Highways 410 and 12
Community Wildfire Protection Plan

December, 2005

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with assistance from
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1. Introduction

Citizens of the Highway 410 and 12 corridors of Yakima County and local wildland fire experts have been concerned about the effects of wildfire for some time. Recent fires throughout the western United States have mobilized local residents and firefighting agencies to join together to proactively plan and implement actions to protect lives, protect their community and reduce the occurrence and severity of future wildfires.

Purpose and Need

The citizens of Highway 410 and 12 corridors value their homes, natural resources and quality of life. Their overarching aim is to protect life and property of the community, its members, and essential infrastructure from fire through prevention and education programs, strategic planning and implementation of hazardous fuel reduction treatments.

The goal of this Community Wildfire Protection Plan (CWPP) is to:

- Improve prevention and suppression
- Reduce hazardous fuels
- Restore fire adapted ecosystems
- Promote community assistance
- Recognition of and adherence to environmental laws and policies
- Tier to existing and approved emergency response plans within Yakima County

More specifically, the residents of the Highway 410 and 12 communities wish to:

1. Provide for human health and safety.
2. Identify areas with a high risk of loss to wildland fire.
3. Suggest and prioritize projects to reduce this risk.
4. Identify avenues for funding these projects.
5. Minimize risk of damage or loss of property and essential infrastructure due to wildfire.
6. Identify the entire area within the CWPP boundary as Wildland/Urban Interface (WUI).
7. Provide input to the WDNR, WDF&W, and USFS as to the management of public land adjacent to our communities.
8. Explore options for biomass utilization wherever practical.
9. Encourage community members to become involved in the NEPA/SEPA process by commenting during the scoping phase of proposed activities.
10. Restore fire adapted ecosystems to a pre-suppression era condition.
11. Maintain the undeveloped character of the forest, shrub lands, and grasslands.
12. Promote and host fire prevention programs such as *Firewise*, *FireFree*, and *Fire Safety Fever – Catch it with Cody* within the local community.
13. Support homeowner and landowner compliance with fire prevention program recommendations as a community objective.
14. Identify communication and suppression equipment needs.
15. Identify avenues for funding these equipment needs.
16. Support and promote participation in our local volunteer fire departments and our elected fire district commissioners.
17. Be in compliance of all environmental laws, regulations, and policies as they apply to each landowner and agency.
18. Present this document to the Yakima County Commissioners so they are aware that we have recognized wildland fire as a threat to our community and are taking action to mitigate that threat.
19. Request that this document be incorporated as an appendix to the Yakima County Multi-Jurisdictional Hazard Mitigation Plan.
20. Form a Community Emergency Response Team (CERT) utilizing this CWPP as one of its guiding documents.
21. Meet as a community frequently to review, validate, and/or update this plan, and to identify additional projects and opportunities.
22. Maintain communication and cooperation with our county, state, and federal government partners.

<u>Community Awareness</u>

The community of Highway 410 and 12 corridors is very aware of the need to develop a Community Wildfire Protection Plan. Recent large-fire activity in and around the CWPP boundary include the Mud Lake Fire of 2004, the Old Naches Fire of 2003, the Woodshed Fire of 2001, the Spruce/Dome Complex of 2001, the Gold Creek Fire of 1997, the Rock Creek Fire of 1990, the Saddle Camp Fire of 1989, and the Devils Rim Fire of 1985. In addition, hundreds of fires have occurred within the boundaries that were suppressed at a small size. The Highway 410 and 12 corridors landowners have provided the community energy, input and guidance essential for the creation of this document. Additionally, it is the hope of the community that residents of the area will start (or continue) efforts to make their properties “Firewise” and implement defensible space strategies.

Values

The citizens of Highway 410 and 12 corridors value their homes, forest and rangeland, and privacy. We wish to improve the safety of their community and contribute to the overall health of the ecosystem. We also want to provide input on land management decisions for adjacent Federal and State lands. Specifically, the residents identified the following values as contributing to their quality of life in this area:

- Life safety
- Wildland setting
- Wildlife habitat
- Outdoor recreation opportunities – hunting, fishing, rafting, hiking, horseback riding, skiing, snowmobiling, boating, etc.
- Economics – taxes, local employment
- Heritage and cultural resources
- History of William O. Douglas as a local resident and forest user
- History of the Longmire Trail
- Nearby wilderness areas
- Air quality
- Water quality
- Water ways – recreational, scenic
- Infrastructure – utilities, roads, ponds, bridges
- Mather Memorial Scenic Byway
- Climate
- Sense of community
- The local volunteer fire department as a part of the community

2. Planning Area

The Highway 410 and 12 CWPP area is approximately 284,712 acres (Yakima County GIS, 2005) and lies west of the City of Yakima and Town of Naches in Yakima and Kittitas Counties, Washington (see Highway 410 and 12 CWPP Area Map, Page). The entire planning area is considered Wildland/Urban Interface (WUI), having conditions that are conducive to large-scale wildland fire. There exists a significant threat to human life and property. The planning area was developed with the help of local fire experts to include those areas where a fire escaping initial attack could directly impact the local community. The area portrays one in which local residents may be concerned that an escaped fire could imminently threaten their life or property.

Areas within the Highway 410 and 12 corridors are defined by watersheds and sub-watersheds. These major drainages and their tributaries include: Tieton River, South Fork Tieton River, North Fork Tieton River, Rimrock Lake, Clear Lake, Naches River, lower Little Naches River, Rattlesnake Creek, Nile Creek, Bumping River, American River, and Bumping Lake.

About 63% (178,893 acres) (Yakima County GIS, 2005) of the area is federally (USFS) managed. This represents approximately 32% of the entire Naches Ranger District. The character of residential development on private lands within the Highway 410 and 12 corridors is rural in nature. Yakima County tax roles indicate that the CWPP boundary includes 1,320 residences on all land ownerships. Development is ongoing. With few areas left available at lower elevations to be developed, more residences being established in the WUI at higher elevations and in more inaccessible areas. Besides the rural, unincorporated areas of Yakima and Kittitas Counties, the planning area includes the communities (also unincorporated) of Goose Prairie, Cliffdell, and Rimrock Retreat. In addition to year-around established residences, recreation residences on federal land make up a large component of the dwellings within the CWPP, accounting for over 500 homes plus organization camps.

General Description of the Area

The Highway 410 and 12 CWPP encompasses a wide variety of terrain, elevation, aspects, and the varying fuels associated with forest and rangelands. Lower elevations and the eastern end of planning area is largely shrub/steppe (grasses, bitterbrush, sagebrush). As you move to the west and to higher elevations, the forest transitions from dry deciduous (Oregon white oak and cottonwood), through dry conifer (ponderosa pine, Douglas-fir), mid-elevation conifer (grand fir, western larch, western hemlock), to high elevation wet conifer (mountain hemlock, pacific silver fir).

At Risk Community/Wildland Urban Interface (WUI)

As described in the Healthy Forest Restoration Act (HFRA, 2003), the term Wildland Urban Interface means an area within or adjacent to an At Risk Community that is identified in recommendations to the Secretary in a Community Wildfire Protection Plan. An At Risk Community means a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land, one in which conditions are conducive to a large-scale wildland fire disturbance event, and one for which a significant threat to human life or property exist as a result of a wildland fire disturbance event. The CWPP boundary was drawn with these parameters defining the planning area and the Wildland Urban Interface. Topographic and weather influences were a major factor in determining the CWPP boundary. Consultation with fire behavior experts identified the margin of potential threat.

General description of existing populated areas

Goose Prairie – This community is a mix of full time residents and a few recreation residences. Goose Prairie is home to Camp Fife, a large Boy Scout camp, typically housing more than 200 scouts and staff members during summer months. Goose Prairie Inn is central within the community and provides a small restaurant and convenience store. Telephone and electrical service are not provided to the area. Goose Prairie is very unique in being a private in-holding completely surrounded by Forest Service administered land. Within 400 feet and on all sides of the boundary of Goose Prairie is the William O. Douglas Wilderness Area. Access is one-way in, one-way out by way of Bumping River Road. Goose Prairie is not within a Fire District and structural protection may not be provided unless by contract with Yakima County Fire Protection District 14 (Nile).

Cliffdell – The community of Cliffdell is comprised mostly of full time residents with a few recreation residences. Access is by way of State Highway 410, coming from Naches and Yakima to the east and Chinook Pass to the west. Whistlin' Jack Lodge is a major tourist attraction within the community, providing cabins, a motel, a restaurant and lounge, and a convenience store with gasoline available. Electrical and telephone services are provided to Cliffdell.

Nile Valley and Highway 410 – The rural area described here is considered those privately owned lands beginning at the intersection of State Highway 410 and U.S. Highway 12 and extending to the community of Cliffdell. Business interests include Gold Creek Station, Black Bear Resort, The Woodshed/Eagle Rock Resort and numerous other privately owned businesses. Access is provided by Highway 410, the Nile Loop Road, and Old River Road. These roads serve as collectors for numerous arterials and Forest Roads. Growth continues in this area, and housing is being developed at higher elevations. Those being built at mid and upper slopes currently rely on cellular phones (limited coverage) and alternate energy sources such as wind, solar, and generator supplied power. The higher elevation homes are remote and not in a fire district. Services within the community include electricity, telephone, businesses, an organizational camp, a community center/library, Community Park, and a community church.

Rimrock Retreat – The community of Rimrock Retreat is located on U. S. Highway 12 approximately 16 miles west of the Town of Naches. Residents are largely year-around. The community is served by electricity and telephone. Three businesses are in Rimrock Retreat, including Trout Lodge Restaurant and Motel, Getaway Sports, and Gameridge Motel. Rimrock Retreat is not within a fire district, and protection is provided only under individual contract with Yakima County Fire Protection District 3 (Naches).

Highway 12 – The rural area described here is considered those privately owned lands beginning at the intersection of U.S. Highway 12 and State Highway 410 and extending to approximately mile post

170, two miles west of Rimrock Retreat (not inclusive). This area contains widely scattered, year around residents.

Recreation Residences – Recreation residences are those in which privately owned cabins are established by lease on Forest Service administered land. The Naches Ranger District has the second highest number of recreation residences of any in the National Forest system. By permit, the structure may not be used as a principal place of residence. Amenities range across the spectrum from no plumbing/electricity/telephone, to full service with all of the facilities of a typical family home. As these are on federal land, they are not in a fire district except where under individual contract with Yakima County Fire Protection Districts 3 (Naches) or 14 (Nile). Recreation residences are located along major travel routes off of U.S. Highway 12, State Highway 410, the Tieton Loop Road, and Bumping River Road. Recreation residences are typically within "Summer Home Groups" of 6-72 lots. A very few groups contain only 1-3 lots.

Recreation residences within the Highway 410 and 12 CWPP include:

Highway 410 Corridor	# Lots	Highway 12 Corridor	# Lots
American Forks	21	Andy Creek	72
American River	11	Bear Cove	39
Bumping Lake	12	Bear Creek	6
Cliffdell	15	Bootjack	9
Crag	17	Chelminar	35
Edgar Rock	7	Hart Creek	35
Edgewater	13	Horseshoe Cove	16
Gold Creek	35	Indian Creek	19
Hawks Nest	4	Russell Creek	14
Idlehour	7	Silver Cove	21
Idlewild	20	South Fork	20
Indian Flat	29		
Kloshe/Gold	10		
Little Naches	11		
Lost Creek	1		
Sleepy Hollow	15		
Stillwater	2		
Timber Creek	13		
Union Creek	6		
Willow Springs	10		

Table 1, Recreation Residences

Please note that *Table 1* denotes the number of lots within the group, and not the number of structures. The majority of lots will have multiple structures on each lot which may include the primary residence and any number of outbuildings (sheds, outhouse, garage, etc.).

Other Values At Risk

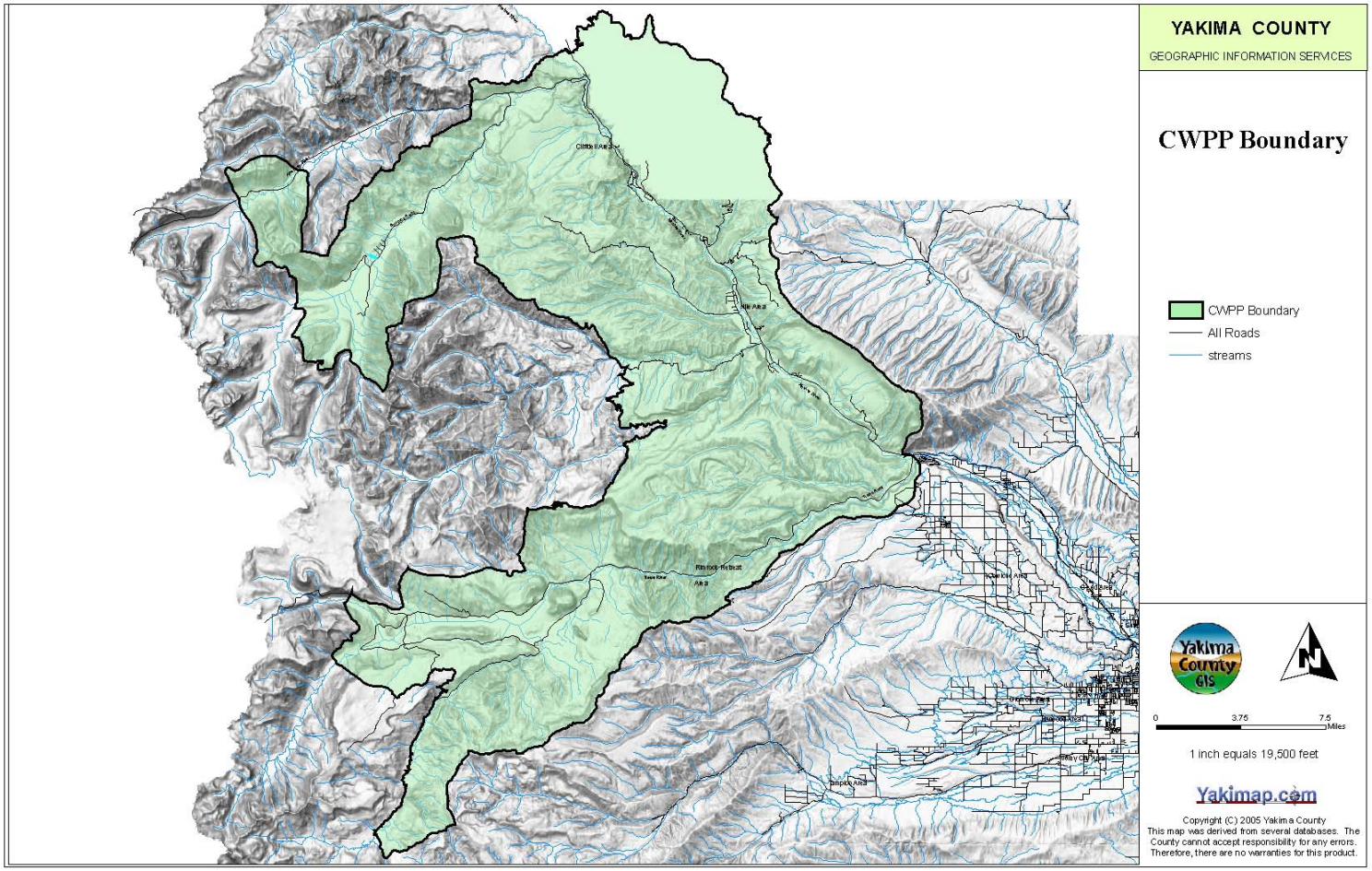
The community would also like to acknowledge that the following values and property are also at risk to loss by catastrophic wildfire. These areas and facilities are an integral part of the community. As such, fire protection and prevention, and hazardous fuel reduction plans and treatments should also be considering these sites.

Values at Risk	
Municipal Watersheds	
Highway 410 Corridor	**Highway 12 Corridor**
North Fork Rattlesnake Creek	
Infrastucture	
Highway 410 Corridor	**Highway 12 Corridor**
State Highway 410	U.S. Highway 12
Nile Loop Road and arterials	Tieton Loop Road
Bumping River Road	Benton Rural Electric Association

Values at Risk	
Old River Road and Arterials	Cowiche Telephone Company
Nile Community Church	
Pacific Power	
Verizon	
Little Bald Radio Site (Nile Fire Department)	
Administrative Sites	
Highway 410 Corridor	**Highway 12 Corridor**
Nile Fire Department Station 1	Tieton State Airstrip
Nile Fire Department Station 2	Oak Creek Game Station
Nile Fire Department Station 3	Rimrock Dam
DOT - Cottonwood Shop	White Pass Work Center
Bumping Dam	Bethel Ridge Communication Towers
Chinook Pass Work Center	Jumpoff Lookout
Cleman Mountain Communication Towers	Oak Creek Feeding Station
Little Bald Communication Towers	WDF&W AmeriCorp Cabin
Cleman Mountain Lookout	Naches/Tieton Irrigation Canal
Nile Game Feeding Station	
Sawmill Remote Automated Weather Station (RAWS)	
Fontaine Lane Traffic Camera	
Developed Recreation Facilities	
Highway 410 Corridor	**Highway 12 Corridor**
Jim Sprick Park	Trout Lodge
Camp Fife	Getaway Sports
Goose Prairie Inn	Game Ridge Motel
Whistlin' Jack Lodge	Rimrock Store
Gold Creek Station	Snug Harbor
Squaw Rock Resort	Masters Resort
Elk Ridge Motel	Silver Beach Resort
Eagle Rock (Woodshed)	Indian Creek Corral
Bumping Campground (CG)	Windy Point CG
Bumping Boat Launch	Wild Rose CG
Bumping Marina	River Bend CG
Bumping Crossing CG	Haus Creek CG
Cougar Flat CG	Peninsula CG
Soda Springs CG	Peninsula Boat Launch
American Ridge Ski Bowl Lodge	South Fork Bay CG
American Forks CG	South Fork Tieton CG
American River Guard Station	Gray Creek CG
Little Naches CG	Clear Lake South CG
Halfway Flats CG	Fishhawk CG
Sawmill Flats CG	Clear Lake North CG
Milk Pond CG	Clear Lake Day Use Area
Cottonwood CG	Clear Lake Reservation Site
Boulder Cave Day Use Area	Indian Creek CG
Mather Memorial Parkway Rest Area	Camp Ghormley
Camp Roganunda	Camp Jubilee
Lost Creek Village	Camp Dudley
Flying H Boys Ranch	Grace Brethren Camp
	Camp Zarahemla
	Camp Prime Time

Table 2, Values at Risk

Community Wildfire Protection Plan Boundary



Map 1

3. Planning Process

Process and Partners

In April of 2005, the Yakima County Fire Marshal's Office and the Washington Department of Natural Resources sponsored a Firewise workshop in the community of Cliffdell. Three hundred invitations were sent out to the local community for this workshop, with thirty-eight persons attending. At this workshop, Fire Marshal Jakki MacLean proposed that interested community members form a committee to prepare a Community Wildfire Protection Plan. The need and advantages of having a CWPP was presented and interested persons invited to sign up.

In June of 2005, interested community members gathered at the Naches Ranger Station to begin preparation of the CWPP. With the facilitation of Jakki MacLean, community members identified the purpose and need for this document, community values, concerns and priorities, and the CWPP boundary. The community group solicited input from the Yakima County Sheriff's Office, Yakima County Commissioner Mike Leita, Fire Chiefs and Commissioners from the Nile and Naches Fire Departments, Yakima County Department of Emergency Management, Washington Department of Natural Resources, and the USDA Forest Service. Preparation of the document began in July of 2005 with community members meeting approximately bi-weekly to review and edit work to date.

4. Assessment

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Existing Information

A substantial amount of data is already available from several sources. Primary fire planning information/Geographic Information System (GIS) data used in this plan came from Yakima County GIS, USFS Naches Ranger District, and WDNR.

Fire Regime/Condition Class

Fire regime is a description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval (NWCG 2005). Fire Regime describes a circumstance that is static on the landscape, changing within moisture regimes or with climatic shifts.

Fire Regime 1 means an area in which historically there have been low-severity fires with a frequency of 0 through 35 years and that is located primarily in low elevation forests of pine, oak, or pinyon juniper. (H.R. 1904, 2003)

Fire Regime 2 means an area in which historically there are stand replacement severity fires with a frequency of 0 through 35 years and that is located primarily in low- to mid-elevation rangeland, grassland, or shrubland. (H.R. 1904, 2003)

Fire Regime 3 means an area in which historically there are mixed severity fires with a frequency of 35 through 100 years and that is located primarily in forests of mixed conifer, dry Douglas-fir, or wet Ponderosa pine. (H.R. 1904, 2003)

Condition Class is a depiction of the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk). (NWCG 2005)

Vegetation

This discussion will not consider developed agricultural land within the CWPP boundary. Developed agriculture is most common in the CWPP boundary in the Nile Valley and eastern portion of the Highway 410 corridor. We will also only discuss the broad categories of wildland types, and not attempt to identify the subtle and innumerable variations within each forest type. Nor will we attempt to identify every species present.

Vegetation within the CWPP boundary transitions from dry shrub/steppe at the lower elevations and at upper elevations of the eastern boundary of the planning area. These areas are dominated by Antelope bitterbrush (*Purshia tridentate*), Big sagebrush (*Artemisia tridentate*), Crested wheatgrass (*Agropyron cristatum*), Pinegrass (*Calamagrostis rubescens*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa Sandbergii Vasey*). The shrub/steppe as well as the dry forested land has been invaded by the exotic Cheatgrass (*Bromus tectorum*) (see discussion in Fire Ecology).

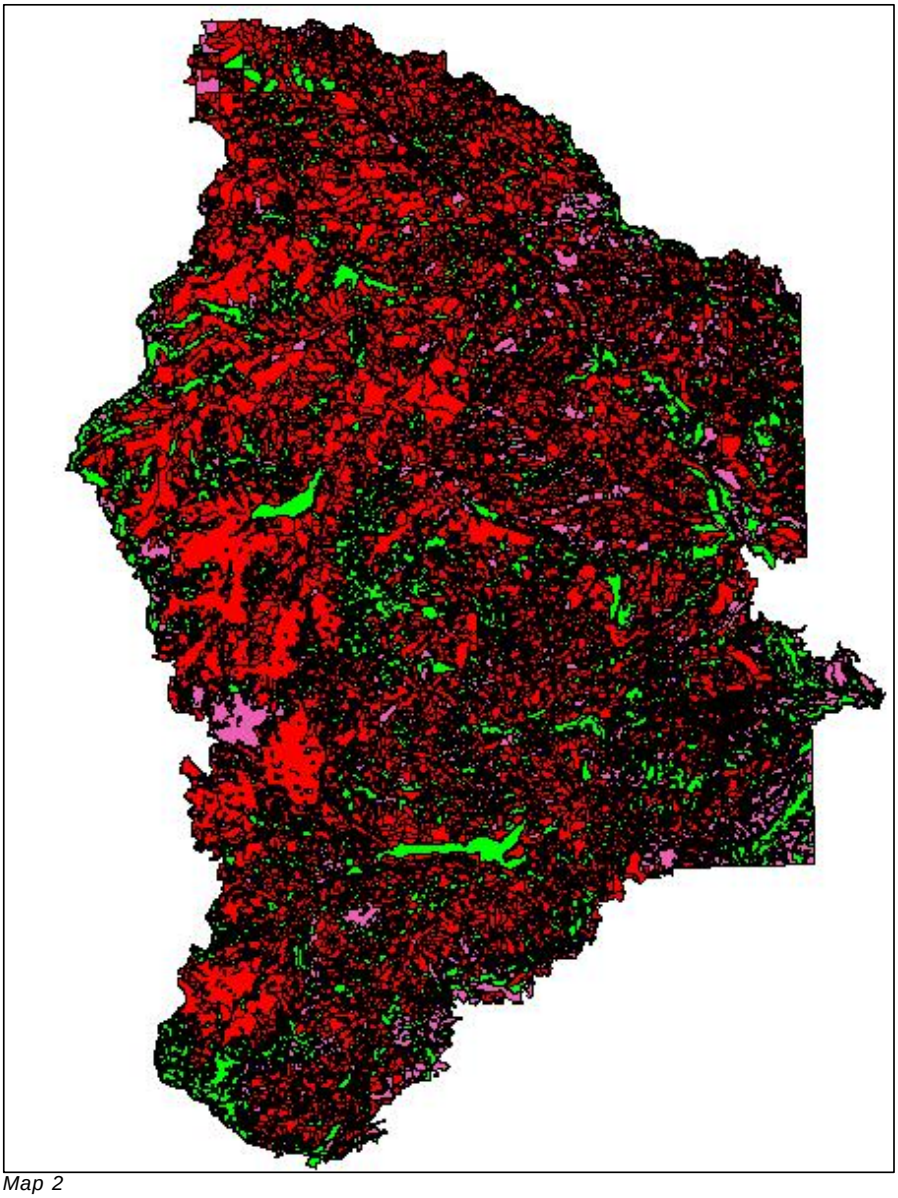
The driest forest type within the CWPP boundary is that which includes Oregon white oak (*Quercus garryana*). This type is unique in that it is limited within the extent of the Okanogan-Wenatchee National Forest to the lower reaches of the Naches and Tieton watersheds, is the hottest and most droughty of forest types, and marks the lower boundary of woodland and forest (Lillybridge, Kovalchik, Williams, Smith, 1995).

The forest then transitions to Ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*). This is the driest of the conifer forests within the CWPP boundary and will often include Antelope bitterbrush, Pinegrass, wheatgrasses and fescues, and cheatgrass. While Grand fir (*Abies grandis*) is typically a mid-elevation tree, it occurs on dry sites on the southern portion of the Okanogan-Wenatchee National Forest. As a result of fire suppression, Grand fir is a major contributor to the dense, overstocked stands, resulting in high fire susceptibility on dry forest sites. Grand fir is often referred to as “white fir”, but true White fir (*Abies concolor*) occurs well south of this region.

Moving west and gaining in elevation, Grand fir, Western larch (*Larix occidentalis*), and Western hemlock (*Tsuga heterophylla*) are common dominant trees. Lodgepole pine (*Pinus contorta*) is also common in many stands.

Upper elevations and the most western portion of the CWPP boundary may include Pacific silver fir (*Abies amabilis*), Mountain hemlock (*Tsuga mertensiana*) and possibly Subalpine fir (*Abies lasiocarpa*). This forest type is present in the western most of the recreation residences and in the upper elevations of the CWPP boundary. The mature condition of this forest type is closed canopy with abundant ladder fuels and ground fuel loadings. Because of this, fires tend to be a stand-replacing type.

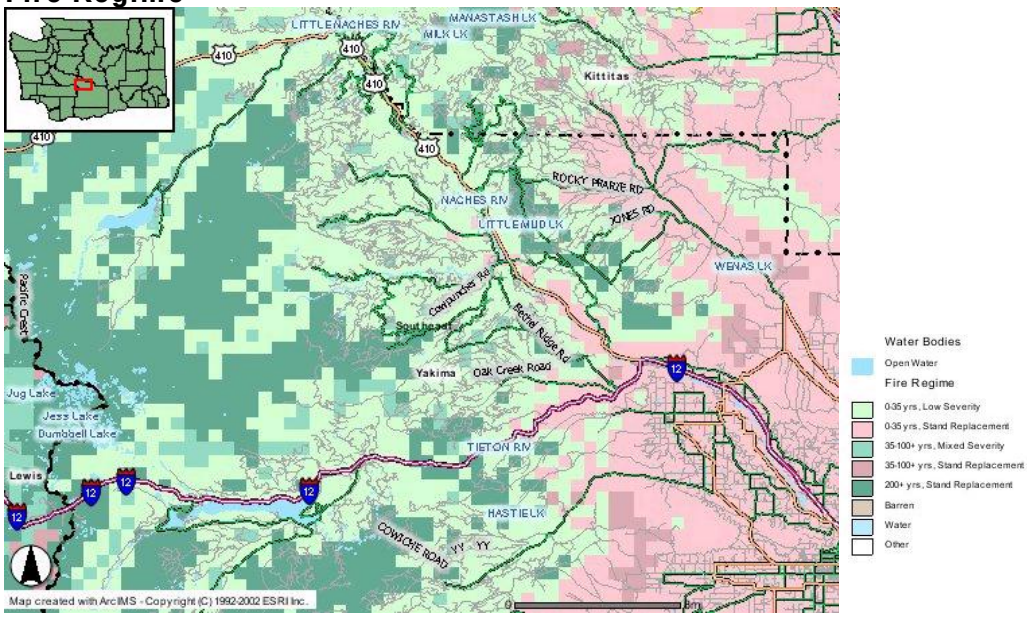
Crown Fire Susceptibility on Federal Land



Vegetation mapping of the Naches Ranger District indicates a mostly High to Moderate susceptibility to crown fire, indicated by the red (high) and magenta (moderate) coloring (Naches RD, 2002).

Map 2

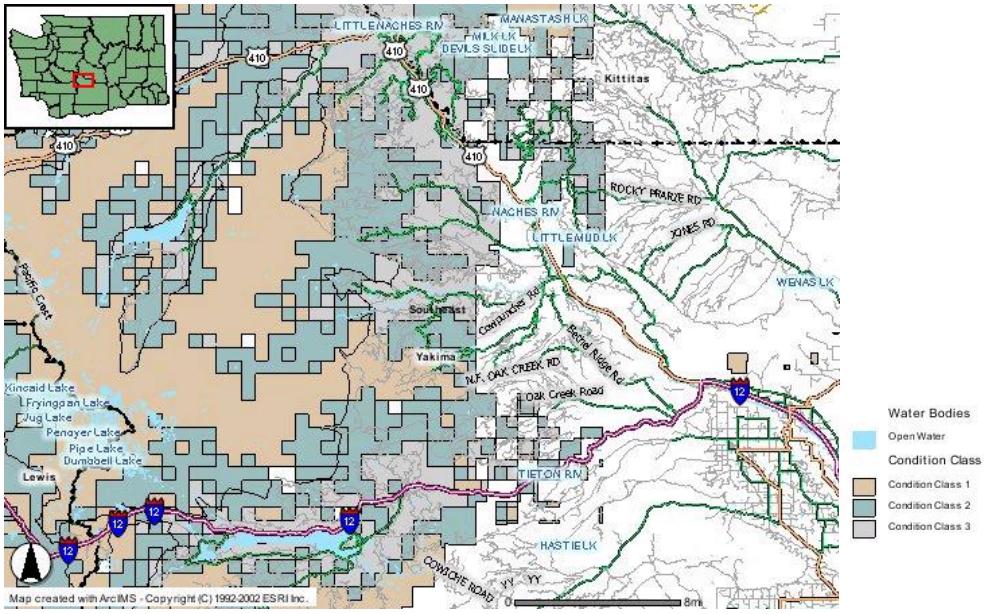
Fire Regime



Map 3

Low resolution mapping indicates that the majority of the CWPP area is in Fire Regime 1, 2, or 3 (DNR Mapping).

Condition Class



Map 4

Condition Class mapping indicates a CC of 2 or 3 in Fire Regimes 1, 2, or 3 (DNR Mapping).

Fire Ecology

Prior to fire suppression, frequent low intensity fire maintained dry forests as open and park-like. Occasional fire-free intervals provided the opportunity for some ponderosa pine (*Pinus ponderosa)* and Douglas-fir (*pseudotsuga menzesii*) to grow large enough to resist destruction by fire (Keane et al. 1990). These communities appeared to have a stable structure which was disrupted at the small scale of the patch. Mature Douglas-fir and ponderosa pine individuals are considered to be highly fire resistant and are not significantly affected by low or moderately severe fire (Williams and Smith, 1991). In contrast, young, small diameter individuals of these species are intolerant to even low intensity fire and will typically be eliminated from a site, leaving the larger, more mature individuals largely unaffected. However, ponderosa pine becomes fire tolerant at a smaller diameter than Douglas-fir. Following severe, stand-destroying fires a grass/forb community with shrubs and conifer seedlings will likely develop (Fischer and Bradely, 1987).

Fire influence in non-forested types ranges from none in the rock and water areas, to little influence in the wet shrub meadows and lithosols, to moderate and high influence in the grasslands, shrublands, and riparian areas. Fire Regime 2 is, by definition shrub, steppes and meadows. These areas experience rapid moving fires, which may be high intensity, but typically with a short duration or residence time. Fire return intervals are 0-35 years and of stand replacement severity. The Condition Class in Fire Regime 2 has been altered by invasives such as cheat grass (*Bromus tectorum*), and no longer has its original condition. For Fire Regime 2 this is described as Condition Class 2.

In forest communities, fire suppression has combined with grazing to alter the shrub component. Bunting et al. (1987) described the response of different sagebrush series (identified by dominant sagebrush species) to fire. Most species are nonsprouters and are reduced or eliminated by fire and reestablished by seed in burned areas. Fire frequency has been altered so that some areas burn less frequently and others more frequently than in the past. Large areas of the sagebrush-grass type have been fragmented and overgrazed so that shrub cover is now high and grass fuels are suppressed, or have such low site potential and low fine fuel loading making burning difficult and requiring wind to carry a fire. Still other areas have experienced a significant increase in wildfires associated with the continuous fuel provided by the exotic cheatgrass. Here, shrubs may be removed by repeated wildfire. Summer burns occurring in the presence of cheatgrass and with perennial grasses weakened by grazing, removes shrubs and further weakens perennial grasses. This is a simplified positive feedback mechanism in which fire favors cheatgrass and cheatgrass promotes fire.

Two important shrub components, bitterbrush (*Purshia tridentata*) and mountain big sagebrush (*Artemisia tridentata*), are easily killed by fire, and likely were not historically present at the levels seen today, due to fire suppression. Mountain big sagebrush will not resprout. Regeneration following fire is from on-site and off-site seed. Seedlings often reestablish readily and grow rapidly on light to moderate burns; reproductive maturity may occur in 3 to 5 years. Even though bitterbrush is often killed outright by fire, it often occurs in communities with a high fire frequency. Fire may be necessary to maintain populations of bitterbrush by removing competing vegetation and baring mineral soil, which favors rodent seed caching (Driver, Winston, and Goehle, 1980, Kuchler 1964). In burned sagebrush communities, prompt rehabilitation before cheatgrass can dominate is important.

Another shrub, snowbrush ceanothus (*Ceanothus velutinus*), was a more common early seral species in the Douglas-fir/ponderosa pine type (Dyrness 1973, Franklin and Dyrness 1973, Halpern 1989, Isaac 1940, Mueggler 1965, Schoonmaker and McKee 1988, Youngberg et al. 1979). It typically increases rapidly after fire through resprouting/or seedling establishment where the fire-free interval was 15 years and less. Snowbrush ceanothus may also be less prevalent due to excessive wildlife use, associated with the reintroduction of elk beginning in 1913.

Cheatgrass is not a climax dominant or indicator species in any habitat classification because of its role as a seral invader after disturbance. However, it can maintain its dominance for many years on sites where the native vegetation has been eliminated or severely reduced by overgrazing or frequent fire. In these situations cheatgrass remains the de facto climax dominant regardless of the site potential. Cheatgrass is a highly flammable species due to its complete summer drying, its fine structure, and its tendency to accumulate litter (Klemmedson and Smith 1964, Tisdale and Hironaka, 1981). Because of its flammability, cheatgrass greatly increases the fire hazard on a site. The rate of spread, size, and frequency of fire all increase. Besides increasing fire frequency, the length of time

cheatgrass remains a hazard is longer than that for perennial grasses. Cheatgrass dries 4 to 6 weeks earlier than perennials and is susceptible to fire 1 to 2 months longer in the fall (Stewart and Hull, 1949).

Stand development within the wet grand fir series was associated with naturally experiencing short return interval crown and severe surface fires (33-100 year fire-free intervals). This scenario is referred to as the moderate fire regime (Agee 1993). The moderate fire severity regime has the most complex interaction of low, moderate and high severity fires. Fire history is most difficult to reconstruct in these areas because of the variability of fire on the landscaped. This variability is largely a function of the influence of weather as the primary factor driving the occurrence of fire. It is predicted that 30 percent of the area with a moderate severity fire regime can be expected to burn with moderate or high intensity, while 70 percent of the area experiences low severity fire (Agee 1993). This regime is represented by overstocked stands and open park-like stands, and gradually supports an abundance of live and dead biomass. Community structure is described as relatively dense (greater than 40 percent canopy closure), multi-storied, with an abundance of snags and down wood less than 12 inches diameter. Insect infestation also contributes to the creation of standing and down woody material in these communities (Hessburg et al).

Weather, topography, and fuels affect wildfire behavior. The Highway 410 and 12 corridors CWPP area, like other areas of Yakima County, is prone to severe weather conditions that can support extreme fire behavior. The landscape has many valleys with steep slopes and dense stands dominated by ponderosa pine, which are primarily less than 18 inches in diameter. Many stands have closed canopies and abundant ladder fuels. Continuous, tall underbrush also predominates. Insect infestations of western spruce budworm, mountain pine beetle and/or fir engraver beetle are becoming more prevalent.

Since the weather and topography of a community cannot be changed, the best approach to minimize the risk to people and potential property losses is to modify and/or reduce fuels surrounding the home, as well as at the landscape level. Fuels treatments within and adjacent to a community can improve safety for fire fighters, help overall fire suppression efforts be successful, and reduce potential risk/damage to individual structures/property. Wildlife habitat benefits can also gained through fuels reduction and natural vegetation restoration projects.

Current fuel profiles reflect a high to moderate fire susceptibility within the forested vegetation types. For purposes of this discussion, susceptibility will be defined as a relative measure of the potential of a fire within a stand, to produce a stand replacement fire on a typical summer day. Included are such factors as vegetation type, crown closure, ladder fuels, vertical arrangement and horizontal continuity of a stand (stand structure), ground fuels, and topography. These same factors, along with favorable weather conditions were described by Rothermel, 1993, as the components necessary to produce a crown fire.

Fire History

Recent fire occurrence and intensity on federal lands is well documented. It can be assumed that ignitions on other ownership on similar elevations, aspects, and vegetative types would follow pattern of that on the federal lands in frequency and intensity.

Forest Service, Naches RD

Statistical Cause		# Fires	% by cause
1	Lightning	436	35%
2	Equipment	55	4%
3	Smoking	145	12%
4	Campfire	434	35%
5	Debris	33	3%
6	Railroad	0	0%
7	Arson	25	2%
8	Children	3	0%
9	Miscellaneous	124	10%
	Total	1255	

Table 3, Fire History

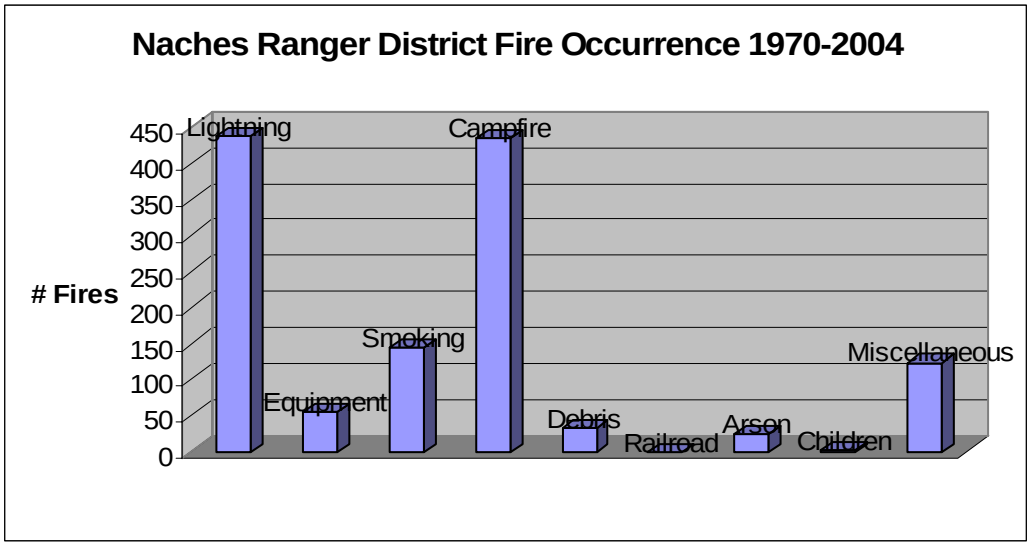
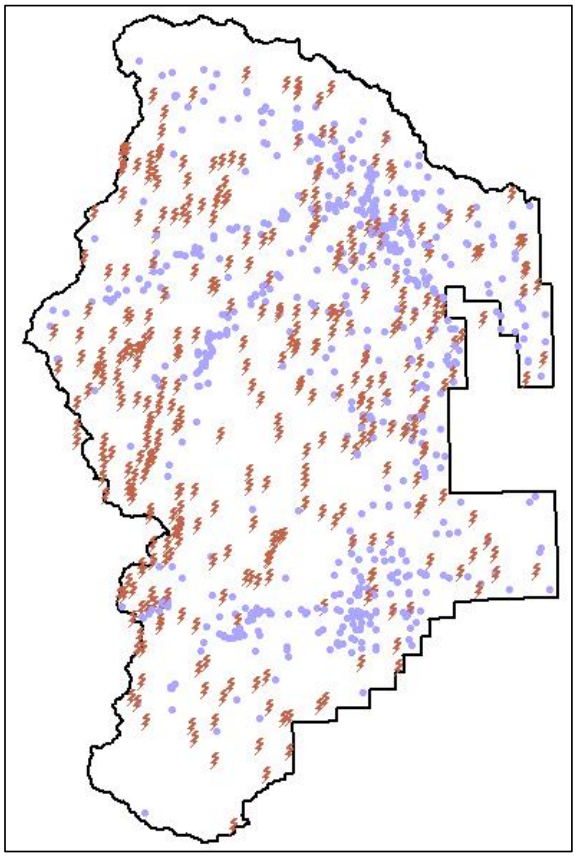


Chart 1, Fire Occurrence (STATFIRE, 2004)

Fire Occurrence



Resolution of this map does not accurately depict the actual number of fire starts, however does portray distribution and composition of ignitions. The blue dots represent human caused fires, and the brown lightning bolts represent lightning caused (Naches RD, 2002).

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Map 5

General Fire Behavior Potential

Fires occurring in or out to the CWPP boundary would historically move rapidly up slope to a ridgeline. Once at the ridgeline, fire spread will depend largely on wind speed and direction. With little or no wind, fires would most likely smolder or creep downhill with low flame lengths, and isolated passive torching in fuel concentrations resulting in short range spotting. Fires would continue to move downhill until encountering a change in aspect where they could make uphill runs or a change in fuels that would stop fire growth. With moderate or higher wind, a fire could also move rapidly along the ridges and down slope. Torching trees would give long range spotting down slope and into draws which would make aggressive uphill runs back into the main body of the fire as well as moving with the wind.

Air Quality

Population centers, summer home groups, heavily used roads and highways, and Class I wilderness areas are considered sensitive to smoke, dust, and other pollutants. Recreation sites would also be affected by smoke and its associated pollutants should fire occur nearby. Air quality in and near the

planning area can be described as good. Intuitively, we can assume, prior to fire suppression, that may not have been the case. Fire frequency in the American west during the summer months would have resulted in fires, sometimes large fires, burning nearly constantly and creating a hazy-to very smoky environment.
The topography allows for good transport of air through the analysis area. Small scale temperature inversions that affect air quality are not common. Large scale inversions and subsidences are common in the fall and can be associated with regional air quality degradation. Impacts to air quality are also associated with pollution flowing with weather patterns through White and Chinook Passes from west-side sources.

The most likely and largest contributor to a pollution event originating in the analysis area would be a wildfire. By using emission modeling, a wildfire can be simulated with the smoke column directed at specific, smoke sensitive receptor sites. Emissions produced, predicted pollutant concentrations, and changes in visibility can be modeled. For purposes of this analysis, a 100 acre fire was modeled over a 24 hour period using typical summer conditions and modeling for severe and low severity type fires. Under these conditions, 103-336 tons of CO was produced in a 24 hour period. During the same period, 5-16 tons of CH_4, and 8-27 tons of $PM_{2.5}$ would be produced (FEPS, 2005). Visibility would be reduced, depending on proximity to the fire, from 0.3 miles to sites within 5 miles of the fire, to little effect on sites 50 miles away. The volume of smoke produced will increase with fire size and lower fuel moistures. What area and who will be affected is dependant on wind direction and speed. Fuel reduction treatments will, in the case of underburning, also create smoke, but in a more controlled manner. By burning when weather conditions are favorable and in controlled amounts (acres), impacts to surrounding residents, communities and use sites can be minimized. By treating fuels, the impacts of a wildfire can be lessened.

Protection Capabilities

Fire protection within the CWPP boundary is supplied by numerous agencies, each with its own charge, capabilities, and limitations. Cooperative agreements exist that allow all agencies to work together to best protect lives, property, and natural resources. Local county, state, and federal agencies have forged positive working relations.

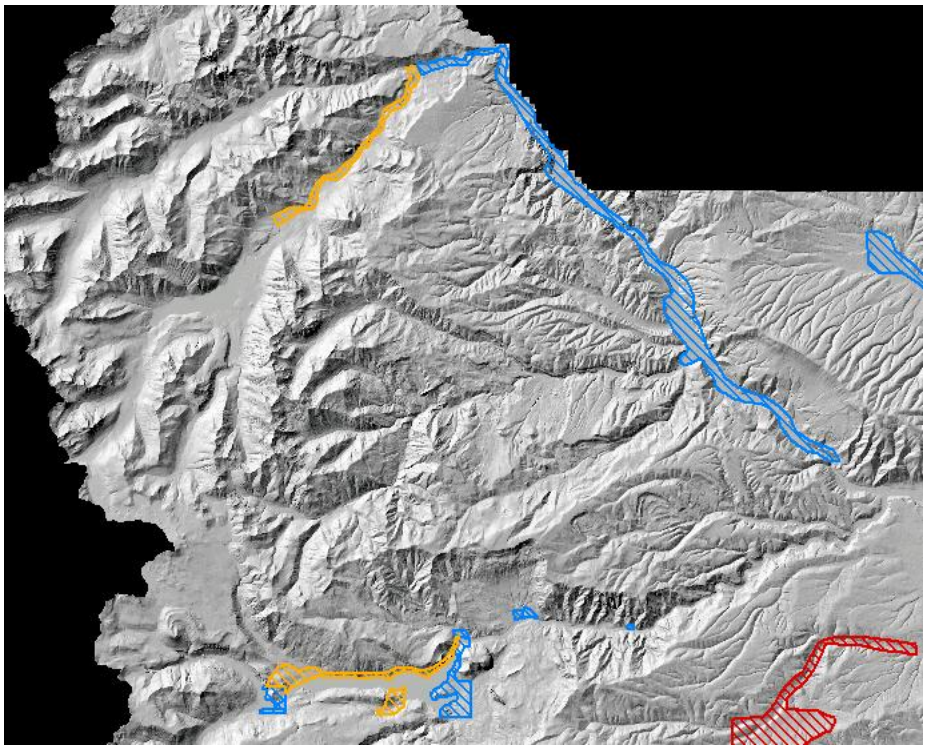
Yakima County Fire Protection District 14 (Nile) is entirely within the CWPP boundary. Yakima County Fire Protection District 3 (Naches) has only the very western edge of their district within the CWPP boundary, but responds throughout the Highway 12 corridor for medical emergencies to the western county line. The emphasis of these departments is to take action for fire suppression, rescue, and emergency medical and hazardous materials emergencies, and to provide fire prevention and education programs for the citizens in the response area. Nile and Naches Fire Departments respond within their districts and outside of district by request. The ability to respond to large wildland fires is limited by equipment and personnel.

The community of Goose Prairie and all recreation residences are outside of any fire district. As such, they do not pay into a tax levy for fire protection. Fire districts are therefore prohibited from responding to these homes as this would constitute gifting of public funds. Some residents have entered into contracts with the nearest fire district to provide protection. This list of residents is constantly developing and being added to. Therefore, we will not attempt to identify those owners in this document.

The Washington State Department of Natural Resources and USDA Forest Service are the primary wildland firefighting agencies within the CWPP boundary. Through cooperative agreements, either agency is able to mobilize large amounts of personnel, equipment, aircraft, and logistical support. However, the actual number of firefighting resources stationed in the locale is small in relation to the area covered, and the CWPP boundary constitutes only a small portion of the district they must protect. Delays in the arrival of suppression

forces of several hours to several days are likely, depending on the availability of these resources. These agencies are not equipped or trained to fight structure fires and do not provide protection of this nature.

Structural Vulnerability



Washington Department of Natural Resources data* suggests that homes within the CWPP boundary are at a Moderate to High risk of loss due to catastrophic wildfire, indicated by the blue (moderate) and orange (high) coloring

Map 6
*DNR Product License Agreement required. DO NOT distribute this data, including the above map.

Key Contacts

Organization	Contact	Phone Number
Yakima County Fire District #14	Chief Derrik Newton	911
Yakima County Fire District #3	Chief Dan Mansfield	911
Yakima County Fire Marshal	Jakki MacLean	(509) 574-2360
Yakima County Sheriff	Sheriff Ken Irwin	911 574-2500
Washington Department of Natural Resources	Rex Reed	(509) 925 - 8510

Key Contacts (continued)

Naches Ranger District (USFS)	District Ranger - Randy Shepard FMO - Gary Jennings AFMO - Sean Stafford	(509) 653-1400
Central WA Interagency Comm. Center (CWICC)		(509) 884-3473 1-800-826-3383
Pacific Power	24 hour customer service Outages	1-888-221-7070 1-877-548-3768
Benton Rural Electric Association		1-509-865-2600
Washington Department of Transportation		(509) 577-1600
Bureau of Reclamation		(509) 249-1138

Table 4, Key Contacts

5. Risk Evaluation

Community members have expressed concern about fuel conditions and fire hazard. Of special worry is the current epidemic of western spruce budworm (*Choristoneura occidentalis* Freeman) and the increased fire hazard as a result of dying and dead trees. Treatment and prevention of such epidemics are ideally the same as treatments that would be conducted to reduce hazardous fire conditions, e.g., thinning of shade tolerant, fire susceptible trees species in overstocked dry forest types.

Escape routes were also identified as a priority consideration. The Bumping River drainage and the community of Goose Prairie are at extreme risk due to threats associated with increased fire hazard as a result of western spruce budworm epidemic in the drainage, a high incidence of human caused and lightning fires, and a one-way-in, one-way-out escape route on a narrow, winding road.

Communications are difficult outside of the main line of both corridors. Goose Prairie has no phone service. Cellular telephone providers at this time have no plans of installing cellular phone towers in the area, due to low profitability. Community members have identified the installation of cellular towers or other communication systems as a key component to improving fire protection to the residents and wildlands within the CWPP boundary.

Access

Major access is provided within the planning area by U.S. Highway 12 and State Highway 410. County maintained roads, while are easily accessible by low-clearance passenger cars, are limited to the

Tieton Loop Road off of Highway 12, the Nile Loop Road with arterials off of Highway 410, and the Bumping River Road off of Highway 410.

Forest roads are generally rock or native surface and are suitable for high-clearance or off-road vehicles. As development continues at mid-slope and higher, consideration must be given that roads accessing these properties may not be accessible by emergency vehicles.

A number of private bridges were constructed over the Naches River following the flood of 1995. Residents have been notified that the fire department will not respond over these bridges unless a certified load limit has been posted on the bridge.

Evacuation, Escape Routes and Safety Zones

Evacuation is an organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas (NWCG, 2005). An escape route is a preplanned and understood route…to move to a safety zone or other low-risk area (NWCG, 2005). A safety zone is an area cleared of flammable materials used for escape in the event the (fire)line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity (NWCG, 2005).

It is recognized that even if fuels were to be treated around all communities and all residences conformed to Firewise standards, evacuations may be necessary in the event of a nearby wildland fire. Safety zones large enough to accommodate an entire community are rare, and it is not desirable to evacuate citizens to a safety zone. However, fuel treatments are not completed and the possibility exists that local residents may need to utilize an escape route and safety zone if firefighting agencies have not had time to respond or react to a new fire start near a community. Safety zones can be uncomfortable, unhealthy (smoke), and frightening until a fire has passed by. Residents may find themselves in a safety zone for several hours. Whenever possible, citizens should take refuge in an evacuation center as directed by law enforcement or firefighting officials. Should the need arise; the community has identified the following sites for evacuation or safety zones.

Evacuation Centers	
Highway 410 Corridor	**Highway 12 Corridor**
Nile Community Church	Camp Dudley
Flying H Youth Ranch	Grace Brethren Camp
Naches School District	Camp Ghormley
Camp Fife	White Pass Lodge
	Naches School District
Safety Zones	
Highway 410 Corridor	**Highway 12 Corridor**
Bumping Dam/Bumping Lakebed*	Rimrock Lakebed
Camp Fife	Tieton State Airstrip
Jim Sprick Park	
Tim Jefferson Ranch	
Paul Ebert Ranch (large animal/livestock)	

Table 5, Evacuation Centers & Safety Zones

Command Post Locations and Staging Area for Tactical Resources

Possible command post and staging areas are on federal, state, and private land. Contact with the land owner/manager should be made prior to use.

Command Post/Staging Areas	
Highway 410 Corridor	**Highway 12 Corridor**
Chinook Pass Work Center	White Pass Work Center
Jim Sprick Park	Tieton State Airstrip & Peninsula Campground
Jefferson Helibase	Oak Creek Game Station
Naches School District	Naches School District

Table 6, Command Post/Staging Areas

Water Supplies

Water for firefighting is abundant within the CWPP boundary in comparison to many areas throughout the western United States, or even in eastern Washington. Major rivers, lakes, and streams are available as water sources for drafting and for aircraft. The DNR and Forest Service have inventoried and mapped water sources on lands under their administration. Fire Districts would benefit from development of drafting sites or standpipes in the WUI, as identified in Section 7 of this plan.

6. Current Activities

Protection Measures

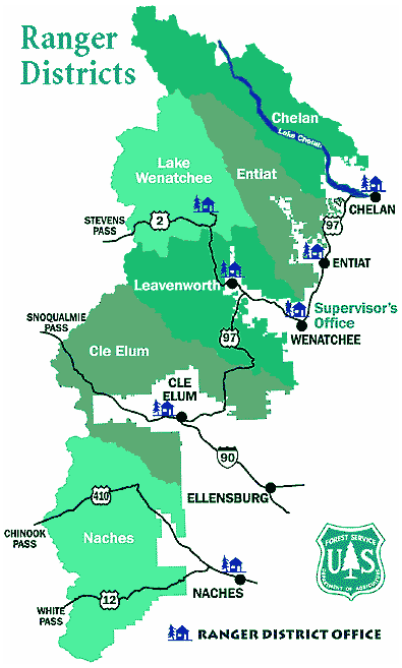
Fire protection within the CWPP boundary is provided by Yakima County Fire District #14 (Nile) and Yakima County Fire District #3 (Naches). Depending on location within the planning area, response times average 10-30 minutes.

Primary responsibility for protection of the wildlands falls on the WDNR and the USFS. Response times within the planning area can be 90 minutes or more, depending on location and time of day.

Existing Procedures

Community members have already organized themselves for the purpose of producing this CWPP, and have identified the need to continue the work by hosting Firewise and FireFree workshops and by forming a Community Emergency Response Team. Many landowners have implemented projects that have reduced the fuel loads around individual homes. Grant funds have been applied for through the Washington Department of Natural Resources for larger fuels reduction projects and shaded fuel breaks. The communities have forged close ties to the County Fire Marshal, who presides as the chairwoman of the Local Coordinating Group. This group coordinates grant applications (particularly National Fire Plan Grants and Western States Grants) that can provide funding for fuels reduction, and prevention and education programs.

The USFS has implemented shaded fuel break projects around many recreation residences and private communities, and continues this work.



Project Proposals

Project proposals as indicated in Part 7 were developed with input from fire and fuels specialists from the WDNR and USFS. The Wenatchee National Forest Dry Site Strategy was used as guidance in selecting projects, with particular attention being paid to Fire Regimes 1 and 3.

Coordination with Forest Service Activities

The Naches Ranger District, Okanogan and Wenatchee National Forest maintain close relations with the local fire departments, the Yakima County Fire Protection Bureau (Fire Marshal's Office), Yakima Sheriff's Office, WDNR, WDF&W, and local citizens. Several employees of the Naches Ranger District were involved in preparing this plan, including the District Ranger, the District Fire Management Officer, Geographic Information Systems (GIS) Analysts, and the District Fire/Fuels Planner. While not present at the community meetings, review and input was also received from the District Silviculturist and Botanist/Ecologist.

Landowner Committees

The committee that formed to prepare this CWPP was originally formed at a Firewise presentation in the community of Cliffdell. Members of the CWPP have expressed a desire that, working through the Fire Marshal's Office and the WDNR, annual Firewise and FireFree workshops be offered.

After meeting with the Yakima County Office of Emergency Management (DEM), members of the CWPP committee have also expressed interest in forming a Community Emergency Response Team (CERT). It was decided that forming CERT was not within the scope of duties of a committee tasked to prepare a CWPP, but that the plan would be one of the guiding documents of a CERT. Community members will follow-up with DEM to form and organize a CERT.

7. Mitigation Action Plan

Fuels Reduction (listed in order of priority)

Project Number	Name of Project	Status	Landowner/Responsible Party	Funding Opportunities
	Defensible Space	Intermittent	Homeowners	National Fire Plan (NFP) Grant, Western States Grant
1	Improve/establish safety zones a. Bumping Dam/lakebed b. Rimrock Lakebed c. Flying H Youth Ranch d. Jim Sprick Park e. Tieton State Airstrip		Community, Yakima County, DNR-RP, USFS	NFP, Western States
2	Goose Prairie	Completed on FS land. Approved for implementation in 2006	FS DNR-RP/Yakima County	 NFP
3	Bumping River Road Escape Route	Will be implemented when Goose Prairie is complete.	FS	
	Request/encourage state and private timber land owners to treat backlog slash, especially in the dry forest WUI • Rattlesnake • Little Rattlesnake • Rock Creek • Benton Creek • Gold Creek • Bald Mountain • Oak Creek	Proposed	Private timber land owners, DNR-SL, WDF&W, The Nature Conservancy (TNC)	NFP/Western States
	Encourage timber land owners/managers to treat fuels created by commercial logging and other activities	Proposed	Community	
	Encourage community to comment during	Proposed	Community	

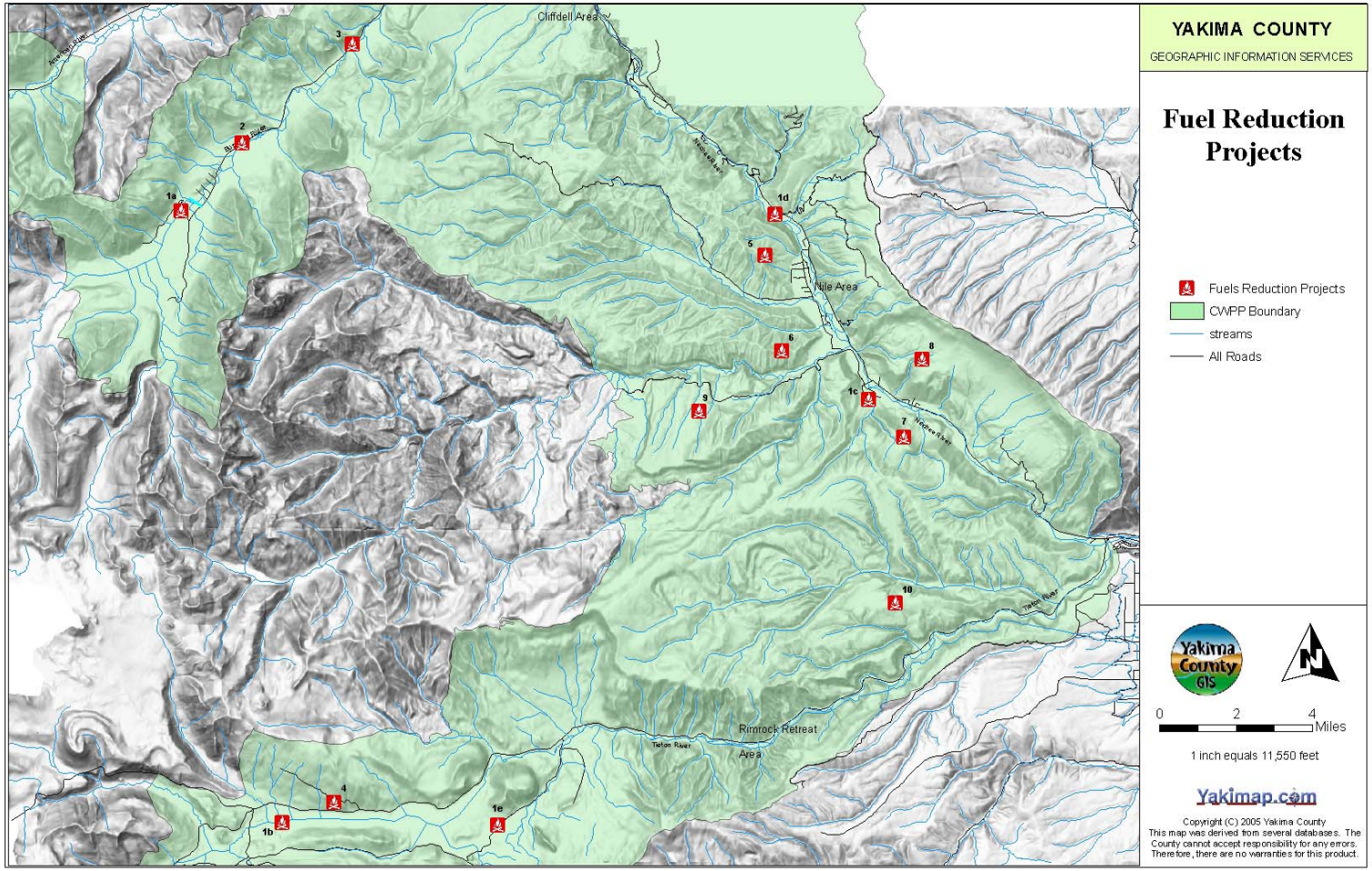
Project Number	Name of Project	Status	Landowner/Responsible Party	Funding Opportunities
	scoping on proposed timber sales and request that slash treatment be included as part of all harvest and/or thinning projects			
4	Russell Ridge	Planning had nearly been completed for a shaded fuel break. Project is now being re-analyzed for a more aggressive treatment due to rapidly deteriorating stand conditions.	FS	
5	Nile Ridge	Proposed	Private/DNR-SL	NFP, Western States
6	Dry Creek	Proposed	Private/DNR-SL	NFP, Western States
7	Meloy Canyon to Rattlesnake	Proposed	Private/DNR-SL	NFP, Western States
8	Sanford Pasture/Cleman Mountain/Bald Mountain	FS is planning a fuels reduction project immediately adjacent	DNR-SL	NFP
9	Rattlesnake Creek	FS is currently implementing fuels reduction projects immediately adjacent	WDF&W, DNR-SL	NFP
10	Oak Creek		WDF&W TNC FS	NFP, Western States
	Encourage expanded personal use firewood collection available to reduce residues that are in excess of large woody debris requirements	Personal use firewood collection is not allowed in many areas with high fuel loadings	FS DNR-SL	

Table 7, Fuels Reduction Projects
Project Numbers are keyed to Map 7, below

DNR State Lands (DNR-SL): responsible for on-the-ground-management for DNR trust lands; provide management advise concerning timing, feasibility, and management activities on trust lands within the CWPP scoping area. If appropriate, would work with the CWPP committee to apply for grants to address identified concerns in the CWPP.

DNR Resource Protection (DNR-RP): provide technical advise on fuel reduction, defensible space, etc; to coach and facilitate the planning process to develop the CWPP; to be present and engaged in the CWPP development process.

Proposed Projects



Map 7 – See Table 7, above, for key to project numbers

Education/Outreach (listed in order of priority)

Name of Project	Responsible Party	Funding Opportunities
Structural Risk Assessments	Fire districts, Yakima County Fire Marshal	Assistance to Firefighters Grant (AFG), NFP
Firewise	Community/Wildland Fire Agencies	NFP
FireFree	Community/Wildland Fire Agencies	NFP
Community Sign Plan	Homeowners, working with Nile and Naches FD's to set standards	AFG
Interagency relations – annual community meetings	Agencies and community	
Fire Safety Fever – Catch It With Cody	Yakima County Fire Marshal	NFP

Table 8, Education/Outreach Projects

Improve Prevention/Suppression Capabilities in the Wildland/Urban Interface

Name of Project	Responsible Party	Funding Opportunities
Form a Community Emergency Response Team (CERT)	Community members with assistance from Yakima County Department of Emergency Management	
Recruit and Train Volunteer Firefighters	Naches/Nile FD's	Assistance to Firefighters Grant (AFG)
Advanced Wildland Firefighting Courses	Naches/Nile FD's	AFG
Structural Risk Assessments	Homeowners, Naches and Nile FD's	AFG
Improve communications • Install cellular phone towers • Systematic warning system • Alert warning system • Tree phones	Naches/Nile FD's Community	AFG, partnerships with government agencies for use of existing facilities
Community Sign Plan/Address Coordination/Signing	Homeowners, Naches and Nile FD's	AFG
Evacuation Plan	Naches/Nile FD's, YSO, Community	
Identify Evacuation Centers, develop notification plan	Naches/Nile FD's, YSO, Affected facility managers	
Identify Evacuation Zones tied to evacuation plan		
Establish/improve water drafting sites and stand pipes	Naches/Nile FD's	AFG
Consider if development of a fire district or extending Fire District 3 and/or 14 to include recreation residences is feasible	Naches/Nile FD's, County Commissioners, local recreation residence owners	AFG
Upgrade rural fire department equipment and vehicles	Naches/Nile FD's and Fire Commissioners	AFG
Standardize equipment/apparatus to interagency criterion	Naches/Nile FD's	AFG, Federal Excess Property
Request/encourage state and private land owners to clearly number and post roads for	Community, Naches/Nile FD's	AFG

Name of Project	Responsible Party	Funding Opportunities
emergency response		
Encourage public land agencies to minimize road closures allow fire fighting access	Community	
Establish community volunteer firewatch and lookouts	Naches/Nile FD's Community	
International Urban Wildland Urban Interface Code enforcement	Yakima County Fire Marshal	

Table 9, Improve Prevention/Suppression Capabilities in the WUI Projects

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Appendix 1

Glossary of Terms

"A"

Aerial Fuels:
All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition:
Ignition of fuels by dropping incendiary devices or materials from aircraft.

Aerial Reconnaissance:
Use of aircraft for detecting and observing fire behavior, values at risk, suppression activity, and other critical factors to assist command decisions on strategy and tactics needed for fire suppression. Often called aerial recon or just recon.

Agency:
Any federal, state, or county government organization with jurisdictional responsibilities.

Air Attack:
The deployment of fixed-wing or rotary aircraft on a wildland fire to drop retardant or suppressant, shuttle and deploy crews and supplies, or perform aerial reconnaissance of the overall fire situation. Can also refer to the person functioning as air attack officer and directing aerial operations.

Airtanker:
A fixed-wing aircraft equipped to drop fire retardant or suppressant.

Anchor Point:
An advantageous location, usually a barrier to fire spread, from which to start building a fireline. An anchor point is used to reduce the chance of firefighters' being flanked by fire.

Aramid:
The generic name for a high-strength, flame-resistant synthetic fabric used in firefighters' protective clothing. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect:
Direction toward which a slope faces.

"B"

Backfire:
A fire set along the inner edge of a fireline to consume the fuels in the path of a wildfire and/or to change the direction of force of the fire's convection column.

Backpack Bucket:
A portable sprayer with a hand pump, fed from a liquid-filled container fitted with straps and worn like a backpack, used mainly in fire and pest control. (See also Bladder Bag)

Bambi Bucket:
A collapsible bucket slung beneath a helicopter. Used to dip water or retardant from a variety of sources for fire suppression.

Behave:
A system of interactive computer programs for modeling fuels and fire behavior that includes two systems: BURN and FUEL.

Bladder Bag:
A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump. (See also Backpack Pump)

Blow-up:
A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. (See Flare-up.)

Brush:
A collective term that refers to stands of vegetation dominated by shrubby, woody plants or low-growing trees, usually of a type undesirable for livestock or timber management.

Brush Fire:
A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Bucket Drops:
The dropping of fire retardant or suppressant from a specially designed bucket slung beneath a helicopter.

Buffer Zones:
An area of reduced vegetation that separates wildland areas from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is often used for another purpose such as agriculture or recreation, or parks or golf courses.

Bump-up Method:
A progressive method of building a fireline on a wildfire without changing firefighters' relative positions in the line. Work is begun with a suitable space between firefighters. Whenever one overtakes another, all crew members ahead move one space forward and resume work on the uncompleted part of the line. The last in line does not move ahead until completing his or her section of line.

Burn Out:
Setting fire inside a control line to widen it or to consume fuels between the edge of the fire and the control line.

Burn Plan:
This document provides the prescribed fire burn boss the information needed to implement an individual prescribed fire project. Also called prescribed fire plan.

Burning Ban:
A declared ban on open-air burning within a specified area, usually put into place by the agency in charge of managing that area and usually in cases of sustained high fire danger.

Burning Conditions:
The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index:
An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period:
That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

"C"

Campfire:
As used to classify the cause of a wildland fire, a small fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Candle:
A single tree or a small clump of trees that is candling, or burning from the bottom up.

Chain:
A unit of linear measurement equal to 66 feet, often used in describing the length of fireline built or yet to be built.

Closure:
Legal restriction on -- but not necessarily elimination of -- specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front:
The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 mph or more often continue for 12 to 24 hours.

Cold Trailing:
A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hands for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff:
The command staff consists of the information officer, safety officer, and liaison officer. They report directly to the incident commander (IC) and may also have assistant staff.

Complex:
Two or more individual incidents located in the same general area which are assigned to a single incident commander or unified command.

Condition Class 1:
Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within the historical range.

Condition Class 2:
Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.

Condition Class 3:
Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

Contain a Fire:
A fuel break around the fire has been completed. This break may include natural barriers such as a river or road, and/or fireline built by hand, and/or fireline constructed mechanically.

Control a Fire:
The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through the line.

Control Line:
All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency:
An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coyote Tactics:
A progressive line construction duty using self-sufficient crews who build fireline until the end of the operational period, stay or camp there while off duty, then begin building line again the next operational period where they left off.

Creeping Fire:
Fire burning with a low flame and spreading slowly.

Crew Boss:
A person in supervisory charge of a crew -- usually 16 to 21 firefighters -- and responsible for their performance, safety, and welfare.

Crown Fire:
The movement of fire through the crowns or tops of trees or shrubs more or less independently of the surface fire. A fire is said to be crowning when the flames get up into the tops of trees and spreads.

Curing:
Drying and browning of herbaceous vegetation or slash.

"D"

Dead Fuels:
Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning:
A fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space:
An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and

resources or lives at risk. In practice, defensible space is generally defined as an area of 30 feet or more around a structure that is cleared of flammable brush or vegetation or other fuels.

Deployment:
Removing a fire shelter from its case and using it as protection against fire.

Detection:
The act or system of discovering and locating fires, for example, by staff or volunteers in lookout towers.

Direct Attack:
Any treatment of burning fuels, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning fuels from unburned fuels.

Dispatch:
The implementation of a command decision to move a resource or resources -- such as crews or dozers or engines or aircraft -- from one place to another.

Dispatch Center:
A facility from which resources are directly assigned to an incident.

Dispatcher:
A staff person who receives reports of discovery and status of fires, confirms their locations, receives orders for resources and takes action to provide people and equipment needed for control, and sends them to the designated locations.

Division:
Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located with the Incident Command System organization between the branch and the task force or strike team.

Dozer:
Any tracked vehicle with a front-mounted blade used for exposing mineral soil or constructing fireline or safety zones.

Dozer Line:
Fireline constructed by a dozer.

Drip Torch:
A hand-held device for igniting fires by dripping flaming liquid fuel onto the materials or area to be burned; consists of a fuel fount, burner arm, and igniter. The fuel used is generally a mixture of diesel and gasoline.

Drop Zone:
Target area for airtankers, helicopters, and cargo dropping.

Drought Index:
A number representing the net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm:
Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff:
The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

"E"

Energy Release Component (ERC):
The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine:
A ground vehicle providing specified levels of pumping, water, and hose capacity.

Engine Crew:
Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment:
A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening situation where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter. These situations may or may not result in injury; they include "near misses."

Environmental Assessment (EA):
EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are analytical documents prepared with public participation to determine whether an Environmental Impact Statement (EIS) is needed for a project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS):
EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision-makers by providing information, analysis, and an array of action alternatives, allowing managers to see the probable effects of management decisions on the environment. Generally, an EIS is written for a large-scale action or geographical area.

Equilibrium Moisture Content:
Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route:
A pre-planned and understood route firefighters can take to move to a safety zone or other low-risk area, such as an already burned area (commonly called "the black"), a previously constructed safety area, a meadow that won't burn, or a natural rocky area that is large enough to provide refuge without being burned.

Extended Attack Incident:
A fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

Extreme Fire Behavior:
"Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following are usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, a strong convection column. Predictability is difficult because such fires often exercise influence on their environment and behave erratically, sometimes dangerously.

"F"

Faller:
A person who cuts down or fells trees. Also called a sawyer or cutter.

Field Observer:
Person responsible to the Situation Unit Leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine Fuels:
Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

Fingers of a Fire:
The long narrow extensions of a fire projecting from the main body.

Fire Behavior:
The manner in which a fire reacts to the influences of fuels, weather, and topography.

Fire Behavior Forecast:
A prediction of probable fire behavior, usually prepared by a Fire Behavior Analyst, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist:
A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuels, weather, and topography. Also called Fire Behavior Analyst.

Fire Break:
A natural or constructed barrier used to stop or check fires, or to provide a control line from which to work.

Fire Cache:
A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew:
An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Front:
The part of a wildland fire in which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity:
A general term relating to the heat energy released by a fire.

Fireline:
A linear fire barrier that is scraped or dug to mineral soil after being cleared of all vegetation.

Fire Load:
The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP):
A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Perimeter:
The entire outer edge or boundary of a fire, which may contain within it substantial areas of unburned fuels.

Fire Season:
1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Shelter:
An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation.

Fire Shelter Deployment:
Removing a fire shelter from its case and using it as protection against fire.

Fire Storm:
Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire Triangle:
Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module:
A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, trained to ignite, hold, and monitor prescribed fires.

Fire Weather:
Weather conditions that influence fire ignition, fire behavior, and suppression.

Fire Weather Watch:
A term used by fire weather forecasters to notify firefighters and agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into a dangerous fire weather situation.

Fire Whirl:
A spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls can equal the intensity of a small tornado.

Firefighting Resources:
All people and major items of equipment that are or could be assigned to fires, ranging from crews and other personnel to engines to aircraft to dozers to water tenders and including a large variety of support personnel and services.

Flame Height:
The average maximum vertical extension of flames at the leading edge of the fire front . Occasional flashes that rise above the general level of flames are not considered. The flame height is less than the flame length if flames are tilted by winds or slope.

Flame Length:
The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); flame length is an indicator of fire intensity .

Flaming Front:
The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone, combustion is primarily glowing. Light fuels typically have a shallow flaming front, and heavy fuels have a deeper front. Also called fire front.

Flanks of a Fire:
The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up:
Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels:
Fuels such as grass, leaves, pine needles, ferns, tree moss, and some types of slash, flash fuels or flashy fuels ignite readily and are consumed rapidly when dry. Also called fine fuels.

Forb:
A plant with a soft rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel:
Combustible material. Includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. (Also see Surface Fuels.)

Fuel Bed:
In a research setting, an array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also commonly used to describe the fuels composition in natural settings.

Fuel Loading:
The amount of fuels present expressed quantitatively in terms of weight per unit area.

Fuel Model:
Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture:
The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit. Also referred to as fuel moisture content.

Fuels Reduction:
Manipulation, including combustion or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control. Often includes thinning and/or prescribed burning.

Fuel Type:
An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or

other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee:
A colored flare originally designed as a railway warning device and widely used to ignite suppression and prescription fires.

"G"

General Staff:
The group of incident management personnel reporting to the incident commander. They may each have a deputy or assistant, as needed. Staff includes operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area:
A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of fire management resources. Each geographic area includes a Geographic Area Coordination Center (GACC) that handles fire intelligence, information, ordering, and dispatch.

Ground Fuels:
All combustible materials below the surface litter, including duff, tree or shrub roots, punky wood, peat, sawdust, and other materials that can support a glowing combustion without flame.

"H"

Haines Index:
An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line:
A fireline built with hand tools, such as shovels and pulaskis.

Hazard Reduction:
Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Head of a Fire:
The portion of the fire having the fastest rate of spread.

Heavy Fuels:
Fuels of large diameter such as snags, logs, and large limb wood, that ignite and are consumed more slowly than flashy fuels.

Helibase:
The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot:
A temporary landing spot for helicopters.

Helitack:
The use of helicopters to transport crews, equipment, and fire retardant or suppressant to the fireline during the initial stages of a fire. Helitack can also refer to personnel, as in helitack crews.

Helitack Crew:
A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions:
Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources:
Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Hose Lay:
Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew:
A highly trained and experienced fire crew used mainly to build fireline by hand. Hotshots -- also called Interagency Hotshot Crews or IHCs -- are national resources, also called Type 1 crews.

Hotspot:
A particular active part of a fire.

Hotspotting:
Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

"I"

Incident:
A human-caused or natural occurrence, such as a wildland fire or tornado or hurricane or major flood, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP):
The plan that contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period on an incident. The plan may be oral or written. When written, the plan may have a number of attachments, including incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, fire weather, and incident maps.

Incident Command Post (ICP):
Location at which primary command functions are executed. The ICP is often co-located with the incident base or other incident facilities.

Incident Command System (ICS):
The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives on an incident.

Incident Commander:
The individual responsible for the management of all operations at the incident site. The IC is usually in charge of an incident management team, which may be national (Type 1) or regional or local (Type 2 or 3) and which includes a wide variety of resources and personnel.

Incident Management Team:
The incident commander and appropriate general staff or command staff personnel assigned to manage an incident. Teams vary in size and experience and are assigned based on availability of the teams and complexity of the incident.

Incident Objectives:
Statements of guidance and direction necessary for selection of appropriate strategy or strategies, and the tactical direction of assigned resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Infrared Detection:
The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack:
The actions taken by the first resources upon arrival at a wildfire to protect lives and property and prevent further expansion of the fire.

"J"

Job Hazard Analysis:
This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions, and the required safety equipment to ensure public and employee safety.

Jump Spot:
Selected landing area for smokejumpers.

Jump Suit:
Approved protection suit worn by smokejumpers.

"K"

Keetch-Byram Drought Index (KBDI):
Commonly used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought). Updated maps are online.

Knock Down:
To reduce the flame or heat on the more vigorously burning parts of a fire edge.

"L"

Ladder Fuels:
Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help start and continue crowning on a fire.

Large Fire:
1) For statistical purposes, a fire burning more than a specified area of land; e.g., 100 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Lay Down:
A fire is said to "lay down," often at night, when temperatures drop and RH rises. Fires do not "lie

down." It's a long-standing term in fire and means that the fire is burning less actively than it did during the day.

Lead Plane:
Aircraft used to make dry runs over a target area to check wind and smoke conditions and topography and to lead airtankers to targets and supervise their drops. Lead planes are mandatory with MAFFS operations.

Light Fuels:
Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels ignite readily and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL):
A number, on a scale of 1 to 6, that reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout:
A firefighter who determines the location or placement or route of a fireline to be built.

Litter:
Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer. It's composed of loose debris including sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels:
Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms rather than by external weather influences.

"M"

Micro-Remote Environmental Monitoring System (Micro-REMS):
Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and Air Transportable Modular Unit (ATMU) to an incident. The ATMU is a weather data collection and forecasting unit consisting of four modules, weighing a total of 282 pounds and occupying 27.1 cubic feet of space when transported. Used by incident meteorologists on an incident.

Mineral Soil:
Soil layers below the predominantly organic layers; soil with little combustible material.

Mobilization:
The process and procedures used by all organizations -- federal, state, and local -- for activating, assembling, and transporting all resources requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS):
A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified military C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop up:
To make a fire safe or reduce residual smoke after the fire has been contained, by extinguishing or removing burning material along or near the control line, felling snags, or moving logs and large rocks so they won't roll downhill. Mop-up work is usually (but not always) handled by hand crews.

Multi-Agency Coordination (MAC):
A generalized term describing the functions and activities of representatives of involved agencies and/or jurisdictions who make decisions regarding the prioritization of incidents and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement:
Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request by furnishing personnel and equipment.

"N"

National Environmental Policy Act (NEPA):
NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make land management decisions.

National Fire Danger Rating System (NFDRS):
A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildlife Coordinating Group (NWCG):
A group formed under the direction of the Secretaries of Agriculture and the Interior that includes representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and National Association of State Foresters. The group's purpose is to handle coordination and effectiveness of wildland fire activities and provide a forum to discuss and resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex®:
Trade name for a fire-resistant synthetic material used in the manufacturing of flight suits and protective clothing worn by firefighters. (see Aramid)

Normal Fire Season:
1) A season during which the weather, fire danger, and number and distribution of fires are about average. 2) Period of the year that normally comprises the fire season.

"O"

Operational Period:
The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually are not more than 24 hours.

Operations Branch Director:
Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Overhead:
People assigned to supervisory positions, including incident commanders, command staff, general staff,, directors, supervisors, and unit leaders.

"P"

Pack Test:
The pack test gauges the aerobic capacity of fire suppression and support personnel and assigns physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections. Various levels of the test apply to various levels of firefighting duties or jobs.

Paracargo:
Anything intentionally dropped, or intended for dropping, from an aircraft by parachute, by other retarding devices, or by free-fall. Often includes firefighting supplies and tools for firefighters in remote areas.

Peak Fire Season:
That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to cause damage at an unacceptable level.

Personal Protective Equipment (PPE):
All firefighting personnel must be equipped with protective equipment and clothing in order to mitigate the risk of injury from or exposure to hazardous conditions encountered while working. PPE includes, but is not limited to, 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves, and individual first aid kits.

Preparedness:
Condition or degree of being ready to cope with a potential fire situation. Preparedness Levels are determined by region and nationally as the season progresses, based on current and expected conditions.

Prescribed Fire:
Any fire ignited by management actions under certain pre-determined conditions to meet specific objectives related to hazardous fuels reduction or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met prior to ignition. Prescribed fires are ignited and managed within a "window" (see "Prescription" below) of very specific conditions including winds, temperatures, humidity, and other factors specified in the burn plan.

Prescribed Fire Module:
A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, trained to ignite, hold, and monitor prescribed fires.

Prescribed Fire Plan:
This document provides the prescribed fire burn boss the information needed to implement an individual prescribed fire project. Also called burn plan.

Prescription:
Measurable criteria that define conditions under which a prescribed fire may be ignited, which also guide selection of appropriate management responses and indicate other required actions. Prescription criteria may include safety, economic factors, air quality, public health, and other environmental, geographic, administrative, social, or legal considerations.

Prevention:
Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuels hazards.

Project Fire:
A fire of such size or complexity that a large incident management organization and prolonged activity are required to suppress it.

Pulaski:
A combination chopping and trenching tool that combines a single-bitted ax blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

"R"

Radiant Burn:
A burn injury incurred from a radiant heat source.

Radiant Heat Flux:
The amount of heat flowing through a given area in a given time, usually expressed as calories per square centimeter per second.

Rappelling:
Technique of landing specially trained firefighters from hovering helicopters; involves sliding down ropes with the aid of hand-held friction-producing devices called "Genies." Rappellers are often deployed into remote areas where access is difficult (e.g. without roads or helicopter landing spots) or too remote to allow effective deployment of firefighters without extended hiking time.

Rate of Spread:
The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn:
The burning of an area that has previously burned but that contains flammable fuels that ignite when burning conditions are more conducive to ignition. Can also refer to an area that has reburned.

Red Card:
Fire qualifications card issued to fire-rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions on a fire or other incident.

Red Flag Warning:
Alert issued by fire weather forecasters to warn personnel about an ongoing or imminent critical fire weather situation.

Rehabilitation:
Commonly referred to as "rehab," the work necessary to repair damage or disturbance caused by wildland fire or suppression activities. Often includes restoration of firelines or dozer work, and projects such as erosion control, installation of water bars or culverts, re-seeding or other rehab of fire-damaged areas.

Relative Humidity (RH):
The ratio of the amount of moisture in the air to the maximum amount of moisture that the air would contain if it were saturated -- the ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automated Weather Station (RAWS):
There are nearly 1,500 interagency Remote Automated Weather Stations (RAWS) strategically located throughout the United States. Weather data assists land management agencies with monitoring air

quality, rating fire danger, and providing information for research applications. Most of the stations owned by the wildland fire agencies are located where they can monitor fire danger. RAWS units collect, store, and forward data to a computer system at the National Interagency Fire Center (NIFC) in Boise, Idaho, via the Geostationary Operational Environmental Satellite (GOES). The GOES is operated by the National Oceanic and Atmospheric Administration (NOAA). These data are automatically forwarded to other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center in Reno, Nevada (www.wrcc.dri.edu). Other Automated Weather Stations (AWS) transmit data to the WIMS system via telephone telemetry. Fire managers use RAWS data to predict fire behavior and monitor fuels; resource managers also use data to monitor environmental conditions.

Resource Management Plan (RMP):
A document prepared by field office staff with public participation and then approved by field office managers, providing direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order:
An order placed with dispatch for firefighting or support resources, often initiated by the incident management team on a fire.

Resources:
1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to fires or other incidents. 2) The natural resources of an area, such as timber, wildlife habitat, grasslands, watershed values, and recreational and other values.

Retardant:
A substance or chemical agent which reduces the flammability of combustibles. Retardant application is generally via fixed-wing airtankers or helicopters, and is used to slow or retard the flames, often for pre-treatment of fuels prior to ground attack or other suppression activities or for slowing the spread or potential for spread of the fire.

Run of a Fire:
The rapid advance of the head of a fire with a marked change in fireline intensity and rate of spread from that noted before and after the advance. A fire "makes a run" if such conditions are present.

Running:
A fire event including rapidly spreading surface fire with a well-defined head.

"S"

Safety Zone:
An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews maintain a safety zone close at hand. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of a blow-up in the vicinity.

Scratch Line:
An unfinished preliminary fireline hastily established or built as an emergency measure to slow or halt the spread of fire.

Severity Funding:
Funds provided to increase suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource:
An individual, a piece of equipment (such as an engine) and its staff, or a crew or team of persons with an identified work supervisor.

Size Up:
To evaluate a fire to determine a course of action for suppression.

Slash:
Debris left after logging, pruning, thinning, or brush cutting; can include logs, chips, bark, branches, stumps and broken understory trees or brush.

Sling Load:
Cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over:
A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smoke Management:
Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smokejumper:
A firefighter who travels to fires by aircraft and parachutes in to the fire area.

Smoldering Fire:
A fire burning without flame and barely spreading.

Snag:
A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester:
A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire:
A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast:
A special forecast issued to fit the time, topography, and weather of a specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than regular zone forecasts.

Spotter:
In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting:
Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area:
Locations set up at an incident where resources can be placed while awaiting a tactical assignment on an available basis. Staging areas are managed by the operations section.

Strategy:
The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team:
Specified combinations of the same kind and type of resources -- such as a group of staffed engines -- with common communications and a leader.

Strike Team Leader:
Person responsible to a division or group supervisor for performing tactical assignments given to the strike team.

Structure Fire:
Fire burning any part or all of any building or structure.

Suppressant:
An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when directly applied to burning fuels.

Suppression:
All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels:
Loose litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Swamper:
(1) A worker who helps fallers and/or sawyers by clearing away brush, limbs, and small trees. Carries chainsaw gas, oil, and tools and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

"T"

Tactics:
Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Temporary Flight Restrictions (TFR):
A restriction requested by an agency and put into effect by the Federal Aviation Administration (FAA) in the vicinity of an incident restricting the operation of nonessential aircraft in the airspace around that incident.

TerraTorch®:
A device for throwing a stream of flaming liquid, used to initiate rapid ignition during burn out operations on a wildland fire or during a prescribed fire project.

Test Fire:
A small fire ignited within the planned burn unit to determine the characteristics of the prescribed fire, such as fire behavior, detection, performance, and control measures.

Timelag:
Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching:
The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Two-way Radio:
Radio equipment with transmitters on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type:
The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability in power, size, or capacity. Can refer to type of engine or type of crew or type of team.

"U"

Uncontrolled Fire:
Any fire which threatens life, property, or natural resources.

Underburn:
A fire that consumes surface fuels but not trees or shrubs.

"V"

Vectors:
Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD):
A fire department of which some or all members are unpaid.

"W"

Water Tender:
A ground vehicle capable of transporting water in the field, generally used to supply engines.

Weather Information and Management System (WIMS):
An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line:
A line of water, or water and retardant, sprayed along the ground, which serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildland Fire:
Any non-structure fire, other than prescribed fire, that occurs in a wildland area.

Wildland Fire Implementation Plan (WFIP):
A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire that is managed for resource benefits.

Wildland Fire Situation Analysis (WFSA):
A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions. A WFSA is required when the documentation of suppression decisions needs to occur when (1) a wildland fire

escapes initial actions or is expected to, or (2) a wildland fire managed for resource benefits exceeds prescription parameters in the fire management plan, or (3) a prescribed fire exceeds its prescription and is then declared a wildland fire.

Wildland Fire Use:
The management of naturally ignited (usually by lightning) wildland fires to accomplish specific pre-stated resource management objectives in predefined areas outlined in Fire Management Plans.

Wildland/Urban Interface:
The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Often incorrectly referred to as the "interzone" or "urban/wildland interface."

Wind Vectors:
Wind directions used to calculate fire behavior.

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Appendix 2

Glossary of Acronyms, Abbreviations, Symbols

AFG:
Assistance to Firefighter's Grant

CC:
Condition Class

CERT:
Community Emergency Response Team

CG:
Campground

CH_4:
Methane

CO:
Carbon Monoxide

CWPP:
Community Wildfire Protection Plan

DEM:
Department of Emergency Management (Yakima County)

DNR:
Department of Natural Resources (Washington State)

FD:
Fire Department

FR:
Fire Regime

FRCC:
Fire Regime Condition Class

FS:
Forest Service

GIS:
Geographic Information System or Geographic Information Services

NEPA:
National Environmental Policy Act

NF:
National Forest

NFP:
National Fire Plan

NWCG:
National Wildfire Coordinating Group

$PM_{2.5}$
Particulate Matter less than 2.5 microns in diameter

PM_{10}
Particulate Matter less than 10 microns in diameter

RAWS:
Remote Automated Weather Station

RD:
Ranger District

SEPA:
State Environmental Policy Act

TNC:
The Nature Conservancy

USFS:
United States Forest Service

USDA:
United States Department of Agriculture

WDF&W:
Washington Department of Fish and Wildlife

WDNR:
Washington Department of Natural Resources

WUI:
Wildland/Urban Interface

YCFPB:
Yakima County Fire Protection Bureau (County Fire Marshal's Office)

YSO:
Yakima County Sheriff's Office