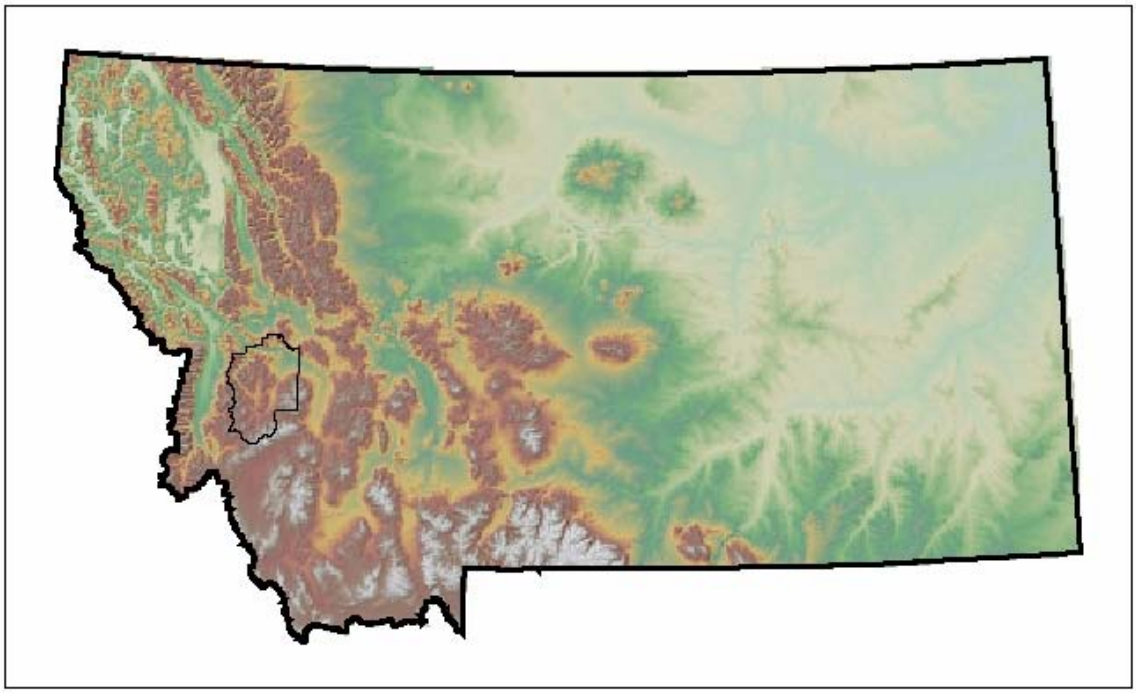
COMMUNITY WILDFIRE PROTECTION PLAN (CWPP)
Granite County, Montana



Prepared under contract to:

HEADWATERS RC&D AREA, INC.
Economic Development District
305 W. Mercury, Suite 211
Butte, MT 59701

Prepared for:

GRANITE COUNTY, MONTANA

Prepared by:

FoxLogic, LLC
Natural Resource Management & Planning
P.O. Box 411
Florence, MT 59833

In cooperation with:

CONCERNED GRANITE COUNTY STAKEHOLDERS

NOVEMBER 2005

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PLAN ACCEPTANCE

Local Government

Commissioner, Clifford Nelson

Commissioner, Joanne Huffsmith, Chair

Commissioner, Suzanne Browning

Local Fire Departments / Emergency Services

Philipsburg Volunteer Fire Department, Chief,
David Ray

Drummond Volunteer Fire Department. Chief,
Dan Bolster

Georgetown Lake, Volunteer Fire Department,
Administrative Chief, Jeff Brock

Disaster and Emergency Services, County
Coordinator, James Minor

Philipsburg Fire Warden/Sheriff, Steve Immenschuh

State Forest Management

Montana Department of Natural Resources
District Fire Supervisor, Tad Kolwicz

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EXECUTIVE SUMMARY

The Community Wildfire Protection Plan (CWPP) for Granite County, Montana has been developed through a contract between the Headwaters Resource Conservation & Development Area, Inc. (HRCD) and the Bureau of Land Management (BLM) with the cooperation and participation of Granite County. The HRCD entered into a contract with Fox Logic, LLC (Fox Logic) of Florence, Montana to develop stakeholder collaboration, conduct stakeholder meetings, perform research, and carry out other activities necessary to produce a CWPP for Granite County.

Purpose Statement

The purpose of the CWPP is the generation of management recommendations that protect values at-risk from wildfire in the wildland-urban interface (WUI) including lives, homes, businesses, and essential infrastructure (e.g., escape routes, municipal water supply structures, and major power and communication lines), with appropriate consideration for other community values.

To avoid confusion, the terms “goal” and “objective” are not used to describe the intent of the CWPP. Rather, a “purpose statement” is used to stimulate discussion for CWPP development.

Overview

Development at the edge of forest or grassland areas is conducted in what is referred to as the WUI. This unique zone where structures meet or intermingle with undeveloped wildland or vegetative fuels is an area with potential to be at an increased risk to wildfire. Characteristics that make the WUI an attractive area to live in also make fire fighting and emergency response dangerous, difficult, and very expensive. To make matters worse, a buildup of vegetation, resulting from decades of fire suppression and recent drought have increased the risk and probability of catastrophic wildfire in many areas of the WUI. Through the development of a CWPP, Granite County aims to reduce the risk of catastrophic wildfire and its potential consequences in the WUI.

The CWPP is a tool designed by and for at-risk WUI communities to pre-plan and improve their capability to negate and/or survive wildfire. The United States Healthy Forests Restoration Act of 2003 (HFRA) encourages the development of CWPPs. Section 101(3) describes a CWPP as a plan that:

1. Is developed in the context of the collaborative agreements and guidance established by the Wildland Fire Leadership Council and agreed to by the local government, local fire department, and state agency responsible for forest management, in consultation with interested parties and the federal land management agencies that manage land in the vicinity of an at-risk community;
2. Identifies and sets priorities for areas needing hazardous fuel reduction treatments and recommends the types and methods of treatment on federal and non-federal lands that will protect one or more at-risk communities and their essential infrastructure; and
3. Recommends measures to reduce the chance that a fire will ignite structures throughout an at-risk community.

Stakeholders and Plan Development

The development of the CWPP required active collaboration of interested Granite County stakeholders. Principal CWPP stakeholders included the local government, the local fire departments, and the Montana Department of Resources and Conservation (MT DNRC), with technical support and resource management input also received from the United States Department of Agriculture: Forest Service (USFS) and BLM.

Fox Logic invoked discussions with and received feedback from the public, private organizations, and federal, state, and local agencies to identify wildfire risks, priority areas, priority projects, and mitigation activities. Planning was based on verbal input from stakeholder meetings held during the spring of 2005 and written responses submitted to Fox Logic by interested entities. Input from public stakeholder groups was additionally encouraged through solicitation letters sent directly to potential stakeholder groups and public notices published in local newspapers (Appendix A and Appendix B).

To further maximize stakeholder outreach, a draft of the Granite County CWPP was mailed on CD ROM to a group of core stakeholders on October 12, 2005. After a two-week review period stakeholder comments were incorporated, and on October 30, 2005 the Final Draft, was posted via the Internet on the Fox Logic website. Notification of this Internet posting was issued through email/traditional mail to all previously identified stakeholders. Finally, copies of the completed document were sent to the HRC&D office in Butte, MT and County Disaster and Emergency Services (DES) office in Philipsburg, MT in mid November 2005.

Healthy Forests Restoration Act (2003)

The purpose of the HFRA is to support projects that carry out fuel treatments in and around at-risk communities under the National Fire Plan and the Western Governor's Association, 2001, *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy*.

The HFRA provides monetary aid for at-risk communities that complete CWPPs and expedites National Environmental Protection Act (NEPA) procedures for authorized fuel reduction projects on federal lands in the WUI.

The USFS and BLM are directed in accordance with *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan* (May 2002) to:

- "Develop an annual program of work for Federal land" in Granite County "that gives priority to authorized hazardous fuel reduction projects that provide for protecting at-risk communities or watersheds or that implement CWPPs" (HFRA Section 103(a)).
- Consider recommendations made in the Granite County CWPP in the generation of annual work plans for federal land (HFRA Section 103(b)(1)).
- Provide that financial assistance for authorized hazardous fuel reduction projects on non-federal land in Granite County will be allocated by federal agencies based on CWPP recommendations (HFRA Section 103(d)(2)).

The Wildland-Urban Interface

Section 101(16)(B)(ii)) of the HFRA offers a definition of Wildland-Urban Interface (WUI) but communities are also encouraged to use the CWPP process to derive their own definition of WUI within their county. Granite County has defined its own WUI. The Granite County WUI definition includes:

- A WUI protection area including and extending four miles from the HFRA-defined WUI
- An area extending one mile on each side of a primary egress/ingress route
- An area extending one mile on each side of a major power line

Protection Priorities

The Granite County WUI was broken into four 1-mile-wide zones of diminishing protection priority extending concentrically away from the center of the WUI defined by the HFRA. Each protection zone is incrementally ranked with reduced protection priority as distance from the center of the WUI increases. Protection ranking is one of four factors used in determining mitigation priorities for the Granite County CWPP.

Risk Assessment

To illustrate the level of wildfire risk and facilitate planning for Granite County, the four WUI priority protection zones were used in conjunction with three other factors to delineate the WUI into high-, medium-, and low-risk land areas. Wildfire risk factors are determined by three factors:

- Potential Fire Behavior
- Ignition Probability
- Fire Regime Condition Class

The best available information, science, and technology were used in the prediction of Granite County fire conditions. Three geographic information system (GIS) model/mapping projects provided information critical to the scientific evaluation of the County land area. In addition, local fire authorities were asked to evaluate their emergency response capabilities within their respective fire protection districts and throughout the County.

Implementation, Monitoring, and Review

County stakeholders generated a short list of wildfire mitigation strategies that may be used to reduce WUI risk conditions. Further higher detail planning will need to be completed before mitigation activity can occur. Higher detail plans will incorporate one or many of the following strategies ranked by order of decreasing level of consideration:

- Fuels Management
- Education/Prevention
- Planning
- Development
- Training
- Inter-Agency Cooperation

Building on the mitigation strategies outlined above, the CWPP also contains information on reducing risks to structures. Recommended measures specifically address issues immediately around and in the individual structures at-risk within the WUI. Concepts introduced are primarily borrowed from the Firewise™ program.

Possible fire mitigation action will be implemented according to a diminishing level of risk and is referred to in the Plan as a fire mitigation priority rating (FMPR). A 10-year schedule beginning in 2005 and ending in 2015 addresses very-high-risk and high-risk areas first, medium-risk areas second, and all remaining areas and previously treated areas last. It is anticipated that 10 and 5 percent of the first and second priority implementation acreages respectively can be treated by 2015. It is not expected that a significant area of third priority, low-risk areas and maintenance of previously treated areas will occur during the first 10-year CWPP implementation period.

To ensure appropriate implementation of the Plan, the formation of a Monitoring Committee is recommended. This committee formed under the auspices of the County Fire Council, should conduct a minor review every year and a major review of the Plan in year 9 of implementation. Major review can also be initiated at any time during the life of the CWPP as determined by the Monitoring Committee.

BACKGROUND

General Information

Located in west-central Montana, Granite County extends north into the Garnet Mountain Range and the Blackfoot River drainage, west to the peaks of the Sapphire Range, south to the upper reaches of the upper Rock Creek watershed, and east to the top of the Flint Mountain Range (Figure 1). Granite County encompasses 1,731.2 square miles and contains mid to high-elevation mountain ranges that extend up to 8,000 feet above mean sea level. Habitats range from dry grassland in the Flint Creek Valley to forested mountains that flank the County.

Philipsburg is the largest city in the County and is at the heart of a rich mining heritage dating back to the mid to late 1800s. Philipsburg is centrally located in the County and acts as the Granite County seat (Figure 1). Historic mining activities throughout the County and in adjacent Counties supplied thousands of tons of metal-rich ore and fueled a thriving Montana economy.

Ranching and timber harvesting remain the major natural resource industries in Granite County and account for 21.1 percent of the industrial job market (Census 2000). Though ranching remains a significant way of life for many Granite County residents changes in the economy have resulted in many large ranches being put up for sale and/or sub-divided and inevitably creating more development of rural areas.

Georgetown Lake, located in the southeast corner of the County, is the largest body of water in Granite County (Figure 1). Many small lakes, streams, and the Clark Fork River can be found in Granite County. Larger creeks in the County include Rock Creek and Flint Creek, both of which are tributaries to the Clark Fork River.

Climate

The National Weather Service station at the Philipsburg United States Department of Agriculture: Forest Service (USFS) Ranger Station has maintained records since 1955. Record review indicates that the area is subject to a continental weather regime experiencing a maximum annual average daily temperature of 55.3 degrees Fahrenheit and minimum of 27.5 degrees Fahrenheit (WRCC 2004). The warmest month of the year is July with an average maximum temperature of 80.0 degrees Fahrenheit and the coldest month is January with an average low of 13.3 degrees Fahrenheit. Average annual precipitation in Philipsburg is 14.47 inches. June is the wettest month with 2.40 inches and February is the driest with 0.47 inches.

Local small-scale variability in temperature and moisture occur throughout the County because of natural terrain variation. Generally, moisture levels tend to be highest at middle elevations, on north-facing slopes, and in sheltered valleys (Barnes et al. 1998). Relatively dry sites can be found on low, south-facing sites and high-elevation, windy ridges. Temperature is also affected by terrain. High-elevation terrain and shaded, north-facing slopes at lower elevations are generally cooler, while low elevation sites and south-facing slopes tend to be warmer.

POPULATION AND DEVELOPMENT

Total County-wide population in 2000 was estimated by the U.S. Census Bureau at approximately 2,830 people, an 11.1% increase from 2,548 recorded during the 1990 census. The city of Philipsburg has historically been and currently remains the largest city in Granite County; with a population of 914 or 36% of the County total (U.S. Census 2000). Outside of Philipsburg, most residents live in Drummond or along the Interstate 90 and Montana Highway 1 corridors.

Although Granite County has not experienced the population influx seen in many communities in western Montana, it has seen growth in the number of developments where the wildland and the urban setting commingle such as the Georgetown Lake area.

Wildland-Urban Interface

Developed land at the wildland interface is referred to as the wildland-urban interface (WUI). More specifically, the WUI is defined as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels,” as stated in the Glossary of Wildland Fire Terminology (NWCG 1996). The tremendous risk to life, property, and infrastructure in WUI communities and the dangerous and complicated situations firefighters face have driven community wildfire protection planning efforts.

Granite County has many areas where structures and undeveloped wildland commingle with approximately 1,396 houses outside the major urban clusters in the County (Census 2000). WUI issues are not just a local problem; an estimated 42 million homes or 37 percent of the nation’s total homes lie within the WUI. These lands constitute 273,000 square miles or nine percent of the lower 48 states (USFS 2004). Specific WUI issues and statistics including exact size, extent, and changes within have not been well identified.

LAND USE AND HISTORY

A large percentage of terrain in Granite County consists of rolling hills or rugged mountains separated by areas of broad open valley. Sagebrush-juniper habitat, coniferous forest, and in many places, coniferous forest with a deciduous quaking aspen or mountain alder component, occur throughout the upland area of the County (Figure 2). Tree species found in the County include Douglas-fir, black cottonwood, juniper, lodgepole pine, quaking aspen, ponderosa pine, sub-alpine fir, western larch, and whitebark pine. Wildland structure and composition are highly variable and change naturally with elevation, aspect, geology, and fire history.

A significant portion of land area is covered with a mosaic of forest and grassland that was historically important for logging, and cattle ranching (Figure 3). Public land management agencies and private landowners once intensively managed large portions of County forest for natural resource production. Recently much of the large-scale forest resource industry has ceased to exist, with Plum Creek Timber and Stimson Lumber remaining the only sizable timber companies in production. Agriculture continues to play an important economic role in Granite County with much of the valley bottomland and inter-mountain prairie, located primarily in a north-south strip through the center of the County, remaining in livestock and crop production. Most of these agricultural lands are by and large privately owned.

Land Ownership/Administration

Land in Granite County is owned/managed by six primary entities: private non-industrial landowners, USFS, BLM, Montana State, U.S. Fish and Wildlife Service, Plum Creek Timber Co., and Stimson Lumber Co. (Table 1) (Figure 3).

Owner	Acres	% of Total
U.S. Forest Service	661,736	59.7
Private	337,461	30.5
Plum Creek Timber Co. and Stimson Lumber Co. Lands	41,413	3.7
Bureau of Land Management	38,864	3.5
State Trust Land	20,572	1.9
Private Conservation	5,390	0.5
Local Government	11	0.0
Other State Land	5	0.0
TOTAL	1,107,977	

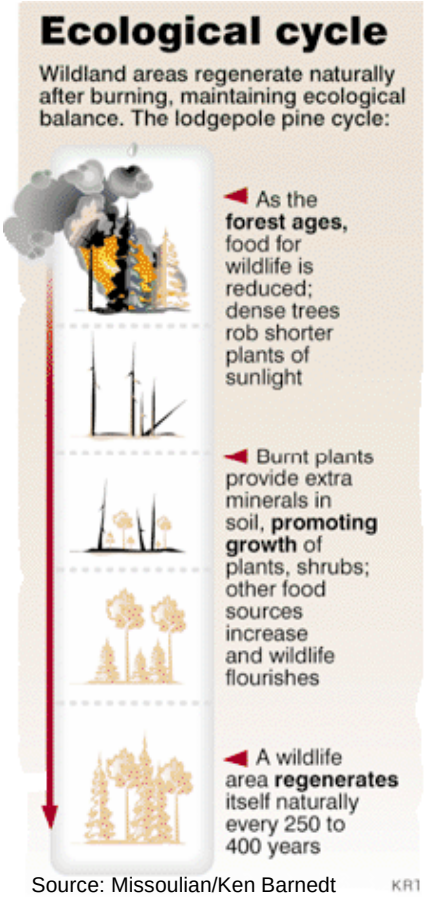
Source - MT NRIS 2004

Table 1 – Community Land Ownership/Management

Historic Fire Occurrence

In Granite County and throughout the inter-mountain west, the majority of wildfires occur in July, August, and September. During these months high temperatures, dryness, and an increased incidence of lightning strikes create conditions conducive to the ignition and rapid spread of wildfire.

Before European settlement during the 1800s, numerous large and small fires occurred periodically throughout the region. Area forests have been historically subject to a specific natural fire regime. USFS researchers, Agee 1993 and Brown 1995, describe the role of naturally occurring fire in the absence of modern mechanical intervention. These natural fire regimes fall into one of five accepted historic fire regimes further developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001): (1) frequent, low-severity; (2) frequent, high-severity; (3) moderate-frequency, mixed-severity; (4) moderate, high-severity; and (5) infrequent, high-severity fires. An illustration of the ecological cycle and the natural role of fire in an infrequent, high-severity fire regime lodgepole pine forest is depicted below.



Source: Missoulian/Ken Barnedt

During the 20th century, fire policies dictated that public land management agencies and private landowners suppress wildfires throughout the west, including Granite County. These policies were likely the result of a desire by the public to protect the aesthetic beauty of the forest as well as the notion that fire destroyed monetary returns from forest products. Fires have been construed, by many, as a destructive force, one that needed to be eliminated as soon as possible.

Policies and attitudes are slowly changing; fire within the Granite County landscape is more accepted than ever and is considered by many to be natural and necessary for the general health of the greater regional ecology. Widespread fire suppression has denied the natural role of a major ecological force in forests and has generally resulted in negative impacts to forest health within the inter-mountain west. The negative impact of fire suppression can be observed in the forested areas of the County, of which many areas are over-stocked, insect- and disease-infested, and fire-prone. Devastating insect outbreaks alone in western Montana's forested areas affected nearly 200,000 acres in 2004 (Meyer 2004). Deteriorating forest health and vigor, resulting largely from fire exclusion, and sustained drought, along with increased development in remote areas has resulted in a potentially high- risk WUI fire situation. Continued public education and outreach effort needs to further emphasize the natural role of fire and alternatives to allowing natural fire in the WUI landscape.

Many area forests ecologically adapted to burning as frequent, low-severity; moderate-frequency, mixed-severity; or infrequent, mixed-severity fire regimes now, once ignited, burn as an infrequent, high-severity fire that threatens human life, structures, and the environment.

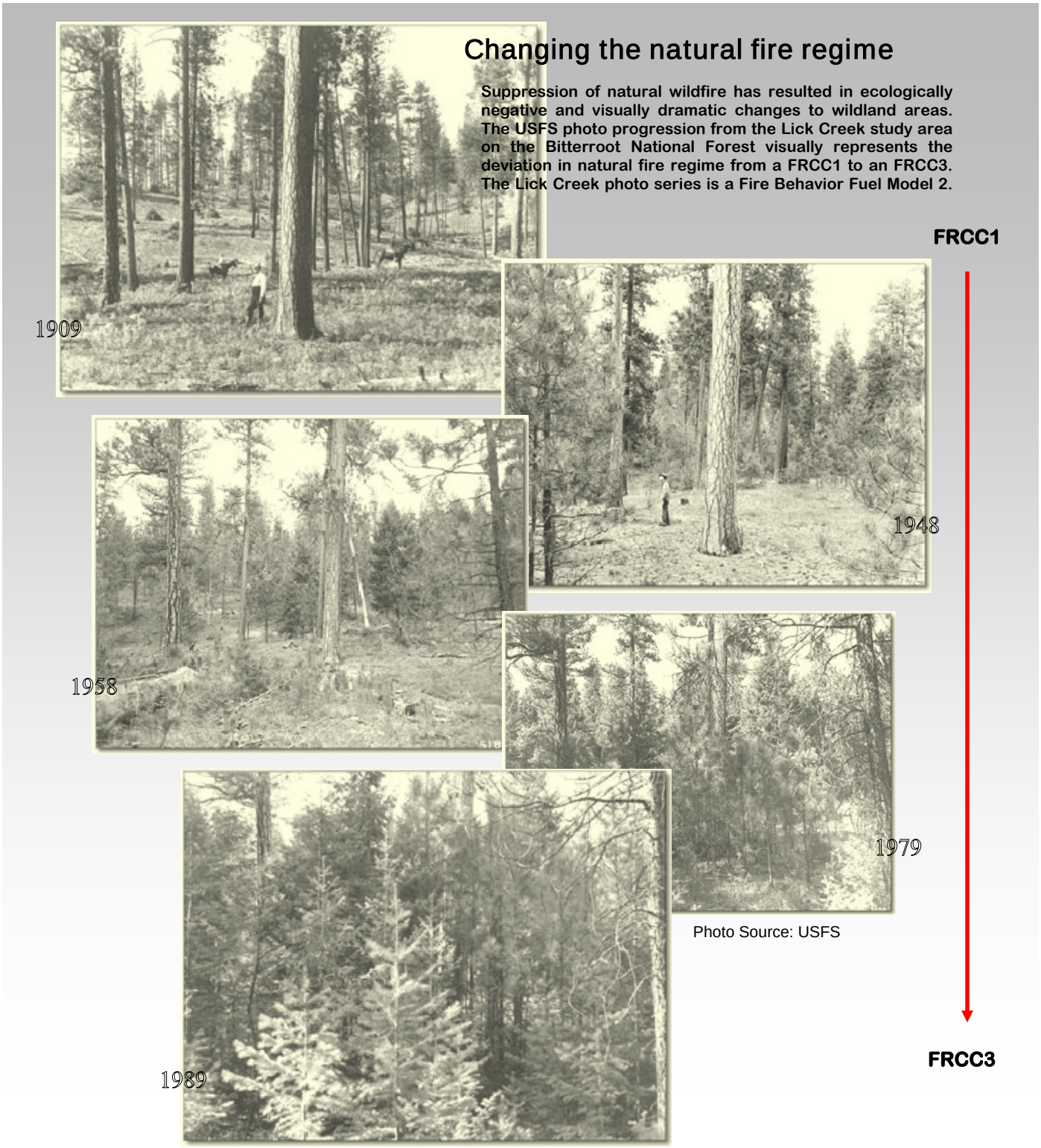


Photo Source: USFS

Forests exhibiting a change of fire regime are classified by departure from the natural fire regime by fire regime condition class (FRCC) (Hann and Bunnel 2001).

It has been suggested by Dr. Stephen Arno, a leading fire ecologist recently retired from the USFS, that "(h)igh fuel loadings," caused by fire exclusion, "eventually will be reduced by decay, fire (wildfire or prescribed fire), or removal" (Arno 1976). Forest fuel decay is too slow due to the cool, dry nature of the region's forests in Arno's opinion, so where fuel reduction programs are not established, nature may reduce fuel loads through large, uncontrolled wildfire (Arno 1976). Recent major fire years may provide support for this hypothesis.

Though fire suppression continues to be very good, with the majority of fires being extinguished while small, an increase in the average size of fires that cannot be suppressed, and the frequency with which those fires threaten the WUI is on the rise. It is these wildfires, and the potential for large catastrophic wildfire, which alarms fire managers and most citizens. Luckily, recent large damaging fires have not had high environmental, social, and economic impact on Granite County, but increasing probability of more damaging wildfire(s) in the County's WUI continues to rise as wildland conditions deteriorate and interface development continues to rise.

Local Fire Statistics

Fires that occur in Granite County are recorded in a database managed by the commanding fire agency. Because each fire respondent maintains their own record of a fire there are two primary databases for which fire information has been compiled for Granite County. These two fire databases, one for federal agencies and one for the MT DNRC information, were consulted to provide historic information on wildfire within Granite County.

The USFS and BLM fire records were compiled using the FireFamily Plus software package in which fires have been recorded since 1968. The software allows the user to assess and report many fire factors including fire year, size, and cause. Data queries for Granite County proper were not possible due to fire statistics being broken out by agency management areas, which do not correspond to County boundaries.

Table 2 on the next page was generated from user specified variables, input into FamilyFire Plus, to query federal agency fires on the USFS Beaverhead-Deer Lodge National Forest, Deer Lodge Resource District and BLM Butte and Missoula Districts. Though the agency management areas queried cover an area greater than Granite County, the fires reported are representative and do include fires in Granite County proper. Table 2 provides a concise summary of historic wildfires that have occurred in and around the County that were responded by federal agencies.

According to the output generated by FamilyFire Plus software and the MT DNRC database (records compiled since 1981) provided by the MT DNRC Southwestern Land Office (MT DNRC 2005), a total of 3,106 fires have burned 199,351 acres. The majority of fires occurred in the month of August, were most often caused by lightning, were usually less than one acre in size, and generally lasted less than one day before being extinguished.

A combined analysis of federal agency and the MT DNRC data indicates 65 percent of fires were caused by lightening and remaining 35 percent were human caused. Of the total human-caused fires, an alarming 46% were caused by escaped debris burning fires.

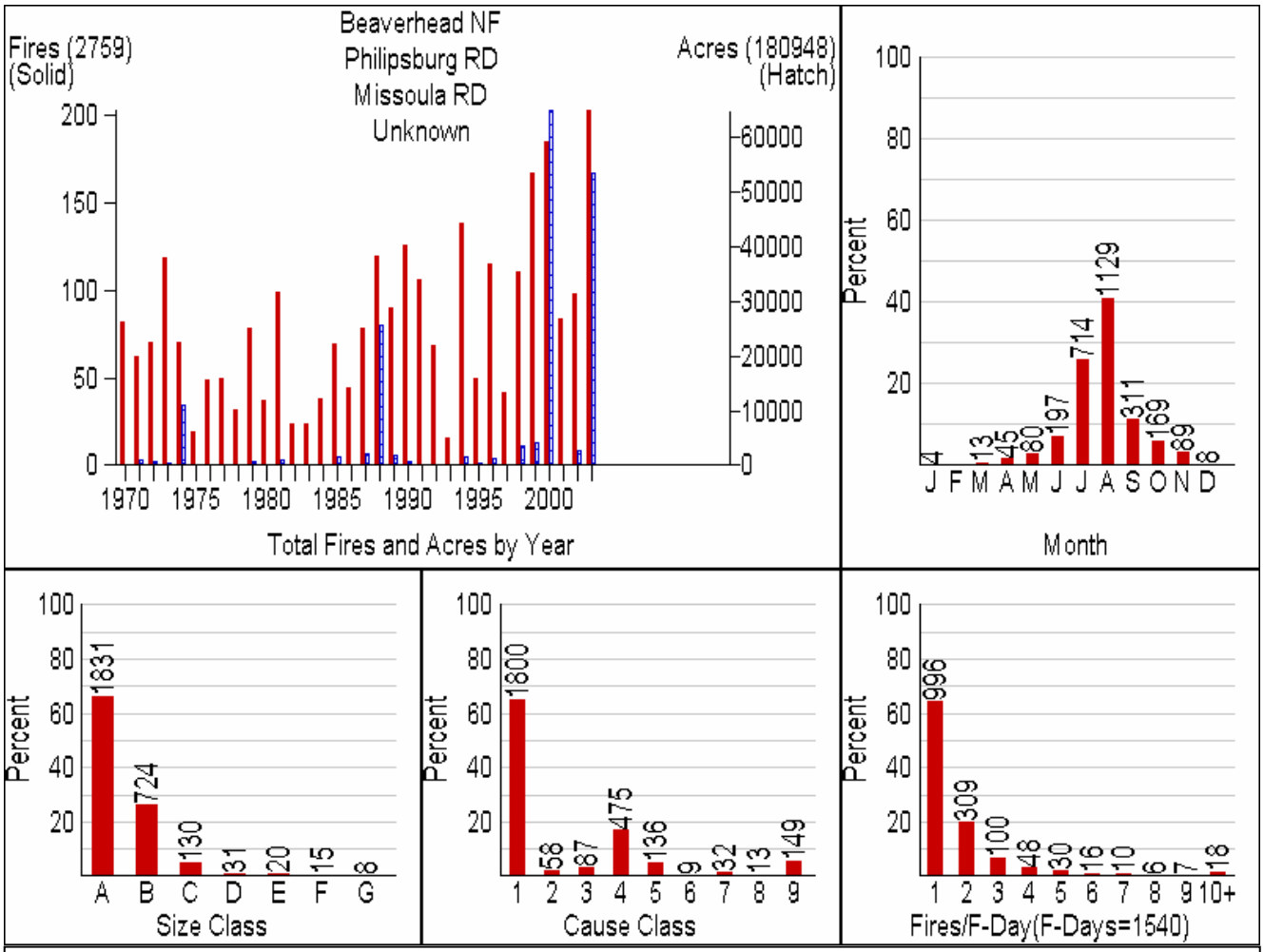


Chart Legend

Size Class (acres) – A (0-0.2), B (0.3-9.9), C (10-99.9), D (100-299.9), E (300-999.9), F (1000-4999.9), G (5000+)

Cause Class (type) – 1 (Lightening), 2 (Campfire), 3 (Smoking), 4 (Debris Burning), 5 (Arson), 6 (Equipment), 7 (Railroad), 8 (False alarms), 9 (Powerline)

Chart 1 – Granite County Area Federal Agency Fire Statistics

VALUES AT-RISK

Granite County stakeholders have identified values at-risk to loss during catastrophic wildfire. As set forth in the Montana Code Annotated (7-33-2202), the County is responsible for the protection of the County's range, farm, and forestlands from fire. This statute aims to protect areas with manmade and natural values at-risk from wildfire. Specific manmade values at-risk within the WUI include lives, homes, businesses, historic structures/districts, and essential infrastructure (e.g., escape routes, municipal water supply structures, and major power and communication lines). Natural values at-risk include the surface water quality, ecological stability, and forest resource health.

Though all values at risk, described below, are considered very important and deserve protection from the impact of wildfire, the protection of human life is of paramount importance, then the protection of critical infrastructure, structures and improvements, followed by protection of forest resource values.

Risk Defined...

Function: noun
Etymology: French risque, from Italian risco
1 : possibility of loss or injury : PERIL
2 : someone or something that creates or suggests a hazard
3 a : the chance of loss or the perils to the subject matter of an insurance contract; also : the degree of probability of such loss b : a person or thing that is a specified hazard to an insurer <a poor risk for insurance> c : an insurance hazard from a specified cause or source <war risk>

Source: Merriam-Webster Dictionary

Human Life

Loss of non-firefighter life due to wildfire is not statistically high but is of paramount importance to prevent. It is estimated that as many as 3,931 residents live in the Granite County WUI. Although, these individuals are not likely to stay in harms way during a wildfire they may be inadvertently at risk of being trapped and killed during a catastrophic fire. Evacuation plans are in place for the County and are discussed at greater length in the Emergency Operations Plan (EOP).

Where civilians are not likely to be present during a wildfire event, firefighters will likely be in the area. Firefighters are faced with trying to protect natural and manmade values and human-life from wildfire while not placing themselves in peril. Though very well-qualified and trained to do their job the dangerous conditions they encounter are continually changing and pose a constant threat to life. No record of fire-cause fatalities could be found for Granite County.

The National Wildfire Coordinating Group (NWCG) has developed a system, the fire danger pocket card, to better inform firefighters of the local-current fire danger. Factors that increase firefighter danger vary with geographic region, local weather, vegetation type, slope, time of year, and time of day. The pocket card is developed using historic local weather conditions and a fuels model representative of a wildland area currently burning. The card also presents condition data that has lead to previous major wildfires in the area.

An index such as the energy release coefficient (ERC), derived on a day-to-day basis by fire behavior specialists, is given to firefighters at the daily fire event briefing. An interpretation of fire danger can be made from that day's index using the pocket card. An example of one possible Granite County area pocket card is presented in Table 3.

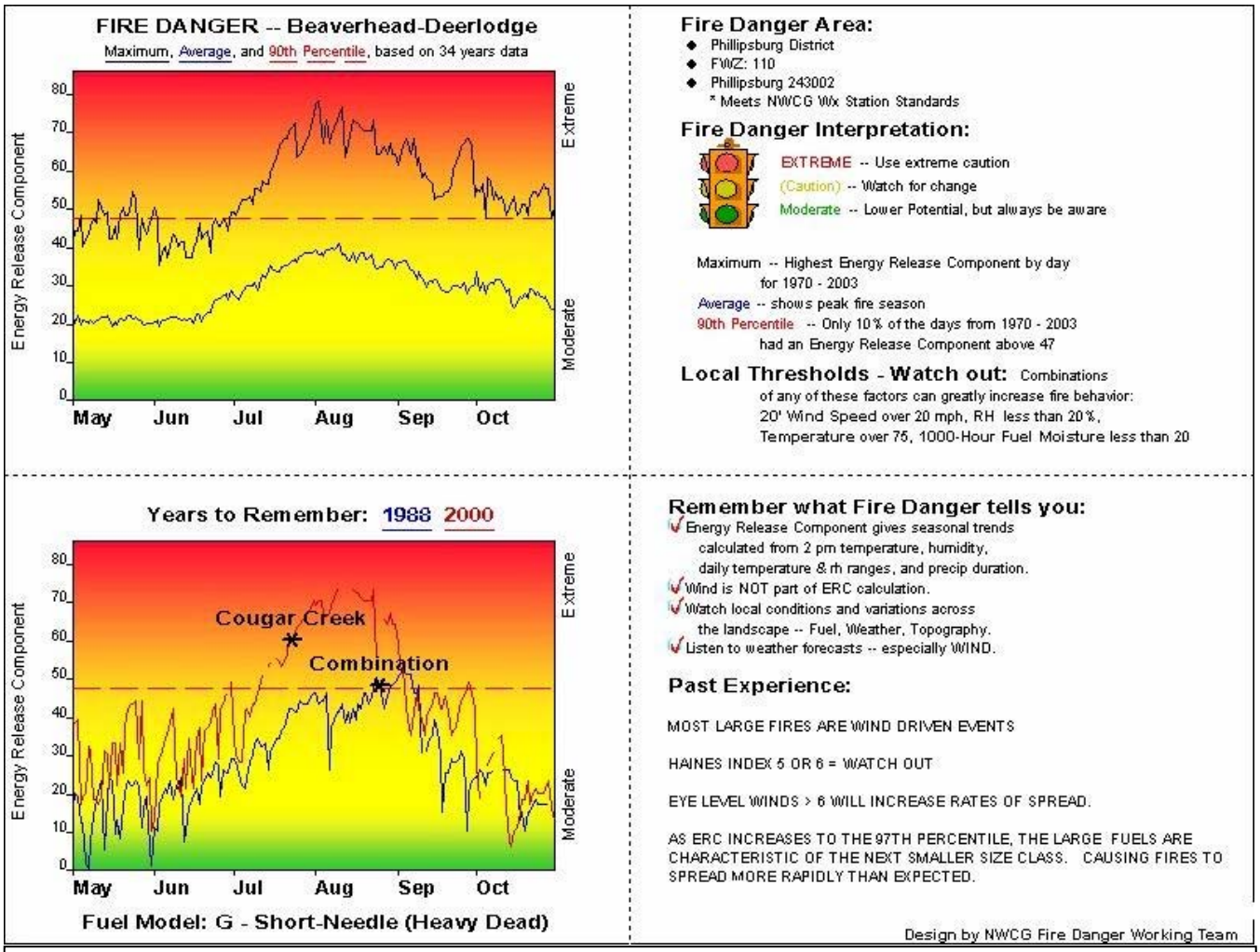


Table 3 – Granite County Area Fire Danger Pocket Card

WUI Structures

The monetary value of WUI homes is estimated using 2000 US Census data of the total 2,074 houses present in the entire County 678 are listed as being in Philipsburg and Drummond. The remaining houses total 1,604. As these housing units are outside the urban unit boundary designated by US Census they are regarded as WUI structures. Multiplying the 2000 US Census average house value for Granite County, $78,300, by the number of estimated WUI houses results in a cumulative WUI housing value of $109,306,800.00. This value reflects only the monetary WUI house value and does not account for the monetary value of other improvements or personal effects that may be at risk to wildfire.

Significant Sites

The *National Register of Historic Places* contains 9 listed sites in Granite County, all of which are located within the city of Philipsburg (National Park Service 2004). Many other mining sites throughout the County are not listed in the Historic Register but are of historical significance to the community and may warrant safeguarding.

Forest

The monetary value of the forest in Granite County is difficult to assess as its values for recreation, aesthetic, carbon sequestration, clean water, etc. are difficult to assign monetary values to and may considered by some to be invaluable.

Assigning a monetary value for standing timber, as a potential commercial resource is easier to calculate. Presently and historically important to the County, there are approximately 192,021 acres of commercial timber in Granite County (HRC&D 2005). Using the taxable dollar value for fair value forestland of $599.25/acre provided by the Montana Department of Revenue (MT DOR 2005) the total taxable value the County's forestland is $115,068,58.25.

FIRE PREPAREDNESS

A community's ability to fight wildland and/or structural fire once ignited is determined by its capacity to respond, confine, contain, and control a fire incident. Granite County has six volunteer fire departments (VFD) with over 160 volunteers representing four rural fire districts charged with primary response to emergency wildfire incidents throughout the County. The VFD crews also work with USFS, BLM, MT DNRC, and municipal fire departments to provide initial attack response and support for these fire incidents. Wildfire protection agreements are in place to provide mutual aid between all capable response departments and agencies for the County and adjacent counties. Fire suppression jurisdictions for each of the agencies or departments are depicted in Figure 4.

VFD personnel are skilled, trained, and equipped to respond to many WUI wildfire incidents. During bad wildfire years, VFD crews and equipment have been pushed to the limit of their response capabilities. Continued interface development, further forest condition deterioration, increasing live and dead forest fuel concentration, and sustained drought have the potential to place even greater demands on fire response crews.

Granite County has recently completed a pre-disaster mitigation plan (PDM) with the aim to improve overall emergency preparedness for the County where necessary. The PDM recommendations and conclusions overlap the CWPP in the area of County fire defense and preparation. This CWPP document will be included as an annex section to the PDM.

Critical Facilities At-Risk

Fire preparedness depends on resources being available for firefighting. Critical facilities in the WUI that are at-risk to potential catastrophic wildfire include the Georgetown Lake Fire Stations (two in Anaconda-Deer Lodge and one in Granite County). These fire facilities are critical to fighting wildfires and loss of the structures as a result of fire would in turn leave inadequate firefighting resources within the County. The MT DNRC has created an area around the structures that will enable defense from wildfire.

One of Three Georgetown Lake VFD Stations
Photo Source: Russell Fox

A planned rural fire department station for the Maxville area needs to be built with an area of defensible space surrounding it to ensure the site is secure in the event of a catastrophic wildfire.

Please refer to the PDM for further information and discussion of critical- and non-critical facilities and vulnerable structures in the remainder of the County.

Critical Egress/Ingress Routes

Access to and from populated areas of the County is important for emergency response for firefighters and for residents during a catastrophic fire event. Firefighters need trouble-free access to and from subdivisions so that they may provide the most effective response for

structure and life protection. Residents also need the opportunity to retreat from WUI areas in the face of wildfire.

Many populated areas throughout western Montana, including Granite County, have subdivisions with only one route of egress/ingress, roads of inadequate width, bridges of limited weight-bearing capacities, and high fire fuel loads within close proximity to the roadway. These are just some of the many situations that may compromise the protection and evacuation of WUI areas.

Nearly all of Granite County's existing WUI subdivision access roads have at least one egress/ingress risk element listed above in need of improvement. Many have multiple problems. Most roads now used for subdivision access were originally established for resource extraction purposes and now would greatly benefit from multiple egress/ingress risk mitigation improvements to allow safe access and escape for the growing number of WUI residences.

Though there are many roads in Granite County that may be compromised in the event of wildfire, one of significant importance, in an area of high risk, is Montana State Highway 1 through the Maxville Valley area. This area of highway is of significant importance as it is the primary access route to a large portion of the south Granite County including the town of Philipsburg.

Fire Fighting Equipment

The fire departments in the County are equipped with numerous wildland firefighting tools and techniques. Information gathered from the fire chiefs through meetings and correspondence indicated no major wildfire fighting equipment shortages are present but did indicate that training and volunteer recruitment, and general equipment inventory is always in need of improvement. It is recommended that excessively old engines/tenders in questionable condition or equipment with outdated or with hard to find parts, must be upgraded within the next five years. The Table 4 lists the resources available in the County as described in the *2004 Granite Annual Wildfire Operating Plan.*

Development Requirements

There is currently no Granite County subdivision planning guideline for wildfire prevention and protection. Though, a draft County-wide subdivision development policy for high wildfire hazard areas is being developed by the Philipsburg Fire Chief, David Ray. This development policy guideline will likely contain wildfire and fire suppression wording such as that contained in the Montana Model Subdivision Regulation (MT DOC 2003) provisions for wildfire. The following excerpt from the model regulations pertains to high wildfire hazard areas under subdivision development.

> "For areas identified as wildfire hazard areas by the United States Forest Service, the Montana Department of Natural Resources and Conservation, a local fire protection authority, or a local growth policy, the following apply:
>
> A. A Fire Prevention and Control Plan must accompany the submission of any application for preliminary plat approval.

Units	Equipment	Capacity (gallons)	Pumping Rate (gpm)
	Philipsburg Fire Department		
1	1964 Ford Engine	500	300
1	1973 Ford Engine	200	500
1	1975 Kenworth Tender	3,000	--
1	GMC Engine	500	250
1	1986 GMC Type 6 Engine	200	100
	Georgetown Lake Fire Service Area		
1	2002 International 4X4 Engine	1,000	1,250
1	1980 Ford Engine	1,000	750
1	1976 Walters 4X4 Engine	600	750
1	1972 Ford Engine	500	1,250
2	1985 International	3,000	--
1	1985 Ford Engine 4X4 Engine	250	100
1	1974 Dodge Engine	2,600	350
1	1975 Dodge Tender	5,000	660
1	1984 Ford 4X4 Pumper	--	750
1	Floating Pump	--	100
1	Portable Pump	--	100
1	Porta-tank	3,000	
	Valley Rural Fire District		
1	1964 Chevy Engine	750	250
1	1986 Mack Engine	750	1,250
1	1971 Chevy Tender	1,200	50
1	1992 Ford Engine	200	100
1	1989 GMC 4X4 Engine	200	100
1	1986 GMC 4X4 Engine	200	100
2	Portable Tank	1,500	--
1	Portable Tank	2,000	--

Units	Equipment	Capacity (gallons)	Pumping Rate (gpm)
	MT DNRC Equipment		
	Anaconda Unit		
3	Engine 4X4 Type 6	300	100
1	Engine 4X4 Type 3	500	2500
1	Pump Trailer w/ 2 Mark 3 Pump	--	?
	with (2) 1600' hoses	--	--
1	Floto-Pump	--	?
1	Honda Mini-Pump	--	?
1	1 Ton Cargo Truck	--	--
1	6 Passenger Suburban	--	--
2	Honda Trail Bike	--	--
1	Polaris 4X4 ATV	--	--
	Garison Initial Attack Station		
2	Engine 4X4 Type 6	200	100
2	Engine 4X4 Type 6	300	100
1	Engine 4X4 Type 3	750	250
1	Honda Mini-Pump	--	?
1	Floating Pressure Pump	--	?
1	Honda Trail Bike	--	--
1	Polaris 425 4X4 ATV	--	--
1	Pump Trailer w/Mark 3 Pump		
	with 1600' hose	--	--
			--
	Missoula Unit		
2	Engine 4X4 Type 6	300	100
2	Engine 4X4 Type 6 (1 staffed)	200	100
2	Engine 4X4 Type 4	500	100
	USFS Equipment		
	Philipsburg		
2	Engine Type 6	200	?
1	Engine Type 4	1,000	?
3	Mark 3 Pumps	--	?
1	Floto-Pump	--	?
2	Shindawa Pumps	--	?

Table 4 - County Cooperative Fire Equipment

B. The Fire Prevention and Control Plan must include the following items:
(i) an analysis of the wildfire hazards on the site, as influenced by existing vegetation and topography;
(ii) a map showing the areas that are to be cleared of dead, dying, or severely diseased vegetation;

(iii) a map of the areas that are to be thinned to reduce the interlocking canopy of trees;
(iv) the identification of roads, driveways, and bridges that are sufficient for emergency

vehicle access and fire suppression activities. Slopes of all roads and driveways must be provided.

C. At least two entrances/exits must provide escape routes for residents and access to the subdivision by fire-fighting vehicles. Bridges providing access to the subdivision must be built to a design load of 20 tons and constructed of non-flammable materials. Road rights-of-way must be cleared of slash.

D. Building sites may not be located on slopes greater than 25 percent or at the apex of “fire chimneys” (topographic features, usually drainage ways or swales, which tend to funnel or otherwise concentrate fire toward the top of steep slopes).

E. The Fire Prevention and Control Plan must be implemented before the governing body will approve the final plat, and will be considered part of the subdivider’s obligations for land development. The local fire chief, or designee, will inspect and approve the implementation of the Fire Prevention and Control Plan. The Plan will not be considered fully implemented until the fire chief has given written notice to the planning board or subdivision administrator that the Plan has been completed as approved by the (planning board).

F. Provisions for the maintenance of the Fire Prevention and Control Plan shall be included in the covenants, conditions, and restrictions for the development. A property owners’ association must be formed and designated to enforce the covenants, conditions, and restrictions.

G. Open space, park land, and recreation areas (including green belts, riding or hiking trails) should be located, where appropriate, to separate residences and other buildings from densely forested areas.

H. A water supply of sufficient volume for effective fire control must be provided in accordance with standards set by (the appropriate local fire protection authority).*

* In the absence of such standards, the subdivider must at least provide the following for effective fire control:

A. A central water system with a minimum flow of 1,000 gallons per minute; or

B. Cisterns, reservoirs or fill ponds at appropriate locations:
(i) For single dwelling units: minimum capacity of 2,500 gallons;
(ii) For 6 or more dwelling units: minimum capacity of 500 gallons per dwelling unit.”

FIRE AND INTERFACE RISK

Granite County's risk from wildfire is largely determined by a combination of four factors: the area of the county that lies within a defined Wildland-Urban Interface; what values are at-risk to wildfire in the defined WUI; the susceptibility of those values to wildfire; and the ability of the community to protect those values.

Granite County Wildland-Urban Interface

It is the opinion of Fox Logic and the Granite County stakeholders that there is no single definition of WUI that will work in all areas at-risk to wildland fire across the nation. The Granite County WUI definition builds upon the nationally recognized HFRA WUI definition.

At the stakeholder meetings and through electronic and traditional mail correspondence stakeholders were asked what they expected from the WUI definition and presented with examples of other existing definitions from the local and national level. The following WUI definition was developed based on stakeholder comment and reaction.

Healthy Forest Restoration Act: Wildland-Urban Interface

National HFRA WUI mapping has been compiled in part with funding by the USFS North Central Research Station and completed by the Applied Population Laboratory (APL) at the University of Wisconsin and Spatial Analysis for Conservation and Stability (SILVIS) at the Department of Forest Ecology and Management, Madison, Wisconsin. The SILVIS project used the following definitions and data to compete the HFRA WUI identification and mapping (Stewart et al. 2003):

- Housing Density

"Housing density information was derived from U.S. Census data. Analysis was conducted at the finest demographic spatial scale possible, Census blocks, from the 2000 Census. All measures of housing density are reported as the number of housing units per square kilometer."

- Landcover

"We utilized the National Land Cover Dataset (NLCD), a satellite data classification produced by the USGS with 30m resolution based on 1992/93 imagery and available for the entire U.S. (Vogelmann et al. 2001) to identify 'wildlands.' Our definition of 'wildlands' encompasses a range of management intensities. NLCD classes that we included as 'wildlands' are forests (coniferous, deciduous and mixed), native grasslands, shrubs, wetlands, and transitional lands (mostly clear-cuts). We exclude orchards, arable lands (e.g., row crops) and pasture."

- Wildland-Urban Interface (WUI)

"WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi(le) of an area (made up of one or more

contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI."

The SILVIS project identified a total of 2,448 WUI interface acres and 4,418 acres of WUI intermix, for a total of 6,866 acres of total WUI in Granite County (Stewart et al. 2003). It is felt, by stakeholders, that this number does not adequately reflect at-risk WUI area in the County.

Granite County: Wildland-Urban Interface

To ensure Granite County values are adequately protected during an extreme wildfire event it is necessary to expand upon the HFRA WUI defined by the SILVIS project. The following areas are included in the Granite County WUI definition:

- WUI Protection Buffer

A WUI protection area or buffer extending 4 miles out from the edge of the HFRA-defined WUI is included in the Granite County WUI. This protection area provides a distance away from values at-risk within the WUI in the event of extreme wildfire behavior. The buffer is designed to better ensure adequate emergency protection in the event of a catastrophic crown fire.

Source: Missoulian/Ken Barnedt

Crown fires are supported mainly in foliage (fuels) of the upper tree canopies in densely forested areas. Crown fires may promote spot fire ignition caused by convection-carried firebrands ahead of the main fire front making a fire much more difficult to contain, confine, and control. Not all wildland fires "crown," but when the condition occurs it is one of the fastest spreading and most intense types of fire, posing an especially high risk to human life

and County values in the WUI. Therefore, crown fire duration and rate of spread (ROS) were key factors used in the determination of a WUI crown fire buffer in the northern Rocky Mountains.

The 4-mile WUI definition adopted by Granite County is based on scientific modeling and research published in *Predicting Behavior and Size of Crown Fires in the Northern Rocky Mountains* (Rothermel 1991). Mr. Duane Harp, District Ranger, USFS, Helena National Forest completed interpretation and application of Rothermel's research.

Mr. Harp offered the two following methodologies and calculations, based on Rothermel's research, to derive an optimum WUI buffer distance that would minimize risk to community values during a crown fire and maximize emergency response opportunity. The calculations show how a fire may burn during a theoretical worst-case scenario crown fire.

WUI Buffer Calculation

Rothermel's research included the study of seven actual fires that produced crowning conditions. The fires occurred for a period of between two and five hours duration, with an average duration of 3.5 hours.

The average forward ROS of the seven crown fires was 1.4 miles per hour.

The average fire duration multiplied by the average ROS resulted in the determination of total distance the head, or front, of the fire spread during an average crown fire.

The average fire duration multiplied by the average ROS resulted in the determination of total distance the head of the fire spread during an average crown fire, 4.9 miles.

Alternatively, Rothermel's crown fire research data was used to calculate individual spread distances for each of the seven crown fires separately. Individual fire spread distances were summed and then divided by the total number of fires. The resultant number is equal to the average distance of fire spread, 3.7 miles.

Mr. Rothermel's research and Harp's calculations indicate that the 1.5-mile HFRA WUI area is not an adequate safety buffer during a worst-case crown fire scenario. Therefore, an expanded WUI protection area extending 4 miles outside the HFRA-defined 1.5-mile WUI will allow for better protection of values at risk from the forward progression of an encroaching fire where fire crowning conditions may exist. While the majority of wildfires are typically extinguished when small, the aforementioned methodology accounts for the minority of fires that cannot be caught and that become large running crown fires in heavy wildland fuels. The calculated 4-mile buffer should allow enough time (3.5 hours) for emergency crews to respond and complete evacuations during the worst-case fire.

Problem Subdivision Road
Photo Source: Russell Fox

- Road Buffer

Primary and secondary highways that provide egress/ingress for County residents and fire protection departments/agencies were assigned a 1-mile buffer. It is also suggested that subdivision roads required for egress/ingress but not covered by the two other WUI buffer areas be buffered to the maximum easement width. Road buffers will also serve as firebreaks for fire containment.

- High Voltage Power Line Buffer

High voltage power lines (>250 Kilo Volt) were assigned a 1-mile buffer as a protective measure to ensure that the County power supply can be adequately protected during a wildfire event and to reduce the probability that a power line fire ignition will travel beyond the power line corridor. Power line buffers will also serve as firebreaks for fire containment.

Priority Protection Zones

To allow for systematic prioritization of the Granite County WUI for fire protection, it was necessary to delineate the 4-mile WUI buffer area, described in the previous section, into 1-mile increments of diminishing priority. It was assumed that a decrease in density of values at-risk as well as an increasing emergency incident response time would occur linearly with greater distance from the WUI centerline. Therefore, there is a decreased total incident protection need as there is decreased density of values. WUI priority protection zones were delineated in 1-mile increments as follows:

- Zone 1 – acreage including and extending 1 mile from the HFRA WUI interface/intermix.
- Zone 2 – acreage between 1 and 2 miles from the interface/intermix boundary.
- Zone 3 – acreage between 2 and 3 miles from the interface/intermix boundary.
- Zone 4 – acreage between 3 and 4 miles from the interface/intermix boundary. Zone 4 also includes buffer and power line buffer acreages.

The area within zone 1, assigned the highest WUI priority protection zone ranking, accounts for the highest density of values at-risk in the WUI and therefore receives the highest priority for protection; subsequently zones 2 through 4 were assigned a decreasing priority ranking (Figure 5). The WUI priority protection zone acreages by administration/ownership for Granite County are listed in Table 5.

Administration Agency/ Owner	Priority Zone 1	Priority Zone 2	Priority Zone 3	Priority Zone 4	Total WUI Zone
	All Data in Acres				
Private	2,077.83	69,440.84	83,283.64	43,685.32	198,487.63
USFS	2,084.25	44,290.60	166,834.31	146,742.87	359,952.03
BLM	62.19	3,649.79	10,242.26	7,092.96	21,047.2
State Trust Land	35.76	3,473.61	5,139.15	3,077.82	11,726.34
FWP	0.05	317.12	2,010.15	1,396.36	3,723.68
Plum Creek Timber & Stimson Lumber	398.01	3,139.96	6,462.26	3,307.32	13,307.55
TOTAL	4,658.09	124,311.92	273,971.77	205,302.65	608,244.43

Table 5 – WUI Priority Protection Zone Area by Ownership

Risk Assessment

To assess the risk of wildfire exposure in the County's WUI it was necessary to first generate a model that assesses the present fire hazard and then correlate the exposure this hazard presents to the WUI. The defined Granite County WUI priority zones and three existing geographic information system (GIS) layers/data in addition to information provided by local stakeholders, universities, and federal and state land management agencies were used to complete the modeling process.

Fire Hazard

To estimate the risk to values within the Granite County WUI in the event of wildfire, an examination of fire hazard at a landscape level is necessary. In the absence of previous fire hazard study specific to Granite County, Fox Logic, with direction from the stakeholders, selected two previously completed modeling projects to build a model of fire hazard across the County. Input data and maps for the model came from the Ignition Probability Model provided by the Wildlife Spatial Analysis Lab (WSAL) at the University of Montana, and Fire Behavior Fuels Models, and FRCC model provided by the USFS Fire Sciences Lab Landfire Project.

Hazard Defined...

Function: noun
Etymology: Middle English, from Middle French hasard, from Arabic az-zahr the die
1 : a game of chance like craps played with two dice
2 : a source of danger
3 a : CHANCE, RISK b : a chance event : ACCIDENT
4 obsolete : STAKE 3a
5 : a golf-course obstacle
- at hazard : at stake

Source: Merriam-Webster Dictionary

- Fire Behavior Fuels Modeling

Three primary environmental factors influence fire behavior: fuel, weather, and topography. To best approximate these factors, fire behavior fuels models developed by Rothermel (1972) and Albini (1976), estimated and mapped by the Landfire project at the USFS Fire Sciences Lab, Missoula (Figure 6), were incorporated into the fire risk/impact model. These fire behavior fuels models are intended to estimate total theoretical fuel load, fire rate of spread (ROS), and flame length present during a peak burning period of the fire season.

Describing Fire and Fuels					
Fuel Model	**Vegetation Types**	**Fire Behavior**	**Fuels**	**Rate of Spread (ft/hr)**	**Flame Length (ft)**
1	Perennial grasslands, annual grasslands, savannahs, grass-tundra, grass-shrub with < 1/3 shrub or timber	Rapidly-moving	Cured fine, porous herbaceous: 0.5 - 0.9 tons surface fuel /acre; 0.5 - 2 ft depth	5,148	4
2	Shrub, pine with <2/3 shrub or timber cover	Moderate spread in herbaceous with added intensity from litter/wood and production of firebrands	Fine herbaceous surface cured or dead, litter, dead stem or limb wood; 1 - 4 tones/acre;0.5 - 2 ft depth	2,310	6
5	Moist or cool shrub types (alder), forest shrub, regeneration shrub fields after fire or harvest	Slow-moving and low moderate intensity	Green foliage with w/o litter; 3 - 5 tons/acre; 1 - 3 ft depth	1,188	4
8	Closed-canopy short-needle conifer types, closed-canopy	Typically slow moving with low intensities; can move rapidly with high intensity with low fuel moistures and hot/dry/windy conditions	Usually low- to moderately-flammable foliage with litter or scattered vegetation understory; 4 - 6 tons/acre surface fuels; 0.1 - 0.5 foot depth	106	1
9	Long needle conifer types (ponderosa)	Fast-moving fires with moderate to high intensity depending on amount of surface fuel	Flammable foilage with needle litter and some dead, downed woody material; 3 - 4 tons/acre; 0.1 - 0.5 foot depth	495	2.6
10	Any forest type with >3" dead, downed woody fuels	High fire intensity with low fuel-moisture and fast moving with wind	Dead, downed > 3" woody fuels and litter; 10 to 14 tons/acre of total surface fuel < 3"; 0.5 - 2-foot depth; 10 to - 14 tons per acre total fuel load < 3"; 0.5 to 2-foot depth	521	4.8

Source: Anderson 1982

The fuels models (30m grid) are described by the most common fire-carrying fuel type (grass, brush, timber litter, or slash), loading and surface area-to-volume ratio by size class and component, fuelbed depth, and moisture of extinction. Each of the total 13 fuels models has a specific estimated total fuel load (< 3-inch dead and live, ton/acre), ROS, and characteristic flame length attributable to the conditions, including inferred weather and topography of an average site in the wildland. Numerically denoted from 1 to 13, fuels models are described by two distinct orientations with two fuel groups in each orientation: vertically, as in grasses and shrubs, and horizontally, as in timber, litter, and slash (Anderson 1982). Not every fuel model will be represented within a given area of the landscape.

Fire behavior fuels models in the Landfire dataset are a prototype model and were assigned on the basis of covertype, and/or potential vegetation type (PVT), and/or size class, and/or canopy by the Fire Lab. Fire management personnel throughout the Northern Region have not completely reviewed the model assignment rules or output for the Landfire fire behavior fuels models. A complete description of the fire behavior fuels models estimation and rule assignment can be found in the Landfire readme.txt file that accompanies the data set (Landfire 2005).

The fuels models present in Granite County as illustrated in Figure 6 are 1, 2, 5, 6, 8, 9 and 10. Each fuels model was ranked, for GIS analysis, based on a ranking value derived from the sum of each fuel model's estimated total fuel load, flame length and ROS provided in *Aids to Determining Fuels Models for Estimating Fire Behavior* (Anderson 1982). This simple fuels behavior model ranking method resulted in the following prioritization (from highest to lowest fire behavior fuels ranking): model 10, 6, 2, 5, 9, 8, and 1.

- Ignition Probability Modeling

A fire ignition probability model GIS layer also developed by the WSAL team for the USFS Region One Cohesive Strategy Team, using USFS fire ignition data, the same data set used in the Fire Statistics section of the CWPP, was selected to portray countywide fire ignition probability based on the predicted incidence (i.e. # fires/1,000 acres /10 years) (Figure 7).

This "…layer is based on an analysis of natural and human caused fire starts from 1981 through 2000. Fire start densities per 1 km cell were calculated using a point interpolate function based on the fire start data. A fire ignition probability layer was then created based on a natural break(s) analysis of the fire start densities. Four fire ignition probability classes were mapped: 1 (low), 2 (mod), 3 (high), and 4 (very high). This layer was based on a fire start point coverage assembled from multiple sources but some data gaps are possible during the 20-year period covered. Each 1 km cell has been assigned relative weighting of probable fire ignition: 1 (low), 2 (mod), 3 (high), and 4 (very high)" (CST 2002).

- Fire Regime Condition Class Modeling

Wildfire in Granite County may also have acute negative impact on the natural wildland ecosystem. In an effort to account for this impact, a FRCC model has been included as part of this risk assessment. The Land Fire data set includes a FRCC model that estimates the deviation of wildland from its natural fire regime (Figure 8).

Fire Condition Class is based on degree of departure between predicted current and predicted historic vegetation conditions (Hann and Bunnell 2001; Schmidt and others 2002; Hardy and others 2001; Hann and others 2004). As noted earlier in this document three condition classes describe low departure (FRCC I), moderate departure (FRCC II), and high departure (FRCC III). As described by the Landfire project, "(t)his departure results from changes to one or more of the following ecological components: vegetation characteristics, including species composition, structural stage, and canopy closure, and spatial fire regime characteristics, including fire frequency and severity. LANDFIRE produces maps of FRCC using methods derived from the Interagency Fire Regime Condition Class Guidebook (Hann and others 2004).

Consequences of a Changed Fire Regime

Fire Regime Condition Class	Description	Species Composition and Structure	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Species composition and structure are functioning within their natural (historical) range at both patch and landscape scales.	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Species composition and structure have been moderately altered from their historical range at patch and landscape scales. For example: Grasslands – Moderate encroachment of shrubs and trees and/or invasive exotic species. Shrublands – Moderate encroachment of trees, increased shrubs, or invasive exotic species. Forestland/Woodland – Moderate increases in density, encroachment of shade tolerant tree species, or moderate loss of shade intolerant tree species caused by fire exclusion, logging, or exotic insects or disease. Replacement of surface shrub/grass with woody fuels and litter.	Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) are low Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components are high.

Source: USFS Fire Regime Condition Class Definition

It is important to note that the LANDFIRE FRCC map represents only the departure of current vegetation conditions from simulated historical reference conditions, which is only one component of the FRCC characterization outlined in Hann and others (2004). LANDFIRE simulates historical vegetation reference conditions using the vegetation and disturbance dynamics model LANDSUM (Keane and others 2002). Current vegetation conditions are derived from a classification of LANDFIRE maps of existing vegetation type, cover, and height." (Landfire 2005).

The areas estimated as FRCC 3 are of particular concern and have been theoretically fire-deprived for three or more fire cycles from their natural fire return interval. The risk of extensive ecological damage to key ecosystem components during a natural fire event in these areas would be high as vegetation composition, structure, and diversity have been significantly altered by fire exclusion. Consequently, these lands are subject to the greatest risk of ecological collapse as a result of uncontrolled catastrophic wildfire.

The FRCC 2 rated areas have missed more than one fire cycle but are not as vulnerable to the impacts of a natural wildfire. FRCC 1 areas are those at or near their natural fire regime. For the purpose of the CWPP fire risk/WUI impact model, wildland in FRCC 3 category within the WUI will receive a rating of high risk of impact from wildfire, FRCC 2 medium risk, and FRCC 1 low risk for later mapping.

Fire Risk

The WUI risk rating system used three weighted GIS layers (fire hazard model) overlaid on the WUI priority protection zone map in order to produce a combined fire risk/WUI impact model. Four model data inputs were used: fire behavior fuels models, the ignition probability model, the FRCC, and WUI priority protection zone data (Table 5). Data from each of the four input sets was weighted and passed through a prioritization matrix that generated a score from 4 to 18 (Table 6). The final fire risk/WUI impact map generated from the weighting and scoring is included as Figure 9. Three smaller scale fire risk/WUI impact maps of Granite County, with a land survey overlay, are also included as Figures 10 to 15.

To allow prioritization of land management activity it is necessary to develop an association between fire risk/WUI impact model and mitigation need. To this end, a fire mitigation priority-rating (FMPR) letter scoring scale is linearly related to the fire probability/WUI impact model and is determined as follows: *very high* (risk score >13), *high* (11 to 13), *medium* (8 to 10), or *low* (<8). Second, risk scoring developed in the first step was spatially separated and mapped into the four WUI protection zones derived in the WUI Prioritization Section of this document (Figure 8).

Site- or project-specific FMPR may be generated to further tailor mitigation activity planning and/or project implementation and prioritization. Two methods can be used to determine an on-site FMPR. Method one is used to generate an on-site FMPR through professional estimation of FRCC and Fire Behavior Fuel, then the use of the Ignition Probability Model (Figure 6), and determination of the WUI Priority Zone (Figure 5). A FMPR score may then be tabulated using the matrix in Table 7. A second method of FMPR estimation uses the maps

contained in this Plan: pinpoint the site in Figures 9 to 15 and the prioritization equals the FMPR. A fictitious area is scored and summed below using the prioritization matrix.

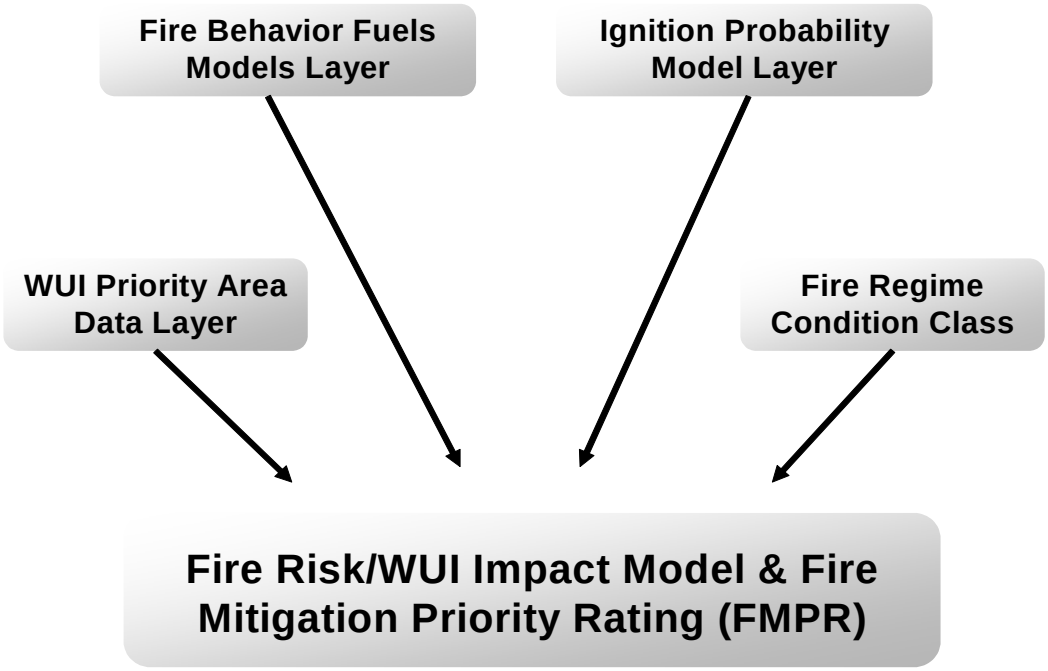


Table 6 – Mitigation Prioritization Rating System Input

To further tailor the fire risk rating the MT DNRC Fire Risk Rating scorecard (DNRC 1993) for existing wildland residential developments is included in Appendix C. The MT DNRC Fire Risk Rating has been used in the inventory of many western Montana subdivisions and is used to derive a fire risk/priority rating. Completion of the MT DNRC risk rating may provide a more thorough understanding of specific area needs. The combination of site- or project-specific FMPR and MT DNRC Fire Risk Rating will provide useful information for allocating funding and establishing baseline conditions for project implementation and monitoring, but does not determine what mitigation scheme or activity will be needed to reduce the fire risk.

FMPR Example

Data/Model Input	*Rank*	*Weighting*
WUI Priority Protection Zone	#2	3
Fire Behavior Fuels Model	#5	4
Fire Regime Condition Class	#2	2
Ignition Probability	Medium	2

FMPR Score = 11
or High Mitigation Priority

WUI Priority Zone 4 (Low)																					
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 6			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	4	5	6	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12
	Moderate	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13
	High	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	Very High	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15

WUI Priority Zone 3 (Moderate)																					
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 6			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13
	Moderate	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	High	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
	Very High	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16

WUI Priority Zone 2 (High)																					
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 6			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	Moderate	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
	High	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16
	Very High	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16	15	16	17

WUI Priority Zone 1 (Very-High)																					
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 6			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
	Moderate	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16
	High	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16	15	16	17
	Very High	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16	15	16	17	16	17	18

Low Priority | Medium Priority | High Priority | Very High Priority

Table 7 – Fire Mitigation Prioritization Matrix

FMPR and MT DNRC Fire Risk Rating will provide useful information for allocating funding and establishing baseline conditions for project implementation and monitoring, but does not determine what mitigation scheme or activity will be needed to reduce the fire risk.

Priority Areas

Granite County FMPR areas are broken into four levels of priority, there are an estimated 4,658.09 acres of very-high FMPR category area, 124,311.92 acres in high, 273,971.77 acres in medium, and 205,302.65 acres in low (Table 6). Of the six primary landowners the USFS has the largest number of very-high priority area, with 2,084.25 acres; as well the largest number of total priority acres is estimated to fall under USFS administration with 359,952.03 acres. Complete FMPR acreages by ownership are listed in Table 8.

Unidentified areas inside the WUI priority assessment have resulted from data gaps in the ignition probability data layer. This missing data results in FMPR model gaps, though relatively insignificant, are illustrated by the difference between total WUI acres (Table 5) and number of priority rated acres (Table 8). Most land not assigned an ignition probability model score is thought to be agricultural land, rock, water, ice, or urban areas.

Administration Agency / Owner	Very High Priority	High Priority	Medium Priority	Low Priority	TOTAL
	All Data in Acres				
Private	2,077.83	69,440.84	83,283.64	43,685.32	198,487.63
USFS	2,084.25	44,290.60	166,834.31	146,742.87	359,952.03
BLM	62.19	3,649.79	10,242.26	7,092.96	21,047.20
State	35.76	3,473.61	5,139.15	3,077.82	11,726.34
FWP	0.05	317.12	2,010.15	1,396.36	3,723.68
Plum Creek Timber & Stimson Lumber	398.01	3,139.96	6,462.26	3,307.32	13,307.55
TOTAL	4,658.09	124,311.92	273,971.77	205,302.65	608,244.43

Table 8 – Fire Mitigation Priority-Rating Acreages

Stakeholder Identified Areas

In addition to the spatial ratings generated by the FMPR it is felt by stakeholders that additional mention of the areas of high local concern is warranted. The subdivisions in Maxville, Philipsburg, and Georgetown Lake areas are of high local concern.

These forested WUI areas will ultimately develop increases in fire hazard and increase value risk due to forest mortality and rising dead woody fuel loading, and new development. The potential fire mitigation need and desire associated with these areas may not be adequately represented in the FMPR model.

PLANNED AND COMPLETED MITIGATION ACTIVITIES

Granite County has been proactive in its effort to reduce the size and frequency of fires in its WUI area. Through the efforts of the BLM, Forest Service, County Fire Warden and many others several fire reduction projects have been planned and many successfully implemented on hundreds of acres of private, state, and federally owned/managed land have been treated to reduce fire hazard throughout Granite County.

Notably the BLM is currently undertaking fuels mitigation activity east of the town of Philipsburg and a planned project encompassing the entire Flint Creek drainage aims to treat hazardous fuel conditions on USFS, BLM, MT DNRC, and private land holdings.

Further, the Georgetown Lake WUI fuels reduction project, funded in part by USFS Community Protection Hazardous Fuels (Stevens) Funding, began in 2003 and remains ongoing. As of July 30, 2005, 130 residential interface properties around the lake, in Granite County and adjacent Anaconda-Deer Lodge County have undergone mechanical forest fuels reduction and defensible space creation in an effort to reduce the chance of catastrophic wildfire and impact to the community.

As a testament o Granite County's commitment to WUI hazardous fuels reduction, improvements to the Philipsburg School have included the installation of a forest waste burning furnace that will be powered by biofuel produced during the treatment of hazardous WUI fuel land areas.

Past effort to quantify WUI risk/hazard issues transpired in 1994 with the MT DNRC contracting Mr. Jon P. Agner of Missoula, Montana to complete an inventory of wildfire risk conditions at the subdivision level within throughout western Montana. In this assessment each of twelve WUI subdivisions with Granite County were assigned risk/priority ratings based on the following ten factors that contribute to hazardous fire conditions, speed of emergency response, and effective fire suppression (Appendix C):

- Total number of houses
- Total number of fire resistant roofs
- Predominant aspect
- Slope of inhabited area
- History of fire occurrence
- Number of road standard egress/ingress routes
- Percentage of homes employing fire-safe landscaping techniques
- Availability of water
- Distance from responding fire protection agency

The subdivision risk assessment reported that 89% of Granite County WUI subdivisions are at or above a -high risk to wildfire and are at or above a high priority for infrastructure/ condition modification and/or improvement (Table 9).

The CWPP aims to mesh into currently functioning programs. Previously planned WUI mitigation activities in Granite County should be fulfilled and effective mitigation efforts or strategies continued while the CWPP is implemented.

Subdivision	Risk/Priority Rating (Points)
Gillies Bridge	124
Philipsburg	132
Bearmouth	133
Upper Willow Creek	135
Maxville	143
Eagle Canyon	147
Georgetown Lake South	147
Georgetown Lake West	147
Beavertail	149

<101 Low
102-124 Moderate
125-139 High
140-158 Very High
>159 Extreme

Source – MT DNRC 1994

Table 9 – Powell County Subdivision Wildfire Risk

IMPLEMENTATION, MONITORING, AND REVIEW

This section outlines recommendations compiled by Fox Logic for the implementation, monitoring, and review of mitigation activities outlined in the CWPP. These recommendations are intended to provide a starting point for the County to build upon. Revisions in the Plan should accommodate changing wildland conditions, new technologies, and evolving priorities within the County. Implementation of on-ground action should be strategic and completed using the FMPR system with one or many of the prescribed activities in the following section of the CWPP.

CWPP management direction will be applied through a dual process of plan implementation and monitoring. Implementation is the responsibility of local government through a designated WUI coordinator, to be developed, to employ the CWPP strategies on priority land areas. The County as a whole has an ongoing responsibility in monitoring how effectively the government is implementing the plan and whether the stated management intent is being achieved. Through ongoing feedback, the implementation of the Plan can be adapted to increase its overall effectiveness.

Activities prescribed in the CWPP will be reflected in resource management, development, and fire mitigation activities as soon as possible. The term of the CWPP is 10 years, with minor review yearly, and a major review beginning at year 9 in preparation for the next plan.

Implementation action will be guided by a time schedule that addresses the highest priority and largest risk areas first, while at the same time (but on a lower priority) treating moderate risk areas over the long term. Low-risk areas will receive low treatment priority unless specifically identified by federal or state agencies or the County WUI Coordinator as requiring treatment.

Implementation

Successfully mitigating WUI wildfire risk and improving structure fire survivability/defense in Granite County rests directly on the effective management of the plan and its implementation. The Fire and Wildland-Urban Interface Risk section identified areas where at-risk values are and respective mitigation priority ratings. Strategies discussed in this section will detail the types of activities that can be implemented to mitigate the risk of negative wildfire impact on WUI structures and values. Implementation of the CWPP risk reduction strategy can occur through a number of processes:

- Incremental mitigation activities implemented as specific CWPP projects
- More detailed plans, such as watershed wildfire plans, subdivision wildfire plans
- Subdivision development requirements
- County wildfire safety codes

Further higher detail planning will be necessary before on-ground mitigation action can occur.

The creation of a WUI Coordinator or equivalent designate is recommended and should be developed for the County. This individual would serve to coordinate activities and ensure the expectation of the CWPP is met

Wildland-Urban Interface Fire Hazard Mitigation

WUI protection and fire hazard reduction may be accomplished using different approaches that will be implemented in mitigation activity planning. Six general strategies to hazard reduction and risk mitigation are ranked from high to low priority (Table 10). The highest priority is assigned to strategies that result in the greatest reduction of WUI fire hazard with the least amount of time.

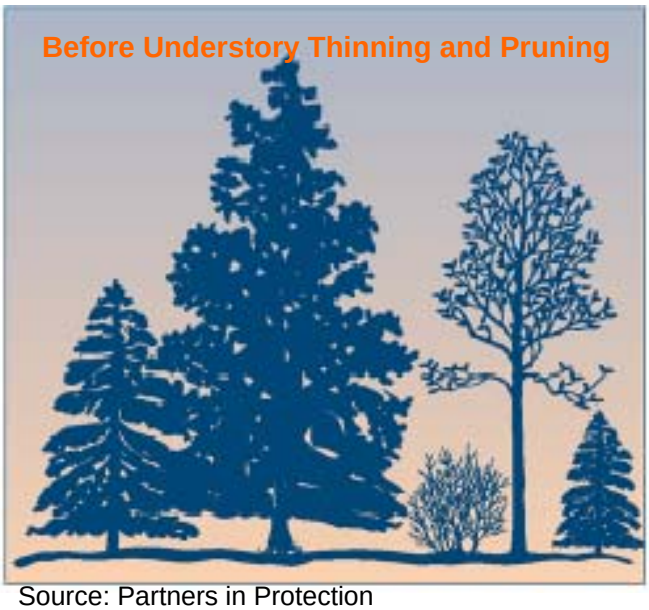
Strategy	Priority	Activity Description
Fuels Management	**1**	• Continue/complete current mitigation activities. Initial focus will be on defensible space then removal of commercial value wood, pre-commercial thinning, prescribed burning, stream restoration, and weed control that promote the reduction of fire hazard. • Support new hazardous fuels treatment projects within the wildland urban interface and promote Firewise™ principles. • Encourage private landowners and agencies to address forest health issues and mitigate fire risk. • Encourage the development of subdivision level wildfire assessment and maintain current planning standards. • Reduce fuel hazard/WUI risk in the Maxville MT HWY 1 corridor where necessary.
Education/ Prevention	**2**	• Introduce/maintain wildfire prevention education and training in the form of public school instruction and media outreach programs. • Expand County outreach or extension programs developed by federal and state agencies. • Design/conduct WUI residence hazard assessments in coordination with federal and state outreach programs. • Promote subdivision wildfire evacuation planning.
Planning	**3**	• Assign/Develop a WUI Coordinator designate by contract or from present public servants. • Complete and adopt a high wildfire hazard subdivision development policy. • Improve road access in constrained areas of the WUI. • Install/improve dry hydrants in priority locations. • Assess and improve bridge capacities in the WUI. • Update fire department equipment resource inventories. • Update/initiate WUI structure mapping.
Development	**4**	• Establish guidelines possibly in the form of minimum codes for new structures and subdivision areas to ensure fire safe characteristics (such as the NFPA 1144 standard) and/or implement FireWise™ standards. • Consider assessing WUI residences as part of a real estate transfer program.
Training	**5**	• Improve cross-training of firefighters who suppress forest and structure fires.
Inter-agency Cooperation	**6**	• Review, improve and revise mutual aid agreements between VFDs, municipal FDs, state, federal, and private firefighting resources where necessary.

Fuels management, a direct strategy, is assigned the highest priority. The five other strategies, indirect mitigation strategies, will lead to changes in policy and attitudes and ultimately result in the reduction of wildfire hazard and risk exposure. Table 10 also describes activities that can be completed under each of the mitigation strategies.

Fuels mitigation activities are complex and numerous and should be tailored to terrain, habitat type and condition, ecology, or social situation. The following is a non-exhaustive list of activities that may be employed for direct fuels mitigation:

- Commercial and non-commercial timber thinning (including selective and group thinning)
- Pruning
- Under burning
- Creating shaded fuel breaks
- Mulching and chipping
- Grazing
- Brush/grass mowing
- Weed treatment

Many mechanical tools are available to complete the above listed activities. Detailed information on these tools can be found in the *Understory Biomass Reduction Methods and Equipment Catalog* (Windell and Bradshaw 2000). Combinations of activities, techniques, and tools used under the appropriate conditions as guided by the CWPP will reduce the identified fire hazard and risk exposure in an ecologically, environmentally, and socially responsible manner. Where possible, fiber wastes created by mitigation activity should be used for biofuel.



Source: Partners in Protection

Structure Ignition and Fire-Risk Reduction

Much of the previous section addressed the mitigation of wildfire risk and/or impact of wildfire on the greater landscape beyond the individual structures in the WUI. This section builds on the landscape level mitigation strategy by making wildfire risk reduction recommendations that can be applied to individual structures and the area directly surrounding those structures. In the event of a major WUI fire involving numerous buildings, firefighters will likely prioritize

(triage) the protection of homes and buildings based on ease of protection. Many of the strategies mentioned previously may also be used to reduce the risk of a potential loss of structure or to increase firefighter safety while engaging fire in the interface.

A series of educational bulletins that include landowner outreach and risk reduction checklists for homes/structures and yards have been included in Appendix D. The items included in the appendix as well as many additional mitigation, emergency preparedness resources, and structural ignition reduction tactics and web links to those resources may be found on the FireWise™ website (www.Firewise.org/) and the Partners in Protection: Fire Smart™ website (www.Firesmart.org/). These resources are tailored guidelines that are based on firefighter observations, scientific analysis, and actual conditions that have allowed structures and communities to be successfully protected in the face of wildfire. Factors that improve structural survivability and defensibility can include, but are not limited to, FireWise™ concepts that help modify interface forest fuels and fuels configuration, promote the use of building material products and techniques that inhibit fire ignition and/or flammability, and provide educational materials and techniques for education of interface landowners.

Vegetation Flammability

Vegetation research has shown that using the following tree species to make landscaping, forest thinning, and species conversion decisions will lead to less flammable interface forest conditions (Partners in Protection 2003).

Tree Species	Flammability
Aspen	Very Low
Cottonwood*	Very Low
Maple	Very Low
Willow species*	Very Low
Birch	Low
Western larch	Low
Ponderosa pine	Medium
White Pine	Medium
Colorado Blue Spruce*	High
Douglas-fir	High
Engelmann Spruce	High
Lodgepole pine	High
Mountain hemlock	High
Sub-alpine fir	High
Western red cedar	High
Western Juniper*	Very High

** Added by Fox Logic*

Aimed at improving structural survivability, and defense, and reducing structural ignition in the face of imminent wildfire exposure, structural risk reduction tactics described in Appendix D items utilize all six wildfire mitigation strategies prioritized in Table 10.

Specific minimum structure ignition reduction measures that the County WUI Coordinator and fire authorities should recommend for established WUI homes and out buildings include the creation of defensible space areas extending 30 feet from all structures that are clear of debris, watered, mowed, and landscaped with lower flammability vegetation that is pruned and manicured. Further recommendations should include fire-resistant decks, porches, and fences, and fire-resistant roof and exterior construction as outlined in Appendix D: The FireWise™ Home.

Fox Logic suggests that the County adopt such a system of fire pre-planning, outreach, and certification for structures and yards in the WUI. FireWise™ is only one example of how a structure-fire risk reduction system can be put together. Such a program could be introduced to

property owners by the County and used in conjunction with other fire risk reduction programs such as the National Fire Prevention Association 1144 *Standard For Protection of Life and Property From Wildfire*. As FireWise™ is currently established as a national system of WUI homeowner outreach, education, guidance, and certification in the United States, Fox Logic recommends that as a minimum Granite County adopts the guidance principles and techniques it prescribes in an effort to become a FireWise™ certified community. Certification effort can be employed simultaneously with mitigation activities in the WUI areas identified as very-high FMPR.

Stakeholder-Identified Priorities

Stakeholders made many specific suggestions to improve suppression capability and reduce hazards in the County as well as were receptive to guidance offered by Fox Logic for identifying activities and priorities. Forest hazard mitigation was a top priority with other ideas including the installation of dry hydrants, increasing inadequate bridge capacities, and improving roads of inadequate width, and subdivision planning policy requirements being important. Many other prioritized activities are listed in Table 10.

Timeline

CWPP mitigation actions will be implemented according to a time schedule addressing very high- and high-risk areas first during the period beginning 2005 and ending 2015. It is anticipated that 10 percent of the highest risk/priority land area can be treated by the end of the ten-year implementation period (Table 11).

The second highest implementation priority is medium-risk areas. Mitigation of these areas will be the focus of attention during the period beginning in 2008 and ending 2015 with the expectation that a 5 percent of the identified at risk land can be treated. Remaining, risk areas identified are the third priority and will be treated during the period beginning 2010 and ending 2015. It is anticipated that long-term maintenance of previously treated areas and treatment of lowest priority areas will be negligible during the first iteration of the CWPP. Activity during the 10-year life of the Plan will be guided by review and recommendations of the by the Monitoring Committee.

CWPP-authorized fuels mitigation action by state and federal land management agencies on public land to reduce fuel hazard will place considerable justification on the FMPR system in determining priority land areas. Initially, highest priority will be assigned to very-high and high FMPR area designation projects that meet developed prioritization criteria and fall within the highest FMPR category. State and federal agency activity planning on public land will meet Montana Environmental Planning Act (MEPA) and National Environmental Planning Act (NEPA) policy, respectively, including public announcements and scoping documents the agencies use to develop mitigation projects.

Fire mitigation projects on private land follow a similar system of prioritization as outlined for state and federal projects. Private non-industrial forest WUI landowners who want to reduce the risk of loss to wildfire are directed to work with their WUI Coordinator, DNRC Extension Forester, or approved private contractor to generate a site FMPR score, or equivalent fire risk rating, for their proposed project area and develop a fuels mitigation plan. The County WUI

Coordinator, or equivalent designate, will use site-specific FMPR scores on private properties to develop an unbiased ranking of site fire risk for allocating assistance.

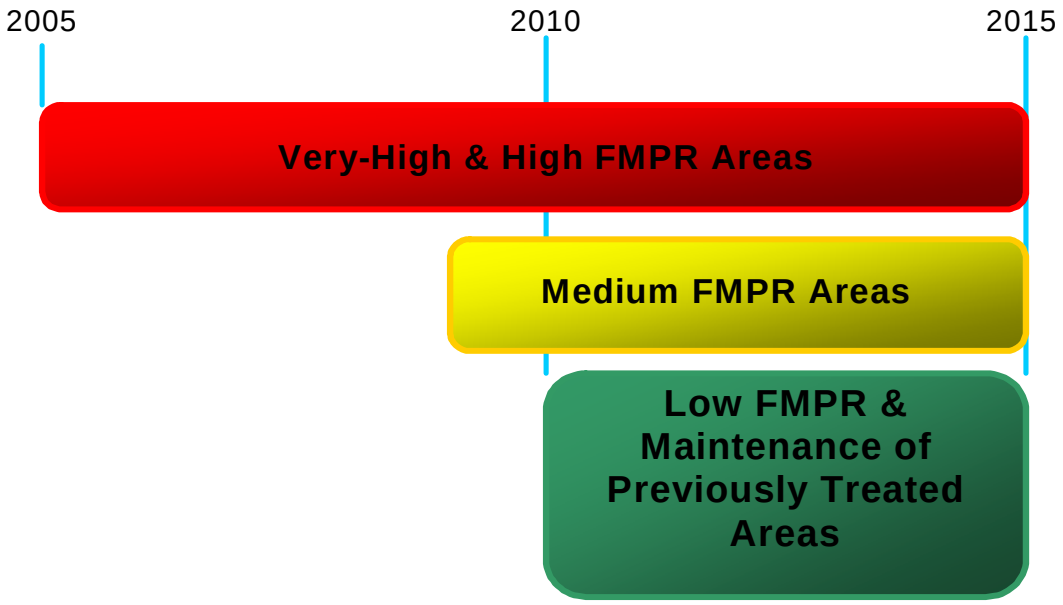


Table 11 – Hazard Mitigation Timeline

Hazard Reduction Treatment Costs

Financial analysis completed by the USFS for comprehensive restoration of forested areas in western Montana indicated that an average cost of treatment, for returning sustainable forest structure while diminishing crown fire risk was expected to be $287.00/acre (Fiedler et. al 2004). The analysis derived the cost estimate based on removing late-successional species and reducing density to promote seral species regeneration. The modeled analysis commonly required the cutting of medium- and larger-sized trees with commercial value. This value often covered much or all of the treatment cost. This analysis does not estimate the costs associated with completing hazard reduction in the WUI but the estimate should be representative of costs for WUI areas at further distance from structures.

Costs associated with treatment of areas within close proximity to structures can often be quite expensive. Each area presents unique challenges and costs can vary greatly. Fuels reduction projects recently completed with the assistance of the Headwaters RC&D District, Inc. have averaged approximately $1,667.00/acre.

Total very-high, high-, and medium- FMPR area is 416,232.68 acres. To estimate total cost of treatment for all these acres it was first necessary to determine a rough estimate of the total acres that could be treated in close proximity of structures. To complete this task the total number of WUI houses (900)(Census 2000) was arbitrarily estimated to have 5 acres of treatable forest immediately around the structure resulting in a total of 6,630 acres. It is assumed that not all houses in the WUI will have five acres of treatable-hazardous forest but it

may be assumed that some homes may have 20 acres or more requiring treatment. The remaining land area of elevated mitigation priority, beyond structures, is 409,602.68 acres.

To estimate WUI treatment cost it was necessary to use both the USFS and the local Headwaters RC&D assisted project cost estimates. The total area that may be treated is 416,232.68 acres of which it is estimated that 6,630 acres are near structures and 409,602.68 acres occur at farther distance from structures. Multiplying the acreages by their respective cost estimate results in: $11,052,210.00 and $117,555,969.00. The total estimated WUI treatment cost using this method is $128,608,179.00.

Higher Detail Plans

As part of implementation, it will likely be necessary to refine the broad, strategic guidance and risk ratings in the CWPP and develop specific project level plans. One such plan, the *Blackfoot/Clearwater Fuels Mitigation Plan,* has already been written by ERSI of Seeley Lake, MT. Some of these detailed wildfire protection and project plans may include watershed level plans, subdivision plans, other managed area wildfire plans, and future local development plans to address area-specific fire issues.

In all cases, it is expected that the detailed planning initiatives and the resulting products will be guided by and be consistent with the intent of the CWPP. Where more detailed planning reveals new information, a minor revision or amendment to the CWPP may be warranted, in accordance with the criteria outlined in the Minor Revision section that follows.

Roles and Responsibilities

A number of different players are involved in implementation and monitoring of the CWPP. The roles and responsibilities of the various participants in the process are as follows:

Granite County Fire Council

The Granite County Fire Council (GCFC) includes managers from resource management agencies, DES coordinator, volunteer fire department chiefs, the fire warden, and the county sheriff. The GCFC provides overall coordination, implementation, and strategic fire planning throughout Granite County. The GCFC will:

- Assign a WUI Coordinator or designate an equivalent position to provide a direct public outreach role;
- Coordinate implementation of the Granite County CWPP;
- Monitor implementation progress and compliance by agencies and private landowners;
- Interpret plan management priorities and strategies and resolve issues where necessary;
- Oversee the preparation of an annual monitoring report on plan implementation;
- Establish and coordinate the activities of a Monitoring Committee;
- Review recommendations from the Monitoring Committee on proposed plan amendments and provide advice on those amendments to local Government;
- Provide the CWPP document to federal and state resource agency staff, stakeholders, and interested public;

- Advise local government of specific problems regarding plan implementation; and
- Coordinate plan review.

Local Government

The County Commissioners will be kept informed about the implementation of the CWPP and are encouraged to participate in the implementation, ongoing monitoring, and review of the plan.

Local governments are encouraged to inform the GCFC and agencies of settlement planning initiatives that may have implications for implementing the CWPP direction.

Federal and State Agencies

Government agencies are the primary vehicles for the implementation of the CWPP through the ongoing delivery of government programs, policies and initiatives as well as agency application of prescribed fire mitigation activities on public land. The relevant agencies will:

- Carry out responsibilities under the plan;
- Prepare a Tactical Plan detailing tasks arising from CWPP objectives and strategies, including defining priorities for implementation and more detailed planning;
- Provide the CWPP document to resource agency staff, stakeholders, and interested public;
- Advise the GCFC on aspects of plan interpretation and implementation;
- Prepare summaries for the GCFC annual monitoring report;
- Initiate, review and/or provide technical recommendations on proposed revisions and amendments to the plan.

CWPP Monitoring Committee

The role of the CWPP Monitoring Committee, assembled by the GCFC, is to monitor resource management and development activities to assess compliance with, and effectiveness of, activities to meet the intent of the Granite County CWPP. The Committee will concern itself with making wildfire mitigation and plan monitoring decisions.

The membership of the Committee is intended to be inclusive and to reflect the diversity of the stakeholders that developed the CWPP.

One of the first tasks of the members of the Monitoring Committee will be to develop a Terms of Reference and Ground Rules. The range of activities of the Committee could include the following:

- To review and provide input to an annual monitoring report;
- To bring any concerns and new information to the attention of the GCFC;
- To provide advice to agencies on plan interpretation and implementation upon request of the GCFC or individual agencies;
- To review and provide recommendations on proposed plan amendments, based on monitoring and implementation reports; and

- To provide community liaison concerning plan implementation and monitoring through the County WUI Coordinator.

Adequate funding may be available and provided through the NFP or other applicable grant sources to support participation in and activities of the Monitoring Committee.

Public

It is recognized that members of the public, in general, are important contributors to the effective implementation and monitoring of the CWPP in partnership with the WUI Coordinator, local government, and the different government agencies. The nature and level of public involvement in more detailed planning will be determined in response to emerging issues, stakeholder interests, and agency resources.

Monitoring

The monitoring phase of the CWPP involves ongoing assessment of how well the primary purpose of the CWPP is being implemented. The public, including the CWPP Monitoring Committee, has an important role to play in monitoring and providing feedback for the CWPP.

There are two aspects to plan monitoring:

1) An assessment of CWPP implementation through agency projects and programs; and

2) The effectiveness of plan implementation in achieving the management intent of the plan. If the desired outcomes of the CWPP are not being achieved, it may be necessary to consider revisions to the plan.

Section 102(g)(5) of the HFRA directs the USFS and BLM to “establish a collaborative multi-party monitoring, evaluation, and accountability process in order to assess the positive or negative ecological and social effects of authorized hazardous fuel reduction projects…” It is recommended that the GCFC Monitoring Committee participate in this multiparty monitoring effort.

Adaptive Management

The risk assessment, mitigation prioritization, and implementation plan in the Granite County CWPP has been developed using the best information and knowledge available at this time. At the same time, there is inevitably a level of uncertainty in the ultimate effectiveness of management recommendations. Therefore, the CWPP endorses a process of adaptive management, in which implemented activities are monitored for effectiveness and changes are enacted when and where required. The use of an adaptive management monitoring strategy will allow continual improvement of management policies and practices. By monitoring key response indicators over time and incorporating new information and knowledge, the GCFC, local government, and agencies will be able to analyze the outcome of their fire mitigation activity in light of the original CWPP intent and incorporate those results into future planning and approach to best practices in the WUI.

Annual Monitoring Report

Accountability to the plan is described in an Annual Monitoring Report, in which individual state and federal agencies and the WUI Coordinator report on implementation progress and the status of completion of projects or actions identified in the CWPP Implementation section. The Report also summarizes, through the evaluation of performance indicators, the achievement of expected outcomes for the CWPP.

The GCFC Monitoring Committee is responsible for preparing the Annual Monitoring Report. Those agencies and the WUI Coordinator responsible for implementing the CWPP objectives contribute annual reports on their progress of CWPP projects and activities.

The Annual Monitoring Report will be presented to the GCFC for review at an annual meeting to ensure that projects and programs are being implemented in accordance with the management direction and intent of the CWPP. As part of the review process, the Monitoring Committee may make recommendations on plan implementation and amendments. The GCFC will report back to the Monitoring Committee on how the recommendations of the Committee have been addressed.

Plan Amendments

Proposed revisions to the Plan as identified by the CWPP Monitoring Committee, agencies, or through more detailed planning will be identified in the Annual Monitoring Report. The GCFC will review and approve minor revisions to the plan, but major amendments will need to be approved by the three principal stakeholders.

Minor Revisions

The Monitoring Committee will make recommendations for minor revisions to the plan to the GCFC. With GCFC approval, minor revisions will be documented in the annual monitoring report.

Examples of minor revisions include but are not limited to:

- Revised priorities for implementation;
- Refinements to objectives and strategies as suggested by more higher plans; and
- Plan changes required to conform to new laws and regulations.

Major Revisions

A major revision to the Plan will be referred to as an amendment. The following are considered amendments to the plan:

- Major revisions to intent or prescribed mitigation activities;
- Changes to the WUI definition and boundaries; or
- Changes to WUI value priority zone boundaries.

Although the CWPP Monitoring Committee does not have the mandate to make land use planning decisions, it can make recommendations for revisions or amendments to the plan.

Any proposed amendments would be identified in the Annual Monitoring Report and at the annual Monitoring Committee meeting. The GCFC will decide when an amendment is required and will define and coordinate the process consistent with existing County regulations and policies.

Plan Review

The Granite County CWPP is subject to a minor review yearly and a comprehensive review to commence in the 9th year of the plan and be completed by the 10th year. The GCFC may also consider annually whether or not a comprehensive review is warranted prior to the scheduled plan review.

Interpretation

From time to time, the public, local government, or agencies may become concerned about how the plan is being interpreted or about specific land and resource practices. In all instances of concern, the issues will be dealt with in a cooperative manner.

Interpretation of Priorities, Activities, and Strategies

The priorities, strategies, and activities in this CWPP should be interpreted at a broad or strategic level wherever possible. Where a concern is raised over the interpretation and/or implementation of priorities, strategies, or activities the concern should be addressed directly to the affected agency or the WUI Coordinator. The agency or WUI Coordinator will respond to the concern in writing, consulting with the GCFC for guidance where necessary.

If the matter is not satisfactorily resolved, the concern will be forwarded to the GCFC for resolution. The GCFC will determine if the decision is consistent with the intent of the CWPP. If it is consistent, no further action will be taken. If it is not, the agency or the WUI Coordinator will be directed to revise the decision to be consistent with the intent of the plan. The GCFC may consult with the Monitoring Committee on issues of plan interpretation.

Assistance Programs

Assistance is available from the federal and state government to non-industrial private landowners, landowner cooperatives, tribes, fire departments, state land managers, and state, city and county government. The purpose of these programs is to provide financial aid and equipment for the purpose of enhancing habitat, reducing wildfire risk, offering education, and aiding in future planning. (Table 12). Federal and state fuel reduction assistance and grant programs within Granite County will prioritize mitigation opportunity on public and/or private lands based largely as identified by the FMPR as described in the Mapping/Risk Mitigation Priority Rating section of this Plan. Initially, highest priority will be assigned to very-high and high FMPR area projects that meet developed prioritization criteria and grant objectives and fall within the highest FMPR category. Grant prioritization criteria will be further evaluated on an annual basis.

Note- Grant funding opportunities are not guaranteed and may vary from year to year.

Program	Description
Rural Fire Assistance	**Source:** National Fire Plan – Department of Interior **Description:** Provides funds to rural fire departments for wildfire fighting; also provides wildland fire equipment, training and/or prevention materials.
	More info: www.dnrc.state.mt.us/forestry/dnrcfiresite/volfire.htm#rfa
Fire Hazard Mitigation Assistance	**Source:** US Forest Service **Description:** USFS grants to state foresters through state and private funding, under authority of Cooperative Forestry Assistance Act. Intended to maintain and improve protection efficiency and effectiveness on non-federal lands, training, equipment, preparedness, prevention and education.
	More Info: www.fireplan.gov; Paula Rosenthal, MT DNRC SW Land Office
	Source: National Fire Plan **Description:** State fire mitigation assistance grant funds are targeted at state and local fire services, county emergency planning committees, and private landowners. Assistance for projects to reduce hazard fuels in the WUI.
	More Info: www.fireplan.gov, www.fs.fed/us/r4 and www.dnrc.state.mt.us/forestry/dnrcfiresite
Volunteer Fire Department Assistance	**Source:** US Forest Service **Description:** State and private grants under the authority of Cooperative Forestry Assistance Act provided to state foresters for distribution to municipal and volunteer fire departments. Provides monetary and technical assistance in organizing, training, and purchasing equipment to enable them to effectively meet their structure and WUI protection responsibilities.
	More Info: www.fs.fed.us/fire/partners/vfa and www.dnrc.state.mt.us/forestry/dnrcfiresite/
Economic Action Program	**Source:** US Forest Service **Description:** A USFS, state and private program with involvement from local Forest Service offices to help identify economic development projects. Addresses long-term economic and social health of rural areas; assists the development of enterprises through diversified uses of forest products, marketing assistance, and utilization of hazardous fuel byproducts.
	More Info: www.fs.fed.us/r1-r4/spf/montana/
Forest Land Enhancement Program (FLEP)	**Source:** US Forest Service **Description:** USDA grants to private non-industrial landowners under the authority of the 2002 Farm Bill. FLEP purposes include: 1) Enhance the productivity of timber, fish and wildlife habitat, soil and water quality, wetland, recreational resources, and aesthetic values of forest land through landowner cost share assistance, and 2) Establish a coordinated, cooperative federal, state, and local sustainable forestry program to establish, manage, maintain, enhance, and restore forests on non-industrial private forest land.
	More info: www.usda.gov/farmbill

Table 12 – Assistance Opportunities

Program	Description
Federal Excess Property	**Source:** US Forest Service **Description:** Provides assistance to state, county, and local governments by providing excess federal property (equipment, supplies, tools) for wildland and rural community fire response.
	More info: www.fs.fed.us/fire/partners/fepp/
Forest Stewardship Program	**Source:** US Forest Service **Description:** Provides grant funding to enable preparation of forest management plans on state, private, and tribal lands to ensure effective and promote efficient hazardous fuel treatment.
	More info: www.fs.fed.us/r1-r4/spf/montana/
Rural Community Assistance	**Source:** US Forest Service **Description:** Provides grant funds to rural organizations with involvement of local Forest Service offices for the development of community strategic action and fire risk management plans to increase community resiliency and capacity.
	More info: Dean Graham, Regional RCA Coordinator at 406-329-3230
Firefighters Assistance	**Source:** Federal Emergency Management Agency and US Fire Administration Program **Description:** Provides grant assistance to municipal and volunteer fire departments to help improve fire fighting operations, services, and provide equipment.
	More info: www.usfa.fema.gov/
Montana Forest Stewardship Program	**Source:** Montana Department of Natural Resources and Conservation **Description:** Program provides grant funding for non-industrial private forest landowners in meeting the demand for wood products and providing high quality management of their resources and develop forestry employment for the local community.
	More info: www.fs.fed.us/r1-r4/spf/montana/factsheet/02landownerassistance.htm
Community Facilities Loans and Grants	**Source:** Rural Housing Service (RHS) US Dept. of Agriculture **Description:** Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; including the purchase of fire-fighting equipment for rural areas. No match is required.
	More info: www.rurdev.usda.gov; or local county Rural Development office.
Sale of Federal Surplus Personal Property	**Source:** General Services Administration **Description:** This program sells, by competitive bid, surplus federal government equipment to individuals, businesses, and organizations. Normally, there are no use restrictions on the property purchased.
	More info: www.gsa.gov
Reimbursement for Firefighting on Federal Property	**Source:** US Fire Administration, Federal Emergency Management Agency **Description:** Program provides reimbursement to fire service organizations that have engaged in firefighting operations on federal land. Payments can be for direct expenses and direct losses.
	More info: www.fema.gov/

Table 12 – Assistance Opportunities continued

Program	Description
Fire Management Assistance Grant Program	**Source:** FEMA **Description:** Readiness, Response and Recovery Directorate provides grants to states, tribal governments, and local governments for the mitigation, management and control of any fire burning on publicly (nonfederal) or privately owned wildland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request.
	More info: www.fema.gov/
Hazard Mitigation Grant Program	**Source:** Federal Insurance and Mitigation Administration, FEMA **Description:** Provides states and local governments with financial assistance to implement measures to reduce or eliminate damage and losses from natural hazards. Funded projects have included vegetation management projects.
	More info: www.fema.gov/

Table 12 – Assistance Opportunities continued

ACTIVE STAKEHOLDERS AND PLAN DEVELOPMENT

The Granite County CWPP generation process has included the participation of many community entities. Generation of this plan has included the following primary stakeholders:

- Fire Council / Fire Chiefs
- Tri-County Resource Advisory Committee
- Commissioners
- Disaster and Emergency Services
- Bureau of Land Management
- United States Department of Agriculture: Forest Service
- Montana Department of Natural Resources

Fox Logic invoked discussions with and received feedback from the public, private organizations, and federal, state, and local agencies to identify wildfire risks, priority areas, priority projects, and mitigation activities. Planning was based on verbal input from stakeholder meetings held during the spring of 2005 and written responses submitted to Fox Logic. Input from public stakeholder groups was additionally encouraged through solicitation letters sent directly to possible stakeholder groups and public notices published in local newspapers (Appendix A and Appendix B).

In mid-October 2005 a 1st Final Draft CWPP was circulated to four core stakeholders for review and comment. In late-October 2005, no revision recommendations were received from the core stakeholder group, therefore the 1st Final Draft CWPP was posted again via the Internet on the Fox Logic, LLC website. Notification of the second Internet posting was issued through email/traditional mail notice to all previously identified stakeholders. Received comments were incorporated and finally, copies of the completed document sent to the HRC&D in Butte, MT and County DES office in Philipsburg, MT in mid-November 2005. The Fox Logic, LLC website was also updated with the completed Final Granite County CWPP on November 15, 2005.

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FIGURES

APPENDICIES

Appendix A

Stakeholder Outreach

PRESS RELEASE

Granite County, Montana is developing a Community Wildfire Protection Plan (CWPP) to be completed no later than September 30, 2005.

The Community Wildfire Protection Plan (CWPP) is a tool designed for at-risk wildland-urban interface (WUI) communities to pre-plan and improve their capability to negate or survive wildfire. The CWPP content must fulfill three stipulations of the United States Healthy Forests Restoration Act (HFRA) of 2003. The HFRA provides funding for wildland-urban interface mitigation/defensibility improvements in communities at-risk to wildfire if they fulfill the following:

- **Develop a CWPP collaboratively with local government, local fire department(s), and the MT DNRC, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community;**
- **Identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure; and**
- **Recommend measures to reduce structural ignitability throughout the at-risk community.**

Interested groups wanting to contribute pertinent and valid information in this matter may submit a written summary to Fox Logic, LLC, a resource management and planning company contracted to facilitate the development of the Granite County CWPP. Information and recommendations received will be carefully evaluated for relevance before being included in the final document. Submissions should be received no later than 1 February 2005 and should be addressed to:

Fox Logic, LLC
Attn: Russell F. Fox
P.O. Box 411
Florence, MT 59833
Or
E-mailed to: foxrus@hotmail.com

Date Posted: 3 December 2004

FoxLogic, LLC
Natural Resource Management & Planning
PO Box 411 Ph: (406) 273-4317
Florence, MT 59833 Cell: (406) 370-8539

November 18, 2004

[Stakeholder Address]

RE: Granite County - Community Wildfire Protection Plan Preparation

Dear [Stakeholder]:

The Community Wildfire Protection Plan (CWPP) is a tool designed for at-risk wildland-urban interface (WUI) communities to pre-plan and improve their capability to negate or survive wildfire. The CWPP content must fulfill three stipulations of the United States Healthy Forests Restoration Act (HFRA) of 2003. The HFRA provides funding for wildland-urban interface mitigation/defensibility improvements in communities at-risk to wildfire if they fulfill the following:

- Develop a CWPP collaboratively with local government, local fire department(s), and the MT DNRC, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community;
- Identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure; and
- Recommend measures to reduce structural ignitability throughout the at-risk community.

It is hoped that the [Stakeholder] would provide ideas, assessments, goals, and objectives pertaining to the CWPP for the County. As a Stakeholder in the County's CWPP your ideas and concerns are important to the entire Community and your response will enhance the ability to prevent catastrophic WUI wildfire, better protect wildland firefighter lives, and reduce the socioeconomic impact of fire.

Please accept this letter as an invitation for [Stakeholder]'s participation in the development of the CWPP for Granite County. I need to get your vision for the CWPP document by no later than January 15, 2004 in order to incorporate it into the final document. Should you have any questions or concerns please call me at (406) 273-4317 / (406) 370-8539 or email me at foxrus@hotmail.com.

Sincerely,

Russell F. Fox, CF
Owner-Manager

Fox Logic, LLC - Community Wildfire Protection Plan Information Sheet & Stakeholder Questionnaire

Overview

CWPP is a tool for at-risk wildland-urban interface communities to pre-plan and improve their capability to negate or survive wildfire.

Is developed in the context of the collaborative agreements and guidance established by the Wildland Fire Leadership Council and agreed to by the local government, local fire department, and state agency responsible for forest management, in consultation with interested parties and the federal land-management agencies that manage land in the vicinity of an at-risk community;

Identifies and sets priorities for areas needing hazardous-fuel-reduction treatments and recommends the types and methods of treatment on federal and non-federal lands that will protect one or more at-risk communities and their essential infrastructure; and

Recommends measures to reduce the chance that a fire will ignite structures throughout an at-risk community.

Why a CWPP:

- Provides financial assistance for authorized hazardous-fuel-reduction projects on non-federal land in the Community-at-risk will be allocated by federal agencies based on CWPP recommendations;
- Allows Federal land Management agencies to give priority to projects "that give(s) priority to authorized hazardous fuel reduction projects that provide for protecting at-risk communities or watersheds or that implement CWPPs"

Healthy Forest Restoration Act (HFRA)

Purpose:
"…to reduce wildfire risk to communities, municipal water supplies, and other at-risk federal land through a collaborative planning, prioritizing, and implementing hazardous fuel reduction projects…"

Wildland Urban Interface

The Healthy Forest Restoration Act defines the wildland urban interface (in absence of a CWPP defined WUI) as:

- an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or
- in the case of any area for which a community wildfire protection plan is not in effect:
    - An area extending 1 mile from the boundary of an at-risk community;
    - An area within 1-1/2 miles of the boundary of an at-risk community including land that:
    - has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community ;
        - has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or
        - is in condition class 3 as documented by the Secretary in the project-specific environmental analysis; and
        - an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at- risk community.

Stakeholder Questionnaire continued

Your Involvement is needed to…

Define the Local Wildland Urban Interface

Each county has its own set of variables that the HFRA WUI definition may not address (How do you want to define your WUI?). Factors to consider include:

- Population Density
- Spotting Distances
- Critical Infrastructure
- Evacuation Routes

Identify Risks

Local knowledge will enhance/supplement risk mapping (metrics). What are the obvious WUI risks that you believe should not be left out? (Examples)

- Response time of suppression resources?
- Forest disease/insect outbreak areas?
- Availability of needed or additional resources?
- Public evacuation issues? (WUI Egress/Ingress)
- Past problem areas?

CWPP Priority Area/Zone Identification

Where will be the high, medium, and low priority risk areas/zones be in the WUI? (Examples)

- Travel corridors protection
- Municipal watershed protection
- Power grid protection
- Communication system protection
- Public/homeowner education

Identify Project Priorities

What are the mitigation projects and their order of priority (high, medium, low) that will mitigate identified risks in the priority areas? (Examples)

- Defensible space creation
- Reduce risk to public and firefighter safety
- Work across jurisdictional boundaries
- Reduce risk of Crown Fires/Catastrophic Fires
- Slow rate of wildfire spread

Identify Project Tasks

What type of tasks will be undertaken to reduce wildfire risk in priority areas/zones? (Examples)

- Cutting and hand piling
- Lop and scatter
- Dispersed Treatments
- Fuel Breaks
- Education
- Underburning

**Fox Logic, LLC, intends the above points only for Stakeholder guidance.*

FoxLogic, LLC
Natural Resource
Management & Planning
PO Box 411 Ph: (406) 273-4317
Florence, MT 59833 Cell: (406) 370-8539

DATE, 2005

«Department»
ATTN: «First_Name» «Last_Name»
«Job_Title»
«Address»

RE: Granite County - Community Wildfire Protection Plan 1st Final Draft Review

Dear «Title» «Last_Name»:

First I would like to thank you for your participation as a stakeholder in the development of the Granite County Community Wildfire Protection Plan (CWPP). It is your involvement that has helped design this valuable tool that will improve wildfire defense, structure survivability, and human safety in Granite County's at-risk wildland-urban interface (WUI).

I have enclosed the 1st Final Draft of the Granite County CWPP on CD ROM for your review. To ensure the document reflects an appropriate interpretation of County wildfire risk and hazard mitigation priorities, it is hoped that you would take some time to review this initial Final Draft Plan.

I understand your time is valuable but hope you will continue your participation in the CWPP development process by providing me with your evaluation of the Draft Plan. To aid me in assessing how well the draft meets the spectrum of stakeholder desires and expectations for wildfire mitigation in the WUI I have attached a CWPP evaluation sheet that you may complete as you review of the document. Please send the completed evaluation with your comments back to me by August 19, 2005.

As a CWPP stakeholder your participation in the development of the Granite County CWPP is invaluable. Should you have any questions or concerns please call me at (406) 273-4317 / (406) 370-8539 or email me at foxrus@hotmail.com. In case you do not have access to a computer for Plan review please call and I will send a hard copy to you.

Best Regards,

Russell F. Fox, CF
Owner-Manager

Enclosure.
Attachment.

Stakeholder CWPP Evaluation Sheet

CWPP SECTION Rating (circle one)

EXECUTIVE SUMMARY

Good	Fair	Poor

comments:

BACKGROUND

Good	Fair	Poor

comments:

VALUES AT-RISK

Good	Fair	Poor

comments:

FIRE PREPAREDNESS

Good	Fair	Poor

comments:

FIRE AND WILDLAND-URBAN INTERFACE RISK

Good	Fair	Poor

comments:

PLANNED AND COMPLETED MITIGATION ACTIVITIES

Good	Fair	Poor

comments:

Good	Fair	Poor

IMPLEMENTATION, MONTORING, AND REVIEW
comments:

ACTIVE STAKEHOLDERS AND PLAN DEVELOPMENT

Good	Fair	Poor

comments:

FIGURES
comments:

Good	Fair	Poor

APPENDIX
comments:

Good	Fair	Poor

Please use back of pages for further comment.

Appendix B

Primary Contact List

Contact	Information
BLM	Butte Field Office 106 North Parkmount, Butte, MT 59701
	Contact: Terina Mullen, Fire Mitigation/Education Specialist
	Missoula Field Office 3255 Fort Missoula Rd., Missoula, MT 59804
	Contact: George Hirschenberger, Planning and Environmental Coordinator
USFS	Beaveread-Deerlodge National Forest, Pintler Ranger District 1002 Hollenback Rd, Suite A, Deer Lodge, MT 59722
	Contact: Jim Harrington, Pintler RD AFMO
	USFS, Lolo National Forest, Missoula Ranger District Missoula, MT 59801
	Contact: John Waverek, Missoula RD AFMO
DNRC	Anaconda Fire Unit 7916 Hwy 1 W., Anaconda, MT 59711
	Contact: Terry Vaughn, Anaconda Unit Fire Supervisor
	Anaconda Fire Unit 7916 Hwy 1 W., Anaconda, MT 59711
	Contact: Mike Meyer, Clearwater Unit Fire Supervisor
MT FWP	Butte Field Office 1820 Meadowlark Lane, Butte, MT Ź59701
	Contact: Kris Douglas
Fire Council	Granite County Fire Council Anaconda Fire Department, Anaconda, MT 59858
	Contact: Chair
DES	County Disaster and Emergency Services Office PO Box 395, Philipsburg, MT 59858
	Contact: James Minor
County Commissioners	County Courthouse 220 N. Sansome, Anaconda, MT 59858
	Contact: Suzanne Browning, Joanne Huffsmith, Clifford Nelson
Sheriff/Fire Warden	SheriffÕs Department 115 Kearney, Anaconda, MT 59858
	Contact: Steve Immenschuh
Sierra Club	HeadwaterÕs Group P.O. Box 1290, Bozeman, MT 59715
	Contact: Christine Phillips
Media	The Silver State Post PO 111, Deerlodge, MT 59722-0111
	Contact: Peggy Kerr, Editor
	The Missoula Independent PO Box 8275, Missoula, MT 59807-8275
	Contact: Brad Tyler
	The Missoulian PO Box 8029, Missoula, MT 59807-8029
	Contact: Mike McInally
	The Philipsburg Mail PO Box 160, Philipsburg, MT 59858-0160
	Contact: Maureen Conner, Editor

Appendix C

Existing Development DNRC Risk Rating System

EXISTING DEVELOPMENT
FORM C -RATING FORM (Rev. 3/93)

RATING AREA: DATE: RATED BY:

ROADS

ROAD ACCESS - Items 1 and 2

- Multiple primary access roads = 0
- Two primary access roads = 1
- One-way primary + one alternative access road = 2
- One-way inlout = 3
- No primary access roads = 4

ROAD SURFACE. WIDTH, PRIMARY ACCESS ROUTES - Item 3

- > 18' Road Surface + Shoulder = 1
- 18' Road Surface + Shoulder = 2
- 16 - < 18' Road Surface + Shoulder = 3
- < 16' Road Surface + Shoulder = 4

MAXIMUM ROAD GRADE - Item 4

- 0-5% = 1
- 6-8% = 2
- > 8 - 10% = 3
- > 10% = 4

SECONDARY ROAD ENDINGS - Item 5

- Loops or > 90' Diameter Cui de Sacs = 1
- Cul de Sac Diameter 70-90' = 2
- Cul de Sac Diameter < 70' = 3
- Dead Ends - No Cui de Sac = 4

BRIDGES - Items 6 and 7

- No Bridges = 1
- 40 Ton(+) limit on access bridges = 2
- 20-39 Ton IimJt on all access bridles = 3
- < 10 Ton limit any access bridge = 4

TOPOGRAPHY

SLOPE - Item 8

- 0-10% = 1
- 11-10% = 2
- 11-30% = 3
- > 30% = 4

ASPECT - Item 9

- North (315 degrees through 45 degrees) = 0
- East (46 degrees through 135 degrees) = 1

- Level = 2
- West (226 degrees through 315 degrees) = 3
- South (136 degrees through 225 degrees) = 4

MOST DANGEROUS FEATIJRE . Item" 10

- None = 2
- Atijacent Steep Slopes = 4
- Draws/Ravines = 6
- Chimneys, Cauyons, Saddles = 8

FUELS

FUEL TYPE - Item 11

- Grass around> 90% of structures = 5
- Low brush field, or open timber around> 10% of structures = 10
- Dense conifer or brush field exist around > 10% of structures = 15
- Slash, bugkill, dense lodgepole pine exist around > 10 of structures = 20

RISK SOURCES - total from Item 12

- 0-4 Risk Sources Present = 5
- 5-8 Risk Sources Present = 10
- 9-12 Risk Sources Present = 15
- 13+ Risk Sources Present = 20

ELECTRICAL UTILITIES. Item 13

- All Underground = 0
- Above Ground/Underground Combination (Well Maintained) = 10
- Above Ground (poorly Maintained) = 20

HOMES

ROOF MATERIAL - Item 15

- 90-100% of homes have metal, composition, = 5
tile or other fire resistant roofing
- 80-89% of homes have metal, composition, = 10
tile or other fire resistant roofing
- 75-79% of homes have metal, composition, = 15
tile or other fire resistant roofing
- *< 75%* of homes have metal, composition = 20
tile or other fire resistant roofing

UNENCLOSED BALCONIES, DECKS, EAVES, STILTS, ETC. - Item 16

- < 10% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 1
- 10-20% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 2
- 21-25% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 3
- > 25% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 4

DENSITY OF HOMES - Item 17

- (For 0-30% slope)
  - > 100' between homes = 1
  - 60-100' between homes = 3
  - < 60' between homes = 5

- (For 31-50% slope)
  - > 100' between homes = 2
  - 60'100' between homes = 4
  - < 60' between homes = 6

LANDSCAPING - Item 18

- 76-100% homes meet the fire-resistant landscaping guidelines in the Appendix F = 2
- 51-75% homes meet the fire-resistant landscaping guidelines in tbe Appendix F = 4
- 26-50% homes meet the fire-resistant landscaping guidelines in tbe Appendix F = 6
- 0-25% homes meet tbe fire-resistant landscaping guidelines in the Appendix F = 9

WATER SUPPLY

HYDRANTS - Items 19, 20 and 21

- 500 GPM hydrants available on < 660' spacing = 2
- 00 GPM hydrants available = 4
- < 500 GPM hydrants available = 6
- No hydrants = 8

DRAFT SOURCES – Item 22

- Accessible Sources Available Within Hoselay Distance = 2
- Draft Sources Available Within 5 mi. via primary access roads = 4
- Draft Sources Require Development = 6
- Draft Sources Unavailable = 8

HELICOPTER DIP SPOTS - Item 23

- Under 2 min. turnaround « t mi.) = 1
- Within 2-5 min. turnaround (1-2 mi.) = 2
- Within 6 min. turnaround (3 mi.) = 3
- Beyond 6 min. turnaround or Unavailablp. = 4

STRUCTURAL FIRE PROTECTION - Items 24 and 25 .

- < = 5 min. from fire department = 5; if VFC = 10
- 6-15 min. from fire depaa1ment = 10; if VFC = 15
- 16-30 min. from fire department = 15; if VFC = 20
- No RFD, FSA, municipal fire district or VFC? = 20

HOMEOWNER CONTACT - Items 26 and 27

- Central contact - formal/well organized group (e.g., a homeowners assoc.) = 5
- Less central contact - an informal/loosely organized group (e.g., a civic club or development office) = 10
- Multiple groups - different contacts representing different parts of the community = 15
- No organized contacts = 20

FIRE OCCURRENCE - Item 28

- .00 - .10 Fires/1000 ac./10yr. = 5
- .11 - .20 Fires/1000 ac./10yr. = 10
- .21 - .40 Fires/1000 ac./10yr. = 15
- .40 Fires/1000 ac./10yr. = 20

TOTAL SCORE

< = 110 low risk - low priority
111-135 moderate risk - moderate priority
136-150 high risk - high priority
151-170 very high risk - very high. priority
>=171 extreme risk - extreme priority

Appendix D

Structural Risk Reduction Resources

Source: Firewise

FIREWISE CONSTRUCTION

To create your FIREWISE structure, remember that the primary goals are fuel and exposure reduction.

- Use construction materials that are fire-resistant or non-combustible whenever possible.
- Consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, or cement and concrete products for roof construction.
- Construct a fire-resistant sub-roof for added protection.
- Use fire resistant materials such as stucco or masonry for exterior walls. These products are much better than vinyl which can soften and melt.
- Consider both size and materials for windows; smaller panes hold up better in their frames than larger ones; double pane glass and tempered glass are more effective than single pane glass; plastic skylights can melt.
- Prevent sparks from entering your home through vents, by covering exterior attic and underfloor vents with wire mesh no larger than 1/8 of an inch.
- Keep your gutters, eaves and roof clear of leaves and other debris.
- Clear dead wood and dense vegetation within at least 30 feet from your house, and move firewood away from your house or attachments like fences or decks.

Any structure attached to the house, such as decks, porches, fences and sheds should be considered part of the house. These structures can act as fuses or fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

- If you wish to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.
- Use non-flammable metal when constructing a trellis and cover with high-moisture, fire-resistant vegetation.
- Prevent combustible materials and debris from accumulating beneath patio deck or elevated porches; screen underneath or box in areas below the deck or porch with wire mesh no larger than 1/8 of an inch.

WWW.FIREWISE.ORG

BEWARE & PREPARE

Firefighters need your help. Use these tips to PREPARE your home and PROTECT your family and pets. BEWARE of accidentally starting a wildfire!

FIREWISE COMMUNITIES™

www.firewise.org

FOR MORE INFORMATION, VISIT THESE HELPFUL WEBSITES:

USDA FOREST SERVICE
www.fs.fed.us

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BUREAU OF INDIAN AFFAIRS
FISH & WILDLIFE SERVICE
NATIOAL PARK SERVICE
www.doi.gov/bureaus.html

NATIONAL ASSOCIATION OF STATE FORESTERS
www.stateforesters.org

NATIONAL FIRE PROTECTION ASSOCIATION
www.nfpa.org

U.S. FIRE ADMINISTRATION
www.usfa.fema.gov

FEDERAL EMERGENCY MANAGEMENT AGENCY
www.fema.gov

FOR MORE INFORMATION CONTACT:

FIREWISE COMMUNITIES
1 BATTERYMARCH PARK - QUINCY, MA 02269

FIREWISE COMMUNITIES™

www.firewise.org

www.firewise.org

FIREWISE LANDSCAPING

To create a landscape that will make your home less vulnerable to wildfire, the primary goal is fuel reduction. Think of the area around your home in zones. Zone 1 is closest to the structure, Zone 4 is the farthest away.

Zone 1 This well-irrigated area encircles the structure for at least 30 feet on all sides, providing space for fire suppression equipment in the event of an emergency. Plants should be limited to carefully spaced fire resistant tree and shrub species.

Zone 2 Fire resistant plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.

Zone 3 Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.

Zone 4 This furthest zone from the structure is a natural area. Thin selectively here and remove highly flammable vegetation.

Also remember to:

- Carefully space the trees you plant.
- Take out the "ladder fuels" – vegetation that serves as a link between grass and tree tops. These fuels can carry fire from vegetation to a structure or from a structure to vegetation.

When maintaining a landscape:

- Keep trees and shrubs pruned. Prune all trees six to 10 feet from the ground.
- Water and maintain your lawn regularly.
- Mow dry grass and weeds..
- Dispose of cuttings and debris promptly.
- Landscape with less-flammable plants: Contact your local state foerster, county extension office ot landscape specialist for plant information.

WWW.FIREWISE.ORG

Source: Firewise

A FIREWISE HOME HAS...

DEFENSIBLE SPACE

Do you have at least 30 ft of space surrounding your home that is **Lean, Clean and Green**?

The objective of Defensible Space is to reduce the wildfire threat to your home by changing the characteristics of the surrounding vegetation.

Lean – Prune shrubs and cut back tree branches, especially within 15 feet of your chimney.

Clean – Remove all dead plant material from around your home; this includes dead leaves, dry grass and even stacked firewood.

Green – Plant fire-resistant vegetation that is healthy and green throughout the year.

Did You Know? Defensible space allows firefighters room to put out fires.

FIRE-RESISTANT ATTACHMENTS

Attachments include any structure connected to your home, such as decks, porches or fences. If an attachment to a home is *not* fire-resistant, then the home as a whole is *not* firewise.

A DISASTER PLAN

The time to plan for a fire emergency is now. Take a few minutes to discuss with your family what actions you will need to take.

- Post your local firefighting agency's telephone number in a visible place.
- Decide where you will go and how you will get there. With fire, you may only have a moments notice. Two escape routes out of your home and out of your neighborhood are preferable.
- Have tools available: shovel, rake, axe, handsaw or chainsaw, and a 2 gallon bucket.
- Maintain an adequate water source.
- Have a plan for your pets.
- Practice family fire drills.

Did You Know? Evacuations for a wildfire can occur without notice; When wildfire conditions exist, BE ALERT.

LEAN, CLEAN AND GREEN LANDSCAPING

With firewise landscaping, you can create defensible space around your home that reduces your wildfire threat. Large, leafy, hardwood trees should be pruned so that the lowest branches are at least 6 to 10 ft high to prevent a fire on the ground from spreading up to the tree tops. Within the defensible space, remove flammable plants that contain resins, oils and waxes that burn readily: Ornamental junipers, yaupon holly, red cedar, and young pine. A list of *less*-flammable plants can be found within this brochure.

Did You Know? Although mulch helps retain soil moisture, when dry, it can become flammable. Mulch as well as all landscaping should be kept well watered to prevent them from becoming fire fuel.

FIRE-RESISTANT ROOF CONSTRUCTION

Firewise construction materials include Class-A asphalt shingles, metal, cement and concrete products. Additionally, the inclusion of a fire-resistant sub-roof adds protection.

Did You Know? Something as simple as making sure that your gutters, eaves and roof are clear of debris can reduce your fire threat.

FIRE-RESISTANT EXTERIOR CONSTRUCTION

Wall materials that resist heat and flames include brick, cement, plaster, stucco and concrete masonry. Double pane glass windows can make a home more resistant to wildfire heat and flames.

Did You Know? Although some vinyl will not burn, firefighters have found that some vinyl soffits can melt, allowing embers into the attic space.

EMERGENCY ACCESS

Identify your home and neighborhood with legible and clearly marked street names and numbers so emergency vehicles can rapidly find the location of the emergency. Include a driveway that is at least 12 feet wide with a vertical clearance of 15 feet – to provide access to emergency apparatus.

Firewise Construction Checklist

FIREWISE Construction

When constructing, renovating, or adding to a firewise home, consider the following:

- ❑ Choose a firewise location.
- ❑ Design and build a firewise structure.
- ❑ Employ firewise landscaping and maintenance.

To select a firewise location, observe the following:

- ❑ Slope of terrain; be sure to build on the most level portion of the land, since fire spreads more rapidly on even minor slopes.
- ❑ Set your single-story structure at least 30 feet back from any ridge or cliff; increase distance if your home will be higher than one story.

In designing and building your firewise structure, remember that the primary goals are fuel and exposure reduction. To this end:

- ❑ Use construction materials that are fire-resistant or non-combustible whenever possible.
- ❑ For roof construction, consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, cement and concrete products, or terra-cotta tiles.
- ❑ Constructing a fire-resistant sub-roof can add protection as well.
- ❑ On exterior wall facing, fire resistive materials such as stucco or masonry are much better choices than vinyl which can soften and melt.
- ❑ Window materials and size are important. Smaller panes hold up better in their frames than larger ones. Double pane glass and tempered glass are more reliable and effective heat barriers than single pane glass. Plastic skylights can melt.
- ❑ Install non-flammable shutters on windows and skylights.
- ❑ To prevent sparks from entering your home through vents, cover exterior attic and underfloor vents with wire screening no larger than 1/8 of an inch mesh. Make sure undereave and soffit vents are as close as possible to the roof line. Box in eaves, but be sure to provide adequate ventilation to prevent condensation.
- ❑ Include a driveway that is wide enough to provide easy access for fire engines (12 feet wide with a vertical clearance of 15 feet and a slope that is less than 5 percent) . The driveway and access roads should be well-maintained, clearly marked, and include ample turnaround space near the house. Also provide easy access to fire service water supplies, whenever possible.
- ❑ Provide at least two ground level doors for easy and safe exit and at least two means of escape (i.e., doors or windows) in each room so that everyone has a way out.
- ❑ Keep gutters, eaves, and roofs clear of leaves and other debris.
- ❑ Make periodic inspections of your home, looking for deterioration such as breaks and spaces between roof tiles, warping wood, or cracks and crevices in the structure.
- ❑ Periodically inspect your property, clearing dead wood and dense vegetation at distance of at least 30 feet from your house. Move firewood away from the house or attachments like fences or decks.

Any structures attached to the house, such as decks, porches, fences, and outbuildings should be considered part of the house. These structures can act as fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

- ❑ If you wish to attach an all-wood fence to your house, use masonry or metal as a protective barriers between the fence and house.
- ❑ Use metal when constructing a trellis and cover it with high-moisture, low flammability vegetation.
- ❑ Prevent combustible materials and debris from accumulating beneath patio decks or elevated porches. Screen or box-in areas below patios and decks with wire screen no larger than 1/8 inch mesh.
- ❑ Make sure an elevated wooden deck is not located at the top of a hill where it will be in direct line of a fire moving up slope. Consider a terrace instead.

Access additional information on the Firewise home page: ***www.firewise.org***

Please see the other side of this sheet for the ***Firewise Landscaping Checklist.***

Source: Firewise

Testing for Combustibility

Testing involves burning wood cribs or brands of varied sizes placed on the roof surface to test the combustibility of roofing materials. This simulates the spotting of firebrands and flaming debris so typical of wildland fires.

To attain a Class A rating, a test roof must remain unburned after the largest brand is placed on the roof and allowed to burn itself out.

Smaller brands are used to help determine B and C ratings.

Underwriters' Laboratories of Canada (ULC) rated Class A roofing material test is wood cribbing material of kiln-dried, knot-free Douglas-fir. Wood crib dimensions are 305mm square and about 57mm high. Wood crib is three layers of 12, 19mm by 19mm by 305mm strips, arranged 12mm apart, nailed at each end. Each layer is stacked 90 degrees to adjacent layer.

Rating	Class A	Class B	Class C
Fire Resistance	High	Moderate	Low

Source: Partners in Protection

Common Roof Types and Fire Ratings

Type	Fire Rating	Advantages and Disadvantages
Clay Tile	Class A	Durable but fragile. Heavy tiles need strong framing. (Can re-roof on standard framing with bracing).
Concrete Tile	Class A	Weight/breakage challenge as with clay tile. (lightweight concrete tile available)
Fibreglass / Asphalt Composition Shingles	Class A	Easy to apply, most common and economical of A-rated roofs. Some homeowners associations have covenants forbidding use.
Metal Roofing	Rating requirements vary: Class A – if old roof removed. Class B – installed with heavy roofing paper over old roof. Class C – if applied directly over old roof.	Lightweight and durable, wide color range. Some designed to simulate shake roof appearance.
Fibrous Cement Shake	Rating requirements vary: Class A – if installed over plywood. Class B – if not installed over plywood.	Lightweight and durable. Best simulation of shake and slate appearance. No roof reinforcement needed.
Built-up Roof	Rating requirements vary: Class A – 9 layers of roofing felt. Class B – 7 layers of roofing felt. Class C – 3 layers of roofing felt.	Standard tar and gravel flat roof, inexpensive. Unless done properly, no rating secured at all. (Asphalt or paper felt placed over wood with insufficient top coating is very flammable).
ULC Rated Shakes	Rating requirements vary: Class A – 'B'-rated shakes over roof deck Class B – 'B'-rated shakes over sheathing. Class C – 'C'-rated shakes over lathing. **No other shakes meet fire ratings.**	Must be kept clean. Moss, needles and other debris increase fire danger.
Unrated Shakes	None	Untreated shakes (or those with spray-on fire-retardant treatments) are highly combustible.

Source: Partners in Protection

Firewise Landscaping Checklist

FIREWISE Landscaping

When designing and installing a firewise landscape, consider the following:

- ❑ Local area fire history.
- ❑ Site location and overall terrain.
- ❑ Prevailing winds and seasonal weather.
- ❑ Property contours and boundaries.
- ❑ Native vegetation.
- ❑ Plant characteristics and placement (duffage, water and salt retention ability, aromatic oils, fuel load per area, and size).
- ❑ Irrigation requirements.

To create a firewise landscape, remember that the primary goal is fuel reduction. To this end, initiate the zone concept. Zone 1 is closest to the structure; Zones 2-4 move progressively further away.

- ❑ **Zone 1.** This well-irrigated area encircles the structure for at least 30' on all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully spaced low flammability species.

- ❑ **Zone 2.** Low flammability plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.

- ❑ **Zone 3.** Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.

- ❑ **Zone 4.** This furthest zone from the structure is a natural area. Selectively prune and thin all plants and remove highly flammable vegetation.

Also remember to:

- ❑ Be sure to leave a minimum of 30' around the house to accommodate fire equipment, if necessary.
- ❑ Widely space and carefully situate the trees you plant.
- ❑ Take out the "ladder fuels" — vegetation that serves as a link between grass and tree tops. This arrangement can carry fire to a structure or from a structure to vegetation.
- ❑ Give yourself added protection with "fuel breaks" like driveways, gravel walkways, and lawns.

When maintaining a landscape:

- ❑ Keep trees and shrubs properly pruned. Prune all trees so the lowest limbs are 6' to 10' from the ground.
- ❑ Remove leaf clutter and dead and overhanging branches.
- ❑ Mow the lawn regularly.
- ❑ Dispose of cuttings and debris promptly, according to local regulations.
- ❑ Store firewood away from the house.
- ❑ Be sure the irrigation system is well maintained.
- ❑ Use care when refueling garden equipment and maintain it regularly.
- ❑ Store and use flammable liquids properly.
- ❑ Dispose of smoking materials carefully.
- ❑ Become familiar with local regulations regarding vegetation clearances, disposal of debris, and fire safety requirements for equipment.
- ❑ Follow manufacturers' instructions when using fertilizers and pesticides.

Access additional information on the Firewise home page: ***www.firewise.org***

Please see the other side of this sheet for the ***Firewise Construction Checklist.***

Source: Firewise

Vegetation Management Strategies

Other factors that figure prominently in a community's choice of vegetation management strategy are maintenance, water requirements, homeowner capabilities, erosion control, and historical weather and fire behavior patterns.

Vegetation management strategies break down into three approaches. These are:

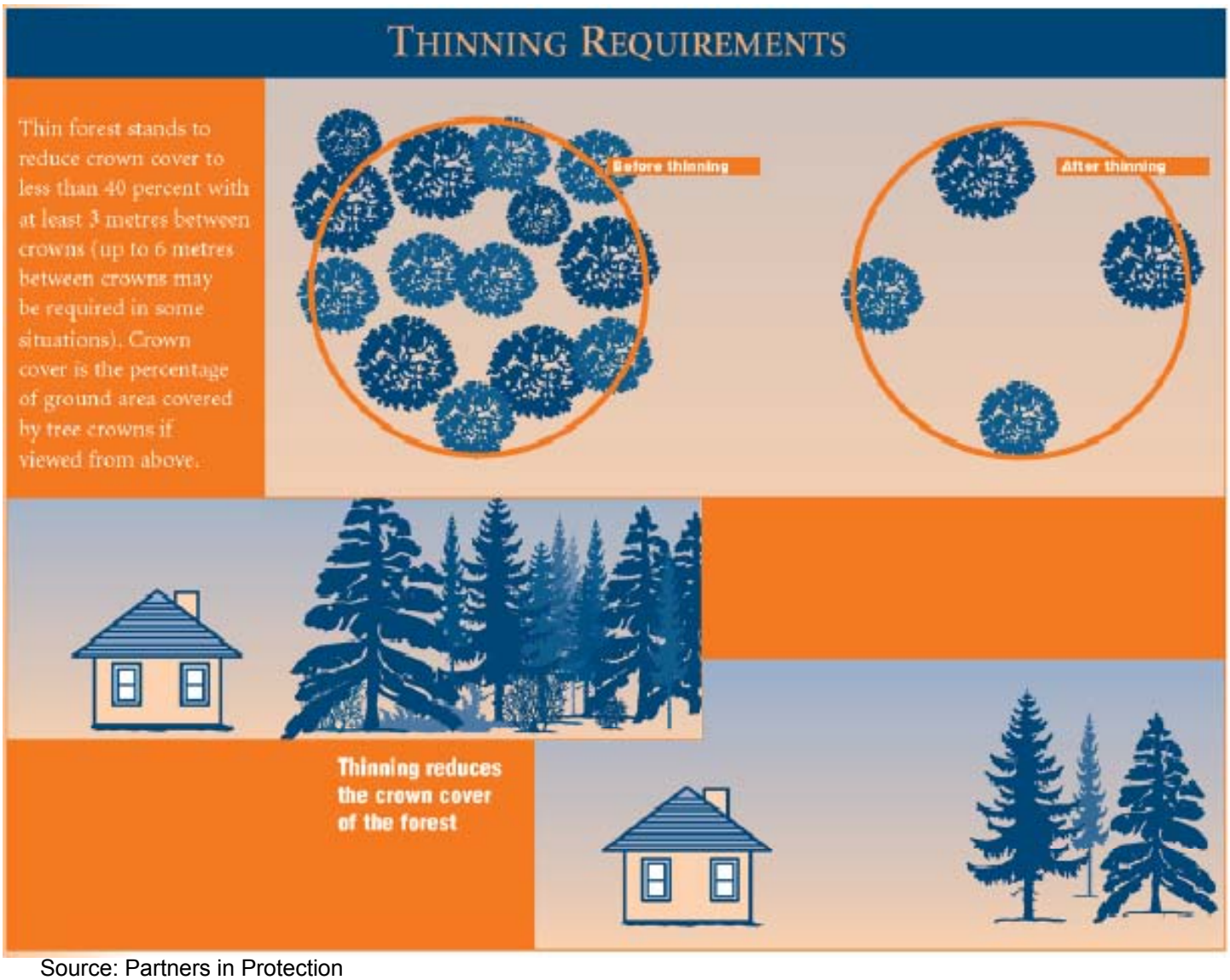
- Fuel removal
- Fuel reduction
- Fuel conversion

Before

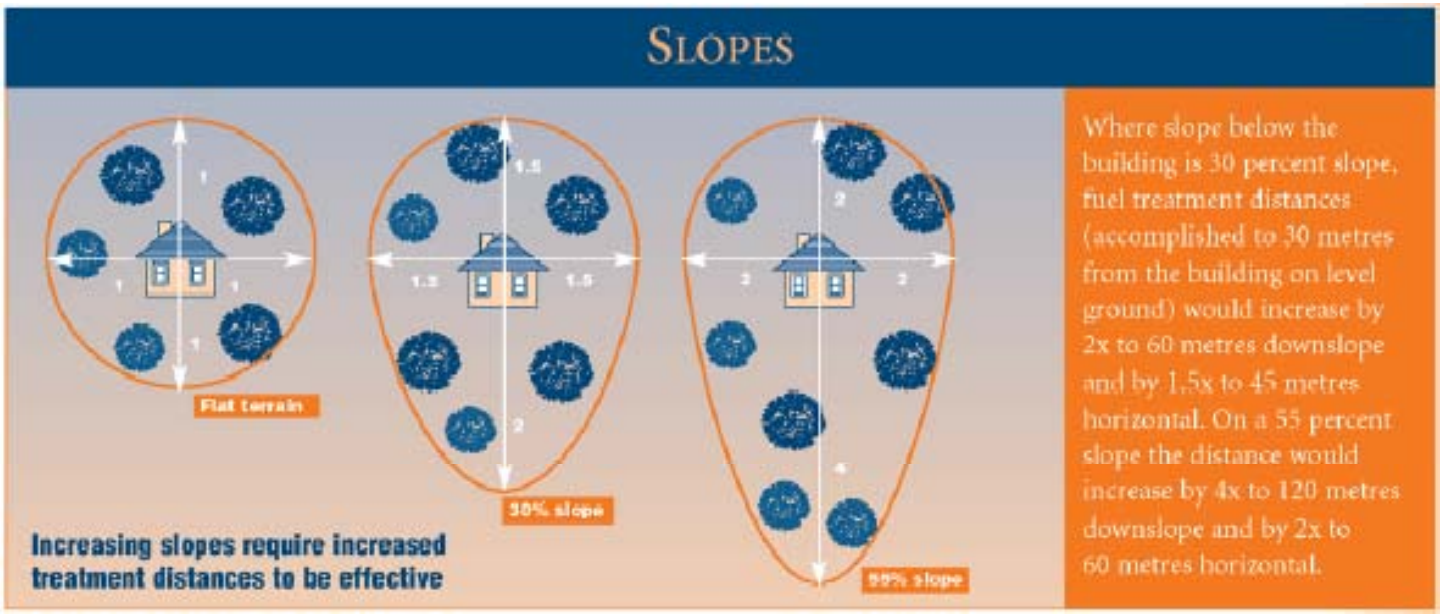
Recommended guidelines are provided for each vegetation management strategy. For communities or individuals seeking a higher degree of protection, vegetation management standards providing a higher level of protection are outlined in Appendix 2: Fuel Reduction Standards for Crown Fire Hazard.

After

Source: Partners in Protection



Source: Partners in Protection



Source: Partners in Protection

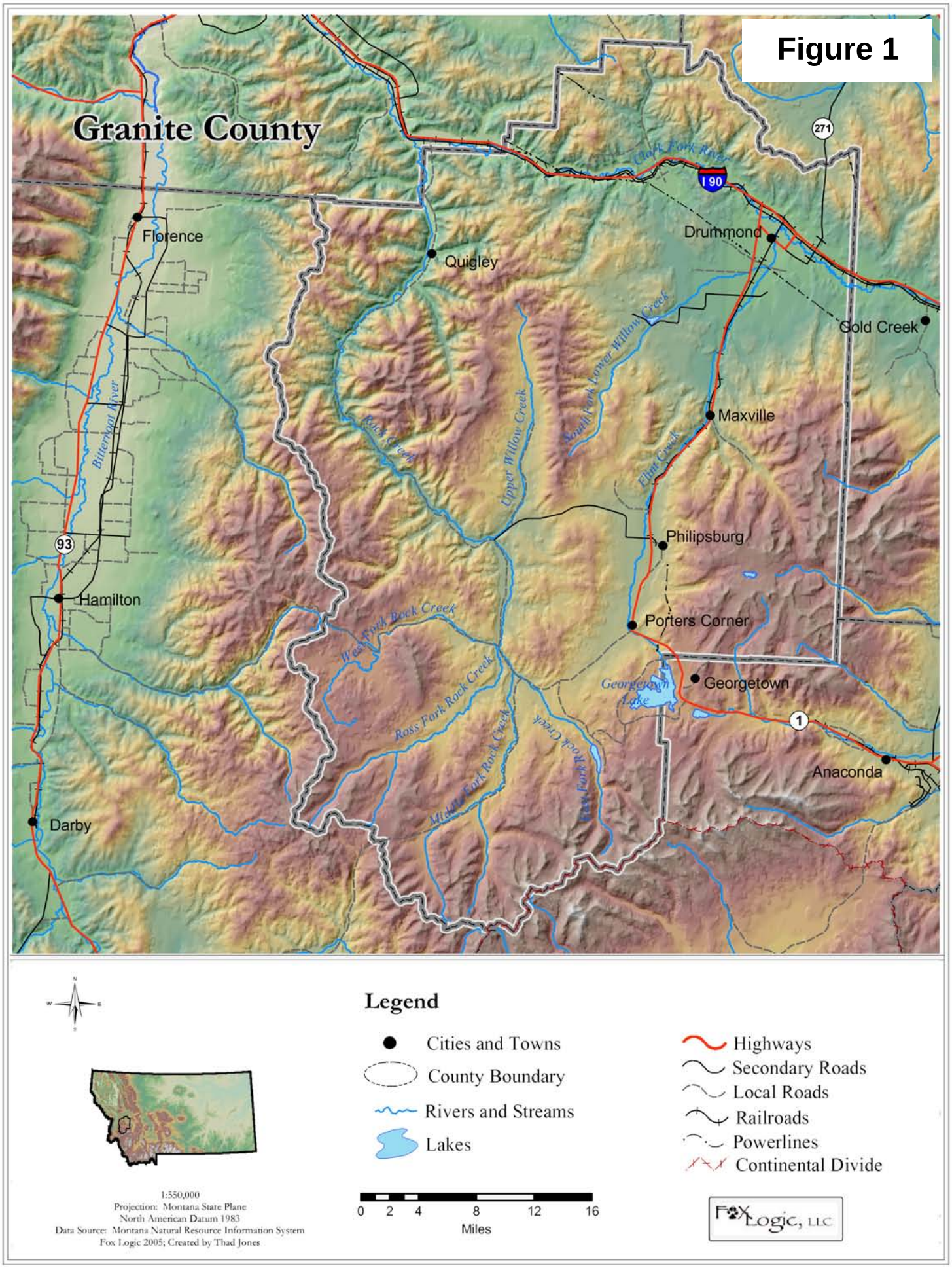
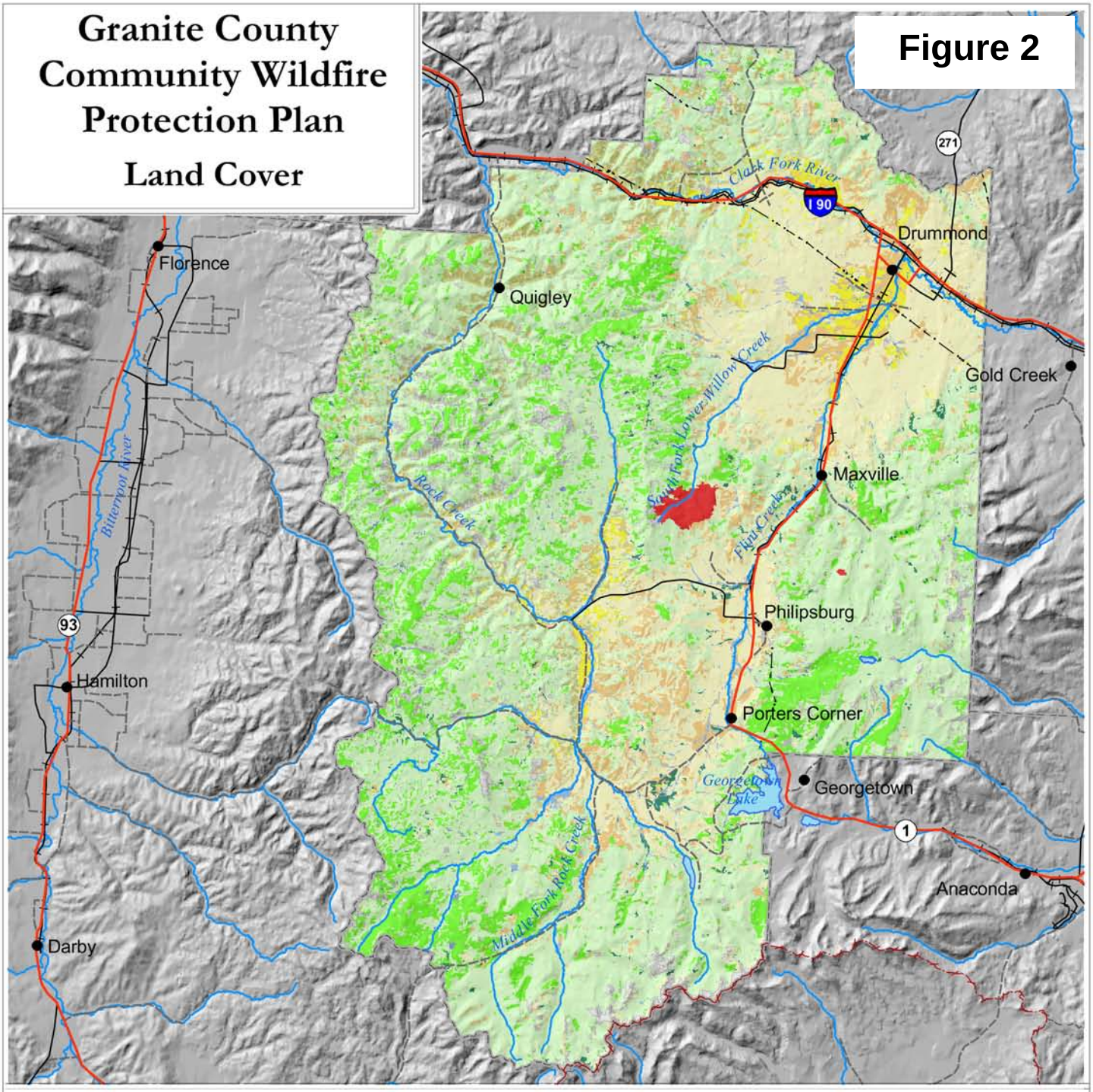


Figure 1
Granite County
Florence
Quigley
Drummond
Gold Creek
Maxville
Philipsburg
Porters Corner
Georgetown
Georgetown Lake
Anaconda
Hamilton
Darby
Bitterroot River
Clark Fork River
Rock Creek
Upper Willow Creek
South Fork Lower Willow Creek
Flint Creek
West Fork Rock Creek
Ross Fork Rock Creek
Middle Fork Rock Creek
East Fork Rock Creek
I 90
271
93
1
Legend
Cities and Towns
County Boundary
Rivers and Streams
Lakes
Highways
Secondary Roads
Local Roads
Railroads
Powerlines
Continental Divide
0 2 4 8 12 16
Miles
1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones
Fox Logic, LLC

Granite County Community Wildfire Protection Plan

Land Cover

Figure 2



Land Cover Types (90m)

Shrub and Grass Lands

- Agriculture/Altered Herbaceous
- Grasslands/Alpine-Subalpine Meadows
- Shrublands/Sagebrush

Riparian

- Graminoid/Shrub Riparian
- Mixed Riparian

Forest

- Xeric Mixed Forest
- Mesic Mixed Forest
- Mixed Subalpine Forest
- Mixed Broadleaf Forest
- Previously Burned Forest
- Rock/Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

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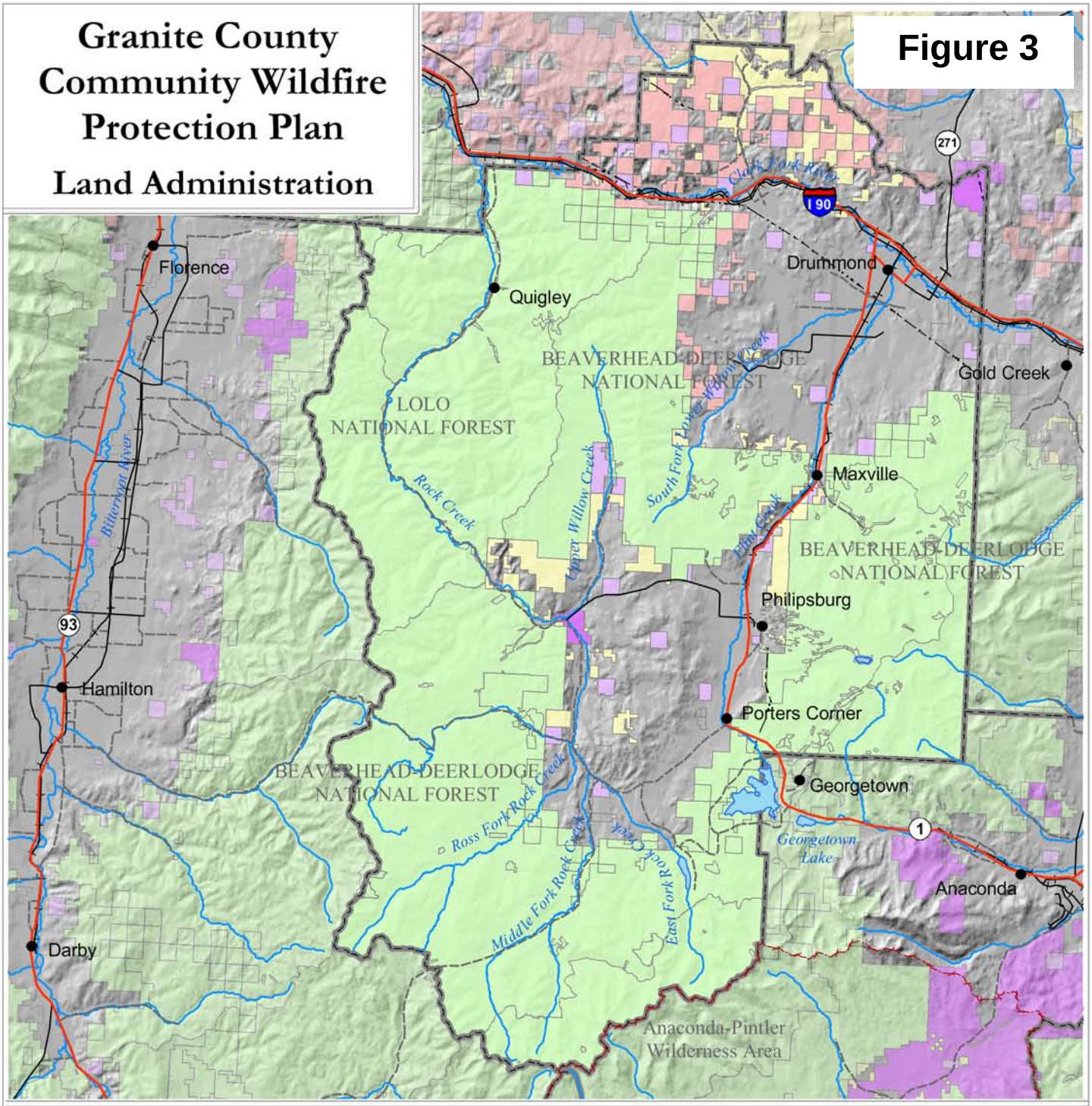
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Land Administration

Figure 3



Land Administration

- Private Lands
- Forest Service
- Bureau of Land Management
- State Lands
- Fish, Wildlife & Parks
- Plum Creek
- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

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0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
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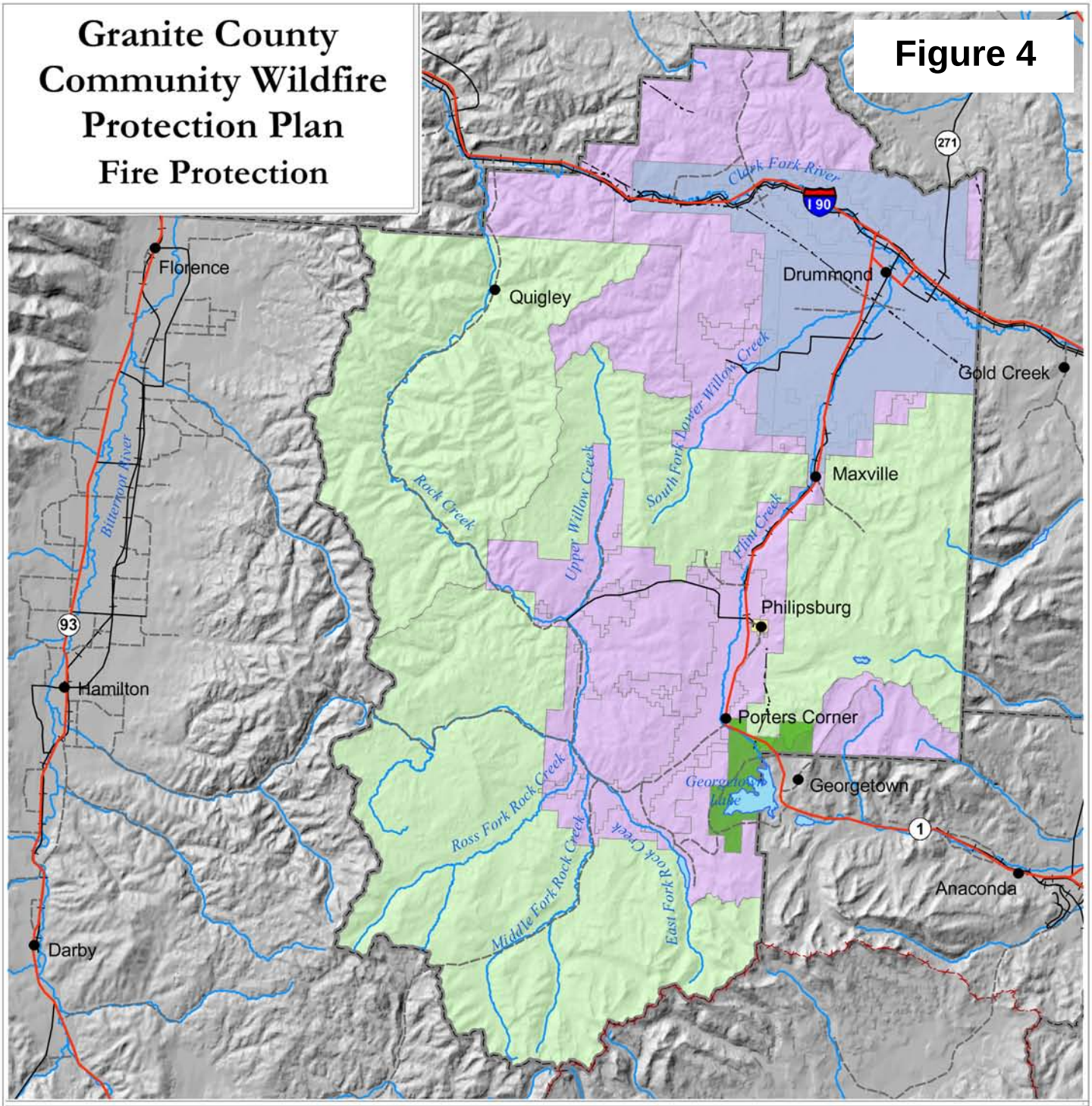
Granite County Community Wildfire Protection Plan
Fire Protection

Figure 4



Fire Protection Agency

- Rural Fire District
- Fire Service Area
- State Fire Protection
- Federal Fire Protection
- Volunteer Fire District
- No Fire Protection

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

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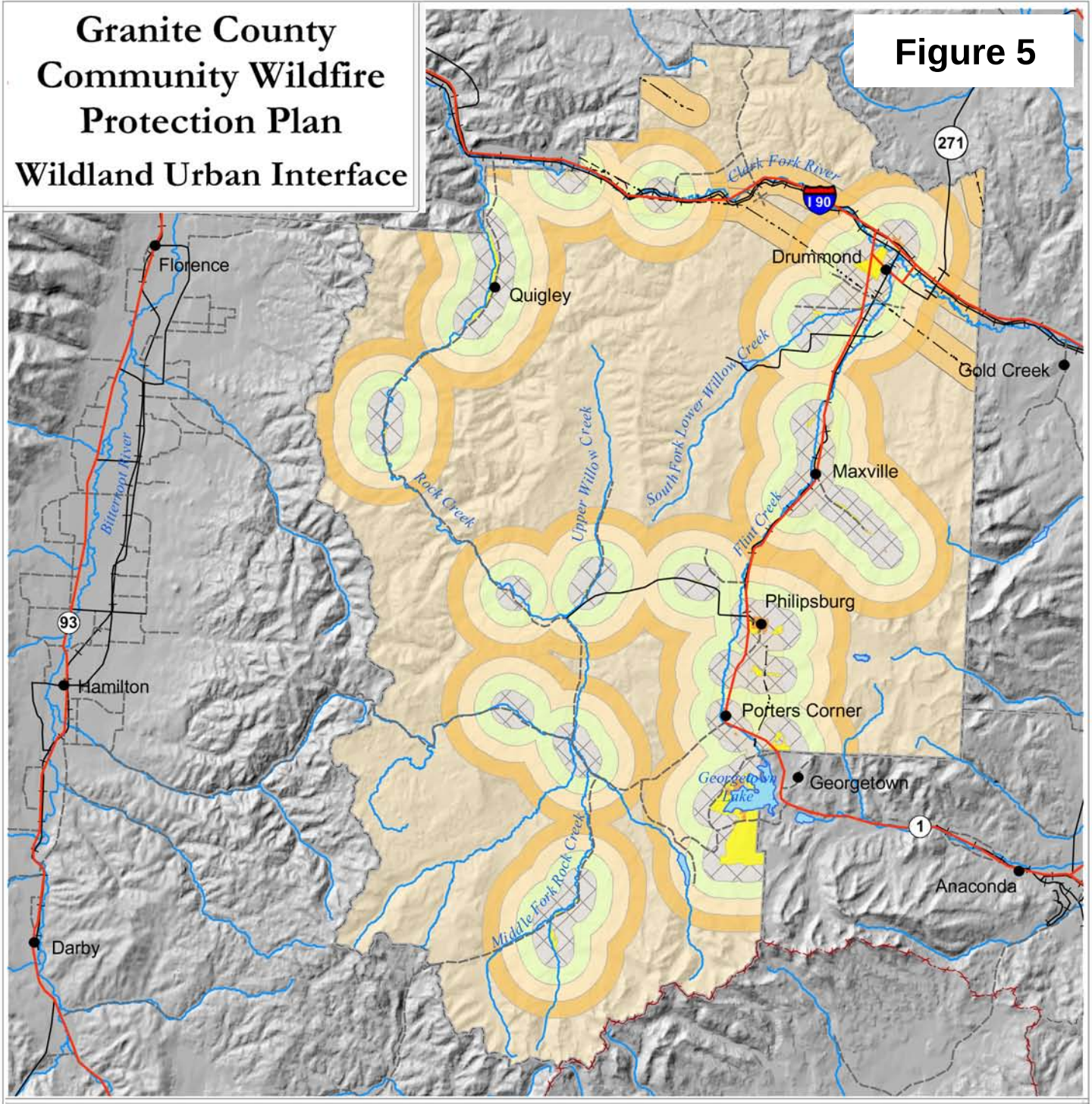
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Wildland Urban Interface

Figure 5



Granite Wildland Urban Interface

WUI Ratings
- High Density
- Medium Density
- Low Density

WUI Buffers
- 1 Mile
- 2 Mile
- 3 Mile
- 4 Mile/ 1 Mile Highway and Powerline

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

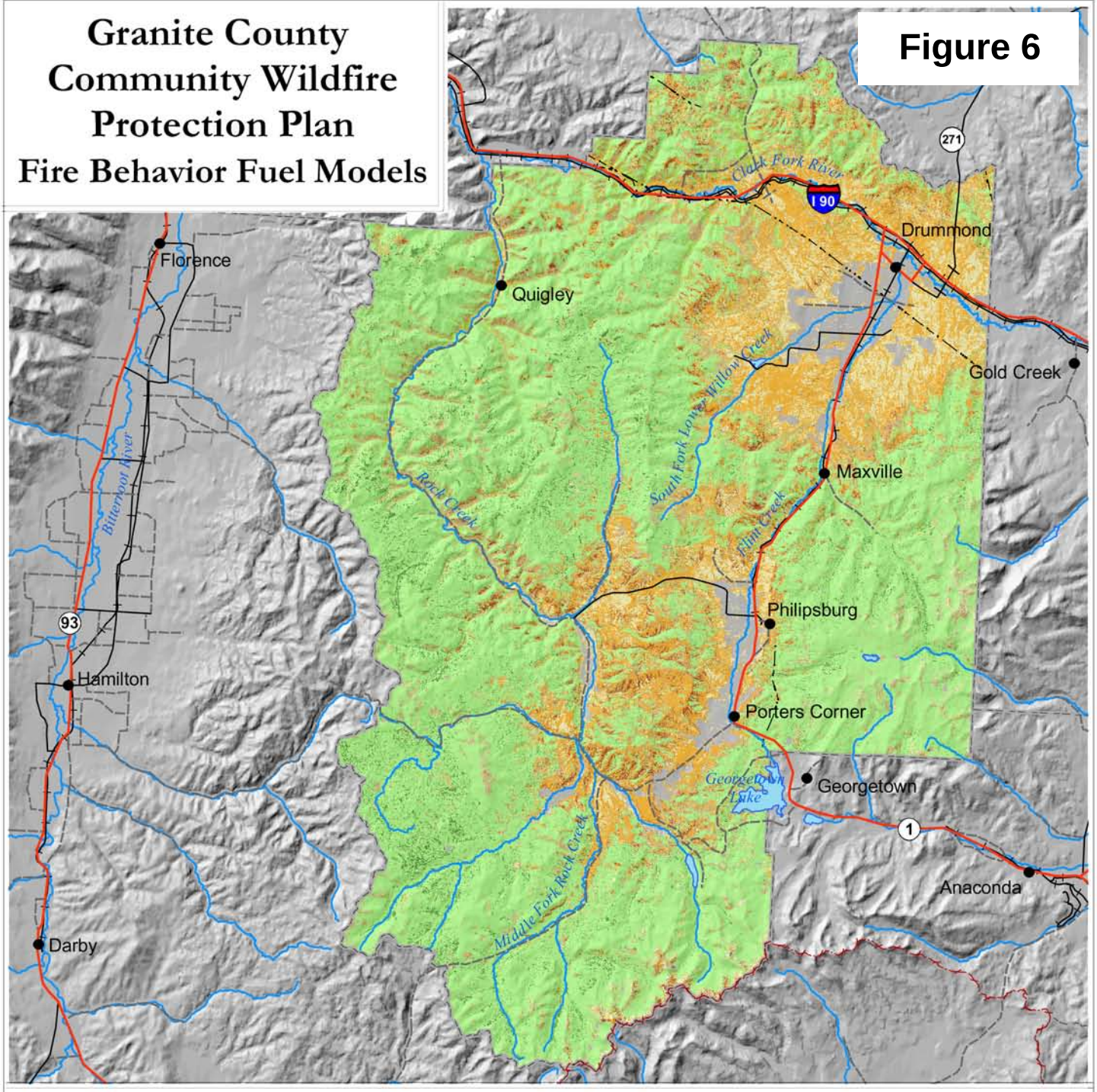
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
WUI Data: Forest Ecology and Management, University of Wisconson, Silvis Lab 2005. Fox Logic 2005; Created by Thad Jones

Fox Logic, LLC

Granite County Community Wildfire Protection Plan
Fire Behavior Fuel Models

Figure 6



Fire Behavior Fuel Models

- 1= Grass and grass-dominated (Shortgrass up to 1 ft.)
- 2= Grass and grass-dominated (Timber: grass and understory)
- 5= Chaparral and shrub fields (Brush up to 2 ft.)
- 6= Chaparral and shrub fields (Dormant brush)
- 8= Timber litter (Closed timber litter)
- 9= Timber litter (Ponderosa pine litter)
- 10= Timber litter (Timber: litter and understory)
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Rivers and Streams
- Lakes

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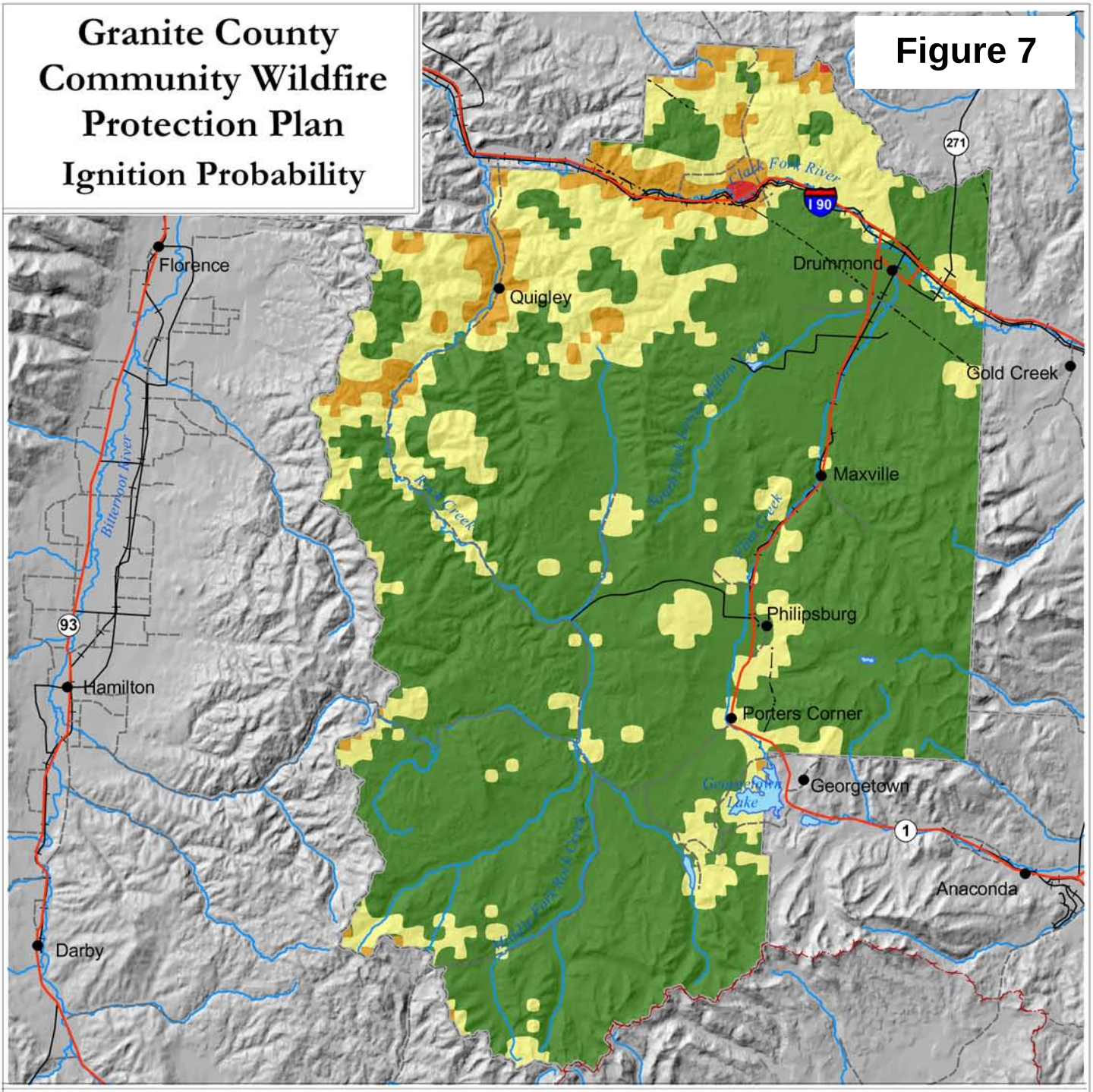
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System.
Fuel model data derived from the LANDFIRE Project, USDA Fire Lab. Missoula, MT. Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan
Ignition Probability

Figure 7



Fire Ignition Probability
(# fires/1,000 acres/10 years)

- Low (0.0 to 0.154)
- Moderate (0.154 to 0.535)
- High (0.535 to 1.525)

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

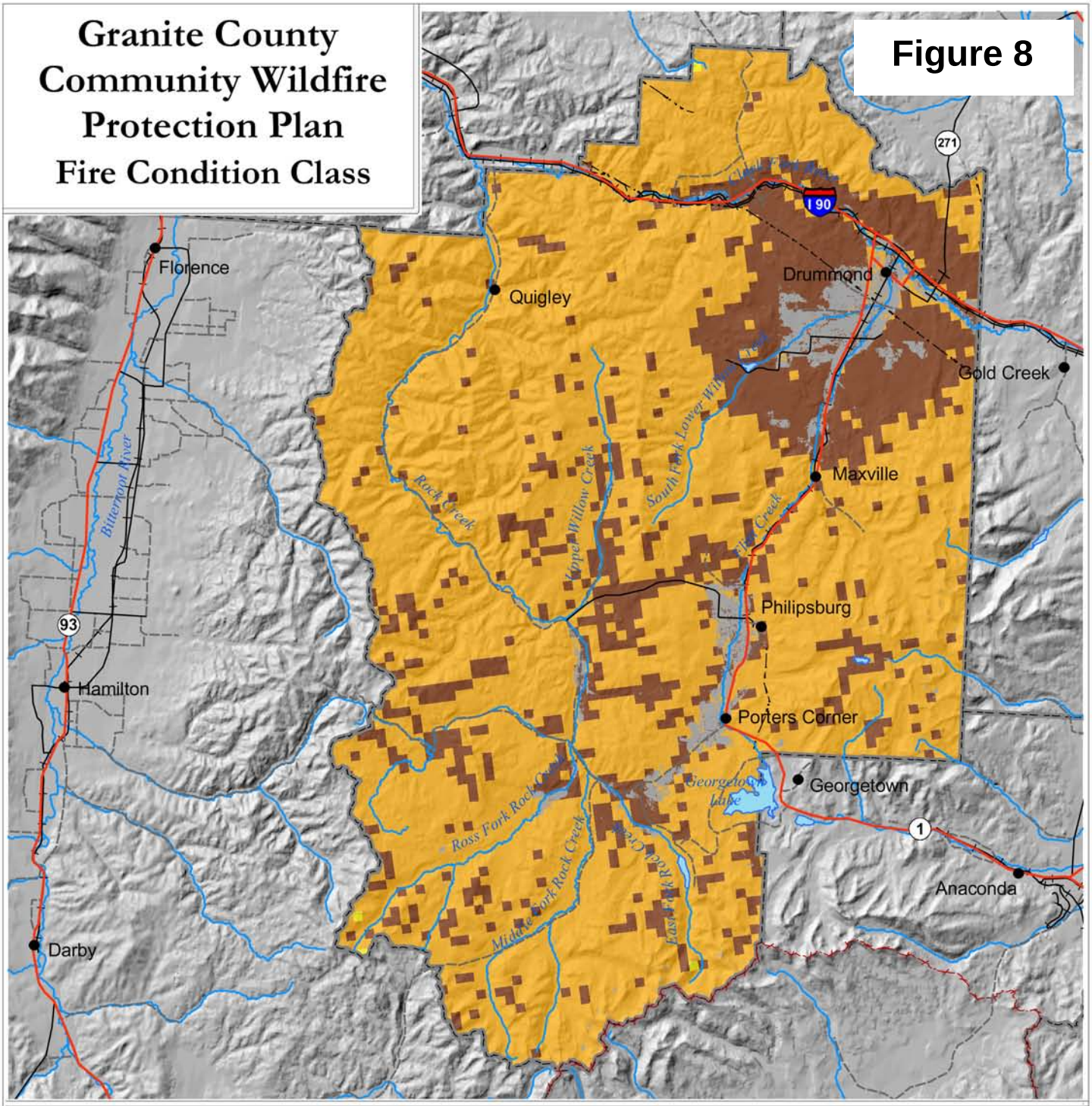
Fox Logic, LLC

0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System, Wildlife Spatial Analysis Lab, Montana Cooperative Wildlife Research Unit, The University of Montana. Ignition probability data has been altered for presentation purposes. Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan
Fire Condition Class

Figure 8



Fire Condition Class
(Departure from historic fire regime)

- 1- natural/near natural fire cycle
- 2- >1 missed fire cycle
- 3- =>3 missed fire cycles
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

FoxLogic, LLC

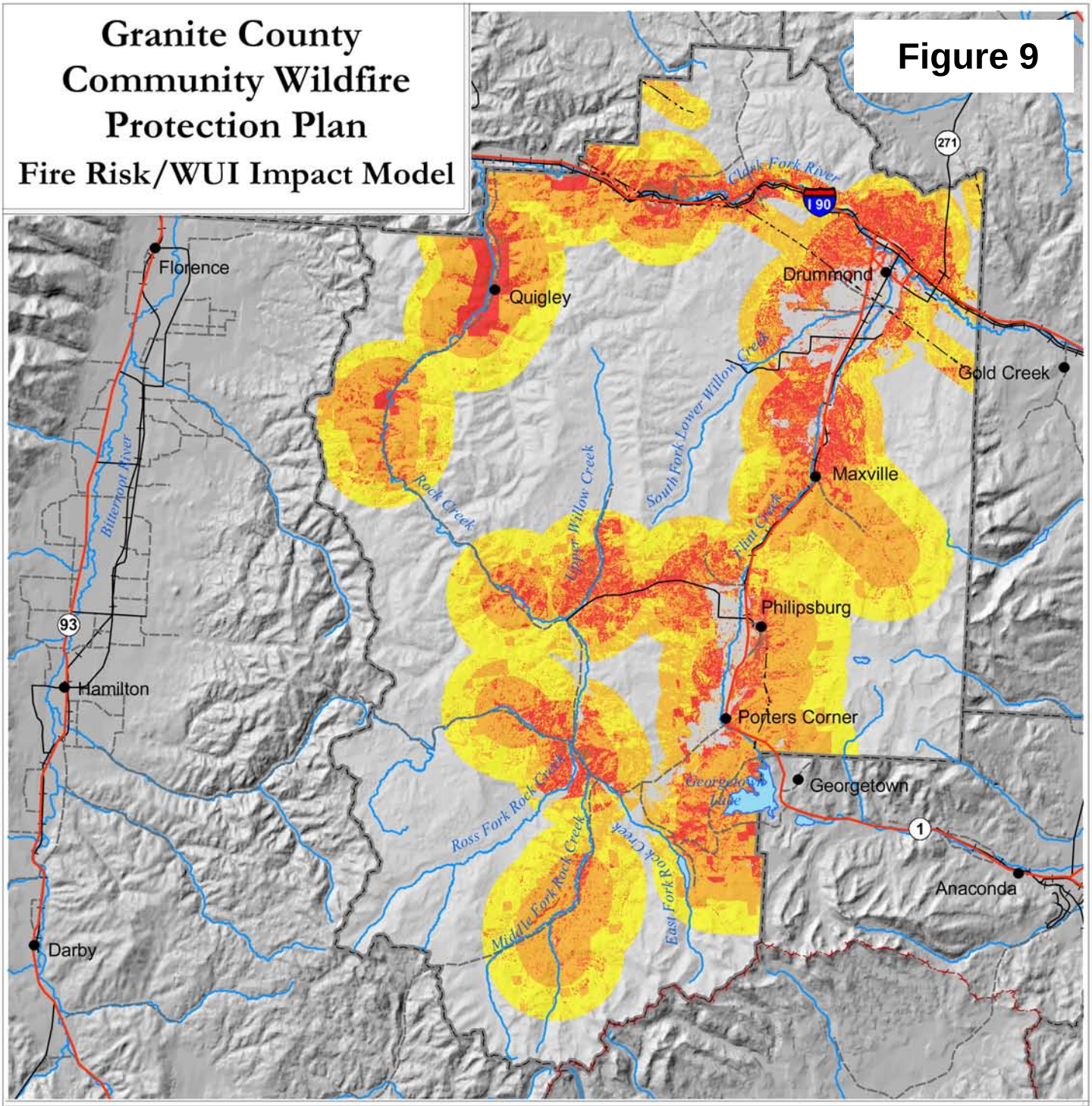
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Condition class data derived from the LANDFIRE Project,
USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Fire Risk/WUI Impact Model

Figure 9



Fire Risk/WUI Impact Model

- Low Priority
- Medium Priority
- High Priority
- Very-High Priority
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

FoxLogic, LLC

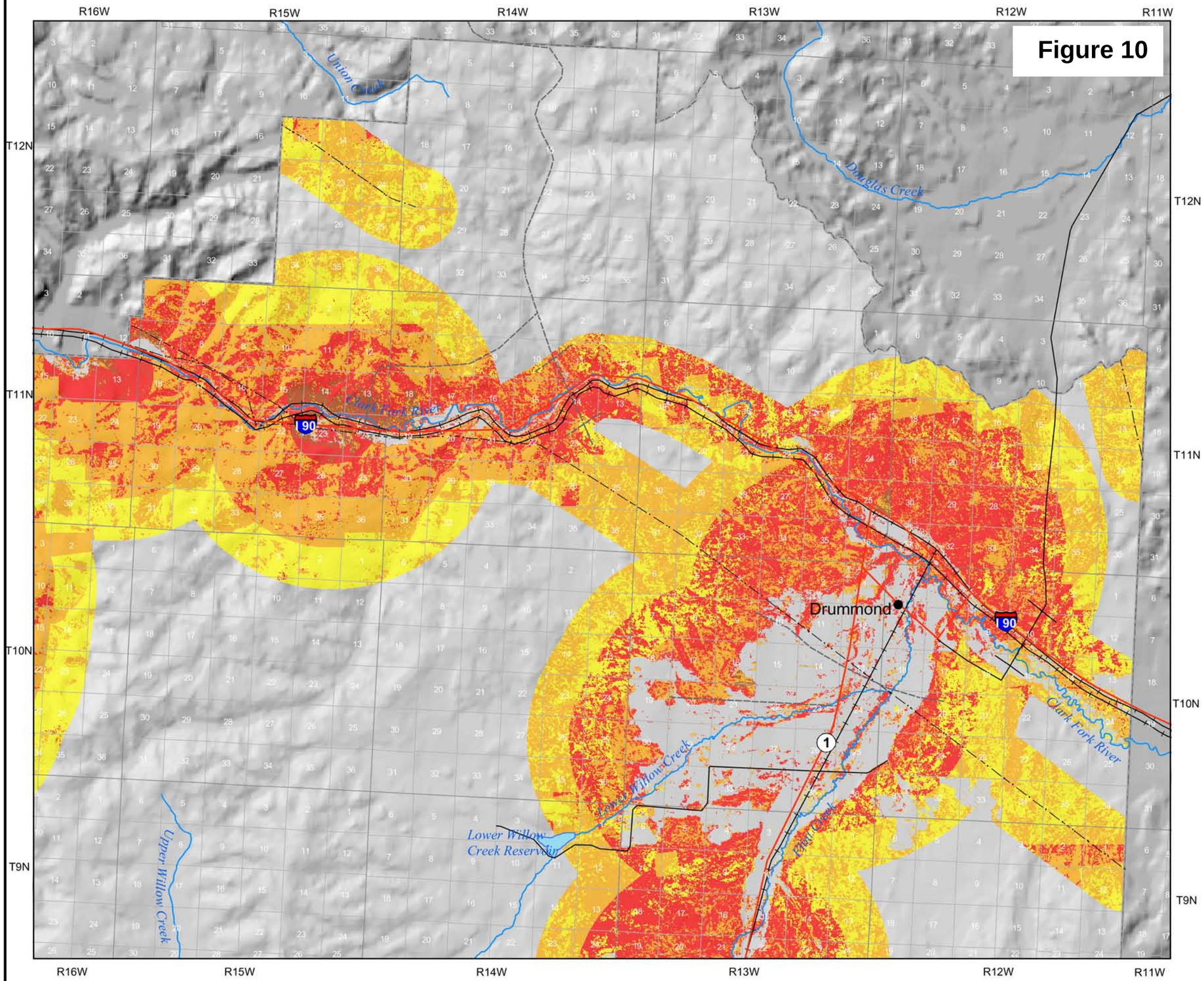
0 2 4 8 12 16
Miles

1:550,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project, USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Fire Risk/WUI Impact Model

Northern Granite



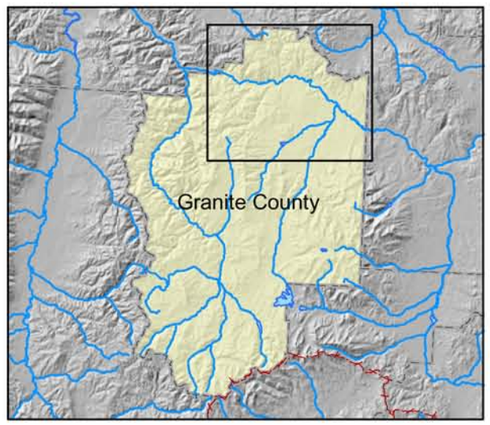
Fire Risk/WUI Impact Model

- Low Priority
- Medium Priority
- High Priority
- Very-High Priority
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles

N W E S



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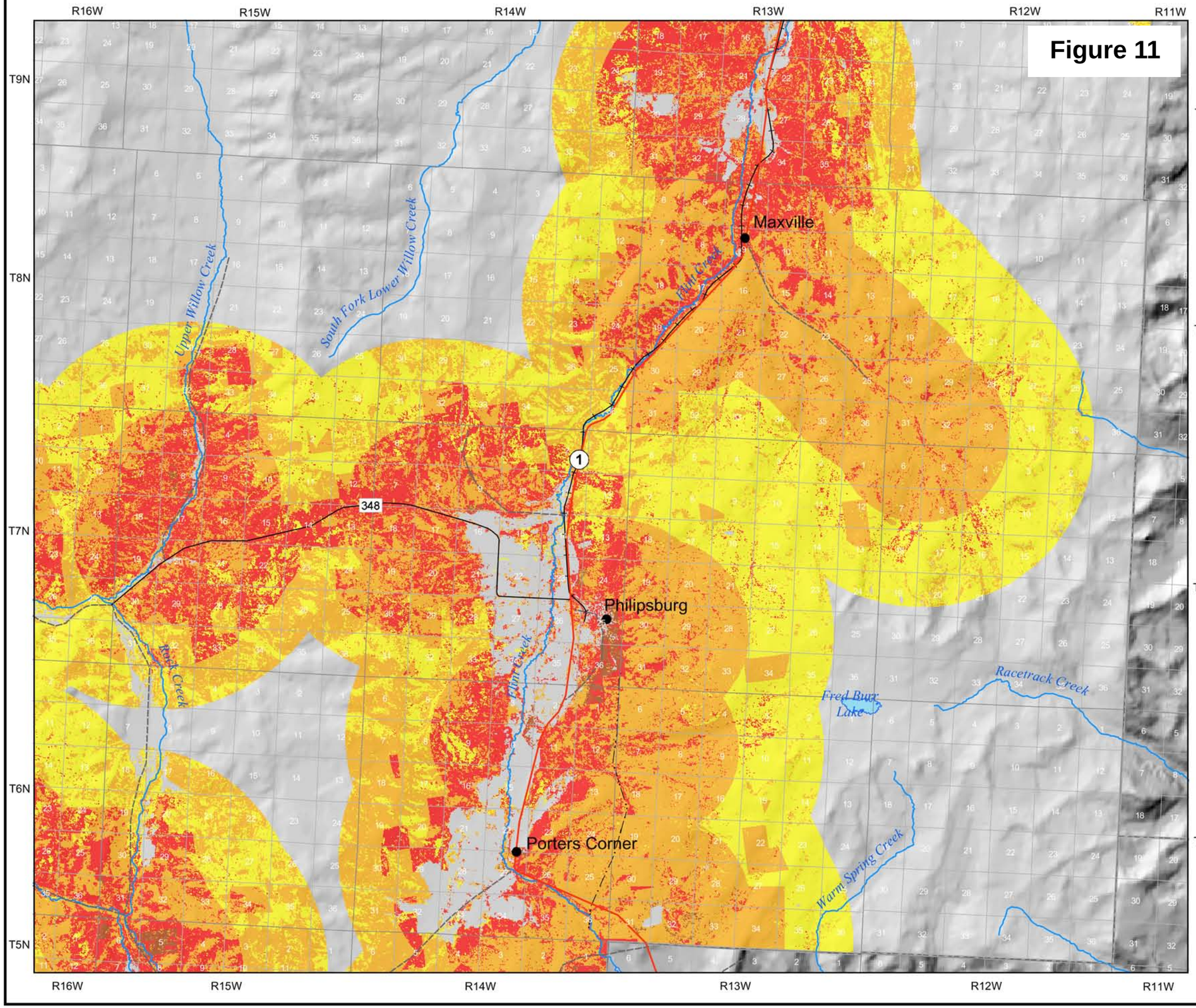
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project,USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Fire Risk/WUI Impact Model

Eastern Granite

Figure 11

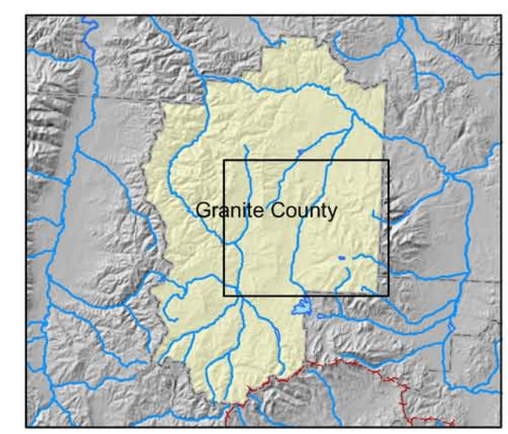


Fire Risk/WUI Impact Model

- Low Priority
- Medium Priority
- High Priority
- Very-High Priority
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



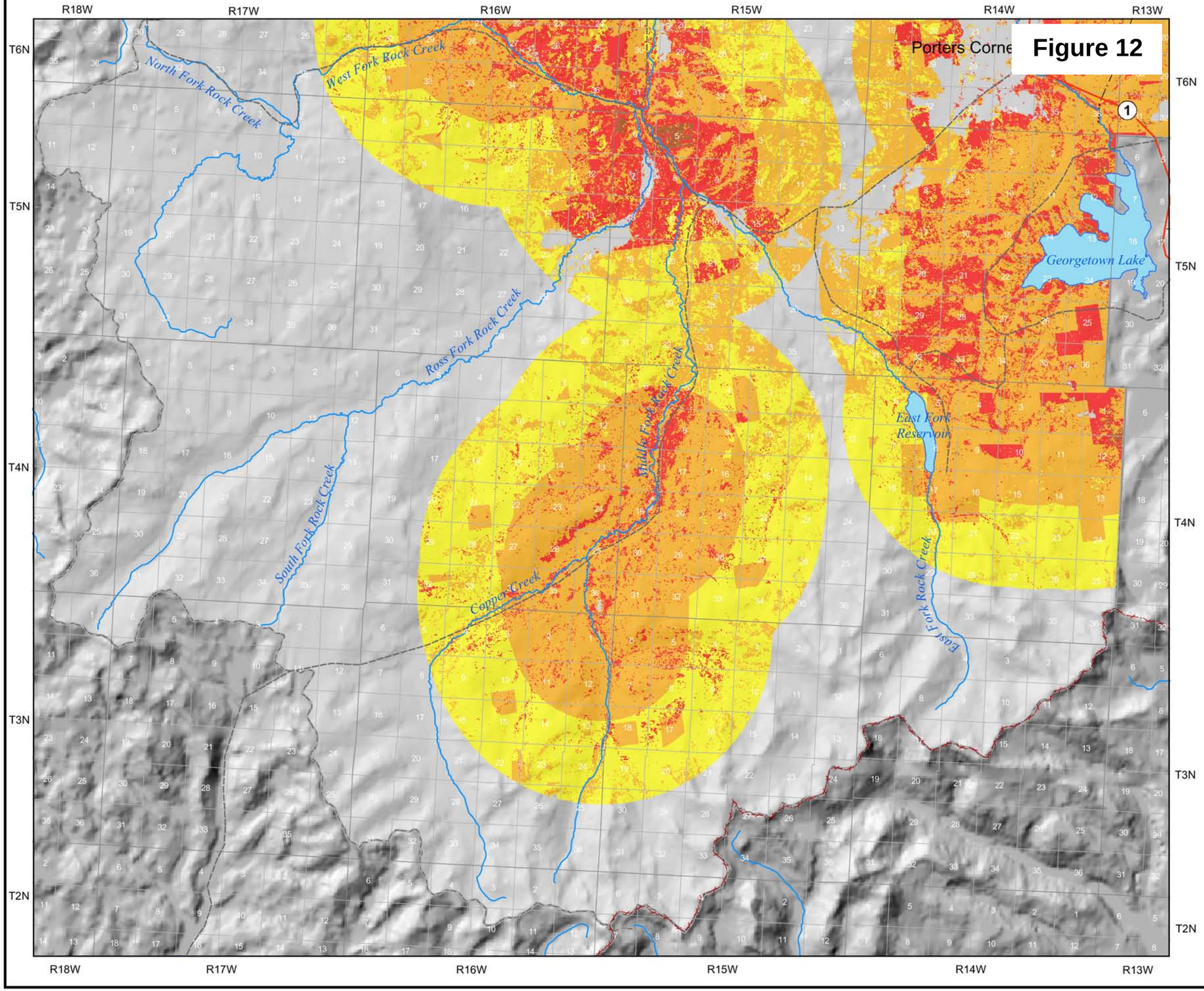
1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project,USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones

Granite County Community Wildfire Protection Plan

Fire Risk/WUI Impact Model

Southern Granite

Figure 12



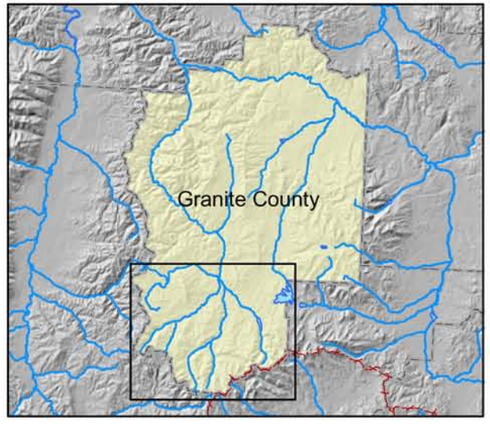
Fire Risk/WUI Impact Model

- Low Priority
- Medium Priority
- High Priority
- Very-High Priority
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles

N W E S



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Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project,USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones

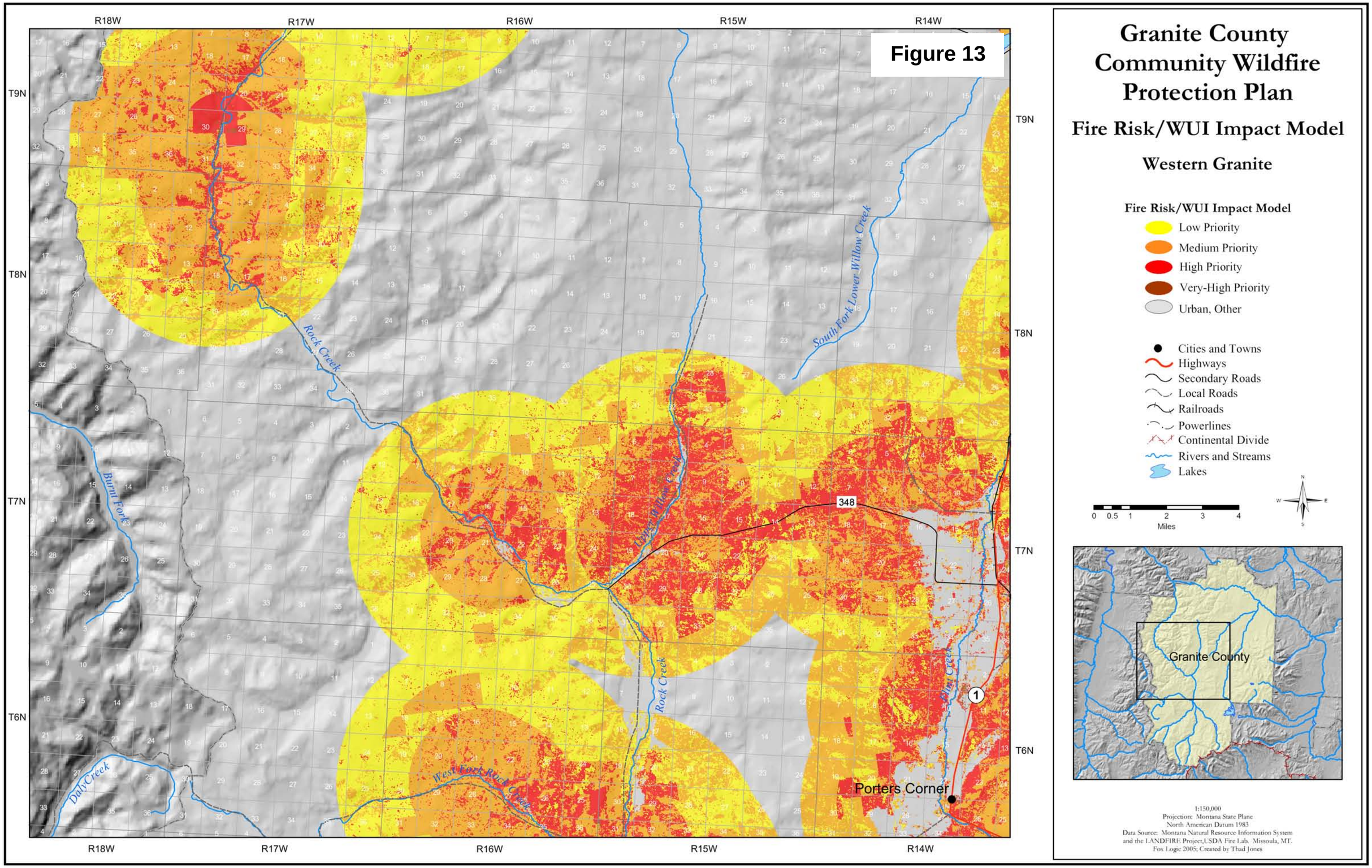
Figure 13
Granite County Community Wildfire Protection Plan
Fire Risk/WUI Impact Model
Western Granite
Fire Risk/WUI Impact Model
Low Priority
Medium Priority
High Priority
Very-High Priority
Urban, Other
Cities and Towns
Highways
Secondary Roads
Local Roads
Railroads
Powerlines
Continental Divide
Rivers and Streams
Lakes
0 0.5 1 2 3 4
Miles
N
S
E
W
Granite County
1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project,USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones
R18W
R17W
R16W
R15W
R14W
T9N
T8N
T7N
T6N
Rock Creek
South Fork Lower Willow Creek
Burnt Fork
Daly Creek
Upper Willow Creek
West Fork Rock Creek
Flint Creek
348
1
Porters Corner

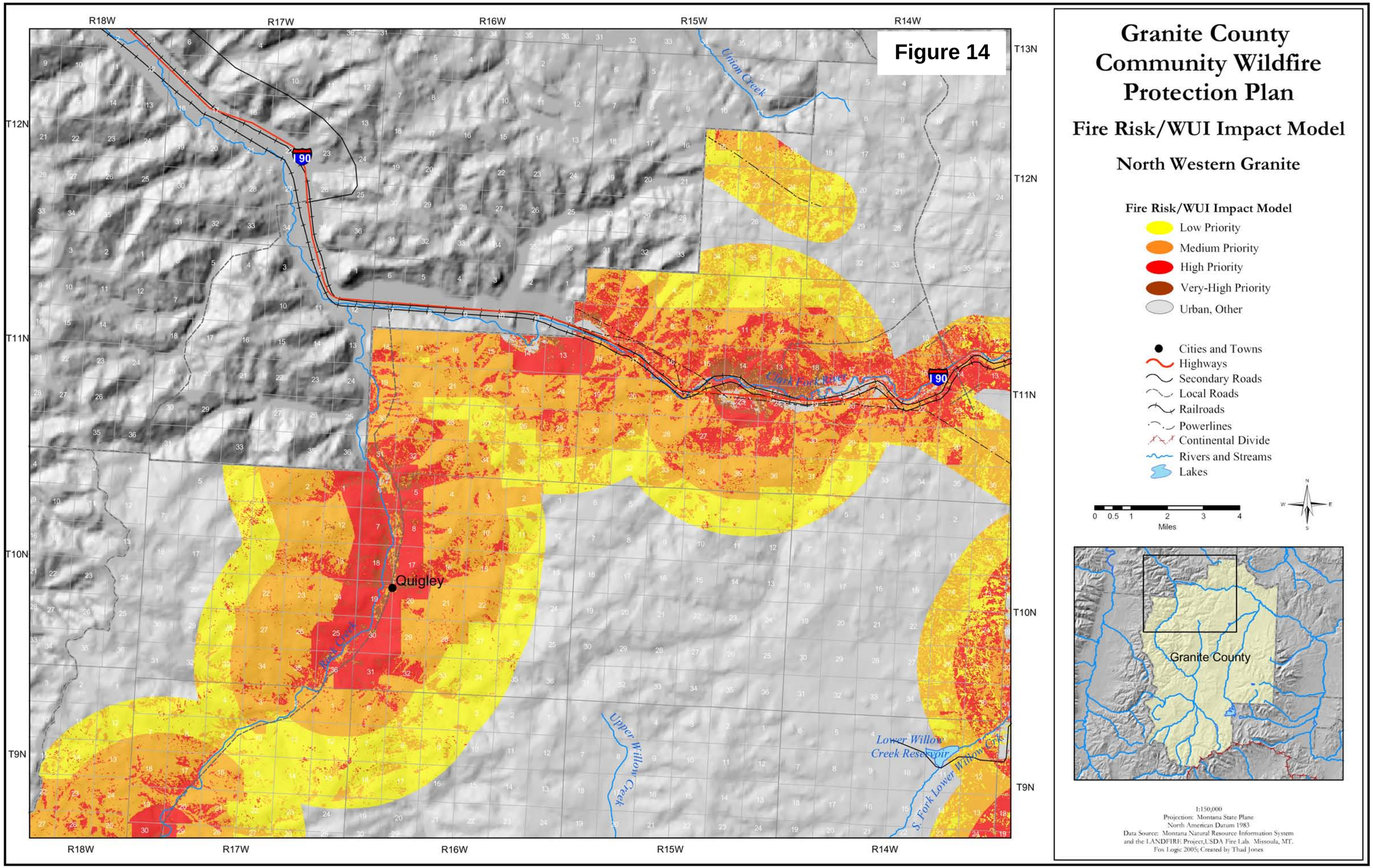
Figure 14
Granite County Community Wildfire Protection Plan
Fire Risk/WUI Impact Model
North Western Granite
Fire Risk/WUI Impact Model
Low Priority
Medium Priority
High Priority
Very-High Priority
Urban, Other
Cities and Towns
Highways
Secondary Roads
Local Roads
Railroads
Powerlines
Continental Divide
Rivers and Streams
Lakes
0 0.5 1 2 3 4
Miles
N
W
E
S
Granite County
1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the LANDFIRE Project,USDA Fire Lab. Missoula, MT.
Fox Logic 2005; Created by Thad Jones
R18W
R17W
R16W
R15W
R14W
T13N
T12N
T11N
T10N
T9N
I 90
Union Creek
Clark Fork River
Quigley
Rock Creek
Upper Willow Creek
Lower Willow Creek Reservoir
S. Fork Lower Willow Crk