8.9 Fire Facts – What are? Types of Fires.

NORTHWEST FIRE SCIENCE CONSORTIUM

What are? TYPES OF FIRE

There are three basic types of forest fires: ground, surface, and crown.

FIRE FACTS

During a wildfire, it's not uncommon to have all three types of fire. The proportion of each type, however, can vary greatly day to day or even minute to minute depending on fuel, topography, and weather conditions. Fuel, topography, and weather drive a fire's behavior, and changes to any of three may cause a ground fire to emerge as a surface fire or a surface fire to escalate into a crown fire, or vice versa.

Ground fires

Ground fires burn mostly in decayed roots below ground and in the duff layer. The duff layer is made up of compacted dead plant materials such as leaves, bark, needles, and twigs. Ground fires are sustained by glowing combustion (without flames) and can go undetected for a long time because they produce little to no smoke and spread slowly.

Photo Credit: Deschutes Land Trust

Surface fires

Surface fires burn loose needles, moss, lichen, herbaceous vegetation, shrubs, small trees, and saplings that are at or near the surface of the ground, mostly by flaming combustion. Surface fires spreading in surface fuels dictate much of a fire's expansion. They can grow in intensity to scorch or even consume the forest canopy, a characteristic that is seen in crown fires, depending on: the amount of surface fuel (is high), fuel moisture content (is low); slope and/or wind

Photo Credit: United States Forest Service

speed (is high), the resultant surface flame length (is high); the height to the base of tree crowns (is small); and the density and compactness of tree crowns (is tight).

Crown fires

Crown fires burn forest canopy fuels, which include live and dead foliage/ branches, lichens in trees, and tall shrubs that lie well above the surface fuels. They are usually ignited by a surface fire.

Photo Credit: United States Forest Service

Crown fires can be passive or active. Passive crown fires involve the burning of individual trees or small groups of trees (often called torching). Active crown fires, or also referred to as running crown fires, present a solid wall of flame from the surface through the canopy fuel layers as seen in the photo below. Active crown fires spread from one tree crown to the next through the canopy.

For more information:

Bennett, M., S.A. Fitzgerald, B. Parker, M. Main, A. Perleberg, C.C. Schnepf, and R. Mahoney. 2010. Reducing Fire Risk on Your Forest Property. PNW 618: 40 p.

Fire Science Core Curriculum. 2017. OSU Extension Service, EM 9172: 197p.

Fire Words. Glossary of Fire Science Terminology. Date accessed, April 10, 2019

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8.10 Fire-Resistant Plants for Oregon Home Landscapes

OREGON STATE UNIVERSITY
EXTENSION SERVICE

Fire-Resistant Plants for Oregon Home Landscapes

Stephen Fitzgerald and Amy Jo Waldo[1]

Forest Resource Note No. 6 April 2001

Introduction

When landscaping around a home, most homeowners are interested in creating a landscape that is aesthetically pleasing, complements their home, and has variations in color, texture, flowers, and foliage. If your home is located in or adjacent to forests or rangeland, you also should consider the flammability of plants within your home landscape.

Flammable plant material in your landscape can increase the fire-risk around your home. The 1991 Oakland Hills Fire in California is a prime example of how flammable plant material (Eucalyptus trees) can act as fuel and contribute to the intensity of a wildfire. Over 3,000 homes were destroyed in that devastating wildfire.

Therefore, homeowners should take active steps to minimize or reduce the fuel and fire-hazard around their homes, *including* planting fire-resistant plants. Good placement of fire-resistant trees, for example, can, in fact, help protect your home by blocking intense heat.

There is a wide array of trees and other plants to choose for your landscape that are both attractive (Figure 1) and fire-safe. This publication provides a diverse list of plant material divided into perennials, groundcovers, trees, and shrubs.

What are fire-resistant plants?

Fire resistant plants are plants that don't readily ignite from a flame or other ignition sources. Although fire-resistant plants can be damaged or even killed by fire, their foliage and stems don't contribute significantly to the fuel and, therefore, the fire's intensity.

Figure 1. Basket-of-Gold beneath Quaking Aspen; both are fire-resistant.

Plants that are fire-resistant have the following characteristics:

- Leaves are moist and supple.
- Plants that have little dead wood and tend not to accumulate dry, dead material within the plant.
- Sap is water-like and does not have a strong odor.

Most deciduous trees and shrubs are fire-resistant. However, it's important to remember that even fire-resistant plants can burn, particularly if they are not maintained in a healthy condition.

In contrast, plants that are highly flammable have these general characteristics:

- Contain fine, dry or dead material within the plant such as twigs, needles, and leaves.

-continued on page 4

Fire-Resistant Plant Materials for Oregon

Groundcovers 18" and lower

Scientific Name	Common Name	Scientific Name	Common Name
Ajuga reptans	Carpet bugle	*Echeveria species*	Hens and chicks
Arctostaphylos uva-ursi	Kinnikinnick	*Fragaria species*	Wild strawberry
Ceanothus prostratus	Squaw carpet (C,E,S)	*Pachysandra terminalis*	Japanese pachysandra (W,S)
Cerastium tomentosum	Snow -in-summer	*Phlox subulata*	Creeping phlox
Delosperma nubigenum	Yellow iceplant	*Sedum species*	Sedum or stonecrops
Delosperma cooperi	Purple/Pink iceplant	*Thymus praecox*	Creeping thyme
Duchesnea indica	Mock strawberry	*Vinca minor*	Periwinkle

Perennials 18" or taller

Scientific Name	Common Name	Scientific Name	Common Name
Achillea species	Yarrow	*Hemorocallis hybrids*	Daylilies
Allium schoenoprasum	Chives	*Heuchera species*	Coral bells
Armeria maritima	Sea thrift	*Hosta species*	Hosta lilies
Aurinia saxatile	Basket-of-Gold	*Iris species*	Iris
Bergenia cordifolia	Heartleaf bergenia	*Kniphofia uvuria*	Red-hot poker
Carex species	Sedges	*Linum perenne*	Blue flax
Coreopsis species	Coreopsis	*Lupinus species*	Lupine
Epilobium angustifolium	Fireweed	*Oenothera missouriensis*	Evening primrose
Geranium species	Hardy geraniums	*Penstemon species*	Penstemon
Helianthemum nummularium	Sun rose	*Stachys byzantina*	Lamb's ear

Shrubs—broadleaf evergreen

Scientific Name	Common Name	Scientific Name	Common Name
Cotoneaster species	Cotoneaster	*Mahonia repens*	Creeping holly
Daphne x burkwoodii var. 'Carol Mackie'	Carol Mackie daphne	*Pachystima myrsinites*	Oregon boxwood
Gaultheria shallon	Salal (S,W)	*Rhododendron macrophyllum*	Pacific rhododendron (S,W)
Ligustrum species	Privet	*Rhododendron occidentale*	Western azalea (S,W)
Mahonia aquifolium	Oregon grapeholly	*Yucca species*	Yucca

C= Central Oregon E= Eastern Oregon S= Southern Oregon W= Western Oregon Page 2

Shrubs—deciduous

Scientific Name	Common Name	Scientific Name	Common Name
Acer circinatum	Vine maple	*Philadelphus species*	Mockorange
Acer glabrum	Rocky Mountain maple	*Rhus species*	Sumac
Amelanchier alnifolia	Pacific serviceberry	*Ribes species*	Currant
Buddleia davidii	Butterfly bush	*Rosa woodsii*	Wood's rose
Caryopeteris x clandonensis	Blue-mist spirea	*Spiraea x bumalda 'Goldflame'*	Goldflame spirea
Cornus stolonifera	Redtwig dogwood	*Spiraea douglasii*	Western spirea
Euonymus alatus	Burning bush	*Symphoricarpos albus*	Snowberry
Holodiscus discolor	Oceanspray	*Syringa species*	Lilac

Trees—evergreens

Scientific Name	Common Name	Scientific Name	Common Name
Larix occidentalis	Western larch (C,E)	*Pinus lambertiana*	Sugar pine (C,S)
Pinus contorta var. contorta and var. murrayana	Lodgepole pine	*Pinus ponderosa*	Ponderosa pine

Trees—deciduous

Scientific Name	Common Name	Scientific Name	Common Name
Acer macrophyllum	Bigleaf maple (S,W)	*Gleditsia triacanthos*	Honeylocust
Acer platanoides	Norway maple	*Gymnocladus diocus*	Kentucky coffee tree
Acer rubra var. Sunset	Sunset maple	*Juglans species*	Walnut
Aesculus hippocastanum	Horsechestnut	*Liquidambar styraciflua*	American sweetgum (S,W)
Alnus rubra	Red alder (S,W)	*Malus species*	Crabapple
Alnus tenuifolia	Mountain alder (C,E)	*Populus species*	Aspen/cottonwoods
Betula species	Birch	*Prunus virginiana*	Chokecherry
Catalpa speciosa	Western catalpa	*Quercus garryana*	Oregon white oak (S,W)
Celtis occidentalis	Common hackberry	*Quercus palustris*	Pin oak
Cercis canadensis	Eastern redbud	*Quercus rubra*	Red oak
Cornus florida	Flowering dogwood (S,W)	*Robinia pseudoacacia*	Black locust
Fagus species	Beech	*Salix species*	Willow
Fraxinus species	Ash	*Sorbus aucuparia*	Mountain ash

C= Central Oregon E= Eastern Oregon S= Southern Oregon W= Western Oregon Page 3

-continued from page 1

- Leaves, twigs, and stems contain volatile waxes, terpenes, or oils.
- Leaves are aromatic (strong smell when crushed)
- Sap is gummy, resinous and has a strong odor.
- May have loose or papery bark.

Both ornamental and native plants can be highly flammable. An example of a highly flammable ornamental shrub often planted in home landscapes is ornamental juniper. Examples of highly flammable native shrubs include bitterbrush, manzanita, sagebrush, and ceanothus. Avoid planting these plants around your home.

-Adapted from University of California Cooperative Extension Hortscript, 1996, No. 18.

How this list was developed

This list was developed by evaluating fire-resistant plant lists developed for other regions and screening the scientific literature on plant flammability. Included in this list are plants adapted to grow *in* Oregon in either irrigated or non-irrigated landscapes. However, most of the plants on this list require some level of irrigation to survive during the dry summer months, particularly in central and eastern Oregon.

All of these plants are adaptable in Oregon unless specified by a C, E, S, or W. Plants indicated by these letters are suitable only for the regions listed below:

C = Central Oregon
E = Eastern Oregon
S = Southern Oregon
W = Western Oregon

Plant descriptions and availability

For a detailed description of the plants on this list, consult local nurseries or refer to the Sunset Western Garden Book and the A-Z Encyclopedia of Garden Plants. These publications can be obtained at local bookstores or nurseries. If you are unable to find some of these plants locally, check out the Oregon Nurseryman's Association website for plant availability at:

http://www.nurseryguide.com

Scroll down to "Search For..." and click on Plants by Name. Type in the name of the plant your interested in and the search will give you a list of nurseries that carry the plant.

Figure 2.

Purple Iceplant

Help us identify other fire-resistant plants

If you know of other fire-resistant plants suitable for Oregon, let us know. You can contact the authors by phone, letter, or email. We will then research your plant and, if it fits the criteria, we will add it to the list.

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APPENDIX A: APPROVED PACIFIC NORTHWEST PLANTS, TREES AND SHRUBS

CONIFER TREES

Cascade fir	Shore pine
White fir	Jeffery pine
Grand fir	Western white pine
Alpine fir	Ponderosa pine
Noble fir	Douglas fir
Incense cedar	Oregon white oak
Port Orford cedar	Coast redwood
Alaska cedar	Western yew
Juniper	Western red cedar
Western larch	Western hemlock
Sitka spruce	Mountain hemlock
Brewers weeping spruce	Oregon myrtle

BROAD-LEAF TREES

Vine maple	Oregon ash
Red alder	Coast silktassel
Pacific dogwood	Quaking aspen

SHRUBS

Kinnickinnick	Coffeeberry
Salal	Cascara sagrada
Oceanspray	Western Azalea
Kalmiopsis	Smooth sumac
Twinberry	Red flowering sumac
Oregon Grape	Rose
Longleaf Oregon grape	Wood's rose
Pacific wax myrtle	Red elderberry
Indian plum	Western spirea
Mock Orange	White snowberry
Western ninebark	Coralberry
Cinquefoil	Evergreen huckleberry
Sadler's oak	Red huckleberry
Huckleberry oak	High bush cranberry

NATIVE FERNS

Maidenhair Ferns	Wood Fern
Lady Fern	Sword Fern
Deer Fern	Licorice Fern
Coastal Shield Fern	

NATIVE IRIS

Slender Tubed Iris	Yellow Flag
Douglas Iris	Oregon Iris

Additional Native Trees

Silver Fir	Pacific Madrone
Pacific Yew	Willow
Yellow Cedar	Cascara
Yellow Cypress	Red Stem Ceanothus
Oregon Maple	Snow Bush
Black Cottonwood	Sitka Alder
White Birch	Beaked Hazlenut
Bitter Cherry	Common Juniper
Pacific Crabapple	Mountain Boxwood
	Whipplevine

Additional Native Shrubs

Western Tea Berry	Twin Berry
Blue Berry	Orange Honeysuckle
False Azalea	Sitka Mountain Ash
Copper Bush	Saskatoon
Rhododendron	Indian Plum
Heather	Black Hawthorn
Crow Berry	Dwarf Rose
Laurel	Nootka Rose
Rosemary	Red Osier Dogwood
Labrador Tea	Red Current
Hairy Manzanita	Sweet Gale
Twin Flower	Gooseberry

NATIVE PERENNIALS

Common Yarrow	Bluebells
Bane Berry	Western Bluebells
Pearly Everlasting	Coast Monkey Flower
Pussytoes	Yellow Monkey Flower
Red Columbine	Pink Monkey Flower
Blue Columbine	Desert Evening Primrose
Hairy Manzanita	Oxalis
Kinnikinnick	Spreading Phlox
Goatsbeard	Beach Knotwood
Wild Ginger	Fan Leaved Cinquefoil
Boykinia	Graceful Cinquefoil
Common Camas	Tufted Saxifrage
Scoulers Harebells	Northwestern Saxifrage
Scoulers Corydalis	Spotted Saxifrage
Bunch Berry	Western Saxifrage
Bleeding Heart	Narrow Leaved Skullcap
Foxglove	Oregon Stonecrop
Fairy Bells	Broad Leaved Stonecrop
Fairy Lantern	Checkered Mallow
Shooting Star	Meadow Sidalcea
Cut Leaved Daisy	Blue Eyed Grass
Beach Daisy	Golden Eyed Grass
Wandering Daisy	Grass Willow
Oregon Sunshine	Star Flowered Solomon's Seal
Fawn Lily	Fringe Cup
Coastal Strawberry	Western Meadowrue
Wild Strawberry	Sugar Scoops, Foam Flower
Indian Blanket Flower	Piggyback Plant
Salal	Red Trillium
Purple Geranium	Yellow Trillium
Large Leaved Avens	Sisile Trillium
Small Flowered Alumroot	Red Robin, Western Trillium
Lewisia	Cat Tail
Tiger Lily	Scouler's Valerian
Leopard Lily	Inside-Out Flower
Sierra Lily	Corn Lily
Twinflower	Yellow Violet
False Lily of the Valley	Broad Leaved California Fuchsia

APPENDIX B: NOXIOUS INVASIVE AND POISINOUS PLANTS

Use of these plants is prohibited

Common Name	Genus	Species	Common Name	Genus	Species
absinth wormwood	Artemisia	absinthium	jointed goatgrass	Aegilops	cylindrica
barbed goatgrass	Aegilops	triuncialis	kochia	Kochia	scoparia
black henbane	Hyoscyamus	niger	kudzu	Pueraria	montana
black twitch	Alopecurus	myosuroides	lawn burweed	Soliva	sessilis
brown knapweed	Centaurea	jacea	meadow hawkweed	Hieracium	pratense
buffalobur	Solanum	rostratum	meadow knapweed	Centaurea	pratensis
bull thistle	Cirsium	vulgare	Mediterranean sage	Salvia	aethiopis
Canada thistle	Cirsium	arvense	medusahead	Taeniatherum	caput-medusae
clary sage	Salvia	sclarea	myrtle spurge	Euphorbia	myrsinites
common bugloss	Anchusa	officinalis	oxeye daisy	Chrysanthemum	leucanthemum
common burdock	Arctium	minus	parrotfeather	Myriophyllum	brasiliense
common crupina	Crupina	vulgaris	perennial pepperweed	Lepidium	latifolium
common ragweed	Ambrosia	artemisiifolia	plumeless thistle	Carduus	acanthoides
cow parsely	Anthriscus	sylvestris	poison hemlock	Conium	maculatum
cultivated rye	Secale	cereale	puncturevine	Tribulus	terrestris
denseflower cordgrass	Spartina	densiflora	purple loosestrife	Lythrum	salicaria
diffuse knapweed	Centaurea	diffusa	purple nutsedge	Cyperus	rotundus
dyer's woad	Isatis	tinctoria	quackgrass	Agropyron	repens
English ivy	Hedera	helix	reed canarygrass	Phalaris	arundinacea
Eurasian watermilfoil	Myriophyllum	spicatum	rush skeletonweed	Chondrilla	juncea
field bindweed	Convolvulus	arvensis	Russian knapweed	Centaurea	repens
field hedge-parsley	Torilis	arvensis	Scotch broom	Cytisus	scoparius
field horsetail	Equisetum	arvense	spotted cats ear	Hypochaeris	radicata
garlic mustard	Alliaria	petiolata	squarrose knapweed	Centaurea	triumfettii
giant horsetail	Equisetum	telmateia	St. Johnswort	Hypericum	perforatum
giant knotweed	Polygonum	sachalinense	striated broom	Cytisus	striatus
hairy whitetop	Cardaria	pubescens	sulfur cinquefoil	Potentilla	recta
herb Robert	Geranium	robertianum	Tamarix complex (combined)	Tamarix	spp.
hoary cress	Cardaria	draba	tansy ragwort	Senecio	jacobaea
houndstongue	Cynoglossum	officinale	velvetleaf	Abutilon	theophrasti
Italian thistle	Carduus	pycnocephalus	wild carrot	Daucus	carota
Japanese knotweed	Polygonum	cuspidatum	wild proso millet	Panicum	miliaceum

Appendix C – Rainfall Records for Little Whale Cove

Rainfall Records for Little Whale Cove*

Through 4/30/2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
2005	---	---	---	---	---	---	---	0.06	2.41	5.90	7.10	14.56	30.03
2006	16.34	2.15	7.95	3.58	2.52	2.35	0.45	0.10	1.32	2.41	17.05	7.12	63.34
2007	4.68	9.89	5.81	2.58	1.46	1.91	1.24	1.41	2.08	5.78	6.60	10.68	54.12
2008	10.34	3.56	8.22	6.11	0.94	2.06	0.51	3.15	0.30	4.24	10.52	8.93	58.88
2009	8.07	3.49	5.88	3.84	4.32	1.46	0.29	1.23	2.53	5.71	8.43	6.93	52.18
2010	14.70	7.58	6.80	7.63	5.05	5.46	0.69	1.13	5.22	5.67	10.13	13.44	83.50
2011	10.70	5.33	12.51	6.71	3.63	1.70	1.42	0.19	1.60	5.00	7.65	4.61	61.05
2012	12.18	5.81	11.45	5.82	3.86	3.09	0.78	0.34	0.18	17.76	11.37	15.71	88.35
2013	7.80	5.57	3.01	3.97	4.71	2.18	0.03	2.75	6.88	1.38	6.30	3.30	47.88
2014	4.06	8.84	9.37	4.25	3.10	2.40	1.30	0.54	2.80	9.48	7.38	12.00	65.52
2015	5.75	8.86	6.63	4.83	1.51	0.49	0.16	1.23	1.57	5.54	9.52	24.81	70.90
2016	13.06	6.14	11.12	2.50	1.48	2.40	1.60	0.46	2.20	15.43	16.36	8.62	81.37
2017	7.37	15.06	14.77	8.77	4.22	2.60	0.20	0.48	3.24	6.80	11.48	7.37	82.36
2018	10.07	4.26	5.82	6.95	0.52	2.10	0.22	0.57	1.70	5.96	6.39	8.15	52.71
2019	6.10	7.65	2.36	6.37	---	---	---	---	---	---	---	---	22.48
MIN	4.06	2.15	2.36	2.50	0.52	0.49	0.03	0.06	0.18	1.38	6.30	3.30	47.88
MAX	16.34	15.06	14.77	8.77	5.05	5.46	1.60	3.15	6.88	17.76	17.05	24.81	88.35
AVG	9.37	6.73	7.98	5.28	2.87	2.32	0.68	0.97	2.43	6.93	9.73	10.44	66.32

*Records are for the Gall Weather Station corrected each month with a standard rain gage