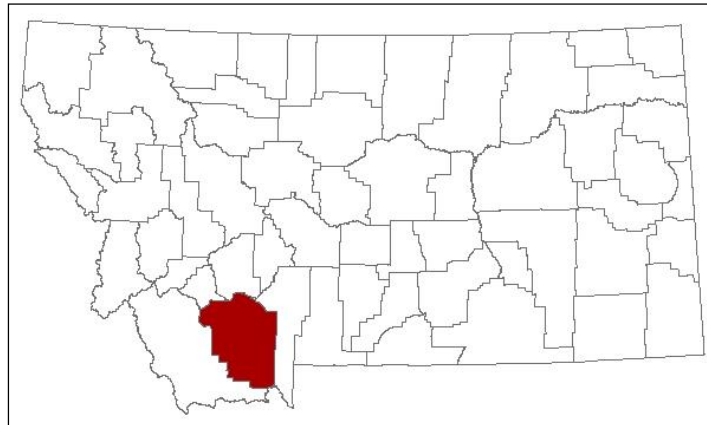


Madison County, Montana COMMUNITY WILDFIRE PROTECTION PLAN

**August 2013 Revision
October 2014 Revision – Resolution 25-2014**



Assistance provided by:



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1. INTRODUCTION

1.1 Purpose

Personal Responsibility is the Key!

Property Owner Responsibilities (excerpted from the Montana Department of Natural Resources and Conservation, Wildland Urban Interface Guidelines, 2009)

Property owners, residents, and people have a responsibility for their own life safety. Understanding the risks of living or being in the Wildland Urban Interface is part of that responsibility. Knowing the risks of staying during a wildfire such as whether you are physically and emotionally prepared to stay, whether enough advance preparation was done to defend your property safely, and whether other family members will be able to cope with their situation given the conditions.

Evacuation should be done early if there is a question of property preparation, safety, physical or mental preparedness. One of the highest risks during a wildfire is on the evacuation routes and roads. Have a plan for the evacuation routes to be used and where you or your family will evacuate to and how you will maintain accountability if anyone in the group is split up for any reason, including, someone deciding to stay.

Property owners have a responsibility for the protection of their assets, structures, and property. In order for those assets, structures, and property to have the best opportunity to survive a wildfire there are some basic principles that have to be followed.

*Assets, structures, and property have to be properly prepared and maintained **before** a wildfire threatens them. Utilize the guidelines and best practices in this document to assist in preparation.*

Do not assume firefighters will be readily available to defend your property. Prepare your assets, structures, and property to survive a major wildfire without firefighter intervention. This will give your property the best chance of survival and likely make it easier to defend, in the event you decide to stay or fire resources are available. You have to have good access, fire resistant construction and landscaping, an adequate water supply and a safe area to operate to be effective or receive assistance.

Have a Fire Plan for a wildfire. Develop a plan to address your own options for dealing with a wildfire threatening your assets, structures, and property. Know where fire is likely to be a threat to your property and how to access it safely. Understand the risks to evacuating mid slope roads and roads where heavy fuel loads are present. Understand weather patterns and the likely affects it will have on whether you can evacuate or stay at your property. Know where your safe zones are.

Remember, the decision whether to stay or go is yours. You have a legal right to remain and defend your property. Every situation is different and has to be evaluated at the time of the threat. What is right for you might not be right for someone else under the same circumstances. You must be confident you are making the best possible decision for the safety of yourself, your family, and others involved with you. The survival of your property really depends on the preparation and maintenance done prior to the

threat. The survival of yourself and others depends on early preparedness and clear decision making at the time of the threat. Away from your structures and on the roads are the highest risk to safety, unless early evacuation is done and even then, it may not be enough if the fire location cuts off your evacuation route.

The Madison County Community Wildfire Protection Plan (CWPP) is intended to reduce the risk of a catastrophic wildland urban interface (WUI) fire event in Madison County by providing guidance to first responders, local officials, state and federal agencies, residents, and property owners on the wildland fire hazard, mitigation strategies, and management priorities. As a planning tool for the county, this plan may also assist in the development of future plans and regulations as they relate to growth in the wildland urban interface. This plan may also aid economic development of forest products through fuel reduction and mitigation efforts.

Plan objectives of the original Strategic Wildland Fire Plan developed in 2003 were:

- Identify, inventory, and prioritize the risks associated with developing areas of the county.
- Recommend projects and programs intended to reduce the above risks.
- Identify areas of concern between Beaverhead, Gallatin, and Madison Counties.
- Provide Madison County with maps associated with development of the plan.
- Through the Madison County Local Emergency Planning Committee (LEPC), begin educating the citizens of Madison County.

Additional objectives included as part of 2013 plan update include:

- Meet the requirements of a Community Wildfire Protection Plan as outlined by the National Association of State Foresters.
- Further detail the wildland fire hazard in Madison County, including defining the wildland urban interface.
- Prioritize, promote, and provide direction for future mitigation and management strategies.
- Support requests for grant funding.
- Educate communities on strategies for living with fire.
- Meet the needs of the Madison County Planning Board for inclusion in the county's Growth Policy.

1.2 Authorities

The basis for Community Wildfire Protection Plans began with the National Fire Plan developed in 2000 following a significant national wildfire season. Community-based wildland urban interface planning was then more formally encouraged through the Healthy Forests Restoration Act of 2003. The 2013 version of this plan was prepared in accordance with the guidelines set forth in the "Preparing a Community Wildfire Protection Plan, A Handbook for Wildland-Urban Interface Communities" publication dated March 2004. "The 10-Year Strategy Implementation Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment," dated December 2006, provides additional authority and guidance for these plans. The need for community wildfire risk assessments and prioritization of hazardous fuels funding has been further highlighted in Section 503 of the Federal Land Assistance, Management and Enhancement (FLAME) Act of 2009. The FLAME Act has resulted in

the development of “A National Cohesive Wildland Fire Management Strategy,” dated March 2011, that again calls for engaging the public for community-based wildfire planning and mitigation.

In Montana, 2009 Senate Bill 131 requires local governments to include analyses and regulations for wildfire hazard areas in their growth policies and subdivision regulations. This plan is designed to assist Madison County in meeting these requirements.

1.3 Plan Scope and Organization

The Madison County Community Wildfire Protection Plan is organized into sections that describe the plan development process and maintenance (Section 2), community (Section 3), fire history (Section 4), fire protection capabilities (Section 5), community risk assessment (Section 6), and mitigation and management strategies (Section 7). Appendices containing supporting information are included at the end of the plan.

2. PLAN DEVELOPMENT PROCESS AND MAINTENANCE

2.1 Initial Plan Development

The initial Community Wildfire Protection Plan for Madison County, titled the Madison County Strategic Wildland Fire Plan, was developed in 2003 with the assistance of a contractor, Fire Logistics, Inc. The Strategic Wildland Fire Plan was developed with consultation and input from the:

- Madison County Local Emergency Planning Committee
- Madison County Planner
- Madison County Fire Warden
- Beaverhead-Deerlodge National Forest
- Montana Department of Natural Resources and Conservation, Dillon District
- Southwest Montana Fire Council
- Local Fire Agencies within Madison County

2.2 Plan Update Process

This Community Wildfire Protection Plan was updated in 2012 and 2013 through the Madison County Department of Emergency Management with the assistance of a contractor, Big Sky Hazard Management LLC. A Planning Committee provided guidance and direction throughout the update process and included representatives from:

- Madison County Department of Emergency Management
- Madison County Planning Department
- Madison Valley Rural Fire District
- Montana Department of Natural Resources and Conservation
- Montana Disaster and Emergency Services
- US Bureau of Land Management
- US Forest Service, Beaverhead-Deerlodge National Forest

Additional participants, including local fire agencies through the Madison County Fire Chief Council, provided data and section reviews, as requested.

An advertised community meeting was held on July 18, 2012 at the Madison Valley Rural Fire Station 1 in Ennis with about 65 people attending. Additional public hearings were held on July 29, 2013, August 26, 2013, and October 8, 2013.

Notes from each of the planning, public, and community meetings can be found in Appendix E.

2.3 Plan Maintenance

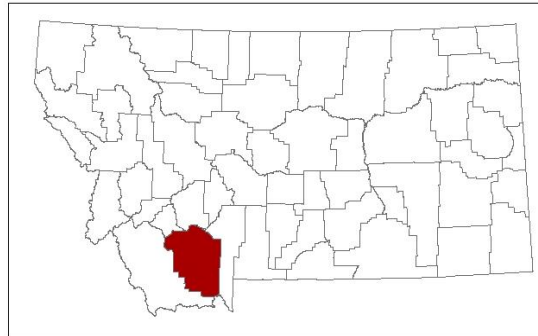
The Madison County Community Wildfire Protection Plan is maintained by the Madison County Department of Emergency Management. The Director will work in partnership with the Madison County Fire Warden, Madison County Fire Chief Council, and Madison County Local Emergency Planning Committee. Ideally, a long-term committee consisting of local officials, wildfire experts, and citizens would work with the aforementioned entities to conduct and guide activities related to wildfire awareness and mitigation and future plan updates. This plan will be reviewed at least annually.

3. COMMUNITY DESCRIPTION

3.1 Jurisdictional and Geographic Profile

Madison County, located in southwest Montana as shown in Map 3.1A, covers 3,587 square miles and is bordered on the north by Silver Bow and Jefferson Counties, on the east by Gallatin County, and on the west and south by Beaverhead County. A small border with Idaho can be found in the southeast corner of the county.

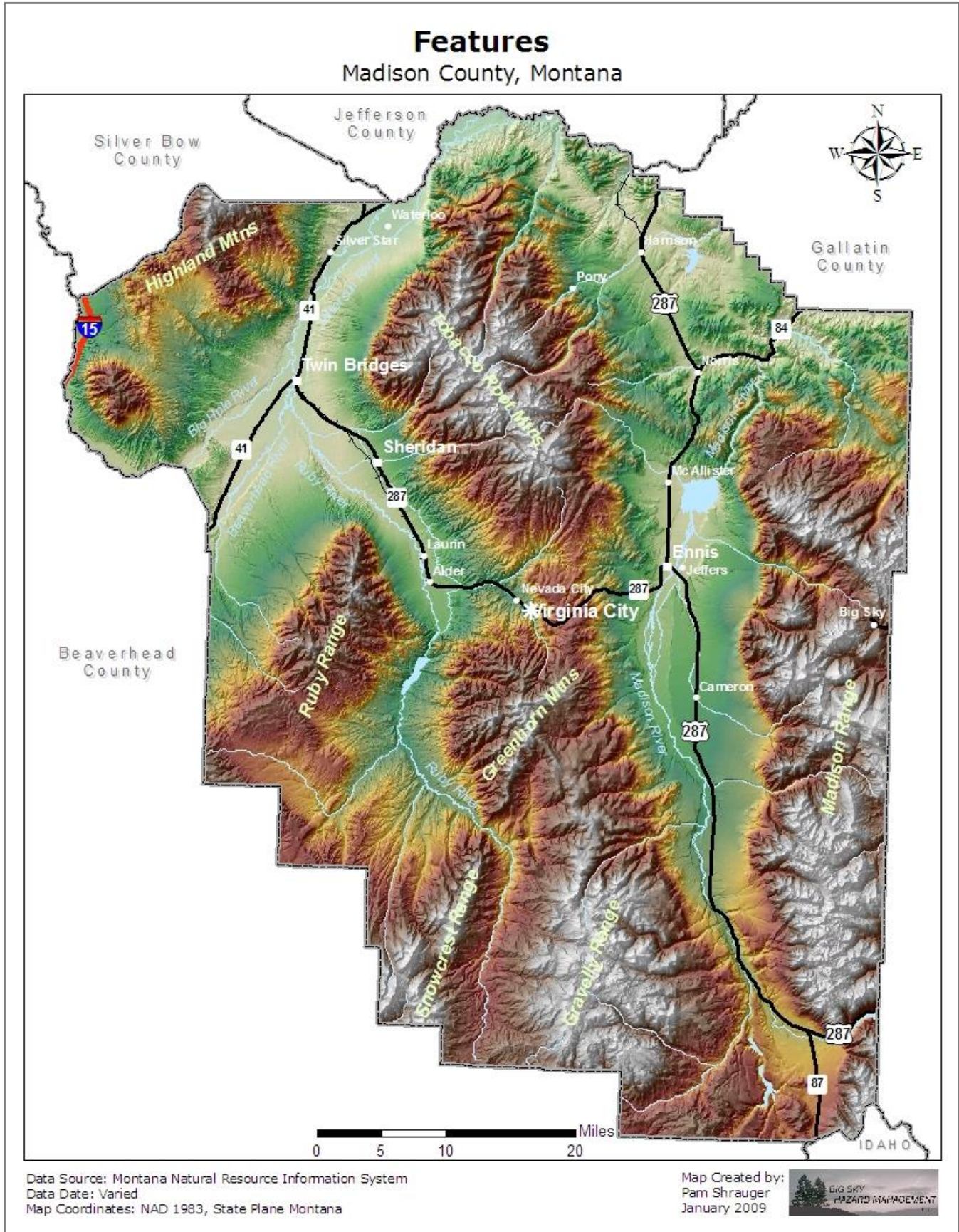
Map 3.1A



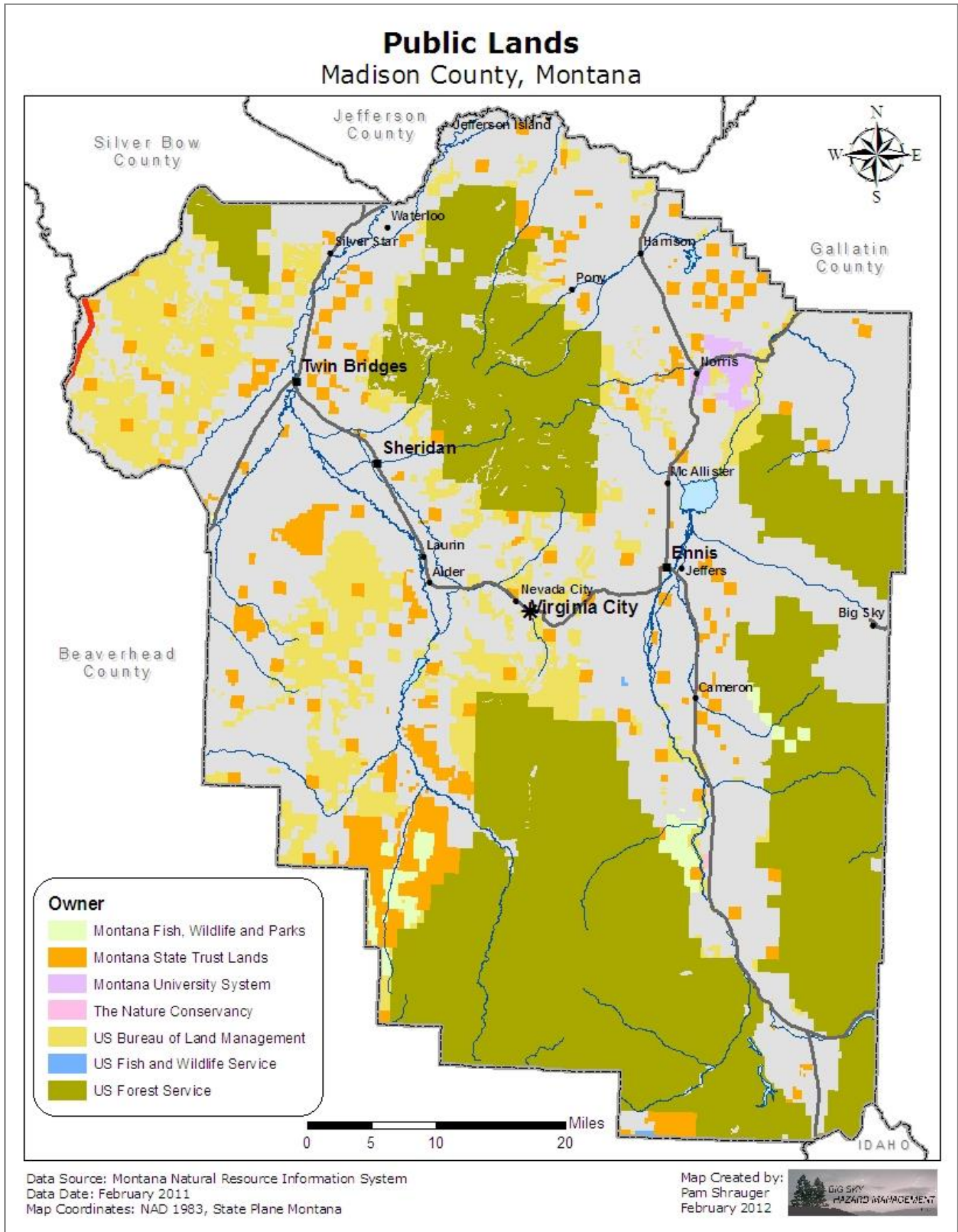
Map 3.1B shows the features and communities of Madison County. Within Madison County are four incorporated towns: Ennis, Sheridan, Twin Bridges, and Virginia City. The Madison and Ruby Valleys, within Madison County, are surrounded by several mountain ranges and are marked by pristine rivers, creeks, and streams. The Madison River flows from Quake Lake in southern Madison County north past Ennis into neighboring Gallatin County, forming the Madison Valley. The Ruby River starts high in the Snowcrest Mountain Range and flows north to Twin Bridges where it comes together with the Beaverhead and Big Hole Rivers to form the Jefferson River. Mountain ranges within Madison County include the Tobacco Root, Snowcrest, Gravelly, Ruby, and Madison Ranges. Elevations range from about 4,300 feet in the valleys to over 11,300 feet in the mountains.

Within Madison County are large areas of federal and state lands. In fact, over half of the land area of Madison County is federal or state managed. National Forests and Wilderness Areas include parts of the Beaverhead-Deerlodge National Forest (Madison, Jefferson, and Butte Ranger Districts), Gallatin National Forest (Bozeman and Hebgen Lake Ranger Districts) and Lee Metcalf Wilderness. The US Bureau of Land Management (BLM) and Montana Department of Natural Resources and Conservation (DNRC) manage many parcels of land within the county as well. Map 3.1C shows these areas.

Map 3.1B



Map 3.1C



3.2 Ecology

The fire ecology of the forest and grassland habitat types is an integral part of the changing dynamics of the fuel conditions. By understanding fire's role within these plant communities, coupled with the knowledge of the subdivision development, one can further understand the present day risks. A method of placing various forest and grassland habitats type into fire groups is commonly used to determine the response of vegetation to fire and the path certain species take during succession. Fire groups describe the natural role of fire following a sequence from low to high elevation vegetative categories. (Fischer and Clayton, 1983) They paint an average picture of fire intensities and frequencies, and describe the natural role of fire prior to active fire suppression efforts. Fire groups correlate directly to Pfister's Habitat Types of Montana (1977) in how they respond to fire disturbance and are grouped in this analysis based on vegetation similarities.

Forest Habitat Types

Three timber fire groups represent Madison County: Cool Dry Douglas fir, Moist Douglas fir, and cool habitats dominated by lodgepole pine. The following will describe the fire ecology of each type and how fire plays a role.

Cool Dry Douglas fir

This group exists on dry sites that are generally too dry for lodgepole pine and too cold for ponderosa pine. Rocky Mountain Juniper, limber pine, and subalpine fir can be found as minor species within these stands. This fire group includes big sagebrush, common juniper, wax current, russet buffaloberry, white spirea, and mountain snowberry.

Downed, dead fuel loads for this group average about 10 tons/acre. While downed, dead woody fuel loading can, at times, be significant, live fuels are less of a problem due to the harsh site conditions. This factor plus the usual open nature of these stands results in a low probability of a crown fire.

Individual trees will often have branches close to the ground, and if sufficient ground fuels are available, torching can occur.

The role of fire in this fire group is not well defined. Fire probably occurred less frequently than in the warmer Douglas fir habitat types. The relatively light fuel load, sparse undergrowth, and generally open nature of the stands would appear to favor a long fire-free interval. However, fire history studies have



Figure 3.2A Example of the Cool Dry Douglas fir fire group.
Source: US Bureau of Land Management, 2012a.

estimated a fire interval of 35 to 40 years. (Arno and Gruell, 1983) Generally, fire plays an important role in favoring ponderosa pine within this group. Without fire, Douglas fir would slowly replace ponderosa pine; however, where this fire group occurs in southwest Montana, ponderosa pine is of rare occurrence and is generally found as scattered individuals in isolated areas. (US Bureau of Land Management, 2012a) Fire's role in seedbed preparation on most of these fire group sites is confounded by the difficulty of regeneration beyond the seedling stage because of undergrowth and overstory competition on these droughty sites. Where dense regeneration does occur, fire probably played the role as a thinning agent in sapling and pole-sized stands. Ground fire probably maintains many mature stands in an open, park like condition. Many pre-settlement stands were actually scattered groves. Fire exclusion has allowed these groves to become forest stands.

Moist Douglas fir

This group exists at elevations of about 4,800 feet to 7,200 feet. Douglas fir is both the indicated climax species and a vigorous member of seral communities. It is not uncommon for Douglas fir to dominate all stages of succession on these sites. Lodgepole pine is a major seral component in many stands. Whitebark pine is usually well represented at higher elevations; however, white pine blister rust and mountain pine beetle have greatly increased mortality of this tree species. Shrubs and moist forbs dominate the undergrowth along with pine grass, bear grass, and elk sedge. Common shrubs include ninebark, snowberry, white spirea, oceanspray, blue huckleberry, grouse whortleberry, kinnikinnick, twinflower, and common juniper.



Figure 3.2B Example of the Moist Douglas fir fire group.

Downed, dead fuel loads average 13 tons/acre but can often be much heavier. Fuel conditions will vary according to stand density and species composition. The most hazardous fuel conditions occur in well-stocked stands with dense Douglas fir understories. These stands are usually characterized by relatively large amounts of downed twigs and small branch wood less than three inches in diameter beneath partially fallen and standing dead sapling and small pole-sized stems. The absence of a dense understory results in a reduced fire hazard, however, the density of overstory trees and the presence of dead branches near ground level create ladder fuels leading to crown fire potential under severe burning conditions. Fuel conditions in stands dominated by lodgepole pine tend to be less hazardous than in stands dominated by Douglas fir. Ladder fuels are much less prevalent, so the probability of fire going from the forest floor to the crown is not as great. The tendency toward overstocking and the subsequent development of dense understories is the main reason for high hazard fuel conditions in many of these stands. Fuel accumulation due to fire suppression, natural mortality, snow breakage, blow down, and insect and disease mortality operate at a high level in many stands. Relatively deep duff

develops and contains a lot of rotten logs. Fires may often sit and smolder undetected in the duff until burning conditions become favorable for fire spread, resulting in a large acreage being burned.

Historically, fire was important as a thinning agent and as a stand replacement agent. Low to moderate severity fires converted dense pole-sized or larger stands to a fairly open condition. Subsequent light burning maintained stands in park like conditions. Severe fires probably occurred in dense, fuel-heavy stands and resulted in stand replacement. Fire's role as a seedbed-preparing agent is less important in this group than in dry Douglas fir. Fire has a demonstrable effect on wildlife habitat through its effect on food plants. The combination of opening up stands by killing overstory trees, reducing competition by removing understories, and rejuvenation of sprouting plants through top kill can significantly increase the availability of palatable browse and forage.

Cool Habitat Lodgepole Pine Types

The cool habitat lodgepole pine types contain two groups of habitat types. The first consists of lodgepole pine climax series habitat types that support essentially pure stands of lodgepole pine. The second group consists of those Douglas fir, spruce, and subalpine fir habitat types that, regardless of potential climax species, are usually found in nature supporting lodgepole pine dominated stands. These stands seldom reach a near climax condition. Periodic wildfires seem to recycle the stand before a substantial amount of mature lodgepole pine dies out. Subalpine fir, spruce, Douglas fir, and whitebark pine occur in varying



Figure 3.2C Example of the Cool Habitat Lodgepole Pine Types fire group.

amounts with lodgepole pine on most of these habitat types. Undergrowth in this group often consists of dense mats or layers of grasses or shrubs. The most common graminoid species are pinegrass, bluejoint, and elk sedge. Common shrubs include grouse whortleberry, blue huckleberry, dwarf huckleberry, myrtle whortleberry, twinflower, kinnikinnick, white spirea, bunchberry dogwood, snowberry, common juniper, bitterbrush, buffaloberry, and Oregon grape.

The average downed dead woody fuel load in this group is fifteen tons/acre but maximum loads may greatly exceed this value. This group's fuel load is characterized by relatively large amounts of material three inches and larger. Live fuels in this group can be a problem. The primary live fuel consideration is related to the occurrence of dense patches or entire stands of young lodgepole pine with intermingled crowns and lower branches extending down to the surface fuels. When ignited under favorable burning conditions, such stands can be entirely consumed in a few minutes.

Densely stocked, clean-boled trees characterize many mature stands with large amounts of deadfall on the forest floor. An immediate source of deadfall in a young lodgepole pine stand is the snags created by a previous fire.

The role of fire in the seral lodgepole pine forest is almost exclusively as the agent that perpetuates or renews lodgepole pine. Without periodic disturbance, the shade-tolerant species replaces the lodgepole pine because it does not regenerate well on duff or under shaded conditions. Fire interrupts the course of succession and increases the proportion of lodgepole with each burn. Within 50 to 100 years following a severe fire, a lodgepole pine forest will exist even though shrubs and herbaceous cover may become dominant immediately following the burn.

Large stand replacement fires play a definite role in the ecology of lodgepole pine forests. The natural range of fire in seral lodgepole pine stands range from less than 100 years to about 500 years. The interval between any two fires in one area might be only a few years. Recurring cool fires may thin a stand or otherwise rejuvenate it without doing serious damage. Stands greater than 60 to 80 years old, however, become increasingly flammable due to overcrowding and/or mountain pine beetle caused mortality. Eventually, an ignition sets off a major conflagration. In certain areas, such a stand replacement fire can cover thousands of acres. Vast tracts of lodgepole can develop in this way as the serotinous cones open and shower the burn with seeds. The exclusive dominance of lodgepole pine in the lodgepole community types is attributed in a large part to fire for the following reasons:

- Historic repeated wildfires over large areas may eliminate seed sources of potential shade-tolerant competitors.
- Light ground fires may remove invading shade-tolerant competitors from the understory.
- Dense stands may prevent regeneration of all conifers for up to 200 years in the absence of disturbance or stand deterioration.
- Sites may be unfavorable for the establishment of other conifers.

Rangeland Habitat Types

Rangeland and the ecology of the plant species that occupy these sites have their own relation to wildland fire. The grass species can be a contributor to fire behavior but can easily be modified through agricultural practices, such as grazing. (Bunting, Kilgore, Bushey, 1987) The sagebrush grass range is fairly extensive within the county. Mountain big sagebrush and silver sagebrush are the predominate species.

Mountain big sagebrush is the most productive sagebrush type. It is not known to re-sprout following a fire. It is well adapted, however, to become established following a fire through seed germination. These plants grow rapidly and reach maturity within 3 to 5 years. The combination of these



Figure 3.2D Example of the sagebrush rangeland habitat type.

two factors favors rapid reestablishment of a new sagebrush field. Mountain big sagebrush may return to pre-burn density and cover within 15 to 20 years following a fire. Establishment after a severe fire may proceed much more slowly and sage may not dominate the area for 30 years. Bitterbrush is often found in communities within the Mountain big sagebrush series. It is normally a decumbent form and is moderately adapted to spring and fall fire. If rabbitbrush occupies a site, it usually re-sprouts following a fire.

Silvertip sagebrush dominates areas within the county. It is a noted sprouter, but apparently, can be controlled by fire in some areas of its range. Others authors refer to silvertip sagebrush as an occasional re-sprouter following fire. In some instances, it re-sprouts vigorously following spring burns, but fall burns result in greater mortality and low vigor of sprouts.

As is the case across all landscapes, the upland plant composition in rangeland habitat types is changing as the result of ecological succession. The natural progression from early seral stage plant communities towards a climax plant community is inevitable without disturbance. The spread of conifers, primarily Douglas-fir and Rocky Mountain juniper, can be attributed, in part, to the reduced frequency of wildfire which has changed the dominant plant species and habitat types in Madison County.

3.3 Current Land Use

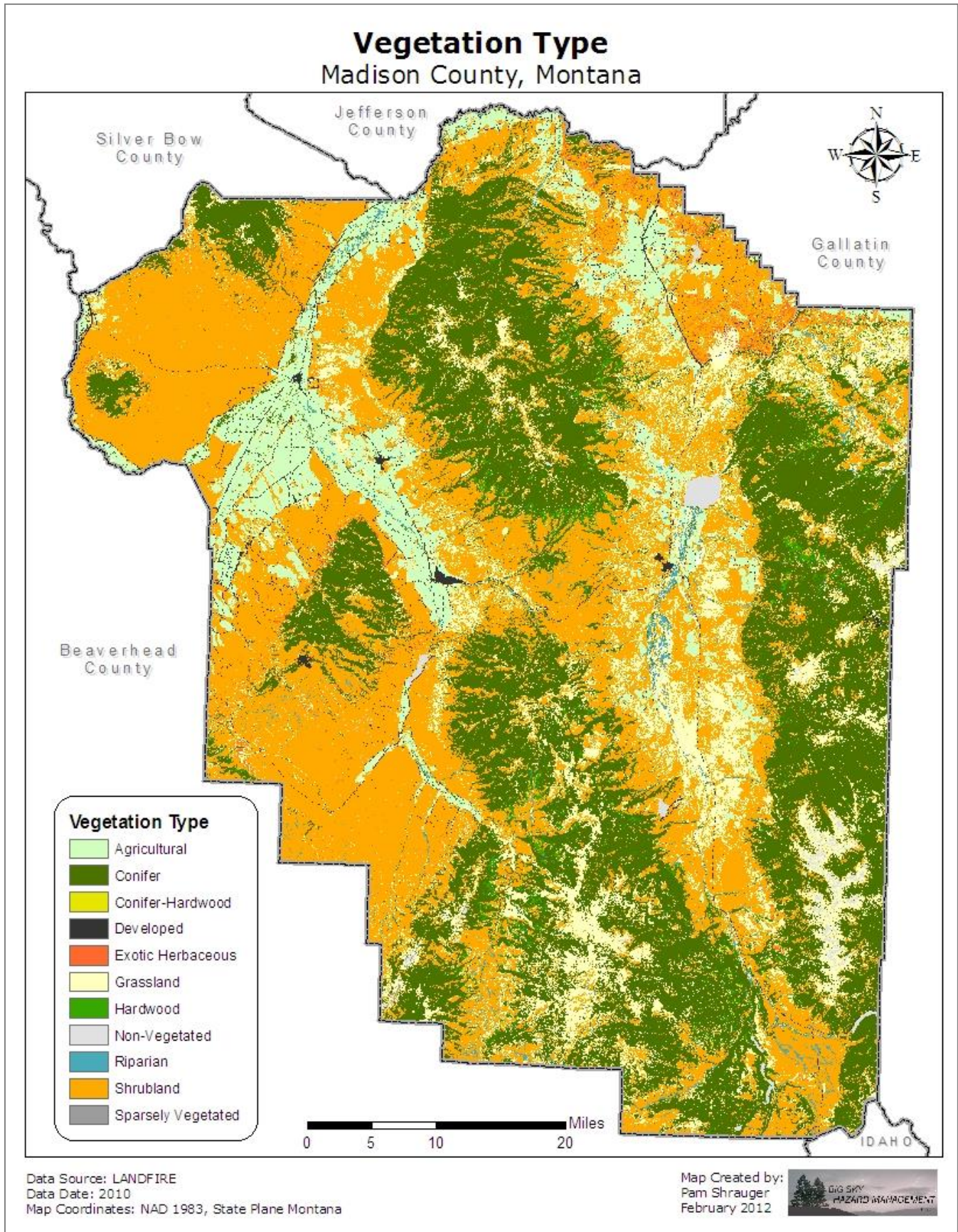
Existing land uses play important roles in wildfire ignition, behavior, and impacts. Madison County has varied land use but is primarily rural with most of the land use devoted to agriculture, undeveloped areas, and government ownership. Small communities and individual homes and farms are interspersed. Map 3.3A shows the land cover by vegetation type in Madison County. About 48% of the land in Madison County is privately owned, 46% is federal land, and 6% is state land. (Madison County Economic Development Council, 2012) About 46% of the land area in Madison County is in agriculture.

Growth during the period of 1990 to 2010 changed the land use in some areas from agriculture and undeveloped to residential. Madison County experienced a 14.4% population increase between 1990 and 2000 and 12.3% between 2000 and 2010. (Montana Census and Economic Information Center, 2012) Many new residences have been built in numerous subdivisions, the majority located in the Madison Valley around Ennis, the Ruby Valley around Sheridan and Twin Bridges, in the Big Sky area, and in northern Madison County near Whitehall. From July 1, 2004 through June 30, 2011, 1,447 lots/units/spaces have been created through the division of 9,827 acres. (Madison County, 2006a; Madison County, 2009a; Madison County, 2012)

Some of the larger subdivisions between July 2007 and June 2008, a period of intense growth, included the Moonlight Basin Ranch – The Front 9 Subdivision with 150 units near Big Sky, the Bradley Creek Subdivision with 110 lots near Norris, and the Ruby Rock Subdivision with 63 lots near Sheridan. (Madison County, 2009a)

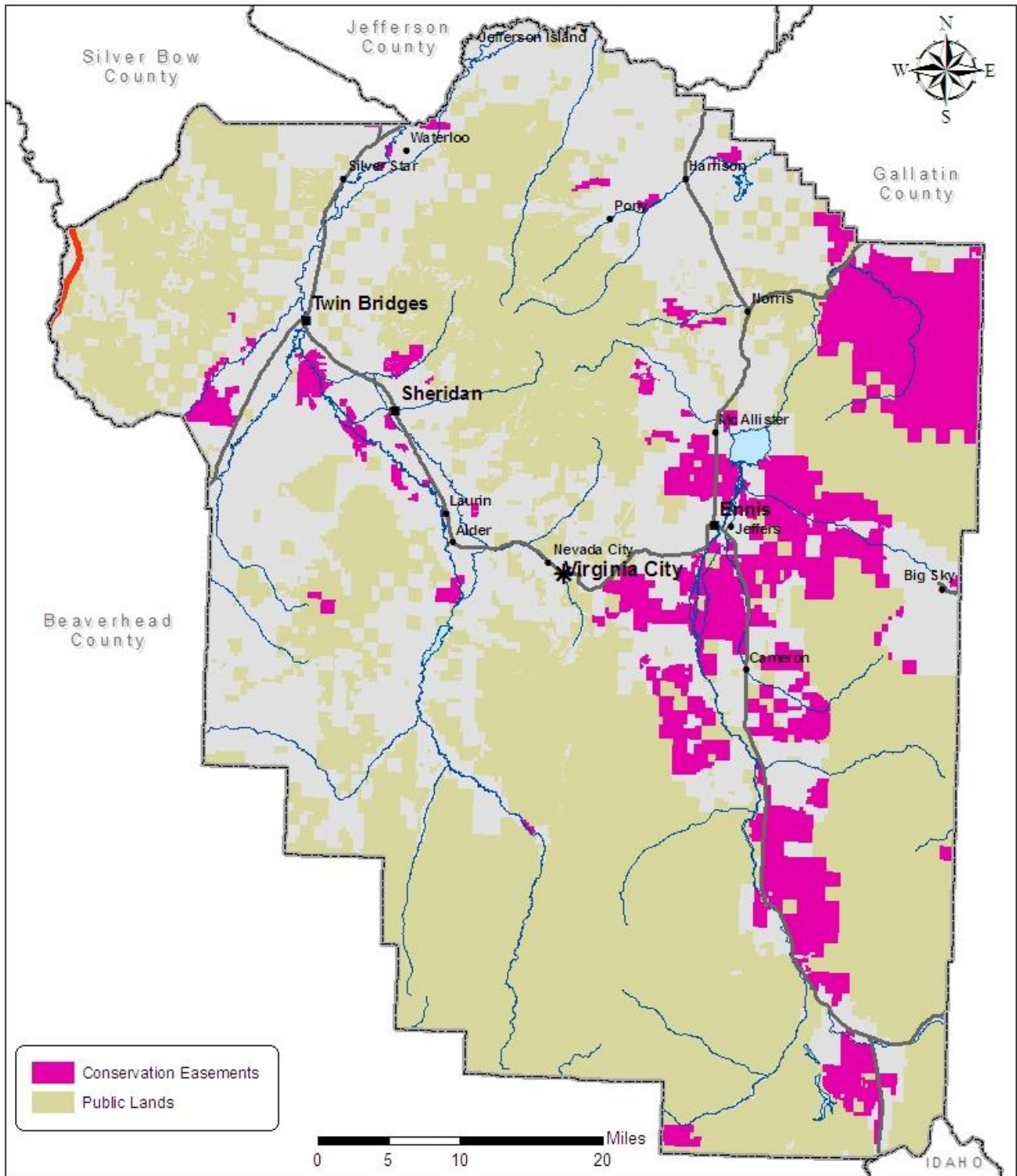
Conservation easements have been widely used in Madison County, especially the Madison Valley, as a tool for voluntary land conservation and preservation of natural resources, productive agricultural lands, and wildlife habitat. About 250,000 acres of privately owned land in Madison County are under conservation easement. Most of these easements have been in the Madison Valley. (Madison County, 2006a; Madison County 2009a) Map 3.3B shows the areas under conservation easement.

Map 3.3A



Map 3.3B

Conservation Easements Madison County, Montana



Data Source: Montana Natural Heritage Program
Data Date: May 2011
Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
Pam Shrauger
February 2012



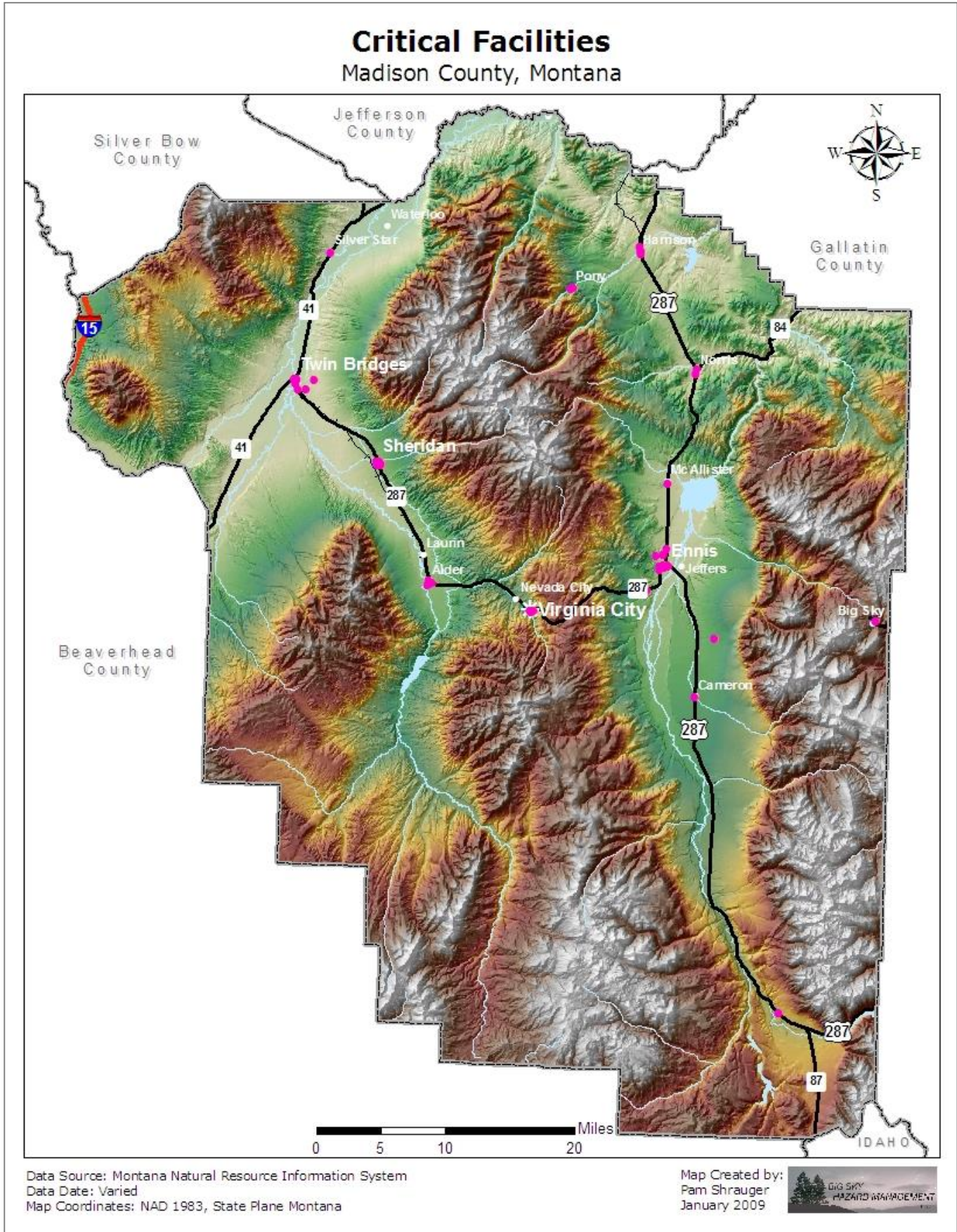
3.4 Community Assets and Values

An important aspect of wildfire mitigation planning is contemplating the effects wildfires may have on the community. To thoroughly consider the effects of the hazards on the community, the assets and values at risk must be first identified. Examples of community assets include the population, critical facilities, businesses, residences, critical infrastructure, natural resources, and the economy. The following sections identify the specific community assets and values.

Critical Facilities

During or following a disaster, some facilities become exceedingly important in protecting the safety of the population, the continuity of government, or the values of the community. Examples include those facilities vital to public safety such as law enforcement, fire services, and health services. Section 3.1 of the Madison County Pre-Disaster Mitigation Plan lists the critical facilities in the county, as identified in 2009. (Madison County, 2009b) Map 3.4A shows the locations of the critical facilities.

Map 3.4A



Infrastructure

Utilities such as electricity, heating fuel, telephone, water, and sewer rely on established infrastructure to provide services. The providers of these services use a variety of systems to ensure consistent service in the county. Each of these services is important to daily life in Madison County, and in some cases, is critical to the protection of life and property.

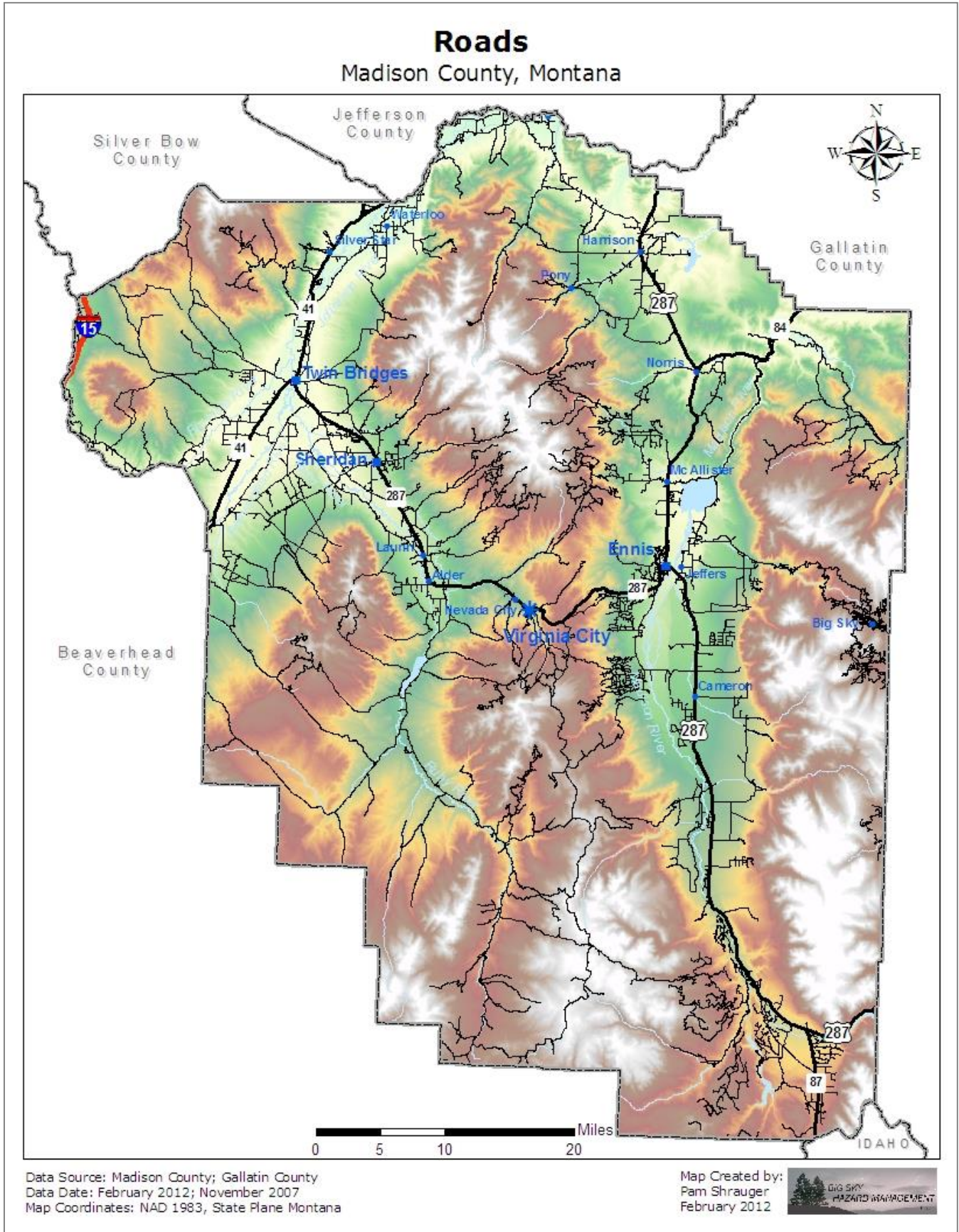
Often regional electric infrastructure passes through wildland and non-irrigated agricultural areas. In particular, the electric substations and transmission lines are usually buffered by or overhang natural fuels. A wildfire could disrupt electricity should this infrastructure be damaged.

Propane tanks also become hazardous infrastructure should a wildfire encroach on a structure. Over 20% of the homes in Madison County, primarily outside the incorporated communities, are heated by propane and have a nearby tank that is refilled regularly by a local propane vendor.

Temporary disruptions or low flows on the public water system may occur if large amounts of water are used to fight a fire, particularly during periods of drought or peak usage times. In many cases, the wildland areas lack adequate water infrastructure to support firefighting efforts.

Madison County has an estimated 1,200 miles of county roadways. Each incorporated town has its own streets, and private roads and lengthy driveways, some with locked gates, are prevalent in unincorporated areas. State and federal highways maintained by the Montana Department of Transportation in the county include a small section of Interstate 15, US Highway 287, and Montana Highways 41, 84, 87, and 287. Map 3.4B shows the roadways, as provided by the Madison County and Gallatin County Geographic Information System Departments.

Map 3.4B

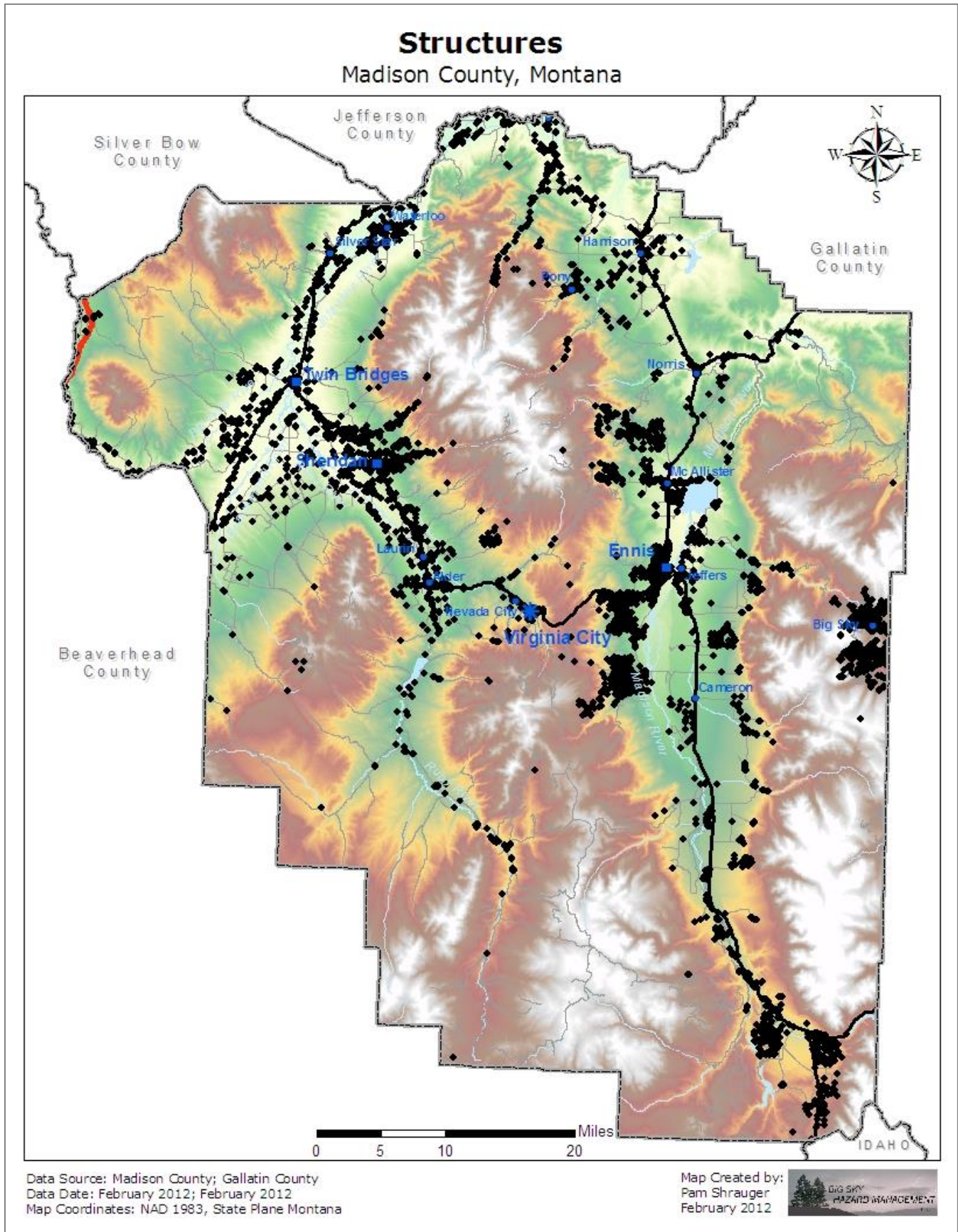


Structures

Like critical facilities, structures such as residences may also be vulnerable to wildfire. Map 3.4C shows the approximate structure locations using data from the Madison County and Gallatin County (for the Big Sky area) Geographic Information System Departments. These datasets contain a total of 7,654 structures in Madison County.

Based on 2010 US Census data, Madison County has 6,940 housing units, a 33% increase of 2,269 units since 2000. Of these units, 527 are within the Town of Ennis, 376 are within the Town of Sheridan, 206 are within the Town of Twin Bridges, and 171 are within the Town of Virginia City. The median value of owner-occupied housing units from 2006-2010 was \$240,100. (Montana Census and Economic Information Center, 2012)

Map 3.4C



Population

As of 2010, the population of Madison County was 7,691 people. Of that population, 838 live within the Town of Ennis, 642 within the Town of Sheridan, 375 within the Town of Twin Bridges, and 190 within the Town of Virginia City. (Montana Census and Economic Information Center, 2012)

Economic, Ecologic, Historic, and Social Values

The economy of Madison County is driven by agriculture, natural resources, and tourism. Each of these industries can be threatened by and damaged by wildfires, thus, jeopardizing local economies.

Two large ski resort areas, Big Sky and Moonlight Basin, exist either entirely or partially within Madison County and directly employ hundreds of people. The Big Sky area has seen substantial growth in recent years, and the new development has increased service-related businesses and tax revenues. The Madison, Beaverhead, Big Hole, Jefferson, and Ruby Rivers are popular for fishing and recreation, also driving the associated service industries. Upland bird, migratory waterfowl, and big game hunting are major attractions in the fall.

In 2007, Madison County had 585 farms and 1,060,883 acres in farmland. The market value of agricultural products sold was \$53,187,000 with 75% from livestock sales and 25% from crop sales. The cattle industry is the primary livestock commodity. Forage is the primary crop, followed by wheat. (US Department of Agriculture, 2012)

The ecological, historical, and social values of Madison County each tie into the quality of life for residents and visitors. Without these values, lives and property may not be threatened, but the way of life and connections to history and the environment could be disrupted. These values can have deep emotional meaning and investment. Ecological values represent the relationship between organisms and their environment. For humans, these values include clean air, clean water, a sustainable way of life, and a healthy, natural environment including a diversity of species. Wildfires are part of a healthy ecosystem but often lead to losses in human values. Historic values capture a piece of history and maintain a point in time. Historic values can include sites, buildings, documents, and other pieces that preserve times past and have value to people. Social values are often not fixed locations or can be quantified but are an important aspect of quality of life and interpersonal relationships.

Wildfires can have an effect on all types of economic, ecologic, historic, and social values. Economically, rapidly moving wildfires can result in livestock, feed, crop, outbuilding, and fence losses. Natural resources such as timber can also be lost. Tourists may be reluctant to visit if smoke and wildfires threaten their recreational opportunities or vacation quality. Depending on the fire's location, historic losses can occur. The Virginia City area, in particular, is rich in Montana history as the Territory Capitol and an early mining community. Social values may be affected for those under evacuation orders and others supporting the firefighting effort. Fire restrictions may not allow campfires, hunting, and other recreational activities people often enjoy.

3.5 Land Management Practices, Regulations, and Policies

Madison County has a diverse mix of federal, state, and private lands, forested areas, prime agricultural lands, open space, riparian corridors, developed communities, rural subdivisions, and interspersed ranch and residential buildings. Managing such varied land use is a delicate balance between protecting private property rights, promoting public safety, and preserving natural resources. Often, smart development is an inexpensive and effective way to reduce the impact of wildfires on the communities. The following mechanisms are used in Madison County to manage lands.

Madison County Growth Policy

The Madison County Growth Policy, as required by state law, does not provide regulatory authority but does outline the future of growth in the county's jurisdiction. Regulatory authorities such as subdivision regulations and zoning are then guided by the growth policy. State legislation passed in 2009 also now requires jurisdictions to consider the wildfire hazard as part of its growth policy. The current Growth Policy, updated in 2013, has the purpose of guiding elected officials in land use, economic development, and capital investment decisions and has minimal emphasis specifically on wildfire. The policy does mention the possible use of zoning districts, development standards, and/or ordinances to address areas such as the "urban/wildland interface." (Madison County, 2013)

Madison County Subdivision Regulations

The Subdivision Regulations apply to all divisions of land within the jurisdiction of Madison County in which one or more parcels created are 160 acres or less. The Design and Development Standards of the Subdivision Regulations contain the following requirements or recommendations related to the wildland fire hazard:

- All subdivisions are urged to follow the design and development standards of the Urban Wildland Interface Code prepared by the International Fire Code Institute.
- An emergency or secondary access is required for subdivisions in areas of wildland/residential interface. Higher standards will be required if recommended by the local fire district or fire prevention specialist.
- Mitigating measures will be required if the estimated emergency response time is greater than 15 minutes to the subdivision. Subdivisions with an estimated emergency response time of over 45 minutes are not allowed.
- All subdivisions must have some level of fire protection.
- Adequate and accessible water for fire protection within one mile is required.
- Fire risk ratings, as calculated by the Office of Emergency Management in consultation with the local fire district, take into account mitigation measures. Subdivisions ranked *high* or *extreme* should be redesigned to reduce the risk. Otherwise, the subdivision will be denied.
- High fire hazard areas – heads of draws, steep slopes, dense forest growth, or other hazardous wildfire components – need additional fire protection measures such as two ingress-egress routes, sprinkler systems, defensible space, specific building materials, etc.
- Homes are not allowed on slopes greater than 25 percent or at the apex of a fire chimney.

The Madison County Disaster and Emergency Services Coordinator, in partnership with the jurisdiction's Fire Chief, review subdivision applications and inspect the completed subdivision, providing guidance to the developers on safety throughout the development process.

(Madison County, 2006b)

To aid in mitigating the impact of fire, it is recommended that defensible space (as listed in the Madison County Proposed Guidelines for Defensible Space found in Appendix C) be used along with fire resistant construction materials outlined in National Fire Protection Association (NFPA) Standard 1144, Chapter 8 and structural sprinklers outlined in NFPA Standard 1142, Annex F in designing the pre-plat application.

(Madison County Disaster and Emergency Services, 2012b)

Madison County Design Guidelines

The Madison County Design Guidelines, as included in the Madison County Code of the New West, 2005 edition, provides residents and potential future residents with information on "Fire Protection in the Wildland/Residential Interface." These guidelines encourage the use of fire resistant building materials, sensible building site locations and driveway design, fire prevention measures, and defensible space.

(Madison County, 2005)

Federal Wildland Fire Use Policy

In areas where assets are not threatened, naturally occurring wildland fires may be allowed to burn so the fire can play its natural role in the ecosystem and achieve resource management objectives. Most often, this policy is used for fires in the wilderness areas, such as the Lee Metcalf Wilderness area in eastern Madison County. Similarly, prescribed burns may be conducted under more controlled conditions to achieve similar objectives. (Wilderness.net, 1995)

Implementation of this policy could concur with mid-summer tourist season and may have several impacts to Madison County and its residents. A fire that is allowed to burn under a prescription potentially will place residual smoke into the valley during the life of the fire. The second impact could come from developing and implementing information and education on fires for resource benefits. With this in mind, the county could expect to expend time, energy, and resources with the US Forest Service during such events to educate and inform the county's citizens and tourists on the fire, this policy, and its intended outcomes.

3.6 Climate and Weather

Weather directly affects fire behavior, with wind being the major influencing factor. Generally, winds in this area prevail out of the southwest, and are moderate to strong depending on the elevation and aspect. South and west facing slopes are more exposed to the prevailing wind, which relates to increased fire behavior activity. Fires generally spread from southwest to northeast. During calm days, fire spread will be dictated by topographic configuration and local upslope-downslope winds. During strong wind events, fire spread will be dictated by wind direction, and the winds will override the effects of the topographic features.

Fire season moisture regimes can be defined in terms of thunderstorm tracks, which generally move across the county from southwest to northeast. The typical storm track affecting the analysis area starts along the southwestern edge of Madison County and tracks from the southwest to the northeast across the county. Typically, any significant moisture associated with these storm tracks are depleted before reaching the northern half of the county. However, lightning associated with these storms can continue to contribute to a significant number of fire starts along the storm's path.

Dry lightning events generally increase in number as the sun's angle increases in elevation. This dries the atmosphere and increases the elevation of building cumulus clouds. Strong downdrafts are produced and are often accompanied by dry lightning. Moisture associated with these building cumulus clouds usually falls as virga and evaporates before reaching the ground.

Climatic seasonal changes can influence fire behavior as well. The winter months of December through February are generally non-fire months, but snow pack accumulations can be a key factor in potential fire activity for any given summer. Spring seasons (April through June) are generally moist months with low fire frequencies. The ignitions that do occur during this period usually result in low intensity fires. Minor fire activity can occur in early spring prior to green-up conditions. As the season turns to summer, grasses and shrubs begin to lose their live fuel moisture, down fuels begin to dry, and fire conditions begin to peak by August. As autumn approaches, conditions generally begin to cool, but the presence of dry, cold frontal passages become quite common and can promote conditions of extreme fire behavior. Late fall conditions in November mark the transition into winter, but again, dry, cold frontal passages at this time of year and the lack of snowpack can lead to conditions of rapid fire growth and high intensity fire behavior.

The normal weather pattern for Madison County can best be understood by looking at the summer weather pattern for the western United States. As the Bermuda High makes its way across Texas and New Mexico in July, it cuts off a supply of low-level moisture. As this moisture diminishes, general thunderstorm activity decreases across Montana and allows the lower atmosphere to dry. This decrease is usually timed with the development of a high-pressure system that sets up across Montana and the subsidence with the high pressure dries the atmosphere. This subsidence does two things: it brings very warm temperatures to the area and it lowers the humidities. The lower humidities begin to dry the fuels of all size classes (1 hour, 10 hour, 100 hour, 1,000 hour and 1,000 hour plus time lag fuels). The 1-100 hour time lag fuels will show evidence of drying within 3-5 days. The 1,000-hour time lag fuels will take significantly longer to dry, usually in the 3-5 week range.

The drying of the lower atmosphere also affects thunderstorms that might develop. These thunderstorms are usually five to seven miles wide at the base and are sufficiently dry to evaporate any moisture falling from these cells. These “dry” thunderstorms often develop strong outflow winds, along with the lightning.

Long-term drought poses significant challenges because of its effect on vegetation conditions (i.e., reduction in live fuel moisture content). Fire records for Madison County indicate that wildland fire suppression actions are effective when the energy release component (ERC) is below the 97th percentile. When the ERC is above the 97th percentile, wildland fire suppression actions are historically not effective.

In reviewing the climate records since 1988, the significance of drought is very evident in both the forested and brush vegetative communities. Mortality as a result of drought will continue to increase the natural fuel loading, which in turn, raises the county’s potential for significant wildland fire incidents.

4. FIRE HISTORY

The fire history for Madison County began long before European settlement advanced into Montana. Data from the Beaverhead area, as well as some from the greater Yellowstone ecosystem (Houston, 1973; Loope and Gruell, 1973; Romme and Despain, 1989; Barrett, 1994) indicate that major fires occurred during severe droughts in the early to mid-1700s. Some of the worst droughts and severe fire years in the Pacific Northwest occurred between the late 1800s and 1930s; however, fire scar and fire atlas data for the Beaverhead National Forest indicate a general decline in large wildland fires beginning as early as the late 1800s. Fire scar samples suggest that these large fires had occurred on an average of every 2 or 3 decades during the pre-settlement era (mean: 33 years).

Since European settlement began in the county during the late 1800s, large fire occurrence significantly decreased. These changes were the direct result of homesteading. Grazing from sheep and cattle modified the fuel complexes to the extent that the sizes of the fires in this ecosystem were reduced significantly.

Beginning in the late 1980s and continuing through 2003, Madison County was under a long-term drought. Due primarily to the drought impact on fuels, the county experienced a number of significant large wildland fire events. Table 4A lists the documented wildfires larger than 1,000 acres. Table 4B identifies federal declarations associated with wildfires in Madison County. Map 4B shows the locations of documented wildfires in the county.

Table 4A Historic Wildfires Larger than 1,000 Acres

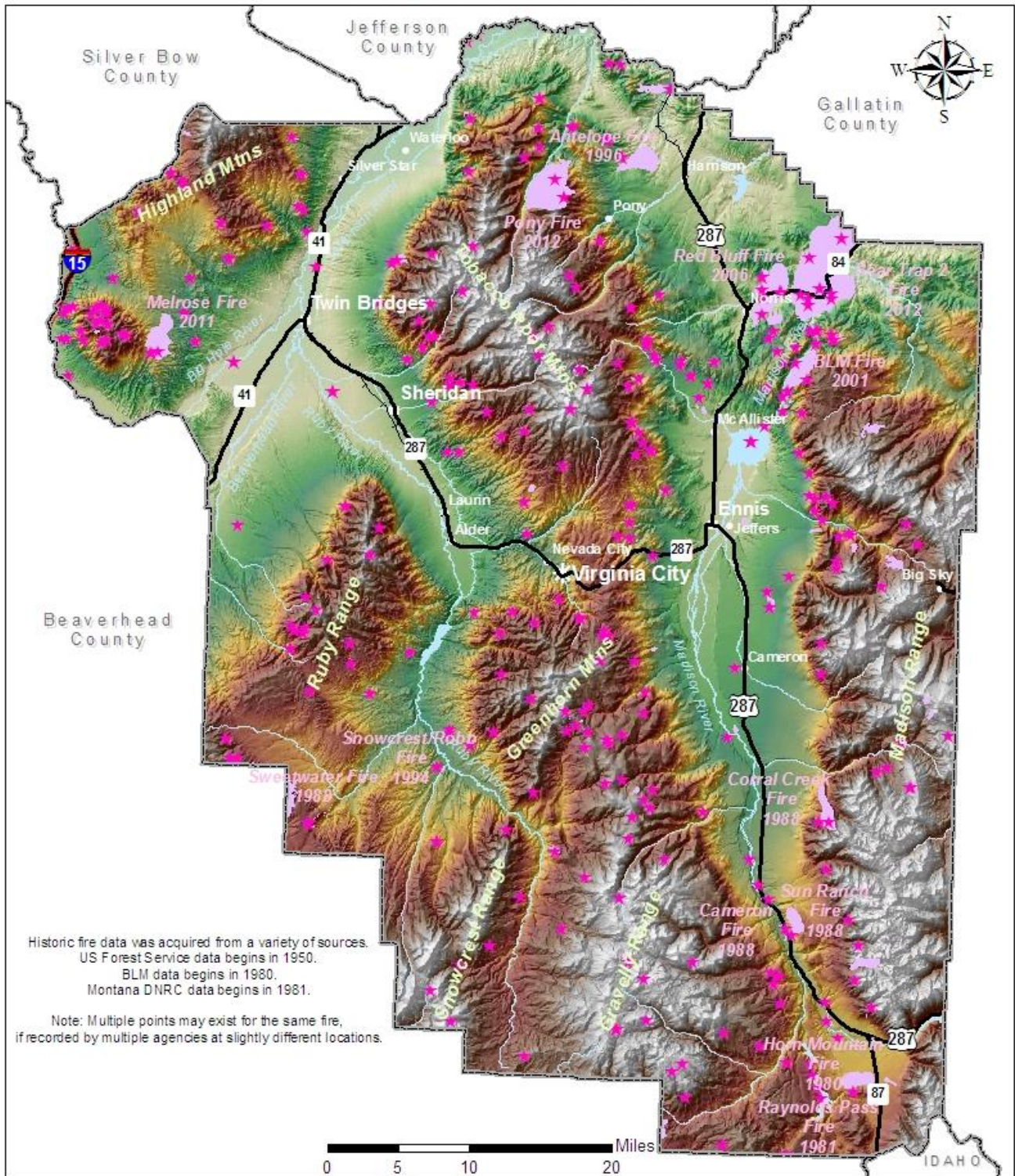
Name	Date Discovered	Size	Cause	Location	Cost
Horn Mountain	1980	1,420 acres		West of Highway 87	
Raynolds Pass	1981	2,100 acres	Lightning	West of Highway 87	
Cameron	1988	1,100 acres	Miscellaneous	South of Cameron	
Sun Ranch	08/25/1988	1,495 acres	Human	South of Cameron, Southeast of Alder	
Corral Creek	08/29/1988	2,853 acres	Equipment	Southeast of Cameron	
Sweetwater*	11/08/1988	7,566 acres*	Lightning	Ruby Range, Beaverhead County Line	
Snowcrest/Robb	04/21/1994	1,033 acres	Debris Burning	Near Ruby River and Robb Creek	
Antelope Creek	09/30/1996	2,100 acres	Equipment	North of Pony	\$28,000
Red Bluff	09/02/2000	1,981 acres		East of Norris	
BLM	2001	1,828 acres		Bear Trap Canyon, NE of Madison Power Plant	
Melrose	10/01/2011	2,572 acres	Lightning	West of Twin Bridges	\$10,000
Pony	06/24/2012	5,157 acres		West of Pony	\$4,700,000
Bear Trap 2	06/25/2012	15,341 acres	Human	East of Norris	\$1,200,000

* primarily in Beaverhead County

Sources: Montana Department of Natural Resources and Conservation, 2012a; US Bureau of Land Management, 2012b; US Forest Service, 2012; National Interagency Coordination Center, 2012.

Map 4B

Historic Wildfires Madison County, Montana



Historic fire data was acquired from a variety of sources.
 US Forest Service data begins in 1950.
 BLM data begins in 1980.
 Montana DNRC data begins in 1981.

Note: Multiple points may exist for the same fire, if recorded by multiple agencies at slightly different locations.

Data Sources: Montana DNRC; BLM; USFS
 Data Date: 2012, 2013
 Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
 Pam Shrauger
 February 2013



The 2012 fire season was the most significant in recent history for Madison County.

Pony Fire: The Pony Fire, located 10 miles west of Pony in the Tobacco Root Mountains, started on June 24, 2012. The cause remains under investigation. The 5,157 acre fire destroyed 2 residences and 5 outbuildings, including 1 bridge. The breakdown of land burned included 3,288 acres of US Forest Service lands, 690 acres of Bureau of Land Management lands, 115 acres of state lands, and 1,064 acres of private lands. Approximately 80 structures were threatened; Mammoth and the area from the fire to the Indiana University Research Station at South Boulder Road and Carmichael Road were evacuated. The Pony Fire was contained on July 8, 2012 with a total suppression cost of \$4,700,000. (InciWeb, 2012)



Figure 4C *Smoke column visible from the Pony Incident Command Post*

Source: InciWeb, 2012. Credit: astaley.

Bear Trap 2 Fire: The Bear Trap 2 Fire, located 20 miles northeast of Ennis along the Madison River and Madison Range, started on June 25, 2012 by fireworks. The 15,341 acre fire destroyed 3 structures and electric infrastructure. The breakdown of land burned included 10,835 acres of private lands, 2,351 acres of Bureau of Land Management lands, and 2,155 acres of state lands. Structures were threatened and Highway 84 was closed for a time. The Bear Trap 2 Fire was contained on July 1, 2012 with a total suppression cost of \$1,200,000. (InciWeb, 2012)



Figure 4D *View of the Bear Trap 2 Fire from the Madison River*

Source: InciWeb, 2012. Credit: Ken Harris.

Table 4E Declared Wildfire Disasters and Emergencies in Madison County

Declaration	Year	Additional Information	Assistance
	1988	All Counties in the state	
State EO 05-91 State EO 10-91	1991	Madison County, plus 15 other counties and Department of State Lands	
State EO 31-91	1991	All Counties in the state	
State EO 13-94 State EO 15-94 State EO 17-94	1994	Madison County, plus 12 other counties Activation of the Montana National Guard	
State EO 21-96	1996	All Counties in the state Activation of the Montana National Guard	\$151,644*
State EO 15-98	1998	All Counties in the state Activation of the Montana National Guard	\$46,963*
State EO 18-00 FEMA-2318-FSA-MT	2000	FEMA Fire Suppression Assistance Madison County and Beaverhead County Activation of the Montana National Guard	\$143,015*
State EO 20-00 FEMA-1340-DR-MT	2000	Presidential Disaster Declaration (Individual Assistance) Madison County, plus 47 other counties and 6 reservations Activation of the Montana National Guard	\$11,579,000*
State EO 20-01 State EO 22-01	2001	State Emergency and Disaster Declarations Madison County, plus 21 other counties Activation of the Montana National Guard	
State EO 14-03 State EO 16-03	2003	State Emergency and Disaster Declarations All Counties in the state Activation of the Montana National Guard	
State EO 34-06 State EO 36-06 State EO 37-06	2006	State Emergency and Disaster Declarations All Counties in the state Activation of the Montana National Guard	
State EO 15-07 State EO 16-07 State EO 17-07	2007	State Emergency and Disaster Declarations All Counties in the state Activation of the Montana National Guard	
State EO 05-2012	2012	State Emergency Declaration Madison County, plus 3 other counties Specifically includes the Pony and Bear Trap 2 Fires Activation of the Montana National Guard	
State EO 09-2012 State EO 11-2012	2012	State Emergency and Disaster Declarations All Counties in the state Activation of the Montana National Guard	

*Figures are for all Montana counties/reservations included in the declaration.

Sources: Montana Disaster and Emergency Services, 2008; Montana Governor’s Office, 2012.

Table 4F Local Fire Department Wildfire Statistics

Data from the Volunteer Fire Assistance / Rural Fire Assistance Program Grant Applications

Department	Year				
	2006	2007	2008	2009	2010
Alder	5	6	5	5	4
Big Sky	n/a	n/a	n/a	n/a	n/a
Harrison/Pony/Norris/Summit Valley	11	7	9	5	1
Madison Valley	20	23	18	20	2
Sheridan	5	11	7	10	4
Twin Bridges	4	24	15	15	7
Virginia City	n/a	n/a	n/a	2	1
Yellowstone Club	n/a	n/a	n/a	n/a	n/a

n/a = not in application or not funded

Source: Montana Department of Natural Resources and Conservation, 2012b.

5. FIRE PROTECTION CAPABILITIES

Madison County provides fire protection through eight local fire protection agencies and a Fire Warden. These agencies differ greatly in their capability, operational effectiveness, staffing, equipment, and training. The following local fire protection agencies serve Madison County:

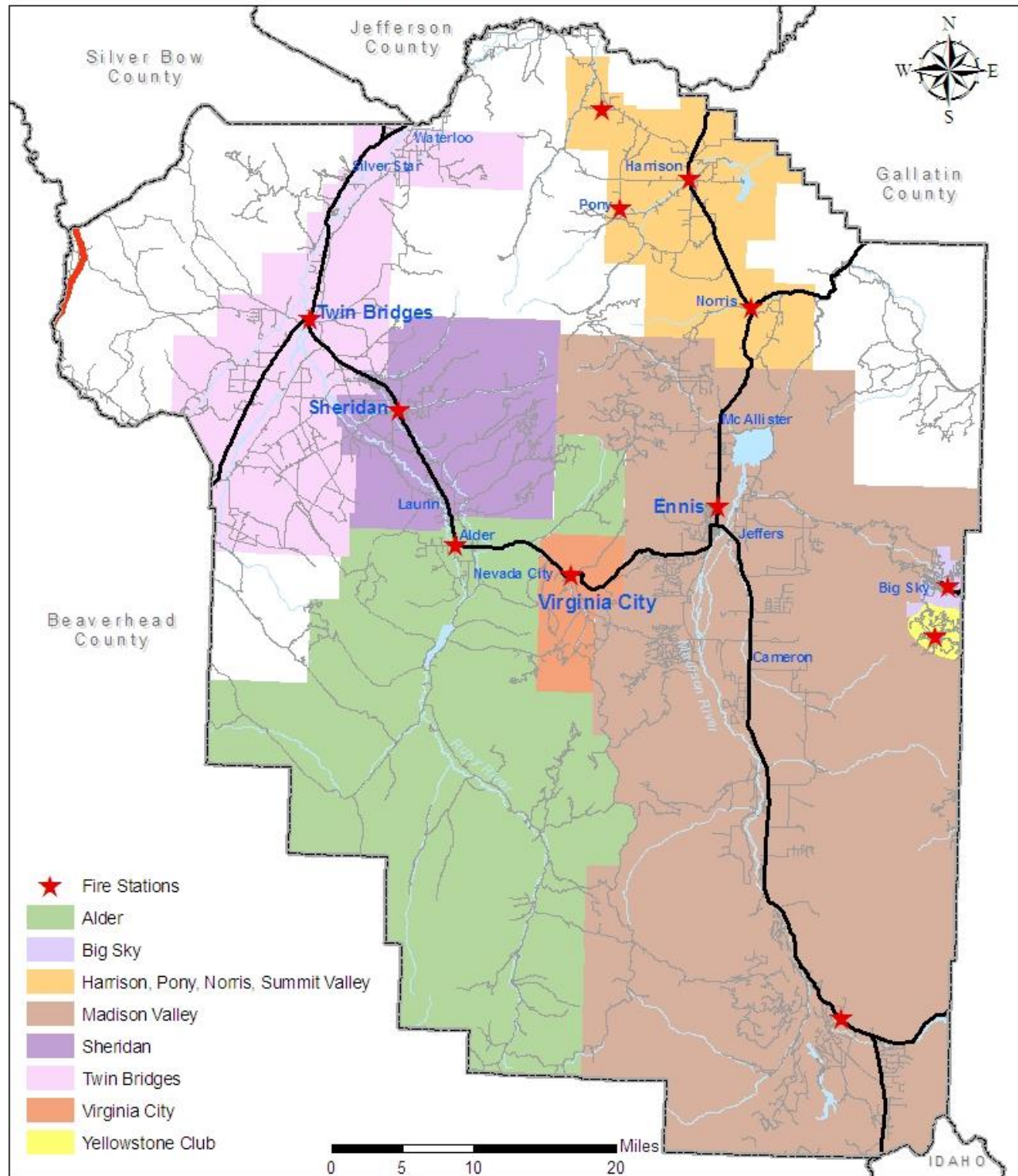
- Alder Rural Fire Department
- Big Sky Fire Department
- Harrison, Pony, Norris, Summit Valley Volunteer Fire Department
- Madison Valley Rural Fire Department
- Sheridan Fire Department
- Twin Bridges Fire Department
- Virginia City Rural Fire Department
- Yellowstone Club Fire Department

Table 5A Madison County Fire Stations

Station	Address
Alder Fire Station	29 Upper Ruby Road, Alder
Big Sky Fire Station #2, Mountain Village	460 Lone Mountain Trail, Big Sky
Harrison Fire Station	102 Main Street, Harrison
Madison Valley Rural Fire Station #1	5037 US Highway 287 North, Ennis
Madison Valley Rural Fire Station #2	1101 US Highway 287 North, Cameron
Norris Fire Station	6558 US Highway 287 North, Norris
Pony Fire Station	59 Johnson Road, Pony
Sheridan Fire Station	103 East Hamilton, Sheridan
Summit Valley Fire Station	92 Armstrong Road, Cardwell
Twin Bridges Fire Station	210 North Main Street, Twin Bridges
Virginia City Fire Station	316 East Wallace Street, Virginia City
Yellowstone Club Fire Station	1 Yellowstone Club Trail, Big Sky

Map 5B

Fire Stations and Districts Madison County, Montana



Data Source: Madison County
Data Date: February 2012
Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
Pam Shrauger
May 2013



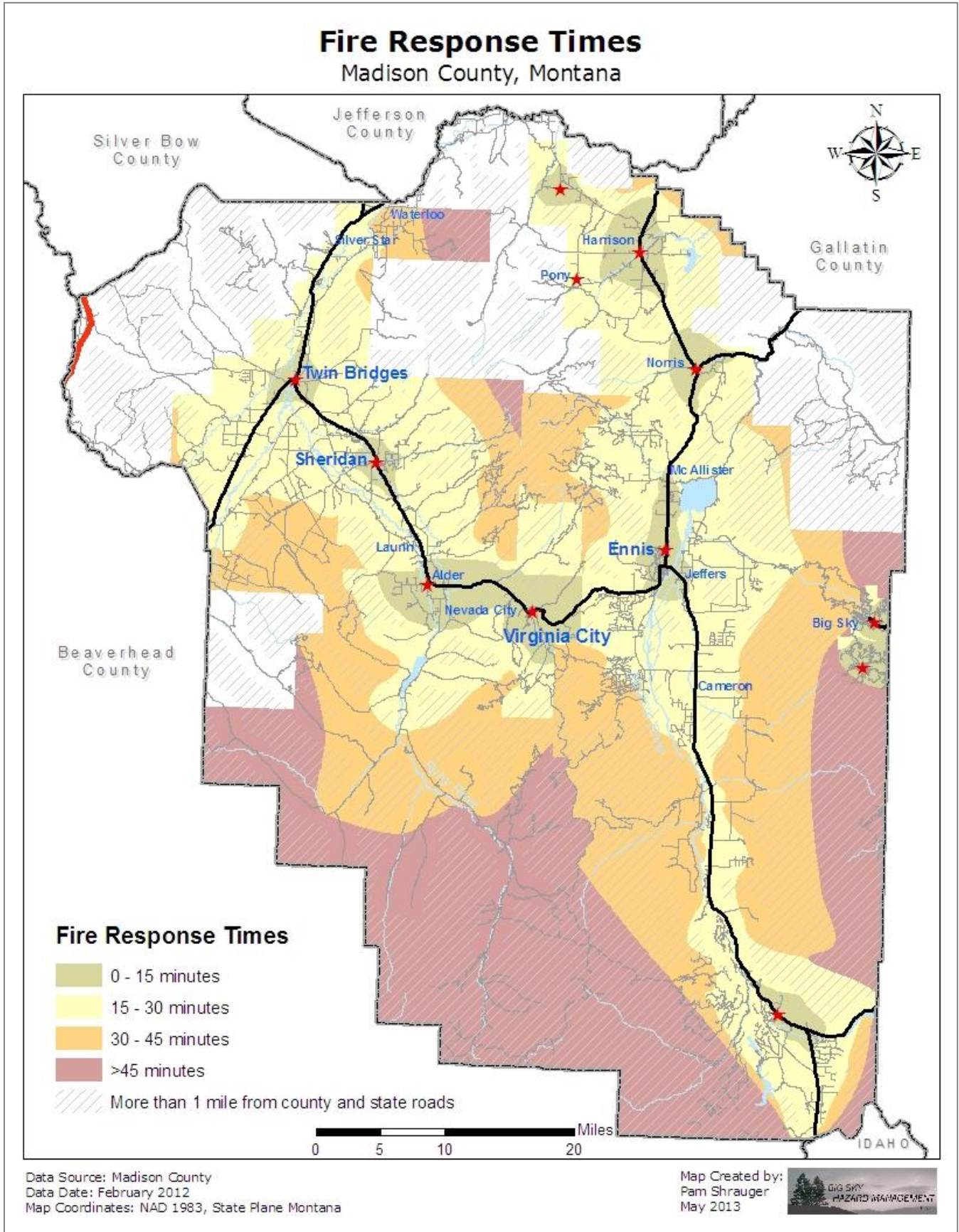
Madison County Disaster and Emergency Services maintains a Master Resource List that contains details on equipment and resources that may be used in a wildland fire. Table 5C summarizes the fire apparatus by department.

Table 5C Madison County Fire Apparatus

Department	Vehicles
Alder Rural Fire Department	<ul style="list-style-type: none"> • 1 Type VI Wildland Engine • 1 Type III Water Tender • 1 Type II Engine/Pumper • 1 Rescue vehicle
Big Sky Fire Department	<ul style="list-style-type: none"> • 1 Type VI Wildland Engine • 1 Type II Water Tender • 1 Type III Water Tender • 2 Type I Engines/Pumpers • 1 Ladder Truck • 1 SCBA cascade fill system trailer
Harrison, Pony, Norris, Summit Valley Volunteer Fire Department	<ul style="list-style-type: none"> • 3 Type VI Wildland Engines • 2 Type II Water Tenders • 4 Type I Engines/Pumpers • 2 Type II BLS, non-transport ambulances • 1 Command vehicle
Madison Valley Rural Fire Department	<ul style="list-style-type: none"> • 1 Type IV Wildland Engine • 2 Type VI Wildland Engines • 1 Type I Water Tender • 1 Type III Water Tender • 2 Type II Engines/Pumpers • 2 Rescue vehicles
Sheridan Fire Department	<ul style="list-style-type: none"> • 2 Type VI Wildland Engines • 2 Type I Engines/Pumpers • 1 Type II Engine/Pumper • 1 Rescue vehicle
Twin Bridges Fire Department	<ul style="list-style-type: none"> • 2 Type VI Wildland Engines • 2 Type II Water Tenders • 2 Type I Engines/Pumpers • 1 Rescue vehicle • 1 Support vehicle
Virginia City Rural Fire Department	<ul style="list-style-type: none"> • 1 Type VI Wildland Engine • 1 Type II Water Tender • 2 Type I Engines/Pumpers • 1 Type II Engine/Pumper • 1 Type VI Engine/Pumper • 1 Rescue vehicle
Yellowstone Club Fire Department	<ul style="list-style-type: none"> • List not available

Source: Madison County Disaster and Emergency Services, 2012a.

Map 5D



The following state and federal agencies provide direct wildland fire protection in Madison County:

- Montana Department of Natural Resources and Conservation
- US Forest Service

Other resources that may assist in a wildland fire include:

- US Bureau of Land Management: By agreement, direct protection of Bureau of Land Management lands in Madison County is provided by the US Forest Service and/or the Montana Department of Natural Resources and Conservation.
- Madison County Disaster and Emergency Services
- Madison County Communications Center
- Madison County Sheriff's Office
- Madison County Road Department
- Ennis Ambulance
- Ruby Valley Ambulance
- Madison County Public Health

Madison County Fire Chief Council

The Madison County Fire Chief Council was established to foster communications and improve working relations between the fire districts in Madison County. This group of Chiefs meets regularly and is an essential component of the fire protection capabilities in the county. Similarly, the Southwest Montana Fire Council is composed of fire protection agencies from Madison and Beaverhead Counties to coordinate fire protection issues between the two counties.

Madison County Automatic Aid

Madison County has implemented an automatic aid system to improve fire suppression efforts in the county. This agreement authorizes the Madison County Communications Center to automatically dispatch resources from neighboring fire districts to assist the primary jurisdiction when the incident appears to be significant based on initial reports. Signatories on this agreement include the following fire jurisdictions: Alder, Big Sky, Harrison, Madison Valley Rural, Sheridan, Twin Bridges, Virginia City, Whitehall, Willow Creek, and Yellowstone Club.

Limitations

As in most rural areas, volunteers are hard to find and keep motivated; recruiting is a problem due to the limited number of people available for community service organizations, commitment of jobs limit the time available for training, and the increasing documentation requirements overload the majority of volunteer fire chiefs. This leads to difficulty in recruiting and filling the position of fire chief with skills and experience.

About 487 square miles in Madison County do not have any fire protection except for a limited wildland response from the existing fire departments. This situation can create confusion between response agencies and may have a devastating effect if a wildland fire escapes local suppression efforts and outside agencies and incident management are called upon to assist.

Currently, there is no impact fee process available to the rural fire districts in Madison County to assist in the funding of capital improvements directly related to subdivision development growth and service delivery requirements. Madison County Disaster and Emergency Services is currently working on this issue.

Community Awareness

Community awareness of the wildfire hazard can play a big role in individuals' preparedness and mitigation activities. An awareness section is published in The Madisonian newspaper by the local fire districts regularly. The 2012 wildfire season raised the awareness for many in the county, especially those in the northern half. Improvements can always be made, particularly with large landowners and new homeowners in the wildland urban interface. Education is an ongoing process that must continue to maintain and improve the awareness of wildland fire hazards.

People moving into the county may have a preconceived expectation of service levels. Normally, the expectation of service is derived from the service received by the new resident at their previous community. These service levels may include but are not limited to the following:

- Full service delivery emergency service organizations that include wildland fire response, structure fire response, motor vehicle accident rescue, vehicle fire response, emergency medical response, hazardous materials response, special rescue response, etc.
- Response times that are quick, with arrival of the emergency response agency shortly after they hang up the phone.
- Professional well trained personnel with adequate equipment and apparatus.
- The ability to acquire fire insurance at a reasonable rate.

More realistic expectations need to be communicated to new residents in an effort to encourage proactive individual preparedness and mitigation with regard to wildfire.

6. COMMUNITY RISK ASSESSMENT

6.1 Fire Regime and Behavior

Fire is a normal part of the ecosystem. Prior to suppression activities, wildfires would burn through vegetation, reducing the fuels available and returning nutrients to the soil. Dead and diseased trees, shrubs, and grasses would all typically burn. These periodic wildfires would reduce the build-up of hazardous fuels. Since fire suppression activities became common practice about 100 years ago, the natural cycle of frequent, low-intensity, surface fires was disrupted, and fuels, particularly in forested areas, have built up to hazardous levels. Those same habitats that would experience low-intensity fires now experience stand-replacing, high intensity fires.

Fire exclusion, caused primarily by fire suppression and the removal of fine fuels by livestock grazing in the area since the 1860s, has changed the structure, density, and plant species composition within the Madison Watershed. The need for and subsequent harvesting of forest products to support mining and agricultural activities in the late 1800s and early 1900s also greatly affected forest distribution, species composition, and structure. The extent of harvest, particularly across the lower slopes of the Tobacco Root Mountains, has likely played a role in restricting fires. (US Bureau of Land Management, 2009)

A study of the fire history for the Beaverhead National Forest indicated a significant reduction in large fires toward the end of the 19th century. That reduction in size may have resulted from changes in the land use patterns and previous stand replacement fires that treated over-mature stands. During the 20th century, those stands of timber matured under a successful fire suppression policy to the extent that fire has had very limited opportunity to play its natural role in the forested communities. Now in the 21st century, Madison County is living with stands of mature and over-mature Douglas fir and lodgepole pine.

The change in forest structure, as well as increased insect and disease activity, leads to a higher likelihood of high-intensity fires occurring in areas that historically experienced more mixed-severity fires. Due to increasing fuel continuity, fires are also more likely to be of significantly greater size than those which historically occurred. Large-scale, high-severity fires pose risks to human life and property, watershed stability, and fish and wildlife habitat. (US Bureau of Land Management, 2009)

A mountain pine beetle outbreak has affected much of Madison County since about 2007. These beetles attack a variety of pine tree species and subsequently create additional dead fuels with significantly reduced moisture contents. The moisture changes can occur relatively rapidly. Ignitability increases in attacked trees. Attacked trees still containing needles are at increased risk for crown fires; however, once the needles have dropped the area is generally more at risk for surface fires for years after an attack. (Jolly, et al, 2012)

During the last three decades of the 20th century, land use patterns have changed the historic look of Madison County. Development of rural areas, from primarily agricultural use to home sites for permanent and seasonal residents, presents a significant problem to the fire protection agencies that provide wildland fire suppression. In many cases, the builder or homeowner gave limited consideration of the risks from a wildland urban interface fire when choosing a home site. Poor planning in past years placed homes, and in some cases entire subdivisions, in a vulnerable situation. This risk is not limited to

the structures and homeowners, but to the firefighters who will be asked to protect the structures and improvements in these locations, including assessing whether or not it is safe to do so.

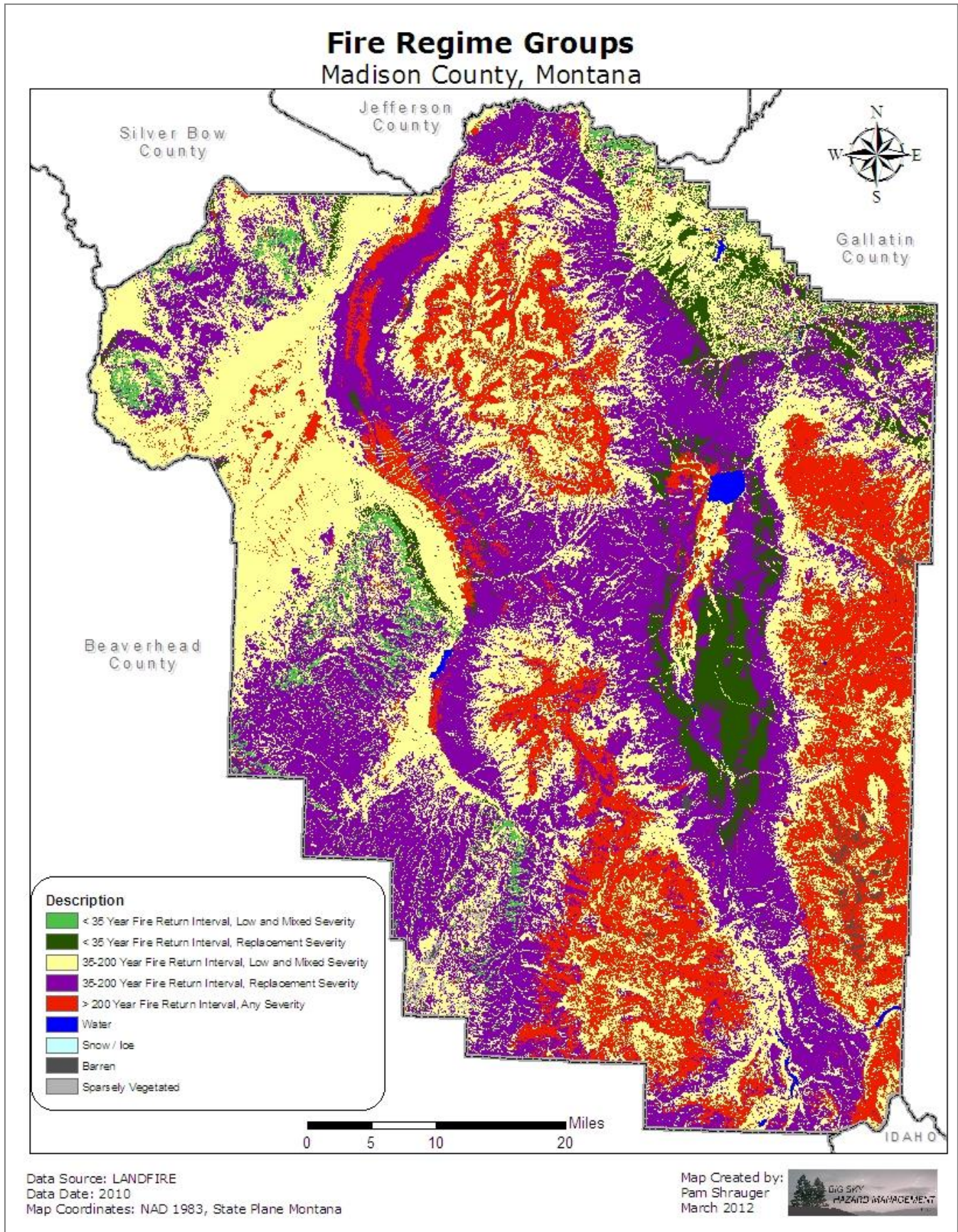
The fire return interval has been exceeded in all historical fire regimes in the Madison Watershed, with the exception of higher elevation forested habitats. This has changed the structure of these habitats, and will result in future fire behavior being altered from that which occurred under the historical fire regimes. Throughout the Madison Watershed, there has been a reduction in the amount of early and mid-seral successional stage forested habitat. The loss of variety of successional stages across the landscape reduces the ability to provide for biodiversity, and increases the susceptibility to widespread insect and disease outbreaks. (US Bureau of Land Management, 2009)

Note: The preceding information from the US Bureau of Land Management's (BLM) Madison Watershed Assessment Report, December 2009, was developed with BLM lands in eastern Madison County in mind.

Different habitats have different natural frequencies and intensities of fire. Map 6.1A shows the Fire Regime Groups for Madison County. Fire frequency is the average number of years between fires. Severity is the effect of fire on the dominant overstory vegetation.

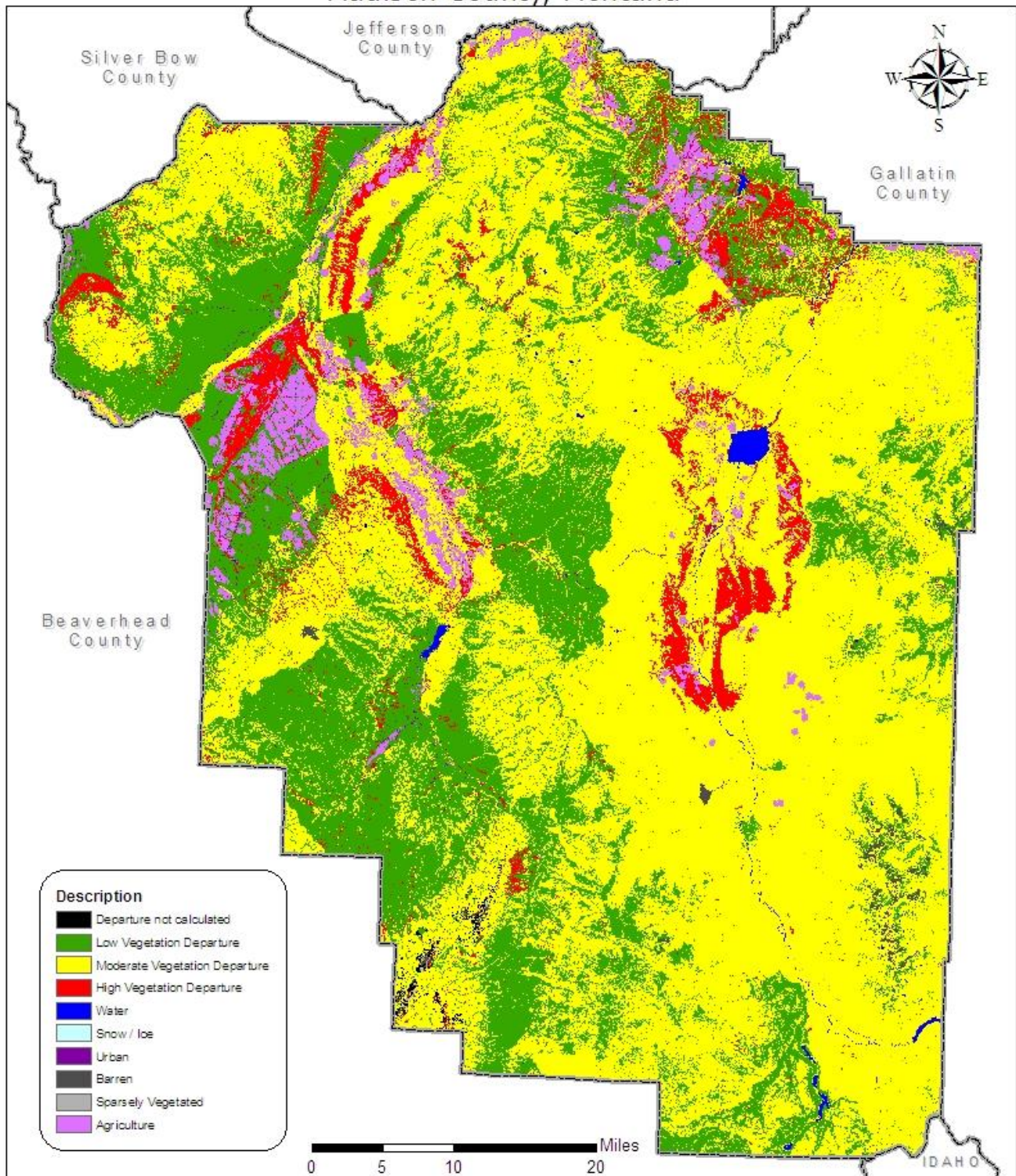
As has been discussed, with fire suppression and land use modifications, the fire regime has changed throughout the region. Changes to the ecosystem can have profound effects on the intensity and severity of wildland fires. To qualify the changes, fire ecologists use the term, condition class, to measure the degree of departure from "natural" conditions. Map 6.1B shows the vegetation condition classes for Madison County in 2010. Much of the county has not experienced wildfires in frequency or severity as would normally be expected. This departure indicates that fuels have likely built up in many areas, and therefore, future fires could burn larger, more intensely, more severely, or in different patterns than would be historically expected.

Map 6.1A



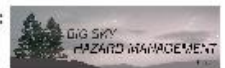
Map 6.1B

Vegetation Condition Class Madison County, Montana



Data Source: LANDFIRE
Data Date: 2010
Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
Pam Shrauger
March 2012

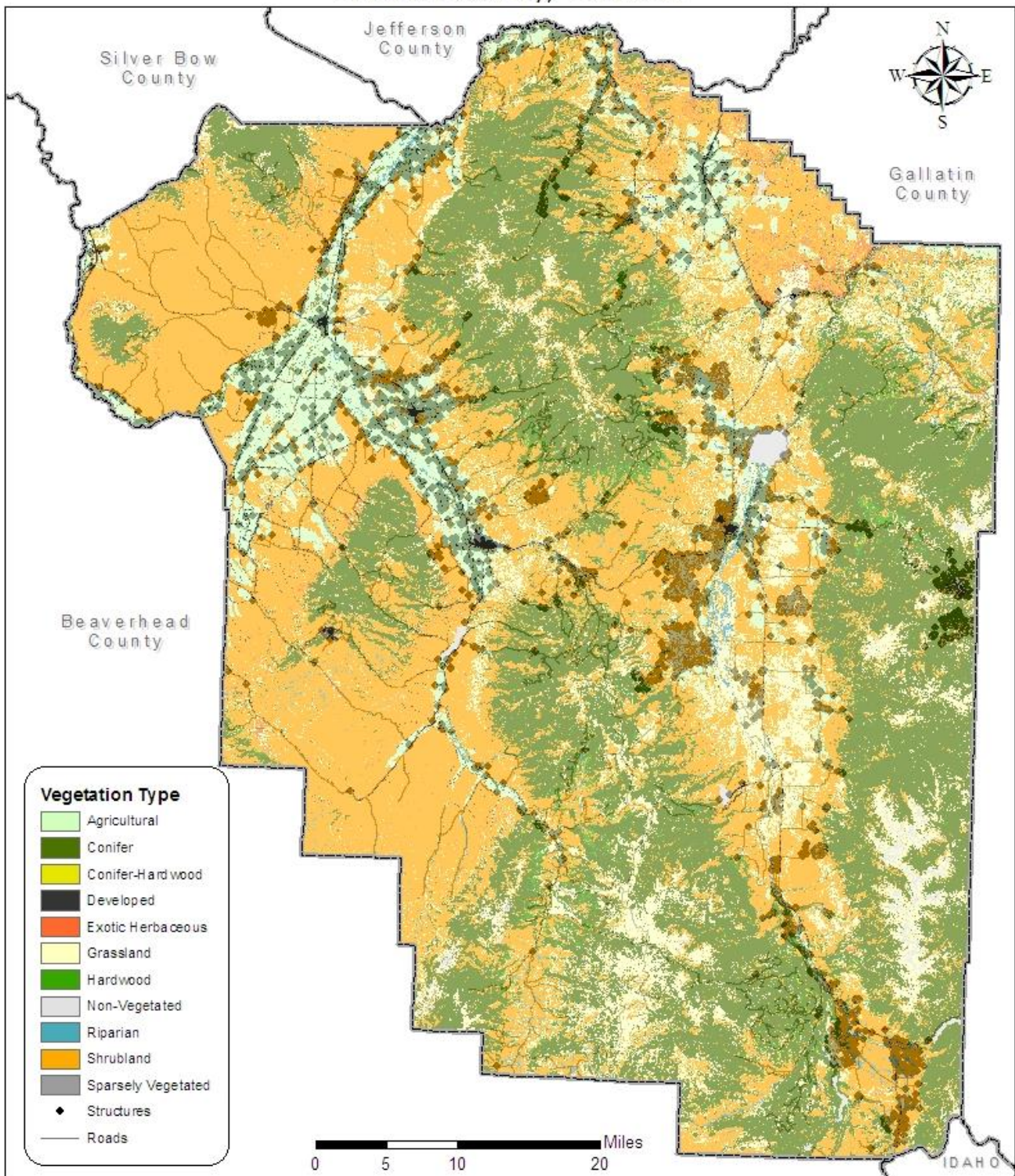


6.2 Fuel Hazards

Essentially all areas of Madison County have vegetative fuels that could be hazardous in a wildfire situation. The only exceptions may be irrigated areas of agriculture or urban settings. Otherwise, in a dry year or with favorable weather conditions, everything from trees to shrubs to grasses can become hazardous fuels. Map 6.2A shows the vegetation type with structure and road locations to more clearly depict the vegetative environment with the communities and residential areas. In this map, the vegetation graphic was made somewhat transparent and the structures and roads can be seen through the layer. Making some generalizations, those structures/points that appear green are within the agricultural areas, those that are brown are within the shrubland areas, and those that are dark green are within the forest/conifer areas.

Map 6.2A

Vegetation Type and Structures Madison County, Montana



Data Source: LANDFIRE
Data Date: 2010
Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
Pam Shrauger
March 2012



6.3 Ignition Risks

Evaluating the historical data provided by the Montana Department of Natural Resources and Conservation, US Bureau of Land Management, and US Forest Service, lightning is the most frequent igniter of wildfires in Madison County, followed by debris burning. These two causes account for about 75% of the recorded wildfires.

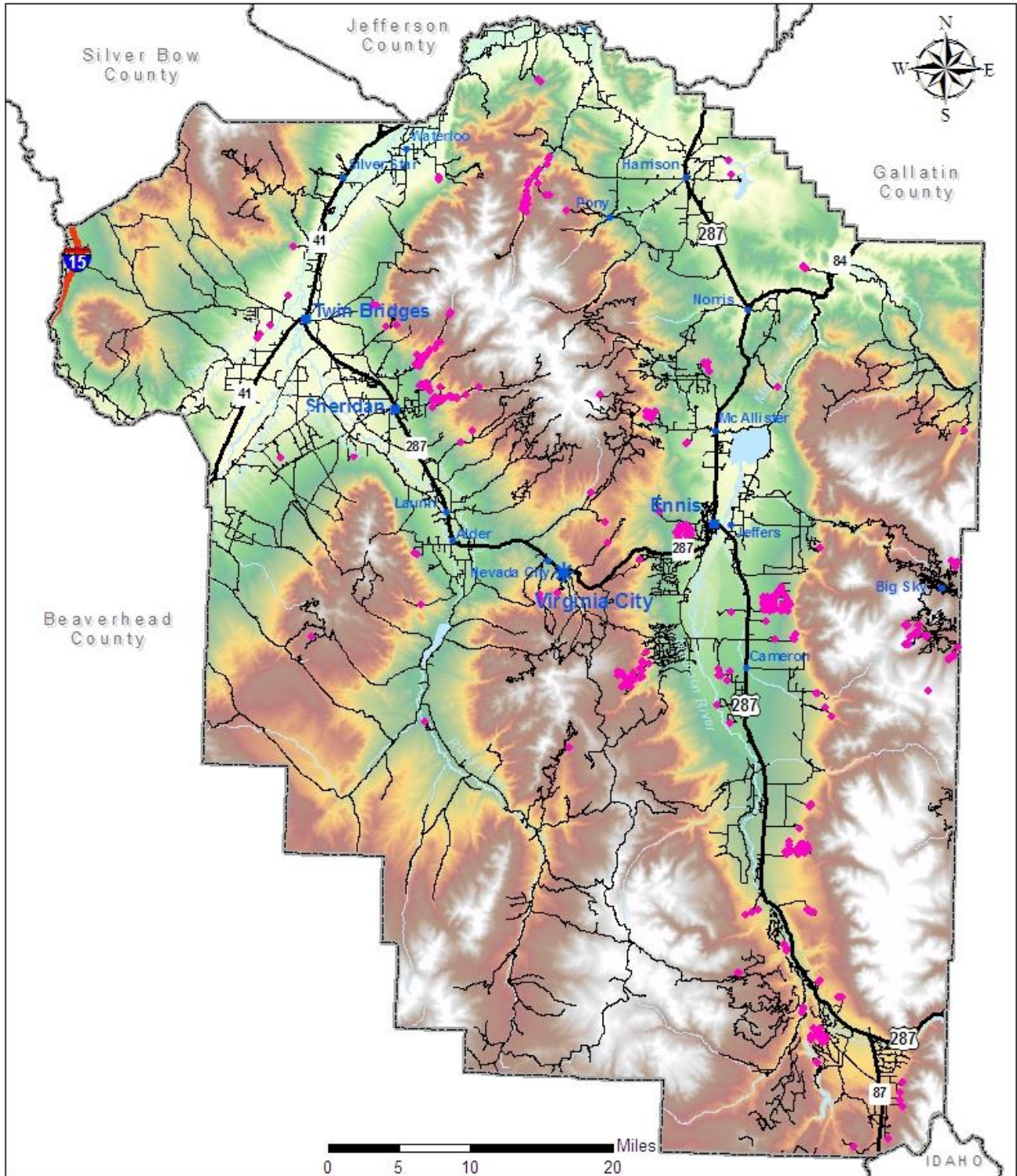
Holidays such as the Fourth of July can increase the probability of an ignition from fireworks. Areas recognized for their potential ignition risks include recreation areas due to the higher risk of ignitions from campfires. Agricultural areas, particularly those that are not irrigated, are at greater risk for ignitions from farm and ranch equipment. Areas along highways are more vulnerable to ignitions from tossed cigarettes and vehicle sparks.

6.4 Transportation Network

The transportation network is an important factor in assessing the wildfire risk to the population. The ability, or rather the inability, of the population, including firefighters, to evacuate an area and access wildland areas can be a significant challenge. Primitive roads and bridges may not provide the infrastructure needed for firefighting vehicles. Private communities with locked gates can additionally compound firefighter access. Map 6.4A shows the transportation network of Madison County and highlights areas with significant potential for transportation problems during a wildland fire. The areas shown in pink are structures that are more than one mile from an alternative exit route. Note that Forest Service roads, although sometimes primitive, were considered a second route.

Map 6.4A

Structures with Limited Transportation Options Madison County, Montana



Data Source: Madison County; Gallatin County
Data Date: February 2012; November 2007
Map Coordinates: NAD 1983, State Plane Montana

Map Created by:
Pam Shrauger
October 2012



6.5 Severity Factors

Many factors exist that can increase the magnitude and severity of wildfires in Madison County. Factors such as the fuel type, accessibility, topography, water supplies, and weather conditions all become important for fire growth and suppression. These factors can make the difference between fire control and a large, raging wildfire. The most critical factors in Madison County are the remoteness of many areas, the lack of water supplies, and communications.

The remoteness and expanse of Madison County becomes an especially important factor when fighting wildfires. The time spent locating and accessing the fire gives the fire more time to grow and become harder to manage.

Water supplies can become a limiting factor in places lacking community water systems. Unless another readily available water supply is found, such as a ranch stock pond that the owner approves for use, water tenders and firefighting vehicles must travel back and forth to the closest supply for water. For the more remote locations in the county, this can be very time and resource consuming.

Communications become critical during wildfires involving different agencies. Although improving, the interoperability of radio systems and antiquated equipment can make radio communications difficult.

6.6 Wildland Urban Interface

The wildland urban interface is defined as the area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Similar terms are wildland/residential interface and wildland/urban intermix.

The development of portions of Madison County into residential lots of varying sizes is contributing to the wildland urban interface fire problem for the fire protection agencies in Madison County. This leads to several complex problems that need to be addressed by local officials and firefighting agencies in the county:

- Subdivision Development
- Defensible Space Requirements
- Building Construction Requirements
- Fuel Reduction on all ownerships
- Fire Protection of structures outside of existing fire protection agencies

The key to reducing wildfire losses is to identify and prioritize the wildland urban interface areas in the county. The highest hazard areas will have a high probability of significant, interface-damaging wildfires. These areas include regions with timber and other significant fuels built up. Additionally, the interface areas, by definition, have human development such as structures or infrastructure. It is also important to identify wildland areas that could see development in the future. Therefore, the entire county is defined as the wildland urban interface, based on the potential for future development in most areas and the abundance of fuels, timber, hardwoods, and grasses.

In an attempt to help officials in their efforts to maximize fire protection effectiveness, areas of the county have been generally prioritized based on their current and/or potential risk:

- High Priority/Potential Areas: These are areas where wildland fire risk is the highest. Fire has the potential to cause major property damage or resource loss, major suppression costs, and could be a high risk to firefighters. Fire suppression actions could be aggressive and the acreage burned will likely be kept as small as possible within these areas. Prevention will also be emphasized to keep the numbers of person-caused ignitions to a minimum. These areas are characterized as those that are near National Forest or other public lands and have a slope and/or fuels favorable to intense wildfires. Consideration was also given to developed areas with poor transportation options (see Map 6.4A) and values at risk (see Section 3.4, Community Assets and Values).
- Moderate Priority/Potential Areas: These are areas where wildland fire is undesirable. Like High Priority/Potential Areas, fuel conditions are hazardous, and fire suppression actions will be aggressive in order to keep fires small. Again, fire prevention will be emphasized in these areas. The fuels in the moderate areas are generally shrublands or grasslands, but agricultural and developed areas greater than five miles from a fire station are also included.
- Low Priority/Potential Areas: These are areas where significant negative effects from wildfire are less likely. These areas are mostly agricultural and are within five miles of a fire station. Wildfires in these areas are usually relatively quickly and easily contained by local fire departments.

These broad characterizations should help prioritize where protection capabilities should be improved and where fuel treatments could be most effective. A projection is made in recognition that any private land not currently protected by a conservation easement is subject to being subdivided. It is also possible that some of the acreages now in the undeveloped private category may be covered by a conservation easement at some point in the future.

Many existing subdivisions were assessed using specific criteria (see Appendix D). The score from the assessment determined the risk category of the subdivision. Section 6.9 further outlines the prioritizations by subdivision.

Map 6.6A

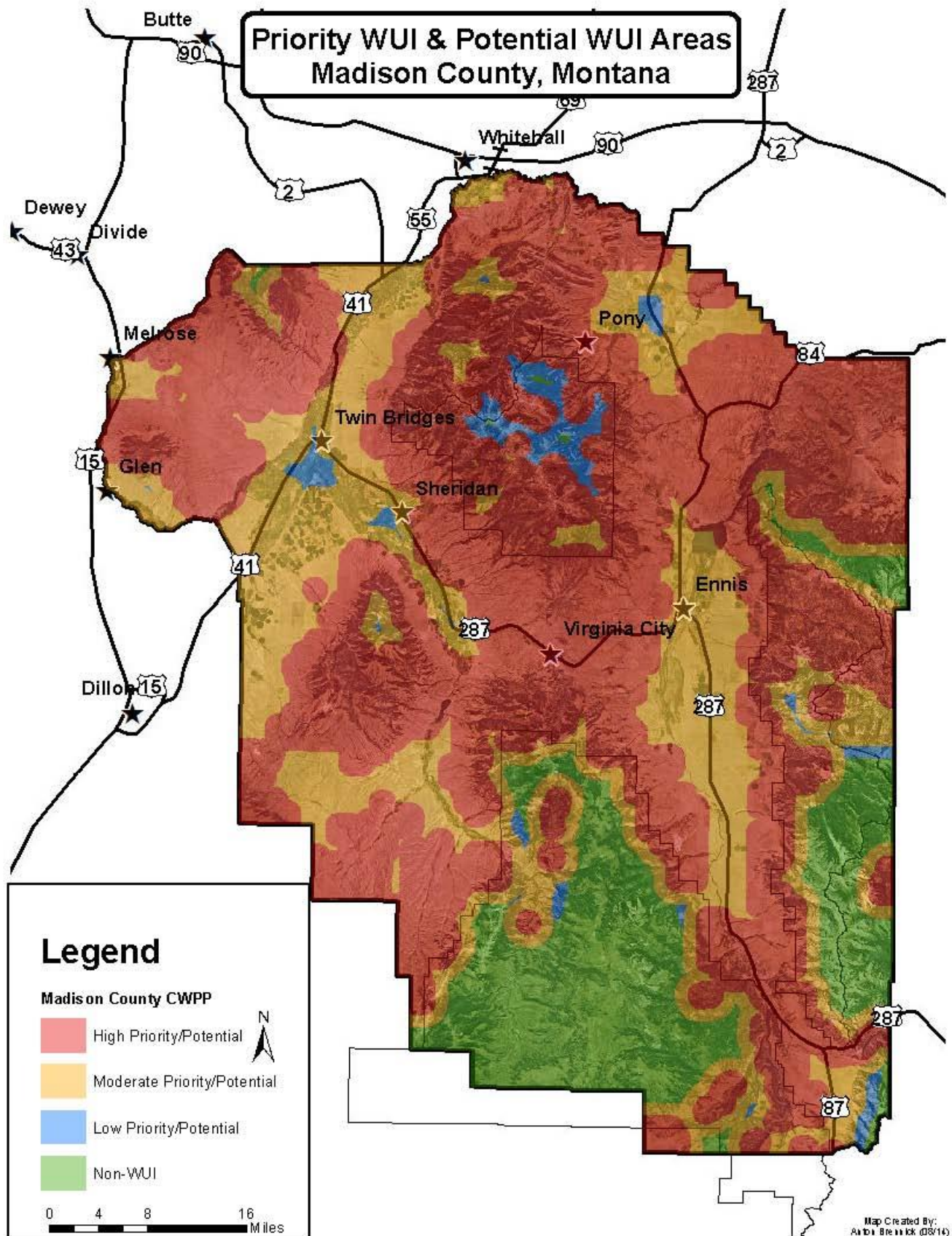


Table 6.6B approximates the number of structures in each category by jurisdiction. Map 6.6C shows the undeveloped land by hazard level to demonstrate the potential for future development in hazardous areas. Table 6.8D approximates the number of undeveloped parcels in each category by jurisdiction. Note that mining claim parcels and parcels under conservation easement are included in the map but not the table.

Table 6.6B Wildland Urban Interface by Wildfire Jurisdiction (within Madison County)

Department	High Hazard	Moderate Hazard	Low Hazard
Alder RFD	36 structures	75 structures	186 structures
Big Sky FD	1,106 structures	50 structures	0 structures
Harrison, Pony, Norris, Summit Valley VFD	47 structures	294 structures	160 structures
Madison Valley RFD	567 structures	1,447 structures	571 structures
Sheridan FD	56 structures	150 structures	774 structures
Twin Bridges FD	9 structures	457 structures	432 structures
Virginia City RFD	214 structures	0 structures	0 structures
Yellowstone Club FD	54 structures	304 structures	0 structures
Outside Fire Districts	146 structures	185 structures	0 structures
TOTAL	2,256 structures	2,941 structures	2,123 structures

Note: 348 structures are located on tax exempt parcels and are not included. The majority of these structures are probably high hazard.

Map 6.6C

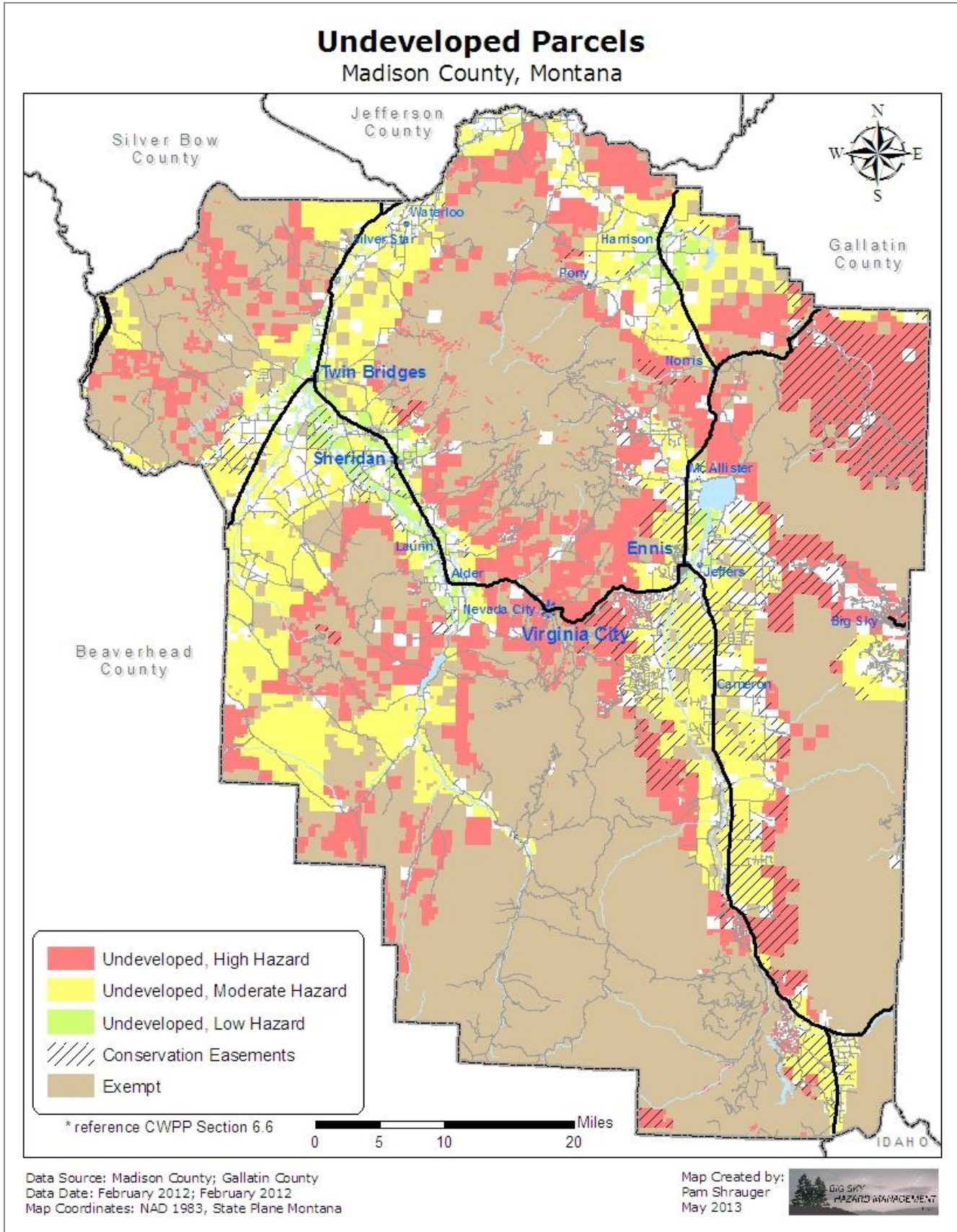


Table 6.6D Undeveloped Parcels by Wildfire Jurisdiction

Department	High Hazard	Moderate Hazard	Low Hazard
Alder RFD	333 parcels	235 parcels	87 parcels
Big Sky FD	350 parcels	112 parcels	0 parcels
Harrison, Pony, Norris, Summit Valley VFD	155 parcels	459 parcels	156 parcels
Madison Valley RFD	658 parcels	1,413 parcels	296 parcels
Sheridan FD	148 parcels	90 parcels	349 parcels
Twin Bridges FD	54 parcels	539 parcels	240 parcels
Virginia City RFD	513 parcels	0 parcels	0 parcels
Yellowstone Club FD	70 parcels	302 parcels	0 parcels
Outside Fire Districts	360 parcels	342 parcels	0 parcels
TOTAL	2,680 parcels	3,453 parcels	1,128 parcels

Note: Does not include mining claim parcels or parcels under conservation easement.

Critical facilities and infrastructure can also be at risk during wildfires. Perhaps the most vulnerable are communications towers, electric transmission lines and substations, and bulk storage tanks located in wildland areas. Rural fire stations and schools may also be at risk if adequate defensible space is not provided. Community infrastructure such as pumping stations and sewer lagoons could be threatened by wildfires in the area.

6.7 Other Vulnerabilities

Management of fires occurring within the mutual threat zone could be a significant issue to Madison County. Mutual threat zones are defined as predetermined areas on either side of a jurisdictional boundary. All the fire protection agencies providing fire protection in these mutual threat areas are separate governmental entities, however, they need to work together cooperatively on mutual threat zone incidents. Pre-planning concerning responses, unified command potential, evacuation, coordinated command and operation, and cost share agreements should be agreed upon by the agencies annually.

Directly related to wildfires is smoke. Smoke can affect many more people than the fire itself. Those nearby or downwind may not feel the direct impacts of the fire, but given the appropriate atmospheric conditions, may experience negative impacts from the particulate matter in the air. Smoke from wildfires may lead to unhealthy air conditions affecting those with respiratory problems and otherwise healthy people. The Montana Department of Environmental Quality (DEQ) monitors air quality during wildfires, issuing daily statements and categorizing the air quality for the larger cities across the state. When the air quality is especially poor, the public may be advised to spend less time outside and to close doors and windows. Smoke can also severely reduce visibilities and lead to road closures and aircraft diversions.

Counter intuitively, wildfires can increase the probability of flash floods and landslides. Destroyed vegetation and seared soils cannot absorb water as readily. Runoff, particularly on steep slopes, occurs rapidly and can flood normally dry areas. Debris flows, such as mudslides, landslides, and erosion, also become more likely without vegetation, particularly roots, holding the soils and rocks in place. Post-fire debris flows are particularly hazardous because they can occur with little warning, exert great impulsive

loads on objects in their paths, strip vegetation, block drainage ways, damage structures, and endanger human life. (US Geological Survey, 2007)

6.8 Future Risks

A wildfire hazard generally exists anywhere in Madison County whether or not the area is developed. Fires can burn through many parts of the county without causing damage to homes or businesses. The problems arise with the wildfire coincides with human development and values. Many areas already have homes, infrastructure, and resources. A limited number of mitigation activities can reduce the risks to these areas. The future vulnerabilities, in addition to the existing ones, depend on the extent, location, and type of future development that occurs in the county. In many cases, such development will add to the vulnerabilities and put more pressure on firefighting agencies. Future development will add to the number of resources needed to protect structures and infrastructure from wildfires. Without proportional increases to firefighting resources, future development will likely lead to more losses during wildfires.

If history is any indication, Madison County shall continue to see considerable new subdivisions. Existing subdivisions may become completely developed and additional lots for development are possible. The county's growth policy and subdivision regulations are the only existing avenues to manage local growth. Local government agencies that will be tasked to provide services for these areas need to participate in the subdivision review process and voice their infrastructure and mitigation requirements associated with this subdivision growth.

People moving into Madison County sometimes have a higher expectation of service than can be provided. Often, these expectations cannot be met in the rural areas due to a small tax base over a large area resulting in volunteer fire departments with aging equipment, apparatus, and limited training. For service delivery to match expectations, either significant modifications, including substantial tax increases, must be made, or public expectations need to become more realistic. As stated at the beginning of the plan, "Personal responsibility is key!"

6.9 Priority Areas

Any part of Madison County that has vegetation has some probability of wildfire. Some areas and subdivisions, however, have been identified as particularly hazardous and vulnerable to wildfires. These areas were scored and prioritized using a weighted assessment tool. The results follow. The complete assessments can be found in Appendix D.

High Priority Areas (Score \geq 80)

- Sun Ranch West (90)
- Elk Hills and South Meadow Creek Subdivisions (89)
- Moonlight Basin Area (86)
- South Boulder and Mammoth Area (86)
- Shining Mountain and Virginia City Ranches Subdivisions (85)
- Haypress Lake Area (84)
- Madison River Ranches Subdivision (84)
- Sundance Bench Ranches Subdivision (84)
- Nevada City Area (83)
- Washington Bar and North Meadow Creek Subdivisions (83)
- Potosi Hot Springs Area (82)
- Sundowner and Sunriser Subdivisions (81)
- Big Sky Area (80)
- Virginia City Area (80)

Moderate Priority Areas (Score 50-79)

- Indian Creek Area (77)
- Yellowstone Club Subdivision (77)
- Highway 87 South to Idaho Line Area (70)
- Rising Sun Mountain Estates Subdivision (70)
- Lonesome Dove Subdivision (69)
- Sphinx Mountain Subdivision (69)
- Double M Ranch Subdivision (68)
- Sportsmans Paradise Subdivision (67)
- Lower Shining Mountain Subdivision (66)
- South Ruby Area (64)
- Pony Area (62)
- Mustang Ranches Subdivision (58)
- Air Park Shining Mountains Subdivision (58)
- Melrose Road Area (57)
- Silver Star Area (56)
- Squaw Creek Tracts Subdivision (54)
- Sturdivant Happy Acres Subdivision (54)

7. MITIGATION AND MANAGEMENT STRATEGIES

7.1 Goals and Objectives

The goals and objectives of the Madison County Community Wildfire Protection Plan are:

Goal 1: Prevent the loss of life and health.

- *Objective 1.1:* Develop systems to notify the public of hazardous wildfires.
- *Objective 1.2:* Create and maintain planning documents at the county and fire department levels that maintain or improve firefighting capabilities for the protection of current and future populations.
- *Objective 1.3:* Provide adequate funding of firefighting operations and wildfire prevention and mitigation.
- *Objective 1.4:* Coordinate efforts to improve the effectiveness of projects and plans.
- *Objective 1.5:* Perform physical modifications to fuels and infrastructure that allow for quicker and safer response and evacuation.
- *Objective 1.6:* Maintain and improve the fire departments' capabilities to respond to wildland fires through adequate staffing, training, equipment, apparatus, and stations.

Goal 2: Prevent the destruction of property.

- *Objective 2.1:* Physically modify the fuel environment around values at risk.
- *Objective 2.2:* Develop and/or improve upon plans and associated funding mechanisms that enable firefighters to protect property throughout the wildland urban interface.
- *Objective 2.3:* Improve coordination of wildland fire mitigation and firefighting operations to better protect property at risk.
- *Objective 2.4:* Improve infrastructure and equipment to enable fast, safer response by firefighters to protect property.
- *Objective 2.5:* Educate property owners on steps they can take to reduce the wildfire risk and associated financial risk to their properties.

Goal 3: Preserve and restore the natural and beneficial function of our forests and watersheds.

- *Objective 3.1:* Return forested areas to a more natural state, prior to years of heavy fire suppression.
- *Objective 3.2:* Coordinate and support efforts by fire departments and local government to protect the local environment with a synergistic benefit of added fire protection.

Goal 4: Minimize future increases in damage potential from wildland fire.

- *Objective 4.1:* Use local planning and regulatory mechanisms to minimize the impact of future development to wildfire hazards.
- *Objective 4.2:* Investigate and increase firefighting capabilities, as needed, to support additional development.
- *Objective 4.3:* Work with neighboring, state, and federal firefighting entities to coordinate measures that reduce the future damage potential from wildfire countywide.

Goal 5: Educate citizens and local businesses.

- *Objective 5.1:* Develop programs specific to Madison County residents and businesses that educate and motivate action in wildfire prevention and mitigation.
- *Objective 5.2:* Use local firefighting resources to encourage and support citizen-driven efforts.

7.2 Current Activities and Programs

Wildfire Planning

Madison County has and maintains this Community Wildfire Protection Plan that describes the wildland fire hazards, estimates the risks to current and future development in the wildland urban interface, and recommends projects and programs to reduce the risks to the citizens of Madison County.

Madison County participated with Gallatin County, the Gallatin National Forest, the Gallatin Canyon Consolidated Rural Fire District, landowners, and the Beaverhead-Deerlodge National Forest to develop the Big Sky Fire Management Strategy. This strategy coordinates resources across county lines for this high risk, high value area.

The Madison County Local Emergency Planning Committee (LEPC) has and maintains a Pre-Disaster Mitigation Plan that incorporates this Community Wildfire Protection Plan as a component.

A report was written for the Virginia City Fire Department which analyzed the capability of the fire department and made fire protection recommendations for the communities of Virginia City and Nevada City. Parts of the recommendations have been implemented.

Fire Prevention Specialist Program

Madison County developed a program where the County hires fire prevention specialists to work with developers to ensure fire protection measures, based on the County’s Subdivision Regulations, are incorporated into development projects occurring in Madison County.

Conservation Easements

Conservation easements are an effective strategy to limit wildland urban interface encroachment into areas of high wildland fire potential. Madison County uses conservation easements to achieve multiple objectives, including wildfire hazard reduction.

Dry Hydrant Program

Madison County fire agencies have installed dry hydrants throughout their fire protection jurisdictions. A program needs to be developed to ensure the proper inspection and maintenance of the dry hydrants is being conducted.



Fuel Treatments

Through financial and educational help provided by the US Bureau of Land Management and Montana Department of Natural Resources and Conservation, Madison County has targeted five (5) high priority areas in Madison County starting in 2006 and continuing on through the present. The treatments are in the form of defensive space around private structures and fuel reduction designed to prevent “crowning,” resulting in larger, uncontrolled fires. This strategy continues today and more areas will be targeted for future treatment, as recommended in this mitigation strategy. Map 7.2A shows the areas targeted and a description of each follows:

South Boulder: Located in and north of Mammoth on the South Boulder Road, 11 projects have been performed resulting in the protection of 16 structures and treatment of 12+ acres using BLM and private homeowner funds.

North/South Meadow Creek: One project resulting in the treatment of 4 acres, protection of 3 structures, thinning, and creation of ingress and egress for firefighting purposes using BLM and private homeowner funds.

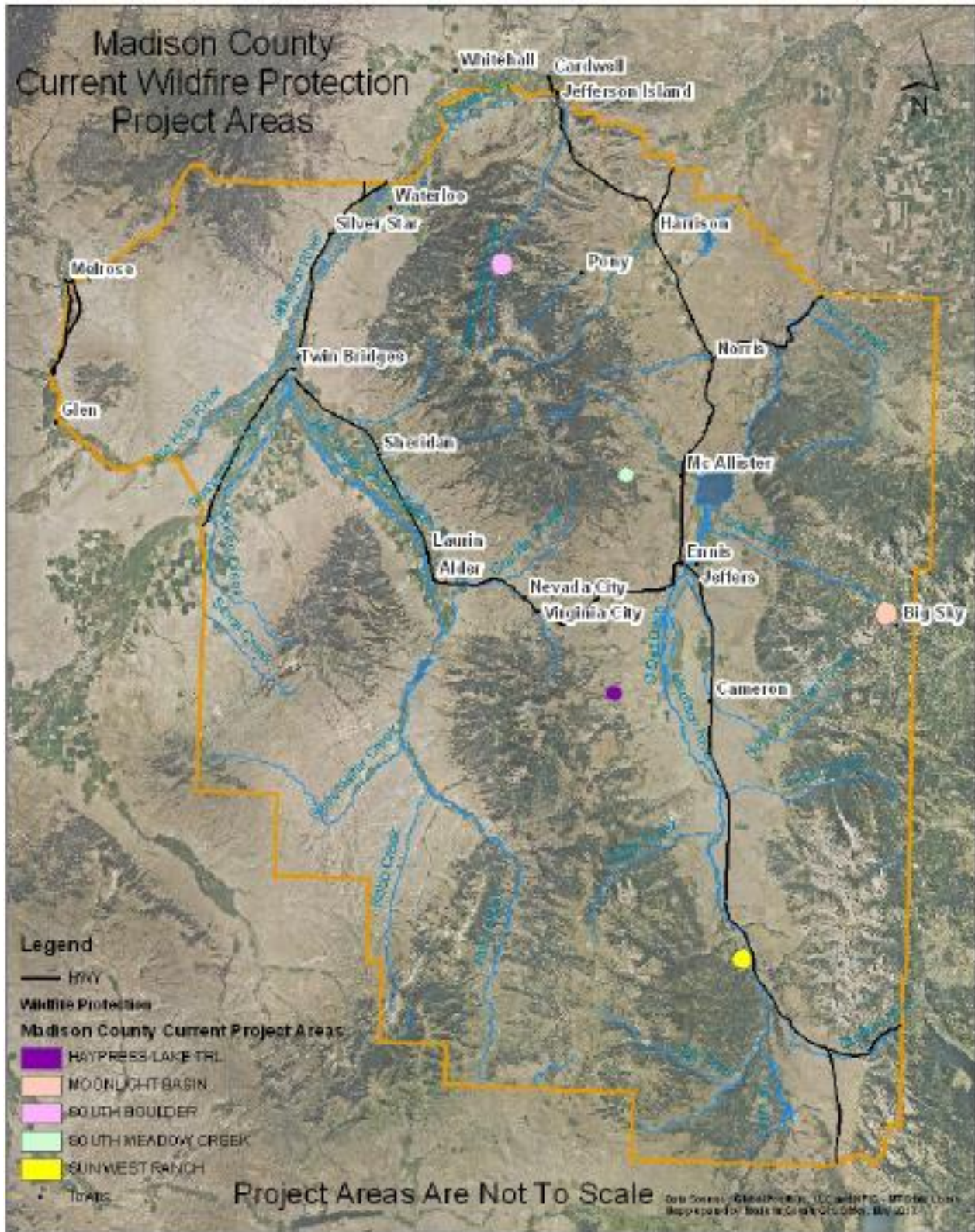
Moonlight Basin: Ingress/Egress creation on about 10 acres using DNRC and BLM funds.

Haypress Lakes: One project resulting in the treatment of 4.5 acres and the protection of 3 structures using BLM and private funds.

Sun West Ranches: Joint project with BLM, DNRC, and private ownership funding treating about 300 acres on both BLM and private land.

Madison County is in the process of securing more funds through grants to proceed with the fuels reduction program in the future.

Map 7.2A



7.3 Proposed Future Activities and Programs

The National Fire Plan's *key point components* focus on building community capacity to develop and implement citizen driven solutions in wildland fire and wildland urban interface prevention planning. These solutions, in the form of strategies are listed below:

- **Community Fire Planning:** A strategy that develops prevention based capacity and organizational infrastructure, identifies and inventories hazards, and establishes treatment plans, while also developing response based capacity and organizational infrastructure and crafting response plans and exercise programs.
- **Wildland Urban Interface Fuel Treatments:** In the wildland urban interface, this strategy reduces the impacts of wildland fires on communities, natural resources, and cultural resources. Past disruptions of natural fire cycles and the use of certain management practices have resulted in wildland fires of increasing size, intensity, and severity. Treatment of hazardous fuels helps reduce the impacts of wildland fires on communities and restores health to fire-adapted ecosystems.
- **Economic Development:** This strategy involves identifying, developing, and expanding economic opportunities related to traditionally under-utilized wood products and expanding the utilization of biomass removed through hazardous fuel reduction treatments.
- **Forest Restoration:** A strategy whose work is broadly defined and the efforts intended for lands that are unlikely to recover naturally from fire damage. The work is often implemented over the course of several years.
- **Community Education and Outreach:** A strategy that develops and disseminates information to help wildland urban interface residents and the general residents of Madison County make sensible choices about living in and around a fire-prone ecosystem. The FIREWISE programs and Defensible Space Workshops are aimed at informing homeowners, firefighters, builders, developers, landscapers, insurance agents, and public officials about the concepts of living FIREWISE.

Recommended Projects and Programs for Madison County

1. **Defensible Space Workshops** - *Madison County Fire Warden, Madison County Fire Agencies, Beaverhead-Deerlodge National Forest, US Bureau of Land Management, and Montana Department of Natural Resources and Conservation*

[Linked to Objectives 2.1, 2.5, 3.1, and 5.1]

Our ability to live more safely in a wildland urban interface fire environment depends on pre-incident mitigation activities. Pre-incident mitigation activities are actions taken by homeowners and developers before a wildland fire occurs which improves the survivability of people and homes by providing for proper vegetation management around the home (known as defensible space), use of fire resistant building materials, and appropriate subdivision design. Untreated shake and shingle roofs, narrow roads, limited access, lack of FIREWISE landscaping, and inadequate water supplies are some of the issues that need to be addressed. A representative program would focus on creating an effective "defensible space" and guide the participants through a process including:

- Defining the defensible space, a minimum of a 30-foot non-combustible area around the home, depending on the adjacent fuels;

- Reducing flammable vegetation, trees, and brush around the home, choosing plants with loose branching, non-resinous woody material and high moisture content;
- Removing or pruning trees, thinning overcrowded or weakened trees, pruning low hanging branches, and limbing up “ladder fuels”;
- Cutting grass and weeds regularly, keeping vegetation well watered;
- Relocating wood piles and leftover building materials, stacking all wood, building debris, and other burnable materials at least 30 feet away from the home, and clearing flammable vegetation within ten feet of wood/debris piles;
- Keeping both roof and yard clean, especially the roof, clearing pine needles, leaves, and debris from roof, gutters, and yard to eliminate ignition sources;
- Signs, addresses, and access: easy-to-read, non-combustible road signs and address numbers that are visible from the road allow firefighters to find homes quickly. Safe and easy access includes two-way roads that can accommodate emergency vehicles and give them space to turn around;
- Rating roofs: The roof is the most vulnerable part of the house in a wildland urban interface fire. If not already fire resistant, roofs should be replaced with approved fire resistant materials;
- Recycling yard debris and branches; check into alternative disposal methods like composting, recycling, or selling the material to small wood/biomass businesses;
- What to do when fire strikes: monitor your local radio and television stations for fire reports and evacuation procedures and centers. Keep an emergency checklist handy. Proper actions also include closing all windows and doors, arranging garden hoses so they can reach any area of the house, and packing the car for quick departure.

2. **Subdivision Regulation Revisions** - *Madison County Planner and Madison County Fire Agencies*
[Linked to Objective 4.1]

Madison County should revise its subdivision regulations to eliminate the permissive language and replace it with mandatory language, especially as it relates to fire protection. Madison County should consider developing, in conjunction with the local rural fire districts, a fire department permit system similar to the system used by Frenchtown RFD.

3. **Alert/Warning System** - *Disaster & Emergency Services Coordinator*
[Linked to Objective 1.1]

Development of a county alert/warning system is critical to continued health, safety, and welfare of Madison County citizens. Currently, there is no warning system in place to alert citizens of impending danger from wildfire. There are three systems available that would dramatically improve warning. They include Weather Radio System, a Radio/TV Emergency Alert System, and automated dial up telephone alert system. A project is needed to select and implement a system.

4. **Fire Station Location Study** - *Rural Fire District Boards, in cooperation with the Madison County Planner*

[Linked to Objectives 1.2, 2.2, and 4.2]

The rural fire districts need to follow the lead of Madison Valley RFD and evaluate their needs for additional fire stations, especially in light of the ISO stance on the 5 mile limit.

5. **Plan for Unprotected Areas** - *Rural Fire District Boards, County Fire Warden, County Sheriff, Madison County Planner, and the Board of County Commissioners*

[Linked to Objectives 1.2 and 2.2]

The rural fire districts need to **immediately** develop an out of district response policy and billing procedure. In the longer term, Madison County, the rural fire districts, the County Fire Warden, the County Planner, and the Board of County Commissioners need to address areas that are outside the recognized jurisdiction’s boundaries, including the community of Mammoth and the areas around Virginia City.

6. **Develop fire protection master plans** – *Rural Fire District Chiefs, Boards of Trustees, and Madison County Planner*

[Linked to Objectives 1.2, 2.2, and 4.2]

An overall fire protection master plan should be developed for each rural fire district in Madison County. Master Plans typically include:

- Need for facilities
- Fire-rescue apparatus
- Personnel
- Training
- Fire Prevention
- Revenues
- Emergency Preparedness

Implementation strategies, time frames, and funding mechanisms for each area are typically established.

7. **Develop capital replacement programs** – *Rural Fire District Boards*

[Linked to Objectives 1.2, 2.2, and 4.2]

Each rural fire district should develop a capital replacement program (Capital Improvement Plan) to include funding sources, capital items needing replacement, and time frames for replacement and future facility and apparatus needs.

8. **Adopt Impact Fees** - *Rural Fire District Boards, County Planner, and Madison County Commissioners*

[Linked to Objectives 1.3, 2.2, and 4.2]

The rural fire districts and/or the county as a whole should investigate and study the need for fire protection and other impact fees.

9. **Evaluate current mil levy and increase if necessary** – *Fire District Chiefs and Board of Trustees*

[Linked to Objectives 1.3, 2.2, and 4.2]

The administration of each rural fire district should frankly evaluate their ability to provide mandated services and ensure appropriate funding is available to ensure meeting those requirements. If additional funding is needed, rural fire districts should consider asking the public for a mil levy increase to fund the service delivery levels. Consideration for the safety of the district’s firefighters and the public should be given the highest priority!

10. Establish a Madison County Fire Council – *Fire Chiefs and Fire Management Officers, County Fire Warden, County Sheriff and Disaster & Emergency Services Coordinator*

[Linked to Objectives 1.4, 2.3, 3.2, 4.3, and 5.2]

To foster improved relationships with local, state, and federal partners, a Madison County Rural Fire Council should be established. A county fire council, which meets on a regular basis, enables and fosters interagency partnerships, cooperation before and during incidents, establishes county-wide communications plans, deployment standards, operational SOP’s, and mutual aid requirements. Benefits of a county fire council would be:

- A consistent subdivision process and standards
- A unified voice of the fire service
- Cooperative efforts for funding of apparatus, equipment, and facilities
- Procedures to operate at emergency incidents in a unified manner
- Maximize the use of individual resources

11. Request Reverse 911 Funds – *Madison County Sheriff*

[Linked to Objective 1.1]

The Madison County Sheriff should investigate the ability to put a reverse 911 system in place for emergency notification of the public.

12. Pressurized Water System Standard – *Madison County Planner, Madison County Fire Agencies*

[Linked to Objective 4.1]

Madison County should establish a fire protection water supply standard that requires pressurized water to be delivered out of storage tanks, ponds, or other water sources. This eliminates the need to commit a scarce resource (fire engine) to the water supply point, further minimizes the need for additional water tenders, and reduces the risk of additional equipment and personnel during emergency water supply operations. Once established, the program should ensure that proper inspection and maintenance is performed to keep the systems in good working order.

13. Coordinated Planning – *Madison County Planner, Madison County Road Department, Madison County Fire Agencies*

[Linked to Objectives 1.4, 2.3, and 4.3]

Additional fire stations are being planned by the Madison Valley RFD in the vicinity of North Meadow Creek/South Meadow Creek and near the Fish Hatchery. Improvements, such as these, should be coordinated with the county so that bridges that are inadequate for fire apparatus are being replaced at the same time. This project should be addressed in the county Capital Improvements Plan (CIP).



14. **Road Signs** – *Madison County Road Department, Madison County Planner, and Board of County Commissioners*
 [Linked to Objectives 1.5 and 2.4]
 A road sign standard needs to be developed and adopted and implemented throughout the County.



15. **Wildland Urban Interface Fuel Treatments** – *Madison County Fire Agencies, Homeowner Associations, and Disaster & Emergency Services Coordinator*
 [Linked to Objectives 1.5, 2.1, and 3.1]

Several strategies may be undertaken to improve the survivability of a given subdivision or area. The best strategy will depend on the type and quantity of fuel present in and around any given subdivision, the prevailing wind direction, and the aspect and slope present.

- a. The first strategy is isolation. This strategy would entail placement of a fuel modification zone around the outside perimeter of the development. Heavier fuels like Douglas fir and Mountain Big Sage would be removed and replaced by light vegetation or a non-combustible material. The width of the fuel modification zone would vary according to the factors listed above but would need to be a minimum of 10 feet and in most cases at least 50-60 feet to be effective. This would give firefighters a chance to establish anchor points and locate fire lines for an approaching wildfire. It would also keep the fire out of the interior of the subdivision and the associated structures.
- b. Another version of the above premise is to conduct a risk assessment of a subdivision and conduct the fuels modification work only on those specific areas where there is a high probability of a wildland fire actually spreading into the subdivision from outside. It would require fewer disturbances since only a portion of the perimeter would be treated and it should be 70-90% as effective as total isolation.
- c. The second major strategy would be to treat around individual structures within the subdivision using criteria established in a number of publications. It would require more fuel modification overall, assuming at some point all lots become occupied. The burden of performance falls to the individual lot owner in this instance versus an association or developer type effort with isolation or partial isolation.
- d. A third strategy is to implement community meetings with homeowner groups to educate them on the need for and benefits of fuel reduction programs.

16. **Revise Covenants** – *Madison County Planner and Homeowner Associations*
 [Linked to Objectives 1.5, 2.1, and 4.1]

Vacant lots, or un-built upon lots, are a perennial problem for fire protection agencies. Subdivision homeowner groups need to revise their covenants to ensure vacant lots do not become a fire hazard to the rest of the development. Grazing and other fuel reduction techniques can be used.

17. Fuel Management Plan – *Madison County Planner*

[Linked to Objective 4.1]

The Madison County Subdivision Regulations require a Land Stewardship Plan as a component of the final plat approval. This concept could be extended to include all fuels in a project area.

18. Hazard Reduction Programs - *Madison County Fire Warden, Madison County Fire Agencies, Beaverhead-Deerlodge National Forest, US Bureau of Land Management, and Montana Department of Natural Resources and Conservation*

[Linked to Objectives 1.5, 2.1, and 3.1]

Madison County and state and federal agencies should collaborate on hazard reduction programs, through the National Fire Plan, sited in strategic locations for fire protection purposes.

The treatments for hazard reduction may include:

- Construction of fuel breaks
- Mechanized treatments
- Prescribed burning
- Grazing
- Timber harvest
- Hand piling and burning
- Machine piling and burning
- Chipping
- Firewood gathering

19. Vegetation Management – *Madison County Fire Agencies and Madison County Planner*

[Linked to Objectives 1.5, 2.1, and 3.1]

Encourage the county and landowners to undertake vegetative management practices, which would include the following:

- Develop a comprehensive fuels management/pre-attack plan for the county.
- A fuel break system utilizing strategic fuels modification projects and incorporating the transportation system right-of-ways. The objective of the fuel break system are:
 1. To provide anchor points and fireline locations.
 2. To reduce the risk of a wildland fire encroaching on a subdivision.
 3. To break up large areas of continuous fuels (sage or timber).

20. Landowner Assistance Program - *MT DNRC and the Madison County Soil and Water Conservation District*

[Linked to Objectives 1.3, 1.5, 2.1, 2.2, 2.5, and 3.1]

Madison County should request funding for a Landowner Assistance Program that involves cost sharing between the State and the landowner for fuel treatments that reduce the fire hazard on state and private lands in Madison County. The goals of the program would be to:

- Assist private landowners in developing defensible space around their homes;
- Construct fuel breaks; and
- Thin adjoining stands on private lands where the federal agencies have either constructed or will construct fuel breaks.

These actions will ensure private lands are better protected from fires originating on federal and state lands and ensure federal and state lands will be better protected from fires originating on private lands.

21. **Grants** – *Madison County, Beaverhead-Deerlodge National Forest, US Bureau of Land Management, and Montana Department of Natural Resources and Conservation*
[Linked to Objectives 1.3, 2.2, and 3.1]

The county should explore the opportunity to participate in all available grant programs, which include the following:

- Department of Commerce – Economic Action Grants
- USFS, BLM, and DNRC – Fuels Mitigation Grants
- FEMA – Mitigation Grants
- FEMA – Fire Act Grants

Some of these programs provide financial incentives to the county and/or homeowners. Others may be used to purchase equipment, develop and establish prevention programs, and/or reduce the fuel loading around homes and improvements. Homeowners in the Bitterroot Valley, Lake County, and Lewis and Clark County have taken advantage of these types of programs, and the creation of defensible space on a significant number of homes has been accomplished. After an area has been treated, the survivability of the improvements and larger trees are greatly enhanced. The treatment must be maintained periodically as the vegetative cover types are very dynamic and will constantly produce new biomass. Without maintenance they will revert to pre-treatment conditions within a few years. Normally, the cheapest method to maintain the treated areas is through the application of prescribed fire at a periodic interval. A combination of treatments may be considered.

22. **Economic Development Utilizing Harvested Fuels** - *Madison County Economic Development Council*

[Linked to Objectives 1.5, 2.1, 2.2, and 3.1]

Once Madison County is successful in initiating fuel reduction projects, the attraction of entrepreneurs to develop products utilizing the wood “bio mass” produced by the hazardous fuels reduction efforts and forest restoration projects may be needed, especially in the Big Sky area.

23. **Right to Manage the Ecosystem** – *Board of County Commissioners, Beaverhead-Deerlodge National Forest, and other stakeholders*

[Linked to Objective 3.2]

The Board of County Commissioners, in cooperation with their stakeholders, should develop a “Right to Manage the Ecosystem” Policy which would be inclusive to all entities, including private, state and federal lands. This policy would provide the right of such entities to manage the ecosystem within their lands, including but not limited to best management practices (BMP).

24. **Community Outreach Program** - *Local Emergency Planning Committee and Madison County Fire Agencies*

[Linked to Objectives 1.1, 1.4, 2.5, and 5.1]

Funding should be sought to develop a program that would allow comprehensive mitigation of citizen misconceptions. The proposal would provide area residents, homeowners, business owners, and other opinion-makers with information, education, and training on *why* fuel treatments are necessary, *what* constitutes proper fuel treatment, and *how* these treatments can be accomplished. Activities would include development of education modules for

homeowners, fire departments, elected officials, students in grades K-12, homebuilders, insurance companies, developers, and planners. Public service announcements, brochures, showcase demonstration projects, website development, and continued Firewise and defensible space workshops are examples.

25. FIREWISE Communities Workshops - Local Emergency Planning Committee and Southwest Montana Fire Council

[Linked to Objectives 1.5, 2.5, and 5.1]

The Madison County LEPC should co-sponsor a FIREWISE Communities workshop with the Southwest Montana Fire Council. Program components include the following:

- FIREWISE Website (www.firewise.org): This site provides a wealth of information to protect your home from wildland fire, including FIREWISE Construction, FIREWISE Landscaping, etc.
- Communication tools such as publications and videos: FIREWISE concepts on landscaping, building, firefighter safety, and other topics are available online as well as through other outlets. One example is a television documentary called “Keepers of the Flame,” which puts America’s fire history and interface fire problem in context.
- Workshops, Training Sessions, and Demonstration Events: These activities are focused on reducing fire risk to property and lives through better community design and retrofit and preparedness planning.
- Technical Assistance to Communities: As FIREWISE spreads across the country, more communities are looking to program organizers for help. This component includes GIS mapping technology.
- FIREWISE Communities USA Recognition Program: Communities can earn national status for their work to improve planning for and mitigation of wildland fire hazards.

26. Response Planning to National Standards - Madison County Fire Agencies

[Linked to Objectives 1.2, 2.2, and 4.2]

To fully evaluate fire operations, national standards and other local jurisdictions’ operations should be used to properly establish the criteria needed to operate and provide the base standard service levels. This allows the county to look outside the local area and evaluate current trends, operational conditions at present and in the future, potential new funding sources, opportunities to attract additional staff for the fire protection agencies, retention strategies for current volunteers, and provide the best possible services with the funds available.

27. Fire Department Preparedness and Response - Madison County Fire Agencies

[Linked to Objectives 1.6, 2.4, and 4.2]

This strategy includes building and maintaining a cost effective level of preparedness and response to fires in the wildland urban interface. Initial attack and suppression allocation modeling should incorporate the resources of the Madison County fire protection agencies.

28. Fire Stations – Madison County Fire Agencies, Madison County Planner

[Linked to Objectives 1.6, 2.4, and 4.2]

There is a direct need for additional fire stations in most areas of the county. Criteria for establishing these stations should be within 5 road miles of all developed or developing areas and future stations within 5 road miles of areas expected to develop. Using these criteria will also reduce fire insurance costs to most residences within the road mile travel distance.

29. Fire Apparatus and Equipment – Madison County Fire Agencies

[Linked to Objectives 1.6, 2.4, and 4.2]

The apparatus and equipment needed for each fire station should be a minimum of one interface engine, one smaller wildland engine, and one water tender. More urban locations such as Ennis, Virginia City/Nevada City, Alder, Sheridan, Twin Bridges, and Big Sky will need additional apparatus such as structure engines, larger water tenders, ladder trucks, ambulances, and specialized apparatus for specific duty. All apparatus will need to be equipped with compliant, modern equipment for the safety and working effectiveness of the personnel. Current National Fire Protection Association (NFPA) standards should be used to ensure compliance of all equipment.

30. Staffing - Madison County Fire Agencies

[Linked to Objectives 1.6, 2.4, 3.2, 4.2, and 5.2]

The staffing component for Madison County fire agencies will be predominantly volunteer firefighters. As the county continues to grow, the need for career staff to coordinate training, maintenance, code management, administration, mandatory reporting procedures, subdivision review, and planning will become unmanageable for volunteers. This may currently be the case and should be considered as soon as possible to manage the growth of the county and the resulting impacts to the fire organizations. New recruiting techniques will need to be deployed to staff the additional stations and keep up with the expanding need for services delivered to the citizens. Maintaining a volunteer workforce continues to challenge the fire service. Recruitment and retention strategies need to be developed and implemented throughout the county.

31. Training - Madison County Fire Agencies

[Linked to Objectives 1.6, 2.4, and 4.2]

Training programs, in compliance with National Standards, typically serve to motivate a high quality workforce of firefighters. High quality training programs help ensure the safety of the firefighters in a hostile work environment.

32. Communications - Madison County Fire Agencies and Madison County 911 Director

[Linked to Objectives 1.6, 2.4, and 4.2]

Communications systems need to be implemented to allow interoperability between local fire agencies and the land management agencies, other emergency services, and each other from all areas of the county.

33. Sun Ranch West Opportunities – Madison Valley Rural Fire District

[Linked to Objectives 1.6, 2.4, and 4.2]

Sun Ranch West owns a structure engine and offered the engine to the Madison Valley RFD. The timing for the district to accept this engine was not good. Apparently the offer to give the engine to the fire district is still in place. The only condition is that if a fire were on the ranch, it would stay on the ranch and fight that fire. All other times, the engine would be the property of the district and could be used as all other equipment is. The ranch also has a facility to house the engine and would help with training and adding as many staff as possible for the fire district.

34. Evacuation Planning – *Madison County Sheriff and Madison County Disaster & Emergency Services Coordinator*

[Linked to Objective 1.2]

Evacuation planning is needed for areas that are at threat from a large wildland fire and well as from other disasters. A coordinated effort needs to be worked out with the Gallatin County Sheriff regarding the Big Sky area since evacuation through Madison County is not possible during the winter. These plans should be coordinated through the Madison County Emergency Operations Plan.

35. Insurance Services Organization – *Madison County Fire Agencies*

[Linked to Objectives 2.2 and 2.5]

ISO grades fire protection agencies and their ratings are used by many insurance companies to establish the cost of fire insurance in the area. The individual fire protection agencies should request a grading if one has not been completed in the recent past. This process will assist in identifying the deficiencies in the agencies and what is needed to provide better rates for the residents. Some insurance companies will not insure structures that are outside 5 road miles from a fire station.

36. Organization of Fire Protection Agencies – *Madison County Fire Agencies*

[Linked to Objectives 1.6, 2.2, and 4.2]

The current fire protection agencies should maintain a written statement or policy establishing the following:

- Existence of the fire department according to state law.
- Services that the fire department is required to provide.
- Basic organizational structure.
- Expected number of fire department members.
- Functions that the fire departments are expected to perform, such as:
 - Structural Fire Suppression
 - Emergency Medical Services
 - Special Operations
 - Aircraft Rescue Fire Fighting
 - Marine Rescue and Fire Fighting
 - Motor Vehicle Crash Rescue
 - Hazardous Materials Mitigation
 - Wildland Fire Suppression
 - Subdivision Review
 - Public Education
 - Emergency Response Planning
- Authority and References for the Fire Protection Agencies

A clear understanding of the laws governing the fire protection authorities in Madison County needs to be accomplished by all jurisdictions before any organization and responsibilities for action are established. Compliance with state law is the first step. Next, a clear understanding needs to be developed of the authority and responsibility of a trustee regarding the planning, funding, operations, and organization of the fire protection agencies. These laws can be referenced in the Montana Code Annotated.

7.4 Prioritization and Implementation

Planning priorities of this plan in order of importance are:

- Protect human life and health
- Protect critical community infrastructure
- Protect private property
- Protect natural resources

Madison County has a relatively small tax base. As such, the amount of time officials and employees can devote to wildfire mitigation and management is quite limited. The majority of firefighters in the county are volunteers. Therefore, an expectation that all recommended projects and activities can be completed within a short timeframe is unreasonable. This plan attempts to spread responsibilities for recommended projects and activities to others besides the local fire agency. Table 7.4A lists the projects by agency/organization/official. These entities should report regularly at LEPC, CWPP, Fire Council, Planning Board, and/or County Commission meetings on their progress in the identified areas.

Table 7.4A Projects by Associated Agency/Organization/Official

Agency/Organization/Official	Projects
Beaverhead – Deerlodge National Forest	1. Defensible Space Workshops 18. Hazard Reduction Programs 21. Grants 23. Right to Manage the Ecosystem
Homeowners Associations	15. Wildland Urban Interface Fuel Treatments 16. Revise Covenants
Madison County 911 Director	32. Communications
Madison County Commission	5. Plan for Unprotected Areas 8. Adopt Impact Fees 14. Road Signs 23. Right to Manage the Ecosystem
Madison County Disaster & Emergency Services Coordinator	3. Alert/Warning System 10. Establish a Madison County Fire Council 15. Wildland Urban Interface Fuel Treatments 21. Grants 34. Evacuation Planning
Madison County Economic Development Council	22. Economic Development Utilizing Harvested Fuels

Table 7.4A Projects by Associated Agency/Organization/Official (continued)

Agency/Organization/Official	Projects
Madison County Fire Agencies (board/governing body)	2. Subdivision Regulations 4. Fire Station Location Study 5. Plan for Unprotected Areas 6. Develop fire protection master plans 7. Develop capital replacement programs 8. Adopt Impact Fees 9. Evaluate current mil levy and increase if necessary 28. Fire Stations 29. Fire Apparatus and Equipment 30. Staffing 33. Sun Ranch West Opportunities 35. Insurance Services Organization 36. Organization of Fire Protection Agencies
Madison County Fire Agencies (chief, firefighters)	1. Defensible Space Workshops 2. Subdivision Regulations 6. Develop fire protection master plans 9. Evaluate current mil levy and increase if necessary 10. Establish a Madison County Fire Council 12. Pressurized Water System Standard 13. Coordinated Planning 15. Wildland Urban Interface Fuel Treatments 18. Hazard Reduction Programs 19. Vegetation Management 21. Grants 24. Community Outreach Program 26. Response Planning to National Standards 27. Fire Department Preparedness and Response 29. Fire Apparatus and Equipment 30. Staffing 31. Training 32. Communications 33. Sun Ranch West Opportunities 35. Insurance Services Organization
Madison County Fire Warden	1. Defensible Space Workshops 5. Plan for Unprotected Areas 10. Establish a Madison County Fire Council 18. Hazard Reduction Programs 21. Grants
Madison County Local Emergency Planning Committee	24. Community Outreach Program 25. FIREWISE Communities Workshops

Table 7.4A Projects by Associated Agency/Organization/Official (continued)

Agency/Organization/Official	Projects
Madison County Planner	2. Subdivision Regulation Revisions 4. Fire Station Location Study 5. Plan for Unprotected Areas 6. Develop fire protection master plans 8. Adopt Impact Fees 12. Pressurized Water System Standard 13. Coordinated Planning 14. Road Signs 16. Revise Covenants 17. Fuel Management Plan 19. Vegetation Management 28. Fire Stations
Madison County Road Department	13. Coordinated Planning 14. Road Signs
Madison County Sheriff	5. Plan for Unprotected Areas 10. Establish a Madison County Fire Council 11. Request Reverse 911 Funds 34. Evacuation Planning
Madison County Soil and Water Conservation District	20. Landowner Assistance Program
Montana Department of Natural Resources and Conservation	1. Defensible Space Workshops 18. Hazard Reduction Programs 20. Landowner Assistance Program 21. Grants
Southwest Montana Fire Council	25. FIREWISE Communities Workshops
US Bureau of Land Management	1. Defensible Space Workshops 18. Hazard Reduction Programs 21. Grants

The most reasonable implementation may be to initiate and/or complete projects that are easily achieved due to funding availability, political or community pressure, or complementary to other ongoing efforts (i.e. regular subdivision regulations revision, etc.). Otherwise, focusing on the projects that are linked to the greatest number of objectives is another reasonable prioritization and implementation strategy, as those projects likely have the highest benefit. Additionally, the priority areas, as identified in Section 6.9, should be given specific focus and prioritization as applicable within the projects.

Appendix A. ACRONYMS

BDNF – Beaverhead-Deerlodge National Forest
BLM – Bureau of Land Management
BLS – Basic Life Support
BMP – Best Management Practices
CAMA – Computer Assisted Mass Appraisal
CFR – Code of Federal Regulations
CIP – Capital Improvements Plan
CWPP – Community Wildfire Protection Plan
DEQ – Department of Environmental Quality
DES – Disaster and Emergency Services
DHS – Department of Homeland Security
DNRC – Department of Natural Resources and Conservation
DOT – Department of Transportation
EO – Executive Order
EOC – Emergency Operations Center
EMS – Emergency Medical Services
EPA – Environmental Protection Agency
ERC – Energy Release Component
FD – Fire Department
FEMA – Federal Emergency Management Agency
FLAME – Federal Land Assistance, Management and Enhancement
FRG – Fire Regime Group
FSA – Fire Suppression Assistance
GIS – Geographic Information System
GNF – Gallatin National Forest
HFRA – Healthy Forests Restoration Act
IFC – International Fire Code
ISO – Insurance Services Organization
LANDFIRE – Landscape Fire and Resource Management Planning Tools Project
LEPC – Local Emergency Planning Committee
MCA – Montana Code Annotated
MDT – Montana Department of Transportation
MT - Montana
MVRFD – Madison Valley Rural Fire District
NCDC – National Climatic Data Center
NIFC – National Interagency Fire Center
NFP – National Fire Plan
NFPA – National Fire Protection Association
NOAA – National Oceanic and Atmospheric Administration
NP – National Park
NWS – National Weather Service
PDM – Pre-Disaster Mitigation
RFA – Rural Fire Assistance

RFD – Rural Fire District

SB – Senate Bill

SCBA – Self Contained Breathing Apparatus

SOP – Standard Operating Procedure

US – United States

USDA – United States Department of Agriculture

USFA – United States Fire Administration

USFS – United States Forest Service

VFA – Volunteer Fire Assistance

VFD – Volunteer Fire Department

WUI – Wildland Urban Interface

YC – Yellowstone Club

YNP – Yellowstone National Park

Appendix B. REFERENCES

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Appendix C. GUIDELINES

The electronic version of the Montana Department of Natural Resources and Conservation Guidelines for Development within the Wildland-Urban Interface can be found at: <http://dnrc.mt.gov/forestry/Fire/WUI/Documents/GuidelinesFINAL.pdf>

The electronic version of the Madison County Proposed Guidelines for Defensible Space can be found at: http://madison.mt.gov/departments/emergency_management/RiskMit/Wildland/DefSpaceGuidlines.pdf

Appendix D. AREA FIELD ASSESSMENTS

AREA FIELD		ASSESSMENT FORM		
Area: Air Park		Date: 09/20/12		Surveyor: Christopher W. Mumme
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	6
Scoring	<50	50-79	≥ 80	Total 58

AREA FIELD		ASSESSMENT FORM			
Area:	Big Sky	Date:	03/13/13	Surveyor:	Christopher Mumme
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating	
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4	
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	6	
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	9	
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2	
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	9	
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9	
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	3	
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6	
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9	
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	6	
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	3	
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	3	
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	6	
Scoring	<50	50-79	≥ 80	Total	
				75	

AREA FIELD		ASSESSMENT FORM		
Area: Double M Ranch		Date: 10/24/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	6
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total 68

AREA FIELD		ASSESSMENT FORM		
Area: Elk Hills		Date: 10/23/12		Surveyor: Christopher W. Mumme
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	9
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	9
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total 89

FORM 1 – HAZARD ASSESSMENT FIELD FORM

Area: Haypress Lake Area Date: 5/14/13 Surveyor: Christopher Mumme

Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	9
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	9
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	3
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	3
Scoring	< 50	50 – 79	≥ 80	Total 84

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Highway 87 South to Idaho Line</u> Date: <u>01/05/03</u> Surveyor: <u>B. Waters</u>				
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	6
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total 70

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Indian Creek</u>		Date: <u>11/13/02</u>	Surveyor: <u>J.P. King</u>	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ormentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	6
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	6
Scoring	< 50	50 - 79	≥ 80	Total
				77

AREA FIELD		ASSESSMENT FORM		
Area: Lonesome Dove		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30% (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				69

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Lower Shining Mountain Ranch</u> Date: <u>01/03/03</u> Surveyor: <u>B. Waters</u>				
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	6
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	3
Scoring	< 50	50 – 79	≥ 80	Total
				66

AREA FIELD		ASSESSMENT FORM		
Area: Madison River Ranches		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	6
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	9
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	6
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total 84

FORM 1 – HAZARD ASSESSMENT FIELD FORM

Area: Melrose Road Date: 11/13/02 Surveyor: J.P. King

Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	6
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	3
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	6
Scoring	< 50	50 - 79	≥ 80	Total 57

AREA FIELD		ASSESSMENT FORM		
Area: Moonlight Basin Area		Date: 03/13/2013	Surveyor: C. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	6
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	9
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	6
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	9
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	3
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				86

AREA FIELD		ASSESSMENT FORM		
Area: Mustang Ranches		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	6
Scoring	<50	50-79	≥ 80	Total
				58

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Nevada City Area</u>		Date: <u>4/02/03</u>	Surveyor: <u>Bruce Suenram</u>	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	6
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	6
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total 83

FORM 1 – HAZARD ASSESSMENT FIELD FORM

Area: Pony Date: 11/12/02 Surveyor: J.P. King

Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	3
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	6
Scoring	< 50	50 - 79	≥ 80	Total
				62

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Potosi, Hot Springs</u>		Date: <u>11/12/02</u>	Surveyor: <u>J.P. King</u>	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	*9
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	6
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	3
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	6
Scoring	< 50	50 - 79	≥ 80	Total
				82

AREA FIELD		ASSESSMENT FORM		
Area: Rising Sun MTN Estates		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	6
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				70

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Shining Mountain/V.C Ranches</u> Date: <u>01/03/03</u> Surveyor: <u>B. Waters</u>				
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	9
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total
				85

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Silver Star</u>		Date: <u>10/21/02</u>		Surveyor: <u>B. Waters</u>
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	3
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	3
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	6
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	3
Scoring	< 50	50 – 79	≥ 80	Total
				56

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>South Boulder, Mammoth</u>		Date: <u>11/12/02</u>	Surveyor: <u>J.P. King</u>	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	9
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	6
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	6
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 - 79	≥ 80	Total
				86

FORM 1 – HAZARD ASSESSMENT FIELD FORM			
Area:	South Ruby	Date:	11/13/02
		Surveyor:	J.P. King

Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	4
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Oramentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	6
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9*
Roads/ Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	3
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	6
Scoring	< 50	50 - 79	≥ 80	Total 64

AREA FIELD		ASSESSMENT FORM		
Area: Sphinx MTN		Date: 09/20/12		Surveyor: Christopher W. Mumme
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	4
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				69

AREA FIELD		ASSESSMENT FORM		
Area: Sportsman Paradise		Date: 09/20/12		Surveyor: Christopher W. Mumme
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	3
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30% (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non- combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				67

AREA FIELD		ASSESSMENT FORM		
Area: Squaw Creek Tracts		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	6
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	3
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	3
Scoring	<50	50-79	≥ 80	Total
				54

AREA FIELD		ASSESSMENT FORM		
Area: Sturdivant Happy Acres		Date: 09/20/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet	Spacing between Crowns is 20-30 feet	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	3
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	6
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	3
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (> 30%) (9)	3
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	3
Scoring	<50	50-79	≥ 80	Total
				54

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Sun Ranch West</u>		Date: <u>1/05/03</u>	Surveyor: <u>B. Waters</u>	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	9
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornaments) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	6
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total
				90

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Sundance Bench/Madison River Ranches</u> Date: <u>1/05/03</u> Surveyor: <u>B. Waters</u>				
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	9
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ormentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	6
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total 84

FORM 1 – HAZARD ASSESSMENT FIELD FORM				
Area: <u>Sundowner/Sunriser Area</u> Date: <u>1/4/03</u> Surveyor: <u>B. Waters</u>				
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	3
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	6
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	9
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	9
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	1
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total
				81

FORM 1 – HAZARD ASSESSMENT FIELD FORM

Area: Virginia City Area Date: 5/14/13 Surveyor: Christopher Mumme

Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N, NW, NE) (2)	East or Level (4)	South and West (SE, S, SW, W) (6)	6
Bridges	> 40 tons (3)	20 – 40 tons (6)	< 20 tons (9)	3
Canopy Closure	Spacing between crowns greater than 30 ft. (3)	Spacing between crowns is 20 to 30 ft. (6)	Spacing between crowns is less than 20 ft. (9)	6
Elevation	> 5500 ft (2)	3500-5500 ft (4)	< 3500 ft (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed. Grass and/or Sparse Fuels (< than 30% cover)/Low (Avg. Less Than 1ft) (3)	Broken Moderate Fuels (31 to 60% cover)/ Moderate (avg. 1-3 ft) (6)	Continuous Fuel Bed. Composition conducive to crown fires or high intensity surface fires. (>60% cover) High (avg. greater than 3 ft) (9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding. (3)	10-50% of homes have fire resistant roofs and/or siding. (6)	Less than 10% of homes have fire resistant roofs and/or siding. (9)	9
Response Times	Prompt response time to interface areas. (10 min. or less) (3)	Moderate response time to interface areas. (11 – 20 minutes) (6)	Lengthy response to interface areas. 21 or more min.(9)	3
Roads/Access	Wide loop roads that are maintained, paved or solid surface with shoulders. Multiple entrances, exits, and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained. Some narrow two lane roads with no shoulders. Limited access route 2 ways in and 2 ways out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or 1 way in, 1 way out. Steep grades. (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30%) (6)	Steep slopes (>30%) (9)	9
Street Signs /Rural Addressing	Present (4" in size, reflectorized and non-combustible) (3)	Present & Combustible (6)	Not Present (9)	6
Structure Density	Less than one structure per 10 acres. (1)	One structure per 5-10 acres. (2)	At least one structure per 0-5 acres. (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property. (>50%) (3)	10-50% of homes have improved survivable space around property.(6)	Less than 10% of homes have improved survivable space around property.(9)	9
Scoring	< 50	50 – 79	≥ 80	Total 80

AREA FIELD		ASSESSMENT FORM		
Area: Washington Bar No. Meadowcreek		Date: 10/24/12	Surveyor: Christopher W. Mumme	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	4
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	3
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	3
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	9
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	9
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	9
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30% (6)	Steep slopes (> 30%) (9)	9
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	9
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	2
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	9
Scoring	<50	50-79	≥ 80	Total
				83

AREA FIELD		ASSESSMENT FORM		
Area: Yellowstone Club		Date: 10/25/12	Surveyor: Tony Young	
Rating Element	Low Hazard	Moderate Hazard	High Hazard	Rating
Aspect	North (N< NW, NE) (2)	East or Level (4)	South and West (SE,S,SW, (6)	6
Bridges	>40 tons (3)	20-40 tons (6)	<20 tons (9)	6
Canopy Closure	Spacing between crowns is > 30 feet (3)	Spacing between Crowns is 20-30 feet (6)	Spacing between crowns is < 20 feet (9)	9
Elevation	> 5500 feet (2)	3500-5500 feet (4)	< 3500 feet (6)	2
Fuel Density/ Fuel Bed Depth	Non-Continuous Fuel Bed Grass and/or Sparse Fuels (< than 30% cover)/ Low (avg.< 1 ft.) (3)	Broken Moderate Fuels (31-60% civer)/ Moderate (avg. 1-3 ft) (6)	Continous Fuel Bed. Composition conducive to crown fires or high intensity surface fires(9)	6
Fuel Type	Small, Light Fuels (Grass, Weeds, Shrubs) (3)	Medium Fuels (Brush, Medium Shrubs, Small Trees) (6)	Heavy Fuels (Timber, Woodland, Large Brush, or Heavy Planting of Ornamentals) (9)	9
Predominant Building Materials/ Flammability of Structures	Majority of homes have fire resistant roofs and/or siding (3)	10-50% of home have fire resistant roofs and/or siding	Less than 10% of homes have fire resistant roofs and/or siding (9)	3
Response Times	Prompt response time to interface areas (<10 min.) (3)	Moderate response time to interface areas (11-20 min.) (6)	Lengthy response time to interface areas (> 20 min) (9)	6
Roads/Access	Wide, maintained, paved or solid surface roads with shoulders. Multiple entrances/exits and turnarounds that are well equipped for fire trucks. (3)	Roads are maintained Some narrow two lane roads with no shoulders. Limited access-two ways in/out. Moderate grades. (6)	Narrow and/or single lane, minimally maintained, no shoulders. Narrow, dead end roads or one way in/out. Steep grades (9)	6
Slope	Flat to little slope (<10%) (3)	Moderate slopes (10-30% (6)	Steep slopes (> 30%) (9)	9
Street Signs/ Rural Addressing	Present (4" in size, reflective and non-combustible) (3)	Present and Combustible (6)	Not Present (9)	6
Structure Density	Less than one structure per 10 acres (1)	One structure per 5-10 acres (2)	At least 1 structure per 0-5 acres (3)	3
Survivable Space Actions on Private Property	Majority of homes have improved survivable space around property (> 50%) (3)	10-50% of homes have improved survivable space around property (6)	Less than 10% of homes have improved survivable space around property (9)	6
Scoring	<50	50-79	≥ 80	Total
				77

Appendix E.

PUBLIC MEETING AND COMMENT RECORDS

Appendix F. PLAN SIGNATURES