Chamise, *Adenostoma fasciculatum*, is not fire retardant since it has a high oil content, fine fuel and low ash characteristics. Two important features that determine how readily a plant will burn depend on fuel moisture and the amount of dead fuel present. The homeowner has the ability to control both features to a certain extent.

Minimizing Fire Risk with Landscape Vegetation: The Zone Approach

Reduced fuel volume is key to providing fire safety within the greenbelt. Santa Barbara City Fire Department officials have developed a fire safe landscaping approach, which incorporates fuel reduction and appropriate plant selection, placement and maintenance in four distinct plant zones, which concentrically surround a home. Zones one and two occupy the greenbelt within 30 feet of the home. Zones three and four correspond to the 30-foot to 100-foot area requiring fuel modification to produce a fire break.

Zone four, the outermost zone, maintains existing native vegetation, which has been thinned to reduce fuel loading. This serves as a transition area between the home and the native vegetation. Proper thinning and plant spacing is important in this zone. Crown thinning is a form of pruning, which removes lateral branches at the base from which they originate. This method opens up a plant but maintains its natural form. It should be done every 3-5 years. Shrub spacing should be approximately five times the plant's height. Trees should be spaced approximately 20-40 feet apart to help reduce lateral spread of fire. Typical plants in this zone include manzanita, coffeeberry, ceanothus, coast silktassel and coast live oak.

Zone three provides added protection with lower fuel volume than zone four to hinder fire flow using shrubs and perennials. Plants in this zone should have low growth habit. Examples include yarrow, artemisia, dwarf coyote brush, and penstemon. Although plants within this zone are drought tolerant, periodic irrigation further reduces flammability. Zones three and four fall between the 30 ft to 100 ft area around the structure.

Zone two consists primarily of fire retardant groundcovers and fleshy succulents. This area is designed to provide maximum fire protection. Irrigation and maintenance play an integral part in keeping this an effective protection zone. Plants in this zone may include wild strawberry and dwarf oleander.

Zone one is closest to the structure. It can be more garden-like, a place for innovative design. Irrigation, proper pruning and heavy plant litter removal are essential. Organic mulch, such as fir or redwood bark applied in a thin layer, can be used under and around plants to retain soil moisture, improve soil condition and reduce invasive weeds. Plants may include dwarf lily-of-the-nile, fortnight lily, star jasmine and red hot poker. Rock gardens, ideal in zones one and two, can transform these areas into an alpine-like landscape using very small shrubs and succulents. Gravel, stone or concrete walkways around the structure, having widths three to five times the height of the adjacent plantings, serve as additional barrier protection. Zones one and two fall within the 30 ft area of the structure.

A Note About Trees and Their Flammability

Limited information is available on flammability of specific trees. Species such as blue gum and manna gum eucalyptus, acacias, junipers and pines are noted for their extreme flammability. This is due, in part, to shedding bark, fine fuels and/or volatile resins within the leaves and wood. These species are not recommended for planting in areas of high fire danger. Existing highly flammable tree species within 30 feet of the home should be removed. Ideally, proper

horticultural practices and maintenance of trees, e.g. spacing and above-ground clearance, can serve to minimize fire hazard.

Defensible Space Law

The Public Resources Code Section 4291 was enacted to prevent fire originating in or around structures from spreading into wildland or forested areas, and to minimize the chances of forest fires from entering populated areas, destroying property, and endangering human life. On January 1, 2005 changes to PRC 4291 were enacted.

Important points contained in PRC 4291 (as amended) pertaining to vegetation include:

- Fuel removal: Maintain around and adjacent to the building or structure a firebreak made by removing or clearing away, for a distance of not less than 30 feet on each side of the building or structure or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimen trees, ornamental shrubbery, or similar plants that are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any dwelling or structure.
- Maintain around and adjacent to the building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth that is located within 100 feet from the building or structure or to the property line or at a greater distance if required by state law, or local ordinance, rule, or regulation. This section does not prevent an insurance company that insures a building or structure from requiring the owner of the building or structure to maintain a fire break of more than 100 feet. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil or prevent erosion.
- Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.
- Maintain any tree adjacent to or overhanging a building free of dead or dying wood.
- Maintain the roof of structure free of leaves, needles, or other dead vegetative growth.

It is important to adhere to laws regarding vegetation around structures and to combine innovative techniques, such as establishing vegetation zones, to enhance this area. The California Department of Forestry and Fire Protection can provide advice and educational materials to the homeowner to help reduce hazards within and around the home. A Registered Professional Forester should be consulted if a landowner is considering thinning conifers and hardwoods that have commercial value. In certain cases, exemptions from preparing a timber harvesting plan to thin trees for the purposes of reducing fire danger may be used.

The following is a partial list of plants that can be planted within each of the four zones around a structure. This plant list is a compilation of observations and research. More research on fire retardant vegetation needs to be conducted to produce a definitive list. Sunset's new Western Garden Book is an excellent source for specific plant descriptions. Visits to community botanical gardens and organizations such as the California Native Plant Society are also good resources for determining appropriate plant selections for your area.

LATIN	COMMON	ZONE
Agapanthus orientalis blue	Lily of the Nile	1
Agapanthus 'Peter Pan'	Dwarf Lily of the Nile	1
Armeria alliacea	Sea Pink	1
Armeria maritima	Sea Pink	1
Armeria pseudaemeria (formosana)	Sea Pink	1
Dietes 'Lemon Drop'	Fortnight Lily	1/2
Dietes bicolor	Yellow Wild Iris	1/2
Dietes vegeta	White Fortnight Lily	1/2
Erigeron 'Moerheimii'	Fleabane	1
Feijoa sellowiana	Pineapple Guava	1
Festuca rubra 'Creeping Red'	Red Fescue	1
Hemerocallis (assorted)	Day Lily	1
Jasminum parkeri	Dwarf Jasmine	1
Kniphofia uvaria	Red Hot Poker	1
Nerine masonorum	Nerine	1
Pun ica granatum 'Nana'	Dwarf Pomegranate	1
Pyracantha 'Santa Cruz'	Pyracantha	1
Quercus agrifolia	Coast Live Oak	All
Trachelospermum jasminoides	Star Jasmine	1
Aeonium arboreum 'Atropurpureum'	Aeonium	2
Aeonium undulatum	Saucer Plant	2
Agave americana 'Alba Picta'	Century Plant	2
Agave attenuata 'Nova'	Blue Agave	2
Aloe arborescens	Tree Aloe	2
Aloe 'Johnson's Hybrid'	No common name	2
Aloe nobilis	Aloe	2
Aloe striata	Coral Aloe	2
Aloe vera	Medicinal Aloe	2
Aloe x Spinosissima	Spider Aloe	2
Arbutus unealo	Strawberry Tree	2
Bulbine caulesceni	Bulbine	2
Bulbine 'Hallmark'	Bulbine	2
Carissa macrocarpa 'Tuttle'	Natal Plum	2
Cercis occidentalis	Western Redbud	2
Coprosma kirkii 'Verde Vista'	Prostrate Mirror Plant	2
Cotyledon barbenyii	No common name	2
Cotyledon macrantha	No common name	2
Cotyledon orbiculata	No common name	2
Crassula arborescens	Silver Jade Plant	2
Crassula argentea 'Pink Beauty'	Pink Jade Plant	2
Crassula lactea 'Taylor's Patch'	Crassula	2
Crassula multicava	Crassula	2
Drosanthemum floribundum rosea	Rosea Ice plant	2
Drosanthemum hispidum	Ice plant	2
Duchesnea indica	Mock Strawberry	2
Dymondia margaretae	No common name	2

LATIN	COMMON	ZONE
Echeveria 'Blue Wave'	Echeveria	2
Echeveria 'Pinkie'	Echeveria	2
Fragaria chiloensis	Wild Strawberry	2
Hesperaloe parviflora	Red Yucca	2
Kalanchoe pumila	Kalanchoc	2
Myoporum parvifolium 'Prostrate'	Myoporum	2
Nerium oleander 'Mrs. Roeding'	Dwarf Pink Oleander	2
Nerium oleander 'Petite Salmon'	Dwarf Salmon Oleander	2
Pelargonium peltatum	Ivy Geranium	2
Phormium tenax 'Maori Maiden'	New Zealand Flax	2
Phormium tenax 'Maori Queen'	New Zealand Flax	2
Phormium tenax 'Maori Sunset'	New Zealand Flax	2
Pittosporum crossifolium 'compacta'	Dwarf Karo	2
Pittosporum tobira 'Wheeler's Dwarf'	Mock Orange	2
Ribes viburnifolium	Evergreen Currant	2
Scaevola 'Mauve Clusters'	Fan Flower	2
Schinus molle	California Pepper	2
Sedum brevifolium	Stonecrop	2
Sedum rosea	Rose Root	2
Sedum spathulifolium 'Purpureum'	Stonecrop	2
Senecio cineraria	Dusty Miller	2
Senecio kleinia 'Mandraliscae'	No common name	2
Thevetia peruviana	Yellow Oleander	2
Tulbaghia violacea 'Silver Lace'	Society Garlic	2
Yucca whipplei	Yucca	2/3
Achillea millefolium	Yarrow	3
Achillea taygetea 'Moonshine'	Yarrow	3
Achillea tomentosa	Woolly Yarrow	3
Achillea millefolium 'Red Beauty'	Red Yarrow	3
Achillea millefolium 'Cerise Queen'	Pink Yarrow	3
Arctostaphylos edmundsii 'Carmel Sur'	Manzanita	3
Arctostaphylos 'Emerald Carpet'	Manzanita	3
Arctostaphylos 'Woods Red'	Manzanita	3
Artemisia 'Canyon Gray'	Silver Wormwood	3
Artemisia pycnocephala	No common name	3
Baccharis pilularis 'Twin Peaks'	Dwarf Coyote Brush	3
Centaurea gymnocarpa	Dusty Miller	3
Centranthus ruber	Red Valerian	3
Cheiranthus sp.	Wallflower	3
Cistus 'Sunset'	Rockrose	3
Cistus hybridus	White Rockrose	3
Cistus ladanifer	Crimson Spot Rockrose	3
Cistus salviifolius	Sageleaf Rockrose	3
Cistus purpureus	Orchid Rockrose	3
Coreopsis lanceolata 'Sun Ray'	Coreopsis	3
Mimulus puniceus	Red Monkey Flower	3
Mimulus longiflorus	Monkey Flower	3
Elymus condensatus 'Canyon Prince'	No common name	3
Eriogonum crocatum	Coastal Wild Gum	3
Eriogonum grandi rubesens	Island Buckwheat	3
Eriophyllum nevinii	Dusty Miller	3
Eschscholzia californica	California Poppy	3
Galveria speciosa	Island Bush Snapdragon	3
Gaura lindheimerii	Gaura	3
Geranium incanum	Stork's Bill Geranium	3
Geranium sanguineum	Geranium	3
Plecostachys serpyllifolia	Curry Plant	3
Helictotrichon sempervirens	Blue Oat Grass	3
Iris 'Pacific Coast Hybrids'	California Iris	3
Koeleria glauca	Blue Hair Grass	3
Lantana montevidensis (sellowiana)	Lantana	3
Lavandula dentata	French Lavender	3
Lavandula stoechas	Spanish Lavender	3
Limonium perezii	Statice	3
Linaria maroccana	Toad-Flax	3
Oenothera berlandieri	Mexican evening Primrose	3

LATIN	COMMON	ZONE
Penstemon'Midnight'	Beard Tongue	3
Penstemon heterophyllus	Penstemon	3
Penstemon'Firebird'	Red Penstemon	3
Penstemon'Skylark'	Penstemon	3
Perovskia atriplicifolia	Russian Sage	3
Rhagodia spinescens deltophylla	Rhagodia	3
Rosmarinus officinalis 'Prostrata'	Rosemary	3
Salvia aurea	Sage	3
Salvia chamaedryoides	Sage	3
Salvia 'Allen Chickering'	Sage	3
Salvia leucantha	Mexican Bush Sage	3
Salvia leucophylla	Purple Sage	3
Salvia 'Dara's Choice'	Sage	3
Santolina chamaecyparissus	Grey Lavender Cotton	3
Santolina virens	Green Lavender Cotton	3
Senecio 'Vira-Vira'	Dusty Miller	3
Silene maritima	No common name	3
Silene californica	California Indian Pink	3
Sisyrinchium bellum	Blue-eyed Grass	3
Sisyrinchium californicum	Yellow-Eyed Grass	3
Stacys byzantina	Lamb's Ears	3
Trichostema lanatum	Woody Blue Curls	3
Alnus rhombifolia	White Alder	4
Arctostaphylos'Dr. Hurd'	Manzanita	4
Arctostaphylos'Sunset'	Manzanita	4
Cercocarpus betuloides	Mtn. Mahogany	4
Ceanothus gloriosus 'Anchor Bay'	Mountain Lilac	4
Ceanothus 'Frosty Blue'	Mountain Lilac	4
Ceanothus 'Joyce Coulter'	Mountain Lilac	4
Ceanothus 'Ray Hartman	Mountain Lilac	4
Ceanothus 'Snow Flurry	Mountain Lilac	4
Ceanothus 'wheeler Canyon'	Mountain Lilac	4
Ceanothus 'Yankee Point'	Mountain Lilac	4
Ceanothus 'Point Reycs'	Mountain Lilac	4
Ceanothus griseus horizontalis	Mountain Lilac	4
Garrya elliptica 'Evie'	Coast Silktassel	4
Heteromeles arbutifolia	Toyon	4
Heuchera maxima	Coral Bells	3/4
Prunus lyonii	Catalina Cherry	4
Rhamnus californica 'Eve Case'	Coffee Berry	4
Rhamnus crocea	Redberry	4
Romneya coulteri	Matilija Poppy	4

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