

Valley County Wildland Urban Interface

# Fire Protection Plan Manual



Valley County Idaho

BOARD OF COUNTY COMMISSIONERS  
FIRE WORKING GROUP COLLABORATIVE

Legislative Committee, John Lillehaug, Chair  
Assembled by Wildfire Prevention Associates, LLC

June 2018

# WILDLAND URBAN INTERFACE FIRE PROTECTION PLAN

## MANUAL TO ASSIST WITH THE OVERSIGHT AND DEVELOPMENT OF THE FIRE PROTECTION PLAN FOR VALLEY COUNTY IDAHO



Proactive thinning of hazard fuels in residential subdivisions areas prior to development

In the spring of 2014 the Valley Fire Working Group Legislative Subcommittee completed a two year process of working with the County Planning and Zoning Commission and Administrator. The series of meetings and workshops served to educate, inform and empower the stakeholders. The resulting Wildland Urban Interface Fire Protection Plan is a collaborative document. Developers are asked to put wildland fire into their earliest planning stages and utilize the plan to help create a fire adapted landscape to promote safer living in the Wildland Urban Interface. The following document includes an example of a finished plan. The goal is to demonstrate the type of content asked for by this plan. Answering the questions is very important, but perhaps an even greater benefit occurs when through the process of completing this document, the planner becomes invested in understanding the specific risks associated with building in an area where wildfire exists. Each site will yield different and varying results to the queries. The goal is to ask each author to tailor the document so that it results in a meaningful mitigation and planning document that will hold with modification all through the planning process and into the hands of the homeowner. Numerous resources exist to assist with this process and will only result in a plan that is valuable to all stakeholders.

To view the plan requirements:

[http://www.sterlingcodifiers.com/codebook/index.php?book\\_id=922&chapter\\_id=73788](http://www.sterlingcodifiers.com/codebook/index.php?book_id=922&chapter_id=73788)

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### 10-7-1: PURPOSE:

Valley County's community wildfire protection plan acknowledges that wildfire hazard areas exist throughout the county. Therefore, wildfire mitigation actions are prudent to enable safe habitation in these fire environments.-The existence of said plan will assist the Valley County planning and zoning commission and the structural fire districts in satisfying the current subdivision regulation, subsection 10-3-2-6D7 of this title. (Ord. 10-07, 8-26-2010)

The price of wildfire in Idaho has never been higher. One way to measure the price of wildfire is the dollars spent on suppression alone. In 1995, fire made up 16 percent of the U.S. Forest Service's annual appropriation budget; in 2015, wildfire consumed more than 50 percent of the agency's budget, a benchmark reflective of steadily rising costs. A recent study of wildfires in Wyoming found that protecting just one isolated home can add \$225,000 to the overall cost of fighting a fire. But the price of fire is also told in lost recreational opportunities, scarred landscapes adjacent to city centers, loss of wildlife habitat, presence of invasive species, and increasingly, after-effects such as flood and landslides, that can cause even greater long-term harm to a community than the initial fire.

Wildfires occur in a variety of terrain, fuels, and weather. This guide is focused on wildfires that occur in the wildland-urban interface, or WUI (pronounced "WOO-ee!"). The WUI is both a sociological and legal term that is fluid based upon context but for purposes of this plan it is that geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels. (Ord. 10-07, 8-26-2010) A wildland-urban interface (or WUI) refers to the zone of transition between unoccupied land and human development. Communities that are within 0.5 miles (0.80 km) of the zone may also be included.

Although fewer wildfires occur in the WUI compared to timberlands or rangelands, they are of increasing concern for several reasons. First, WUI fires are expensive to fight. Six of the ten most expensive fires in the past 100 years were WUI fires. Further, the WUI is relatively undeveloped. By one account, just 14 percent of the WUI is developed, leaving a vast potential region of growth that, if developed without wildfire in mind, could yield staggering costs as the West, and Idaho, grow. Finding ways to prevent “locking in” long-term, high cost development patterns, while still encouraging such development and growth, is a threshold issue facing Idaho property owners, taxpayers, and governments.

The amount of science and technology dedicated to addressing wildfire in the WUI issues is substantial: decades of research provide a rich array of knowledge about fire from which to draw. The missing piece of the puzzle is the planning and legal framework that would apply that knowledge to protect property and lives from fire. How can we use planning, law and incentives to implement what we already know about wildfire and keep our communities safe?\*

## 10-7-2: DEFINITIONS:

**APPROVED:** Refers to approval as the result of review, inspection or tests by reason of accepted principles.

**ASPECT:** Generally refers to the direction to which a mountain slope faces. For example: A slope that faces the sun in the afternoon has a westerly aspect or is a west facing slope.

**DEFENSIBLE SPACE:** Refers to that area between a building and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat.

Defensible space is the natural and landscaped area around a structure that is designed and maintained to reduce fire danger. Defensible space is all about minimizing and rearranging fuels. By treating fuels around your home and outbuildings, you influence wildfire behavior, thereby decreasing ignition potential.

Where homes are close to each other, defensible spaces may overlap to provide added protection for the neighborhood. A minimum defensible space of 100 feet is recommended for homes and outbuildings on flat ground.

For more information

- <https://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA/The-ember-threat-and-the-home-ignition-zone>
- <http://idahofirewise.org/firewise-landscapes/>

**FIRE-RESISTANT ROOF:** *The NFPA Guide* notes that many wildfires are spread by embers landing on flammable roofs that ignite structures. Wood shingle roofs are particularly flammable and should be avoided. A good practice is to require, at a minimum, Class A or B roofs in the highest risk areas, Class B in moderate risk areas, and Class C in lowest risk areas. Some communities ban all wood roofing materials even though Class A wood shake roofs are available.

Class A roofing is the preferred choice for any home, but this type of roofing is particularly important if you live in an area that is **prone to wildfires**. To achieve a Class A rating, the roof must be effective against severe fire exposure. This is proven if it can:

- Experience maximum flame spread of 6 feet
- Withstand a burning brand measuring 12" x 12" and weighing 2,000 grams
- Last 2 to 4 hours before ignition
- Resist 15 cycles of a gas flame turned on and off

Common stand-alone Class A roof coverings include clay tiles, slate, asphalt glass fiber composition shingles, and concrete tiles. Assembly-rated Class A roof coverings are those that meet Class A standards when combined with other elements. For example, shake roofing with a fire-retardant treatment rates Class B on its own, but achieves a Class A rating when combined with specified underlying materials such as Type 72 roll roofing material. If you're using an assembly-rated roofing material, it's crucial that you read the manufacturer's specifications carefully. These will detail exactly what materials must be combined for your roof to achieve a Class A rating.

Class B roofing is effective against moderate fire exposures. This is proven when the roofing can:

- Experience maximum flame spread of 8 feet
- Withstand a burning brand measuring 6" by 6" and weighing 500 grams
- Last 1 hour before ignition
- Resist eight cycles of a gas flame turned on and off

Pressure-treated shakes and shingles are the most common roofing materials to fall under the Class B rating.

Class C roofing provides only light fire protection. Roofing with a Class C rating is able to:

- Experience maximum flame spread of 13 feet
- Withstand a burning brand measuring 1.5" x 1.5" and weighing 1/4 gram
- Last 20 minutes before ignition
- Resist three cycles of a gas flame turned on and off

Examples of common Class C building materials include untreated wood shakes and shingles, plywood, and particleboard. This is not a recommended roof covering.

#### Unrated Roofing

- If roofing is unrated, this means it could not pass even the requirements for Class C roofing materials. This type of roofing provides little, if any, fire resistance and should be avoided. Most building codes will not accommodate any type of unrated roofing material.

Understanding the fire rating for your roofing materials will help you determine how safe your home is in the event of a fire. Depending on the requirements of your area's building code, these ratings may also determine whether a particular roofing material is even a viable option. With the right roofing, you can enjoy a durable construction that's both beautiful and safe. \*\*

**FORESTED:** A thickly/densely/heavily forested area, covered in forest. Idaho Code title 38, chapter 1 (Idaho forestry act) defines "forestland" as meaning "any land which has upon it sufficient brush or flammable forest growth of any kind or size, living or dead, standing or down, including debris or growth following a fire or removal of forest products, to constitute a fire menace to life (including animal) or property."

**FUEL BREAK:** An area, strategically located for fighting anticipated wildfires, where the vegetation has been modified or removed so that fires burning into it can be more easily controlled. Fuel breaks may divide fire prone areas into smaller areas for easier fire control and to provide access for firefighting.

**PROFESSIONAL:** Can include qualified professional forester, fire ecologist, or comparable experience. Professionals can be prequalified by the commission or recommended by the Valley County fire working group and kept on record at the planning and zoning office.

**PROFESSIONAL FORESTER:** An individual holding at least a bachelor of science degree in forestry from an accredited four (4) year institution. (This is consistent with Idaho state tax commission rule 960 of the Idaho administrative code, Idaho state tax commission, PDAPA 35.01.03, section 04.)

**SLOPE:** The variation of terrain from the horizontal; the number of feet of rise or fall per one hundred feet (100') measured horizontally, expressed as a percentage.

STRUCTURE: That which is built or constructed, an edifice or building of any kind or any piece of work artificially built up or composed of parts joined together in some manner.

VALLEY COUNTY FIRE WORKING GROUP: Chartered in 2007 by the Board of County Commissioners. The Valley County Fire Working Group is a collaborative, advisory group comprised of representatives from the multiple public land management agencies, structural fire districts, wildland fire management agencies and state parks located in Valley County. Responsible for the continued update of the County Wildfire Protection Plan (CWPP), the group utilizes the National Cohesive Strategy for Wildland Fire: "To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire." The Cohesive Strategy will address the nation's wildfire problems by focusing on three key areas: Restore and Maintain Landscapes; Fire Adapted Communities; and Response to Fire.

The Fire Working Group is comprised of its general membership and four sub-committees for action items. Lands, Response, Education and Legislative which focus on, but are not limited to, the following goals and actions:

Fire Mitigation Goals:

- Emphasize prevention of wildland urban interface fires using a proactive, cooperative approach.
- Ensure that the land development ordinances and building codes in Valley County support mitigation of wildland urban interface fire danger.
- Promote effective fuel reduction programs in all wildland urban interface areas in Valley County.
- Promote the development of water resources and use agreements for wildland resources throughout Valley County.
- Facilitate and maintain a County-wide mutual aid agreement.
- Produce and distribute functional maps for Rural Fire Departments.
- Facilitate wildfire training for responding agencies

Fire Mitigation Actions:

- Prevention- promote local jurisdictions working together and with Federal and State agencies to establish on-going local prevention programs.
- Regulation- monitor and support and supplement local and national fire codes and wildland fire strategies and ordinances to reduce wildfire risk.
- Fuel reduction- Identify priority fuel reduction projects and pursue the appropriate grant.

WILDFIRE: An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

WILDLAND URBAN INTERFACE AREA: That geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels. (Ord. 10-07, 8-26-2010)  
A wildland-urban interface (or WUI) refers to the zone of transition between unoccupied land and human development. Communities that are within 0.5 miles (0.80 km) of the zone may also be included.

### 10-7-3: BASIS FOR RECOMMENDATION:

Valley County adopted the 2006 international fire code, which references the international wildland urban interface when dealing with wildlands. The following addendum's structure set out in section 10-7-4 of this chapter is based on the 2006 wildland urban interface area requirements section 405. (Ord. 10-07, 8-26-2010)

#### Valley County's County Wildfire Protection Plan - National Fire Plan

The goals of the Wildland-Urban Interface Fire Mitigation Plan identifies opportunities to:

- Improve Fire Prevention and Suppression
- Reduce Hazardous Fuels
- Restore Fire-Adapted Ecosystems
- Promote Community Assistance
- Its three guiding principles are:
  - § Priority setting that emphasizes the protection of communities and other high-priority watersheds at-risk.
  - § Collaboration among governments and broadly representative stakeholders
  - § Accountability through performance measures and monitoring for results.
- By endorsing this implementation plan, all signed parties agree that reducing the threat of wildland fire to people, communities, and ecosystems will require:
  - § Firefighter and public safety continuing as the highest priority.
  - § A sustained, long-term and cost-effective investment of resources by all public and private parties, recognizing overall budget parameters affecting Federal, State, Tribal, and local governments.
  - § A unified effort to implement the collaborative framework called for in the Strategy in a manner that ensures timely decisions at each level.
  - § Accountability for measuring and monitoring performance and outcomes, and a commitment to factoring findings into future decision making activities.
  - § The achievement of national goals through action at the local level with particular attention on the unique needs of cross-boundary efforts and the importance of funding on-the-ground activities.
  - § Communities and individuals in the wildland-urban interface to initiate personal stewardship and volunteer actions that will reduce wildland fire risks.
  - § Management activities, both in the wildland-urban interface and in at-risk areas across the broader landscape.
  - § Active forestland and rangeland management, including thinning that produces commercial or pre-commercial products, biomass removal and utilization, prescribed fire and other fuels reduction tools to simultaneously meet long-term ecological, economic, and community objectives.

#### **10-7-4: SUBMISSION REQUIREMENTS:**

**General:** All developers of proposed subdivisions shall provide a wildland urban interface fire protection plan (the plan) for review and approval by the planning and zoning commission with their preliminary plat application or planned unit development submittal.

**Content:** The plan shall be based upon a site specific wildfire risk assessment that includes consideration of location, topography, aspect, flammable vegetation, climatic conditions and fire history. The plan shall address water supply, access, fire protection systems and equipment, defensible space, and vegetation management.

**Preparation:** The plan shall be developed by a "professional" (see definition in section 10-7-2 of this chapter). Professionals can be prequalified by the commission and a list will be maintained at the Valley County planning and zoning office.

**Format:** The plan shall consist of two (2) sections, Wildfire Risk Assessment and Wildfire Risk Mitigation. The Fire Plan will vary from site to site.

**Review:** The recommended review process includes the local fire district having jurisdiction, the Fire Working Group suggests plans received for review and recommendations are sent back to the Planning and Zoning Commission and Planning Administrator.

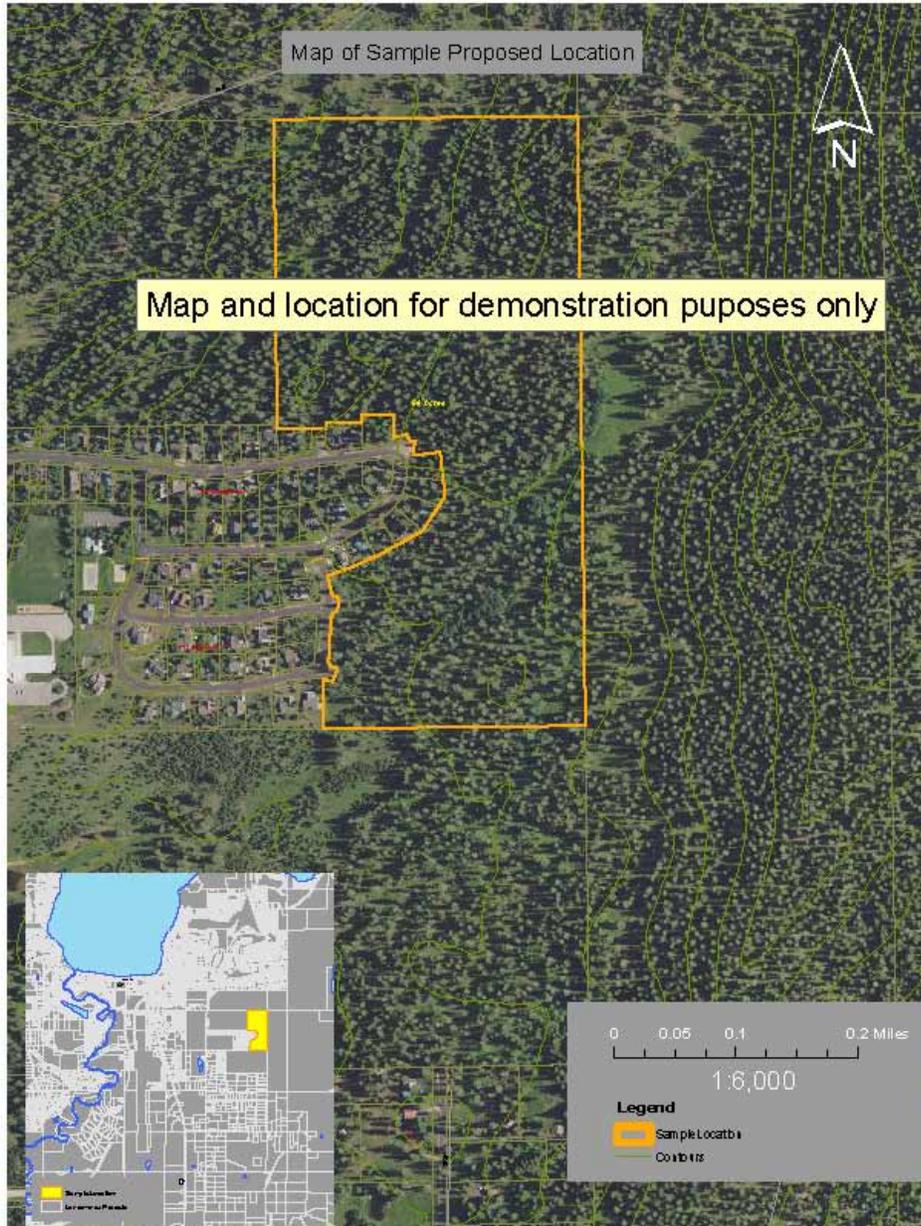
A template for an Administrative Plat is available at the office of the Planning and Zoning Administrator.

## FIRE PLAN EXAMPLE

### Wildfire Risk Assessment:

This portion of the plan includes a map and narrative describing the current status of the land to be developed. The County Wildfire Protection Plan will provide information and standards for use in development of the plan. At a minimum, the following must be included:

- 1) Topographic map.  
Example



- 2) Site description including discussion of slope(s), aspect(s), and significant topographic features.  
Example: The proposed subdivision lies on the eastern boundary of the McCall city impact area, and located in Pts. of E2NW and the E2SW of Section 12, Township 17 North, Range 4

East. The property is located between Woodlands, Spring Mountain and Deer Forest subdivisions. The main access to the property is provided off Long Valley Road, a paved county road that is the major route from McCall to Yellowpine. The road services a school, fire station and market. The road is maintained year round. Access to the area from state highway 55 is available on three main tributary roads. The property is approximately 60 acres. The elevation is approximately 5500 feet with a class 2 seasonal stream flowing through the south third of the parcel. All acreage is timbered with a few small open meadows. The parcel is basically flat. Little Elk Lake is located 3 miles north as the crow flies.

- 3) Narrative describing existing vegetation and fuel hazards, distribution and continuity.

**Example:** The timber stand has had little management activity conducted over the past 15 years. The primary tree species is Ponderosa pine mixed with Douglas Fir, Grand Fir and Aspen. The understory vegetation consists of thornbrush and other small shrubs such as snowberry as well as various forbs and grasses.

The amount of dead woody material on the ground or standing is minimal as the landowner has been allowing firewood to be cut and removed. Also the amount of the ground vegetation is minimal due to the dense tree canopy which inhibits sunlight reaching the forest floor. There is no record of this ground being used for commercial range land.

- 4) Fire history, including historical occurrence, causes, typical wind and climatic conditions which influence fire behavior.

**Example:** The local fire jurisdiction reports a human caused fire in 2017 which was quickly extinguished. Detailed Fire History is included in the County Wildfire Protection Plan. Further example of wind conditions: The Cascade Reservoir is subject to predominant southwest winds in the area and expose the north and east shore to wind conditions that can contribute to development of high intensity, uncontrollable wildland fire.

- 5) Existing roads and bridges, including a description of widths, grade percentages and weight limits.

**Example:** No roads exist on the parcel.

- 6) Location of existing structures and an estimate of the proposed density, types and sizes of planned structures.

**Example:** No structures currently exist on the site. The proposed density for this site is one single family unit per 1/2 acre. Five acres of open space common area is planned. Pathways for mixed recreational use are planned throughout the community. Open space corridors are planned to offer privacy buffers and allow for vegetation and fuels treatment supported by HOA fees. A multi-use community center will service the development.

- 7) Infrastructure that may affect wildland fire risk (i.e., existing power lines, railroad lines, propane tanks, etc.).

**Example:** No utilities exist to date. All utilities and phone lines will be underground. The proposed subdivision at full development is planned for 45 lots with the average size of each lot being about .25 acre.

- 8) Description of existing features that may assist in controlling a wildfire (i.e., fuel breaks, water sources, etc.).

**Example:** Currently no fuel breaks or water sources on the parcel. Adjacent to the parcel is a recently treated tree farm utilizing shaded fuel breaks. A development on the west side features paved roads and existing hydrants.

9) Current structural and wildland fire jurisdictional agencies.

**Example:** Structural and wildland fire protection is provided by the McCall Fire Protection District. Wildland protection on nearby private timberlands provide by Southern Idaho Timber Protective Association. The USDA Forest Service also provides wildland fire protection in the area.

### **Wildfire Risk Mitigation:**

This portion of the plan includes a map(s) and narrative detailing planned wildfire hazard mitigation actions to be taken by the developer prior to individual lot development to mitigate risks to life and property from wildland fire. Specific items to be addressed include:

- 1) Access - planned ingress and egress routes.  
**Example:** Ingress and egress from Highway 55 is adequate for emergency vehicles, allowing equipment to enter and turn around. Roads will be constructed wide enough to accommodate emergency vehicles, with either loop roads or cul-de-sacs with wide turning radii. Roads will be of grades suitable for emergency vehicles. All roads to be well signed and homes numbered with greater than four inch reflective numbers.
- 2) Water supply for structural and wildland fire response.  
**Example:** There are three surface water resources near Payette Lake that enhance the nine ground water sources that provide water to residences in the area. All residences will be on the McCall City water system. Hydrants are planned for locations throughout the development.
- 3) Estimated response time and distances for jurisdictional fire agencies.  
**Example:** McCall Fire and EMS is located less than one mile from the entrance to the development. Estimated response time is 5-10 minutes.
- 4) Planned internal fire protection systems and/or equipment, including buried tanks, wells, hydrants, drylines, etc., along with protective measures for systems and/or equipment.  
**Example:** Hydrants are planned throughout the community. No additional storage tanks are planned.
- 5) Proposed infrastructure, including bridge standards, road widths, grades, signage, aboveground/belowground power lines, etc.  
**Example:** Hydrants are planned throughout the community. No additional storage tanks are planned. Road widths will be 20-24 feet throughout the development. Surfaced grade less than 5%. Street signs will be posted at each intersection. Residence numbers will be greater than four inches and made of reflective material. Access for all forms of firefighting equipment will be provided including adequate turn around in all cul-da-sac locations. Residences will be properly signed with reflective numbers. Streets will be signed.
- 6) Evacuation and Pre-Incident planning.  
**Example:** A pre-incident action plan will be developed and instituted in the community covenants. An escape route and evacuation plan will be developed to encourage pre-planning by residents for preparation in the event of an incident. Periodic interaction between the fire service having jurisdiction and the resident committee of homeowners will be convened to review and address the current plan. Every five years the community will receive an updated assessment of structure and vegetation review. New structures will strongly consider materials meeting a standard of fire resistance advocated by the County Building department.

- 7) Planned live and dead fuel treatment actions, including modification through thinning, pruning, piling, chipping, and fuel break construction; and removal through commercial harvest, chipping and hauling or prescribed burning.

**Example:** Prior to the development site plan preparation the area was treated for hazard fuels reduction. A shaded fuel break was accomplished by thinning dense tree cover and removal of underlying brush. The existing trees were removed to a 15 foot spacing. Leave trees were limbed to 10 feet. All dead or dying trees were managed either by mastication or removal.

- 8) Long term maintenance schedule to sustain fuel treatment effectiveness.

**Example:** This development is designed to exist in concert with the natural ecosystem and to promote forest health and stewardship.

- Periodically will review trends and projections of future fire risk and fire risk reduction capabilities to ensure that mitigation measures are adequate.
- Natural surface water and moisture levels shall be maintained.
- Extend defensible fuel profile zone agreements to subsequent landowners.
- Promote the opportunity to return to native plant species.
- Emergency response capabilities shall be maintained and improved to protect all members of the community.
- Structures with a minimum 100' setback (when feasible) from property lines. \*
- Vegetation encroachment within the 100' zone of each structure will be reduced annually during a community work day, or by a professional hired by the homeowner.
- Woody debris will be collected each spring and removed to an approved facility.
- No open fires will be allowed during closed burn season. May 10-October 20.

- 9) Analysis of the overall change in wildland fire risk within the development and to adjacent landowners once the planned mitigation actions are implemented.

**Example:** Currently the location is exposed to unmonitored access by the public and is at risk of human caused fire. Residents will be subjects to covenants that provide for annual evaluation of fuel loading and recommendations for removal. Development of this project into a community worthy of a Firewise Communities USA designation is the goal of this plan.

**Submittal, Implementation And Verification:**

The plan shall be submitted with the preliminary plat application to the Valley County planning and zoning office.

Planned mitigation work must be completed or financially guaranteed prior to the recordation of the final plat. A schedule for the phased completion of mitigation work may be approved in conjunction with recordation of final plats.

Verification of completed implementation of mitigation actions will be the responsibility of the jurisdictional structural fire district. Where no structural fire district exists, the Valley County sheriff shall appoint a county representative.

**Exceptions:**

Proposed administrative plats of less than five (5) lots and proposed subdivisions with lands less than twenty percent (20%) "forested" (see definition in section 10-7-2 of this chapter) are exempt from the professional requirement. For proposed subdivisions fitting these descriptions, the developer may complete the plan (see the fire protection form). The plan for an administrative plat can be approved by the administrator upon receiving an approval letter from the fire district.

**Cost:**

The cost and implementation of the plan preparation shall be the responsibility of the applicant.

**Plan Retention:**

The approved plan shall be retained at the Valley County planning and zoning office and the jurisdictional fire district or designated agency where no fire district exists. (Ord. 10-07, 8-26-2010).

**Summary:**

The examples shown are a combination of best case scenarios and reality. Not all plans will present locations where slope, aspect, ingress, egress are not significant factors. The Commission is encouraged to use this plan to help developers understand the importance of fire in Valley County. Many resources exist to support the creation of the plan by the selected Professional. Creating a community that understands the meaning of co-existing with fire will be a value added addition to Valley County. In addition, a developer offering a Firewise worthy community to new homeowners is offering a premium product.

## Resources:

Idaho Firewise

<http://idahofirewise.org/>

National Fire Prevention Association

<https://www.nfpa.org/News-and-Research/News-and-media/Press-Room/News-releases/2012/Firewise-Communities-Program-launches-new-complimentary-online-toolkit>

Valley County - County Wildfire Protection Plan

<http://www.co.valley.id.us/community/wildfire-mitigation/>

McCall Fire and EMS

<https://mccallfire.weebly.com/>

Donnelly Rural Fire Protection District

<http://www.donnellyfire.com/>

Cascade Fire

<https://cascadeid.us/city-government/cascade-rural-fire-department/>

Southern Idaho Timber Protective Association

<http://www.sitpa.org/>

Standards for development in the Wildland Urban Interface can be found in several sources, including Planning for Wildfire in the Wildland-Urban Interface: A Resource Guide for Idaho Communities.

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2845046](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2845046)

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\* Miller, Stephen R. and Wuerzer, Thomas and Vos, Jaap and Lindquist, Eric and Mowery, Molly and Holfeltz, Tyre and Stephens, Brian and Grad, Alexander, Planning for Wildfire in the Wildland-Urban Interface: A Resource Guide for Idaho Communities (September 28, 2016). Available at

SSRN: <https://ssrn.com/abstract=2845046> or <http://dx.doi.org/10.2139/ssrn.2845046>

\*\*[www.buildings.com/article-details/articleid/15175/title/the-abcs-of-roof-fire-ratings/viewall/true](http://www.buildings.com/article-details/articleid/15175/title/the-abcs-of-roof-fire-ratings/viewall/true)