

Chapter 4: Summaries of Risk and Preparedness

4 Overview

4.1 Wildland Fire Characteristics

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn, the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, the topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment, the fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to determine how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

4.1.1 Weather

Weather conditions are ultimately responsible for determining fire behavior. Moisture, temperature, and relative humidity determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant affect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

4.1.2 Topography

Fires burning in similar fuel conditions burn dramatically different under different topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influence vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing of fuels, and lower rates of spread. The combination of light fuels and dry sites lead to fires that typically display the highest rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. These slopes also tend to be on the windward side of mountains. Thus these slopes tend to be “available to burn” a greater portion of the year.

Slope also plays a significant roll in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.

4.1.3 Fuels

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, logs, logging slash, forest floor litter, conifer needles, and home sites (the structures) are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content and continuity and arrangement all have an affect on fire behavior. Generally speaking, the smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, “fine” fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease, as surface to volume ratio decreases. Fires in large fuels generally burn at a slower rate, but release much more energy, and burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potentially development of crown fire. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determine how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected affect small changes in any single component has on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless observations and repeated research, some of the principles that govern fire behavior have been identified and are recognized.

4.1.3.1 Conservation Reserve Program Lands

The Conservation Reserve Program is administered by the USDA Farm Services Agency. The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. Through CRP, farmers can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. The Commodity Credit Corporation (CCC) makes annual rental payments based on the agriculture rental value of the land, and it provides cost-share assistance for up to 50 percent of the participant’s costs in establishing approved conservation practices. Participants enroll in CRP contracts for 10 to 15 years.

The program is administered by the CCC through the Farm Service Agency (FSA), and program support is provided by Natural Resources Conservation Service, Cooperative State Research and Education Extension Service, state forestry agencies, and local Soil and Water Conservation Districts. Approximately 3.4 million acres of farm land in Montana have been enrolled in the CRP program through February 2005.

USDA Farm Service Agency’s (FSA) Conservation Reserve Program (CRP) is a voluntary program available to agricultural producers to help them safeguard environmentally sensitive land. Producers enrolled in CRP plant long-term, resource-conserving covers to improve the quality of water, control soil erosion, and enhance wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years.

The Food Security Act of 1985, as amended, authorized CRP. The program is also governed by regulations published in 7 CFR, part 1410. The program is implemented by FSA on behalf of USDA's Commodity Credit Corporation.

CRP protects millions of acres of American topsoil from erosion and is designed to safeguard the Nation's natural resources. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country.

Although there are many benefits to the County stemming from CRP land enrollment, the impact on wildfire control is problematic. When these lands, often near communities and homes, build up heavy fuel loading consistent with natural grasses and shrubs, the fuel loading increases dramatically above that found on farmlands. Fires in these fuels can move very rapidly when fanned by winds (common during the fire season). The FSA allows periodic fuels mitigation treatments on CRP lands. These fuel treatments are critical to the development of a successful wildfire mitigation program in Yellowstone County and are fully endorsed and encouraged by the Wildfire Protection Plan Committee.

4.2 Yellowstone County Conditions

Yellowstone County is characterized by cold winters and dry summers. The cities of Billings and Laurel make up a densely populated metropolitan center; however, much of the remaining area in the county is quite rural. Farms and ranches tend to be widely spread. Grazing activity on both public and private lands by livestock and wildlife tends to decrease the build up of fine fuel loads; however, this does not drastically reduce the fire potential.

The majority of the county is covered by native rangelands, while most of the Yellowstone River valley has been developed or converted to irrigated farm or pasture. Undeveloped rangelands are characterized by low growing grasses with scattered stands of sagebrush or juniper and occasionally ponderosa pine. Rangelands are typically either grazed, thereby keeping the fine fuel buildup to a minimum, or are in various stages of crop production. Agricultural fields are generally not considered to be at high risk of uncontrolled wildland fires; however, fires in this type of vegetation could burn very intensely with large flame lengths depending on the crop type. Annual burning of stubble after harvest occasionally leads to escaped grass fires. Usually, these fires are relatively easily controlled at road crossings or by using available farm implements to modify the vegetation in its path.

Since the induction of the Conservation Reserve Program by the federal government, many former crop producing fields have been allowed to return to native grasses. CRP fields are creating a new fire concern all over the West. As thick grasses are allowed to grow naturally year after year, dense mats of dead plant material begin to buildup. Due to the availability of a continuous fuel bed, fires in CRP fields tend to burn very intensely with large flame lengths that often times jump roads or other barriers, particularly under the influence of wind. Many landowners and fire personnel are researching allowable management techniques to deal with this increasing problem. Currently, according to the CRP Handbook, all management must be part of the landowner's Conservation Plan of Operations, which includes burning to reduce the fuel loading, and must be in the best interest of the CRP. Under certain circumstances, burning may be used as a process to enhance or renovate the existing vegetative cover for wildlife, especially if it is overgrown and stagnant. As noted in Montana CRP-542, burning can only be conducted under an approved burn plan by qualified personnel. The County must also issue a burn permit for any controlled burning on CRP fields.

Human activity is strongly correlated with fire frequency, with increasing numbers of fires as use increases. Discarded cigarettes, tire fires, and hot catalytic converters have increased the number of fires experienced along roadways. Careless and unsupervised use of fireworks also contributes to unwanted and unexpected wildland fires. Further contributing to ignition sources are the debris burners and the practice of ditch burning where fire is used to rid ditches of weeds and other burnable materials.

4.2.1 County Wide Potential Mitigation Activities

There are four basic opportunities for reducing the loss of homes and lives to fires. There are many single actions that can be taken, but in general they can be lumped into one of the following categories:

- Prevention
- Education/ Mitigation
- Readiness
- Building Codes

4.2.1.1 Prevention

The safest, easiest, and most economical way to mitigate unwanted fires is to stop them before they start. Generally, prevention actions attempt to prevent human-caused fires. Campaigns designed to reduce the number and sources of ignitions can be quite effective. Prevention campaigns can take many forms. Traditional “Smokey Bear” type campaigns that spread the message passively through signage can be quite effective. Signs that remind folks of the dangers of careless use of fireworks, burning when windy, and leaving unattended campfires can be quite effective. It’s impossible to say just how effective such efforts actually are, however the low costs associated with the posting of a few signs is inconsequential compared to the potential cost of fighting a fire.

Slightly more active prevention techniques may involve mass media, such as radio or the local newspaper. Fire districts in other counties have contributed to the reduction in human-caused ignitions by running a weekly “run blotter,” similar to a police blotter, each week in the paper. The blotter briefly describes the runs of the week and is followed by a weekly “tip of the week” to reduce the threat from wildland and structure fires. The federal government has been a champion of prevention, and could provide ideas for such tips. When fire conditions become high, brief public service messages could warn of the hazards of misuse of fire or any other incendiary device. Such a campaign would require coordination and cooperation with local media outlets. However, the attempt is likely to be worth the efforts, costs and risks associated with fighting unwanted fires.

Fire Reporting: Fires cannot be suppressed until they are detected and reported. As the number and popularity of cellular phones has increased, expansion of the #FIRE program throughout Montana may provide an effective means for turning the passing motorist into a detection resource.

Burn Permits: The issues associated with debris burning during certain times of the year are difficult to negotiate and enforce. However, there are significant risks associated with the use of fire adjacent to expanses of flammable vegetation under certain scenarios. Burning permits are required by State law on all forested lands within the State during the official fire season of May 1 to September 30. The wildland fire agencies (DNRC, USFS, BLM, and US Fish and Wildlife Service) each have their own guidelines for issuing burn permits in their jurisdictions. Since local government fire agencies are also involved with burn permit regulation, close coordination

between the two types of agencies is needed to ensure safe burning and to exchange information. Enforcement of burning permit requirements is the responsibility of the County Sheriff's Department. Although this is a statewide regulation, compliance and enforcement has been variable between fire departments. There is also considerable confusion on the part of the public as to when a permit is necessary and the procedure for which to obtain the permit. The best-intentioned citizen may unknowingly break this law for a lack of understanding. Clearly, there is a need to coordinate this process and educate the public.

Fire Resistant Oil Rig Sites: The occurrence of oil rig sites throughout central Montana is high. Although the fire risk associated with this machinery is low, the potential for an ignition due to mechanical failure or other reason exists. Maintaining fire resistant vegetation in the immediate vicinity of the rigs will decrease the likelihood of a stray spark igniting nearby fuels. A method for maintaining these sites with an awareness of the associated fire danger should be a priority of every county.

4.2.1.2 Education

Once a fire has started and is moving toward homes or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event.

The majority of the uncultivated vegetation in Yellowstone County is comprised of rangelands. These fuels tend to be very flammable and can support very fast moving and intense fires. In many cases, homes can easily be protected by following a few simple guidelines that reduce the ignitability of the home. There are multiple programs such as FIREWISE that detail precautions that should be taken in order to reduce the threat to homes, such as clearing timber or cured grass and weeds away from structures and establishing a green zone around the home.

However, knowledge is no good unless acted upon. Education needs to be followed up by action. Any education programs should include an implementation plan. Ideally, funds would be made available to financially assist the landowner making the necessary changes to the home. The survey of the public conducted during the preparation of this Community Wildfire Protection Plan indicated that approximately 61% of the respondents are interested in participating in this type of an activity.

4.2.1.3 Readiness

Once a fire has started, how much and how large it burns is often dependent on the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire. For many departments, the ability to reach these suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition can improve response times and subsequently reduce the potential for resource loss.

In order to assure a quick and efficient response to an event, emergency responders need to know specifically where emergency services are needed. Continued improvement and updating of the rural addressing system is necessary to maximize the effectiveness of a response.

4.2.1.4 Building Codes

The most effective, albeit contentious, solution to some fire problems is the adoption of building codes in order to assure emergency vehicle access and home construction that does not “invite” a fast and intense house fire. Codes that establish minimum road construction standards and access standards for emergency vehicles are an effective means of assuring public and firefighter safety, as well as increasing the potential for home survivability. County building inspectors should look to the fire departments in order to assure adequate minimum standards. Fire departments may want to consider apparatus that may be available during mutual aid events in order that the adopted standards meet the access requirements of the majority of suppression resources.

Coupled with this need is the potential to implement a set of requirements or recommendations to specify construction materials allowed for use in high risk areas of the County. The Yellowstone County Commissioners may want to consider a policy for dealing with this situation into the future as more and more homes are located in the wildland-urban interface.

4.3 Yellowstone County’s Wildland-Urban Interface

Individual community assessments have been completed for all of the populated places in the county. The following summaries include these descriptions and observations. Local place names identified during this plan’s development include:

Table 4.1. Yellowstone County Communities

Community Name	Planning Description	Vegetative Community	National Register Community At Risk? ¹
Billings	City	Rangeland	Yes
Laurel	City	Rangeland	Yes
Broadview	Town	Rangeland	No
Huntley Project	Community	Rangeland	No
Worden	Community	Rangeland	Yes
Lockwood	Community	Rangeland	No
Shepherd	Community	Rangeland	No
Custer	Community	Rangeland	No
Acton	Community	Rangeland	No
Ballantine	Community	Rangeland	No
Pompeys Pillar	Community	Rangeland	No

¹Those communities with a “Yes” in the National Register Community at Risk column are included in the Federal Register, Vol. 66, Number 160, Friday, August 17, 2001, as “Urban Wildland Interface Communities within the vicinity of Federal Lands that are at high risk from wildfires”. All of these communities have been evaluated as part of this plan’s assessment.

Site evaluations on these communities are included in subsequent sections.

4.3.1 Mitigation Activities Applicable to all Communities

4.3.1.1 Homesite Evaluations and Creation of Defensible Space

Individual home site evaluations can increase homeowners’ awareness and improve the survivability of structures in the event of a wildfire. Maintaining a lean, clean, green zone around structures to reduce the potential loss of life and property is highly recommended. Assessing

individual homes in the outlying areas can address the issue of escape routes and home defensibility characteristics. Educating the homeowners in techniques for protecting their homes is critical in these environments.

4.3.1.2 Travel Corridor Fire Breaks

Ignition points are likely to continue to be concentrated along the roads and railway lines that run through the county. These travel routes have historically served as the primary source of human-caused ignitions. In areas with high concentrations of resource values along these corridors, fire lines may be considered in order to provide a fire break in the event of a roadside ignition. Access route mitigation can provide an adequate control line under normal fire conditions. Alternatively, permanent fuel breaks can be established in order to reduce the potential for ignitions originating from the main travel roads to spread into the surrounding lands.

4.3.1.3 Power Line Corridor Fire Breaks

The treatment opportunities specified for travel corridor fire breaks apply equally for power line corridors. The obvious difference between the two is that the focus area is not an area parallel to and adjacent to the road, but instead focuses on the area immediately below the infrastructure element. Protection under the high tension power lines is strongly recommended. This may be an opportunity for intensive livestock grazing practices as a tool for reducing fine fuels around significant infrastructure.

4.4 Communities in Yellowstone County

4.4.1 Vegetative Associations and Overall Fuels Assessment

The land ownership pattern in Yellowstone County is a mixture of state, federal, and private. Additionally, a portion of the Crow Indian Reservation lies in the southeast corner of the county. Most of the Yellowstone River valley and the flatter rangeland regions are privately owned. Tillable or grazable ground is generally utilized for the production of agricultural products. The northeastern corner of the county is a mixture of rangeland and scattered forestlands. Ownership in this area is by and large private with scattered inholdings of Bureau of Land Management and State, much of which is leased for grazing rights.

The native mixed grass and sage rangelands present throughout the majority of the county are fairly inconsistent. Farming, ranching, and housing development has broken the continuity of native fuels. Where native rangelands do exist, they are dominated by bluebunch wheatgrass, blue gramagrass, crested wheatgrass, needle and thread, western wheatgrass, Indian ricegrass, little bluestem, juniper, prairie sandreed, and several species of sage. Harsh winters, low precipitation, short growing season, and periodic droughts limit the establishment of trees in low elevation areas.

Much of the rangeland is actively grazed by livestock, mule deer, pronghorn antelope, and other ungulates. Grazing helps keep fine fuel loads low, reducing available fuel for rangeland fire. Fires in areas dominated by grasses and scattered sage tend to spread rapidly, but burn at relatively low intensities. The grass and sage fuels in many areas tend to be relatively sparse and short, with little continuity, limiting fire spread in the absence of wind. Agricultural fields can also serve to fuel a fire after curing, burning in much the same manner as consistent grass fuel. Fires in grass and rangeland fuels tend to burn at relatively low intensities, with moderate flame lengths and only short-range spotting. Suppression resources are generally quite effective in

such fuels. Homes and other improvements can be easily protected from direct flame contact and radiant heat through adoption of precautionary measures around the structure.

Although fires in these fuels may not present the same control problems as those associated with large, high intensity fires in timber fuel types, they can cause significant damage if precautionary measures have not taken place prior to a fire event. Wind driven fires in these short, grass fuel types spread very rapidly. During extreme drought and pushed by high winds, fires in these fuel types can exhibit extreme rates of spread, thwarting suppression efforts. The fires within the Missouri Breaks Complex of 2003 demonstrate the potential for fires in these fuels to grow to enormous size and demonstrate fire behavior atypical of these fuel complexes.

Where moisture becomes more available, ponderosa pine and juniper grow on ridges or in protected draws. Fires tend to be quite common in these habitat types, as open forest structure allows for the accumulation of light grass and surface fuels which dry quite rapidly. In the absence of heavy regeneration or downed wood fuels, these swift moving fires tend to burn at relatively low intensities. Historically, grassland understories were maintained in this type of open pine stand by periodic surface fires. Historic fire frequencies ranged from 5 to 25 years. These fires helped to reduce juniper encroachment and limit survival of pine regeneration, thus maintaining a relatively open understory. Only under extreme weather conditions would crowning and torching occur. The current drought conditions in Yellowstone and surrounding counties is causing large scale mortality of many stands pockets of ponderosa pine. The needles left on these standing dead trees provide excellent fuel for an ignition and increase the probability of a crown fire.

4.4.2 Individual Community Assessments

4.4.2.1 Billings

(This assessment includes Hillcrest Subdivision, Blue Creek Area, Rehberg Ranch Estates, and Lone Eagle Subdivision).

Billings is the commercial center and population hub of Yellowstone County. The city spans the Yellowstone River valley just northeast of where the Clarks Fork of the Yellowstone River joins the main channel. Outside of the urban developments, the city is surrounded, for the most part, by agricultural development in the form of various crops and livestock grazing. North of the city, past the Rimrock, there are some agricultural crop fields; however, relatively flat rangelands extend for many miles broken only by a few shallow and usually sparsely forested coulees. On the south side of the Yellowstone River, there are several developing subdivisions. Wheat, hay, and other crop fields abut many of these housing projects; however, a few are intermingled with somewhat sparse stands of ponderosa pine and juniper.

Extensive development of subdivisions and rural communities has occurred throughout the foothills in almost every direction from the city. Included in this assessment are *Hillcrest, Blue Creek Area, Rehberg Ranch Estates, and Lone Eagle*.

The Hillcrest Subdivision is a newer development going in on the hilltop just south of the Yellowstone River and west of State Route 416 (Blue Creek Road). This has been subdivided out of former agricultural land; thus, there is little native fuels remaining.

The Blue Creek community is a compilation of several small clusters of homes and the Briarwood Estates Subdivision located along State Route 416, otherwise known as Blue Creek Road. The west side of the road is characterized by a gentle, grassy slope leading up to agricultural development along the top. Homes on the west side of the Blue Creek Road are generally at low risk due to lack of dense fuels. There are a few homes in the Basin Creek

drainage that may be at slightly higher risk due to accumulation sage and juniper in the creek bed. Many of the graveled roads accessing homes on the west side of road, namely Basin Creek Road and Vandaveer Road, are very rough due to potholes and washboards. During certain times of the year, emergency vehicles may need to travel very slowly to negotiate the bumpiness. Some of the homes along the east side of the road abut rangeland fuels with an increased sagebrush and juniper component. Homes in the Briarwood Estates Subdivision are generally well protected from fire by the well-manicured lawns that surround their homes. Nevertheless, structures along the perimeter of the development, particularly to the east and south, abut rangeland fuels consisting of medium length grasses, sagebrush, and juniper clumps. Additionally, there are a few occluded sections of wildland fuels within the subdivision that would be much more susceptible to an ignition.

The Rehberg Ranch Estates development sits north of Billings about one mile north of the Rimrock. Upon completion, this subdivision will contain 1,200 homes. Most of this area has previously been employed as a working ranch. This subdivision straddles a small coulee with several smaller drainages throughout. Although the coulee area is lightly timbered with ponderosa pine and juniper with a moderate grass understory, much of the trees are dead or dying. Insect infestation is evident by a significant number of trees with spiked tops and thinning foliage. This overstocked area contains high fuel densities, increasing ladder fuels, and dead and down fuels; which sets the stage for potential crown fires. The risk of a wildland fire occurring in this area is great. Fire history in the general area includes 6-9 fires in the past 15 years. The most recent fire occurred in 2002 on state land immediately to the west of the subdivision. Fire behavior has been characterized by high intensity crown fires and complete consumption of the timber overstory.

The Lone Eagle Subdivision lies a few miles northwest of Billings off of State Highway 3. Most of the homes in the Lone Eagle Subdivision sit on large lots (approximately 5-10 acre parcels) with horse pasture or rangeland surrounding manicured lawns. Many of the homes in this area are accessed via gated private driveways. There is a small rock ledge cutting through the middle of development that supports a few ponderosa pine and juniper; however, the surrounding area is predominantly rangeland.

4.4.2.1.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the city and abutting several of the rural subdivisions consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

Along the face of the Rimrock and in several coulees north of State Route 3 a mixed rangeland/forestland vegetation type abuts many homes and intermixes with the Rehberg Ranch Estates. The overstory consists of ponderosa pine and juniper with a light grass understory. Under normal conditions, a fire in these fuels would burn quickly along the surface with occasional flare ups, particularly in areas with juniper concentrations. Torching of individual trees, increased flame lengths, and high rates of spread would be expected under the influence of drought and/or wind.

The agricultural fields currently dominating the river bottom and regions of the surrounding foothills become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur around the City of Billings. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, trains, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are occasional incidents. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.1.2 Ingress-Egress

There are several arterials traveling to and from Billings including Interstate 90, Interstate 94, U.S. Route 87, U.S. Route 212, U.S. Route 312, and State Route 3. All of these highways are bordered by rangeland fuels. Many of the rural subdivisions are accessed off secondary routes or gravel roads; however, most of these are also well maintained, two-way routes.

The Hillcrest community is accessed via the Hillcrest Road off of State Route 416 (Blue Creek Road). This is a gravel road with enough room for two vehicles to pass easily. State Route 416, known as the Blue Creek Road, accesses several subdivisions in the Blue Creek area including Briarwood Estates. Both the Hillcrest Road and Blue Creek Road are bordered by manicured yards, rangeland fuels, or agricultural fields.

The Rehberg Ranch Estates is accessed from the Rod and Gun Club Road off of State Route 3. Both routes are paved with agricultural fields abutting both sides. There is only one designated access point to the entire subdivision; however, an emergency only access road has been identified on the far northwest end. Currently, it is not maintained, but would likely serve its purpose in an emergency situation.

The Lone Eagle Subdivision is also located directly off of State Route 3 on Lone Eagle Road. Lone Eagle Road is a well maintained paved road that winds through the subdivision with several short spurs accessing homes. Neither Lone Eagle Road nor any of the spurs provide a thru access back to the highway, which not only decreases the safety of residents, but also inhibits the ability of emergency personnel to safely respond. Furthermore, a significant number of personal driveways are gated making access to structures by fire suppression equipment much more difficult and time consuming.

4.4.2.1.3 Infrastructure

The City of Billings is on a municipal water system; however, many of the outlying subdivisions rely on personal or multiple home well systems and water storage tanks.

There is a multitude of high tension transmission lines in the Billings area. Many of these power line corridors extend to other Yellowstone County communities traveling over expansive rangeland fuels. Sparks caused by downed lines, transformer malfunctions, or arcing could easily ignite the receptive rangeland fuel bed below.

There are two active refineries in Billings. The ConocoPhillips and the ExxonMobil, both of which maintain their own security and fire suppression capabilities specific to the needs of the company.

4.4.2.1.4 Fire Protection

The Billings Fire Department is responsible for structural and wildland protection in the City of Billings, the Billings Urban Fire Service Area (BUFSA), Briarwood Subdivision, and Rehberg Ranch Estates. The Blue Creek Volunteer Fire Department provides structural and wildland fire protection to the residents of the Blue Creek Area and the Hillcrest Subdivision. The Montana Department of Natural Resources and Conservation and the Bureau of Land Management will respond to wildland fires in Yellowstone County upon request.

4.4.2.1.5 Community Assessment

Residents within the urban community of Billings have a low risk of being directly affected by wildland fire. Homes located in the more rural subdivisions scattered around the outskirts of the city have an increased risk of fire, particularly those surrounded by or abutting timber type fuels. Developments such as Hillcrest and the west side of Blue Creek Road abut lower risk agricultural fields or rangeland. Nevertheless, landowners should still take precautions to safeguard their homes and families from fire. Creating a green defensible space around structures will help insure that a rapidly spreading grass fire will not threaten their property or lives.

Those subdivisions built near or within higher risk rangeland fuels or wooded areas have an increased risk of wildland fire. Homes located in the Lone Eagle, Rehberg Ranch Estates, and on the east side of Blue Creek Road are surrounded by fuels that have a moderate wildland fire risk due to the higher density of sagebrush, juniper, or timber. The Lone Eagle Subdivision has additional risk due to the lack of a thru access road and restricted driveways.

It is imperative that homeowners, particularly in higher risk areas, implement fire mitigation measures to protect their structures and families prior to a wildland fire event. As the city grows, more and more homes will be built in the wildland urban interface. It will become increasingly important to educate landowners of the potential fire risk. The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.1.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents

of Billings and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Community defensible space projects can also help improve the safety of groups of homes. Rural subdivisions adjacent to wildland fuels can create fuel breaks along their perimeter that also increase the value of the homes in the community. Greenbelts or xeriscaped strips with a walking path not only provide a community defensible space, but they can potentially increase property values.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles. Roads and driveways accessing homes should be regularly maintained with the edges mowed to prevent an accidental ignition. Homeowners with structures located on dead end roads or driveways with no alternative escape route should construct loop roads where possible or establish gates in fencing to allow for an emergency evacuation if the primary escape route becomes impassable.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources available for emergency use and that new roads and driveways are accessible to emergency apparatus will become increasingly important as the community expands.

4.4.2.2 Laurel

The community of Laurel lies in the Yellowstone River valley southwest of Billings west of the junction of the Clarks Fork of the Yellowstone River and north of the main Yellowstone River channel. The community itself is surrounded primarily by agricultural development and is nearly connected to Billings by residential growth. Across the Yellowstone River to the south, much of the native rangelands have been converted to agricultural land, but to the north the agricultural development gives way to rangelands just a few miles past the city limits.

Several rural housing developments have become established in the rangelands north of Laurel. Included in this assessment is the *Buffalo Trail Subdivision, Clappers Flat, Canyon Creek Road area, and Duck Creek area*.

The Buffalo Trail area consists of several housing projects along State Route 401 (Buffalo Trail Road) near the Yellowstone-Stillwater County line. Buffalo Trail Road travels through a relatively wide coulee that is made up of rangeland grass with patches of sagebrush and juniper. Stunted ponderosa pine exists sporadically, but is somewhat denser near the upper slopes. The south side of highway is predominantly newer homes extending from the roadside up a gentle slope to a large plateau where 50 to 60 large lots have been established for construction. The north side of Buffalo Trail Road is a mixture of old and new homes. Structures near the road generally sit on fairly large, open lots, but as the steepness of the coulee wall increases, homes are more closely intermixed with the rangeland/forestland fuels.

The Canyon Creek Road area, which branches off the Buffalo Trail Road just south of the Buffalo Trail Subdivision. The Canyon Creek Road area follows the Canyon Creek drainage west towards the county line. There are several homes in the bottom of this little valley, most of which graze livestock and are relatively spread out.

The Clappers Flat area is a large plateau lying northwest of Laurel and is characterized by rangeland fuels with clumps of juniper and stunted ponderosa pine along the edges. Homes are typically built on large lots intermingled with the semi-wooded areas.

The Duck Creek Area refers to the scattered homes along Duck Creek Road south of the Yellowstone River about half way between Billings and Laurel. These are predominately large lots surrounded by agricultural fields, pasture, or rangeland. Many of the homes on the north end of this community are bordered by the riparian fuels associated with either the Yellowstone River or Duck Creek. The more remote homes towards the south end of Duck Creek Road are typically larger landowners surrounded by farm fields.

4.4.2.2.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the community and abutting several of the rural subdivisions consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

The partially timbered areas near Laurel are almost exclusively made up of ponderosa pine. Stringers and patches of trees typically exist in the coulees and canyons where moisture is more readily available. In most cases, fires in this type of timber will stay on the surface with only occasional torching of individual trees or clumps of trees, particularly where juniper offers a ladder fuel. Under extreme conditions, such as drought or high winds, fires will spread very rapidly with larger flame lengths.

The agricultural fields currently dominating the river bottom and regions of the surrounding foothills become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur around the vicinity of Laurel. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.2.2 Ingress-Egress

The primary access into Laurel is via Interstate 90 from the east or west; however, there are several other main transportation routes coming into the area including U.S. Highway 310/212 and State Route 532. Most of the rural housing is accessed from gravel roads branching off of these primary routes.

Buffalo Trail Road provides the main access into the Buffalo Trail Subdivision. This two lane highway abuts rangeland fuels and provides an escape route out of both ends of the coulee. The Mountain View Road off of Buffalo Trail Road is primary access route for homes on the north side of the road. Mountain View is a graveled loop road; however, it becomes very narrow near the top and it is not well maintained. Potholes and severe washboards may hinder the speed of emergency response. There are several entrances to groups of homes on the south side of the road. These are typically graveled roads that loop through the subdivision. Roads in the Valley Canyon area start out as two-lane routes, but turn to one-lane further south. There are also numerous unmarked spur roads and long driveways extending off of these access routes making navigation through the area somewhat difficult. Better signing of the roads and house numbers at the end of driveways would help reduce confusion for emergency response personnel and for residents during an evacuation. The Medicine Man Road provides access to a large group of homes; however, this route dead ends at the last house. The lack of an alternate escape route significantly decreases the safety of residents in an emergency situation.

Homes in the Canyon Creek area are accessed via the Canyon Creek Road off of the Buffalo Trail Road. This is a two lane, graveled road that extends past the county line to the west. For the most part, this route is well maintained; however, there are a few rough spots that may slow emergency response.

Clapper Flats is reached by following Clapper Flats Road off of the Buffalo Trail/Laurel Road. This is also a two lane, graveled road that is kept in good condition. Most of the homes in this area are accessed by Red and King Gulch Road, which dead ends on the south side of the development. This road starts out as rough, but graveled two lane route; however, it tapers into a one lane dirt road towards the end. There are several dead end spur roads and driveways branching from the Red and King Gulch Road, none of which seem to have alternate escape routes. The safety of residents in the Clappers Flat area would be drastically improved with the development of a thru road.

The Duck Creek Area can be accessed from both Laurel and Billings. From Laurel, Thiel Road, which turns into River Road along the south bank of the Yellowstone River provides the most direct access. From Billings, Duck Creek is reached by following Hillcrest Road out of the Blue Creek area. Thiel Road and River Road are both two-way paved routes while Hillcrest Road is mostly a well maintained gravel road. Duck Creek Road is also a well maintained graveled route that abuts mostly agricultural land with some isolated sections of rangeland. Near where Duck Creek Road connects to River Road, the actual Duck Creek parallels the roadway. The denser riparian fuels in the creek bed could potentially cause access problems from this end in the event of a fire in the area.

4.4.2.2.3 Infrastructure

The City of Laurel has a municipal water system for residents within the city limits. Rural subdivisions and individual homes rely on personal or multiple home well systems and storage tanks.

There are several high tension power lines crisscrossing the Laurel area, most of which travel over surrounding rangeland fuels. These fuels are highly receptive to sparks originating from the downed lines, arcing, or malfunctioning transformers.

A Cenex Harvest States oil refinery is located within the City of Laurel. This is a large facility that maintains its own security and fire suppression programs.

4.4.2.2.4 Fire Protection

The Laurel Volunteer Fire Department is responsible for structural protection for the community of Laurel, Fire District #5, Fire District #7, and the Laurel Urban Fire Service Area. Many of the more rural subdivisions north of Laurel including Buffalo Trails, Clappers Flat, and the Canyon Creek Road area receive structural protection from the Molt Volunteer Fire Department. The Montana Department of Natural Resources and Conservation and the Bureau of Land Management respond to wildland fires in the area as necessary.

4.4.2.2.5 Community Assessment

Commercial and residential development is expanding along U.S. Highway 310/212 to the south and along Thiel Road and River Road, which parallels the Yellowstone River. There are a few remaining patches of native rangelands; however, this area is primarily used for the production of agricultural products. The banks of both the Yellowstone River and the Clarks Fork of the Yellowstone River are lined with dense riparian vegetation that could support an intense fire. Homes directly adjacent to these fuels could be at high risk; however, the development of irrigated lawns and crop fields next to the channels will help keep the fire contained.

Residents within the urban community of Laurel have a low risk of being directly affected by wildland fire. Subdivisions built near or within higher risk rangeland fuels or wooded areas have an increased risk of wildland fire. Homes located in the Buffalo Trail area, Canyon Creek drainage, Duck Creek, and near Clappers Flat are surrounded by fuels that have a moderate to high wildland fire risk due to the higher density of sagebrush, juniper, and timber.

The Buffalo Trails Subdivision has moderate risk of wildfire. Many homes have created an adequate defensible space; however, there are several homes that have juniper and ponderosa pine directly abutting or overhanging structures. Furthermore, many of these homes are built along the upper slopes of the coulee. Fires originating near the road could spread upslope very rapidly giving residents little time to escape. Road and house number signage, as well as road widening and maintenance would significantly improve the safety of residents in the Buffalo Trails Subdivision.

Canyon Creek is a relatively large drainage with thick grasses in the valley bottom and ponderosa pine and juniper lining the rocky slopes. Dense riparian vegetation, including large black cottonwood trees, marks the path of the creek. Homes in this area have primarily been built in the valley bottom with small agricultural crops or livestock pasture surrounding home sites. For the most part, landowners have created defensible space around structures. Homes built closer to the timber may benefit from clearing brush and other ladder fuels from the understory and pruning trees within at least 50 to 100 feet.

Homes in the Clappers Flats area have a moderate to high risk of experiencing a wildfire. Not only are many of the houses intermixed with timber and rangeland fuels, but access into the area is very poor. Ponderosa pine, juniper, and sagebrush commonly abut homes with small or non-existent green yard space creating a continuous fuel bed with the surrounding rangelands. Additionally, not only does the main access route dead end, there are several unmarked spur roads that dead end at home sites. Homeowner education regarding the value of a defensible

space, especially in areas with hazardous fuels would help increase community awareness of the wildfire risk. The safety of residents and emergency response personnel would be improved by road and house number signing as well as construction of a thru road to provide an alternate escape route.

Most of the fuels in the Duck Creek area consist of developed croplands except for the denser riparian vegetation associated with the Yellowstone River and the Duck Creek drainage. Homes along these waterways should be especially aware of the potential for a wildland fire to be carried within the continuous fuel bed of the drainages. Insuring that fuels between the riparian fuels and structures are kept green and free of debris will help decrease the fire risk. Homes surrounded by agricultural fields have lower fire risk; however, the potential for an escaped stubble fire to threaten their structures exists.

It is imperative that homeowners, particularly in higher risk areas, implement fire mitigation measures to protect their structures and families prior to a wildland fire event. As the community grows, more and more homes will be built in the wildland urban interface. It will become increasingly important to educate landowners of the potential fire risk. The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.2.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Laurel and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Community defensible space projects can also help improve the safety of groups of homes. Rural subdivisions adjacent to wildland fuels can create fuel breaks along their perimeter that also increase the value of the homes in the community. Greenbelts or xeriscaped strips with a walking path not only provide a community defensible space, but they can potentially increase property values.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles. Roads and driveways accessing homes should be regularly maintained with the edges mowed to prevent an accidental ignition. Homeowners with structures located on dead end roads or driveways with no alternative escape route should construct loop roads where possible or establish gates in fencing to allow for an emergency evacuation if the primary escape route becomes impassable.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources available for emergency use and that new roads and driveways are accessible to emergency apparatus will become increasingly important as the community expands.

4.4.2.3 Broadview and Acton

Broadview and Acton are small rural communities located along State Route 3. Broadview lies in the northwestern most corner of the county and Acton sits about 15 miles southeast of Broadview. Development in these communities has mostly occurred in tight clusters around the city centers. This part of Yellowstone County is almost entirely grass and sagebrush rangelands with the exception of a couple small coulees and a few sparse stringers of ponderosa pine on a low lying ridge east of Acton. Patches of farm and pasture ground intermittently break up the landscape, but due to the lack of water available, these fields are not extensive.

4.4.2.3.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem surrounding these communities consists of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

There is a small sparse stand of ponderosa pine near some homes east of Acton. Under normal conditions, a fire in these fuels would tend to spread quickly along the surface with only occasional torching of individual trees or clumps of trees. Larger flame lengths and small crown fires could be expected under the influence of wind and severe drought.

The agricultural fields and pasture ground near Broadview and Acton become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur around both Broadview and Acton. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and more abundant ignition sources; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.3.2 Ingress-Egress

Both Broadview and Acton are accessed by State Route 3. This is the only paved roadway in the area. The main secondary roads such as Buffalo Trail Road heading south along the county line and the Acton-Shepherd Road are typically two-lane graveled routes.

4.4.2.3.3 Infrastructure

There are several high tension power lines crisscrossing heading to and from a substation near Broadview. Sparks or downed lines could easily start a fire in dry, flashy rangeland fuels.

The town of Broadview has a municipal water system with a storage tank on the west side of the community. The surrounding area as well as the community of Acton relies on personal or multiple home well systems and storage tanks.

4.4.2.3.4 Fire Protection

The Broadview Volunteer Fire Department is responsible for wildland fire protection within Broadview Fire District #3. The Montana Department of Natural Resources and Conservation and the Bureau of Land Management respond to wildland fires in this area as necessary.

4.4.2.3.5 Community Assessment

The communities of Broadview and Acton are at low to moderate risk of experiencing a wildland fire. Fires in the rangeland fuels surrounding these areas are relatively common; however, under normal conditions they can be controlled by modifying the vegetation and creating a fuel break with the available farm implements. East of Acton there is a scattered group of homes along the Shepherd-Acton Road. Some of these structures abut a lightly timbered slope. This stand of timber is relatively isolated; however, homes with trees adjacent to or overhanging roofs may have an increased risk. Pruning nearby trees and removing any potential ladder fuels will help reduce the risk to the structure. Drought and/or high winds can lead to a very fast spreading fire with large flame lengths that can be much more difficult to control; therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event.

The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.3.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Broadview, Acton, and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site

evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

4.4.2.4 Custer

The small rural community of Custer is located along Interstate 94 near the Yellowstone-Treasure County line. Most of the structures associated with the community lie on the south side of the highway; however, there is several farming and ranching enterprises scattered around the area. There is a low-lying ridge south of town that is partially timbered, but the agricultural development on both the bottom and top side keep the fire danger relatively low. Grass and sagebrush rangelands extend past the crop fields to the north.

4.4.2.4.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem surrounding Custer consists of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

There is a small stand of ponderosa pine on a ridge bordering the south side of the community. This stand is completely surrounded by agricultural crops; thus, the fire danger associated with the increased fuels is minimal. Under normal conditions, a fire in this type of open timber would tend to spread quickly along the surface with only occasional torching of individual trees or clumps of trees. Larger flame lengths and small crown fires could be expected under the influence of wind and severe drought.

The agricultural fields and pasture ground near Custer becomes very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur in the Custer area. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and abundant ignition sources; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.4.2 Ingress-Egress

The primary access into Custer is from Interstate 94 from either the east or the west. State Route 47 is also a paved access route coming from Hardin to the south. Both of these major travel corridors are bordered by rangeland or agricultural type fuels. State Route 310 and the Custer-Pine View Road are graveled routes that could provide additional escape routes. Both of these roadways travel north through the vastly unpopulated rangelands of the northeastern region of Yellowstone County.

4.4.2.4.3 Infrastructure

The community of Custer relies on personal or multiple home well systems.

4.4.2.4.4 Fire Protection

The Custer Volunteer Fire Department is responsible for structural and wildland fire protection in Custer and the surrounding area. The Montana Department of Natural Resources and Conservation provide wildland fire protection throughout the County as necessary.

4.4.2.4.5 Community Assessment

The community of Custer is at low to moderate risk of experiencing a wildland fire. Fires in the rangeland fuels surrounding these areas are relatively common; however, under normal conditions they can be controlled by modifying the vegetation and creating a fuel break with the available farm implements. Drought and/or high winds can lead to a very fast spreading fire with large flame lengths that can be much more difficult to control; therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event.

The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.4.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Custer and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

4.4.2.5 Huntley

Huntley is a small agricultural community that sits just off of Interstate 94 approximately 7 miles east of Billings. The city center and most of the residential housing is located within the Yellowstone River valley. The valley bottom has been developed for agricultural use, which is fairly continuous to the north towards Shepherd and east towards Worden.

There are also numerous homes and ranches in the Pryor Creek area, which is directly south of the Huntley city center. Pryor Creek is a small drainage that runs through a relatively wide valley with steep slopes rising on both sides. The Pryor Creek area consists of agricultural and residential development along the valley floor with native rangeland fuels dominating the steeper slopes.

4.4.2.5.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the community and in the Pryor Creek area consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

Riparian vegetation along the Yellowstone River and in some of the other major drainages, such as Pryor Creek, is relatively dense. Due to the availability of moisture, thick grasses as well as brush, weeds, and other forbs grow very well. Black cottonwoods and other trees are also common along the river and creek beds. During the summer, these fuels become dry and very receptive to an ignition. The consistent fuel bed afforded by the thicker fuels in the riparian zone could easily carry an uncontrolled fire from an ignition point in the rangelands to populated areas. This type of fire is somewhat difficult to suppress due to the lack of access points and the density of the vegetation.

The agricultural fields and pasture ground currently dominating the river bottom and much of the valley floor in the Pryor Creek drainage become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur around the community of Huntley. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland throughout the county. Annual field burning, debris fires, and vehicle use are

common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.5.2 Ingress-Egress

The primary access into Huntley is provided by Interstate 94; however, State Routes 568 and 312 are also paved highways that offer good ingress and egress to the city center. These roads are predominantly bordered by agricultural development.

4.4.2.5.3 Infrastructure

The community of Huntley and the surrounding area relies on a municipal water system as well as personal or multiple home wells.

4.4.2.5.4 Fire Protection

The Worden Volunteer Fire Department responds to structural and wildland fires in the Huntley area and Huntley Project Fire Service Area. Wildland fire protection is provided by the Montana Department of Natural Resources and Conservation and the Bureau of Land Management as necessary.

4.4.2.5.5 Community Assessment

Homes located in the agriculturally-based community of Huntley have low to moderate risk of wildfire. Fires originating in the crop fields are usually suppressed quickly by creating fuel breaks with the available farming equipment. Fires in the rangeland fuels in the surrounding areas and particularly on the slopes of the Pryor Creek drainage are relatively common. Under normal conditions this type of fire can be controlled by relatively quickly. Drought and/or high winds can lead to very fast spreading fires with large flame lengths that can be much more difficult to control; therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event. Homeowners adjacent to the riparian zones of the Yellowstone River, Pryor Creek, or other drainages should be aware of the possibility of a fire within the watershed. Keeping structures an adequate distance from these fuels and maintaining a clean and green yard will help insure the safety of their property.

It is imperative that homeowners, particularly in higher risk areas, implement fire mitigation measures to protect their structures and families prior to a wildland fire event. As the community grows, more and more homes will be built in the wildland urban interface. It will become increasingly important to educate landowners of the potential fire risk. The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.5.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Huntley and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources available for emergency use and that new roads and driveways are accessible to emergency apparatus will become increasingly important as the community expands.

4.4.2.6 Lockwood

Lockwood is a large unincorporated area on the southeast side of the city of Billings. The lower northern part of the area, near the Interstate, is comprised of residential subdivisions, commercial businesses, and large industry. This area has a municipal water system.

The upper area of the community has five notable wildland urban interface developments. These are *Yellowstone Trail*, *Pine Hills*, *Emerald Hills*, *High Trail*, and *Coburn Hills*. Each of these areas is characterized by a ponderosa pine overstory with juniper, sagebrush, and grasses in the understory. These urban interface areas have homes irregularly distributed on steep, narrow, winding roads. Many of the roads are unpaved. Driveways tend to be long and narrow without adequate turnarounds for large fire trucks. Water is extremely limited in these areas as well.

4.4.2.6.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the city and abutting several of the rural subdivisions consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope and tend to burn at higher intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

Fires in the urban interface areas of Lockwood tend to spread quickly thru the light flashy fuels, which are generally continuous. Flame lengths can reach 15 feet or more in areas of high grass. Fires move rapidly, especially when pushed by upslope winds or in steep terrain. Fuels

have built up over the years as fires in these areas have been aggressively suppressed. Several years of drought have stressed the ponderosa pine stands and bark beetles have added to the mortality. Fires move easily from the ground to the trees due to the abundance of ladder fuels. Individual tree torching is common, which increases the potential for crown fires. There is also an increased likelihood of short and medium range spotting as a result of the excessive build up of flammable fuels.

Between Highway 87 East and Interstate 90 a mixed rangeland/forestland vegetation type abuts and intermixes with the Emerald Hills Subdivision. The overstory consists of ponderosa pine and juniper with a light grass understory. Under normal conditions, a fire in these fuels would burn quickly along the surface with occasional flare ups, particularly in areas with juniper concentrations. Torching of individual trees, increased flame lengths, and high rates of spread would be expected under the influence of drought and/or wind.

Ignition Profile

Both natural and human caused ignitions occur around the community of Lockwood. The community center and surrounding subdivisions are more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.6.2 Ingress-Egress

Access to Yellowstone Trail and Pine Hills is from Old Hardin Road. The access route to High Trail Road and Coburn Hill Road is U.S. Highway 87 East. Roads in these areas are mainly gravel with the exception of Emerald Hills Drive and Coburn Road, which are paved. All roads are narrow two lane routes with steep, winding grades.

The most straight forward access into the Emerald Hills Subdivision is via the Old Hardin Road through the Lockwood area to Emerald Hills Road on the northeast side of the development. The main roadways through the subdivision are two-lane graveled routes; however, many of the secondary roads are one-lane dead ends. Dead end roads are typically signed; however, it would be helpful for emergency purposes if the thru roads were marked as potential escape routes. Additionally, there is no organized grid pattern to the road system; therefore, there are several winding corners, short grades, and Y-intersections. The road system makes for a hazardous situation under normal conditions, but would become particularly unsafe for emergency response vehicles and evacuees during a wildfire event. On the primary roads, escape routes are marked with (evacuation signs) provide by the Lockwood Fire District and Yellowstone County DES.

4.4.2.6.3 Infrastructure

High risk infrastructure in the wildland-urban interface area includes numerous cellular, radio, and television towers in all areas except Pine Hills. A large microwave tower is located off U.S.

Highway 87 East adjacent to the High Trail area. Overhead power lines are predominant in most of Yellowstone County.

The community of Lockwood and the surrounding rural subdivisions rely on a municipal water system as well as personal or multiple home wells and storage tanks.

Low risk infrastructure includes the ExxonMobil Refinery, several chemical plants, and other large industry on the north end of the community.

4.4.2.6.4 Fire Protection

Both structural fire protection and wildland fire protection is provided by the Lockwood Fire District. The Lockwood Fire District is manned 24/7 with career firefighters supplemented with volunteer firefighters.

4.4.2.6.5 Community Assessment

The Emerald Hills area of Lockwood has the highest risk of the five areas in the urban interface due to the higher density of homes. Many homes have trees and juniper shrubs next to or overhanging structures. A number of homeowners have built next to steep slopes with continuous fuels directly abutting their homes. So far, only a few homeowners in the Emerald Hills Subdivision have taken proactive steps, such as clearing a defensible space, to protect their homes from wildfire.

There is no fuel break around the perimeter of these higher risk communities; therefore, a fire could easily spread north out of the partially forested rangelands into the residential areas. Further exacerbating this situation is the poor road systems and narrow driveways that make access to homes by emergency response equipment much more difficult and potentially unsafe. Additionally, many homes were constructed with flammable siding or decking and have propane tanks sitting next to or very near structures. Other potential hazards for firefighters include narrow roads, long driveways, lack of available water, and overhead power lines.

It is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event. Lockwood is seeing continued growth in homes built in these interface areas. Education of homeowners to the potential fire risk will increase the likelihood that additional properties will have the defensible space needed to make their homes safe and provide for a safer environment for firefighters responding to these subdivisions.

4.4.2.6.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Lockwood and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Community defensible space projects can also help improve the safety of groups of homes. Rural subdivisions adjacent to wildland fuels can create fuel breaks along their perimeter that

also increase the value of the homes in the community. Greenbelts or xeriscaped strips with a walking path not only provide a community defensible space, but they can potentially increase property values.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles. Roads and driveways accessing homes should be regularly maintained with the edges mowed to prevent an accidental ignition. Homeowners with structures located on dead end roads or driveways with no alternative escape route should construct loop roads where possible or establish gates in fencing to allow for an emergency evacuation if the primary escape route becomes impassable.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources available for emergency use and that new roads and driveways are accessible to emergency apparatus will become increasingly important as the community expands.

4.4.2.7 Shepherd

Shepherd is a small agricultural community located approximately four miles northwest of Huntley and about two miles west of the Yellowstone River. There is a small city center; however, most of the homes in the area are scattered throughout the area. There is also a relatively large subdivision, Pleasant Hollow, which sits on a plateau north of town. Homes in this area are spread out on large lots usually with horses or other livestock grazing in adjacent pastures. Undeveloped lots and the surrounding area are typically native rangeland fuels consisting of medium length grasses and scattered clumps of sagebrush and juniper. Stringers and small stands of ponderosa pine are also common on the plateau and extending in a northeasterly direction.

The Cedar Ridge subdivision is located about 11 miles northwest of Shepherd on U.S. Highway 87. Homes in this area are typically situated on big lots with private driveways. This area is very rural with native rangeland fuels and stringers of ponderosa pine between lots and completely surrounding the development.

4.4.2.7.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the community and surrounding both subdivisions consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

The scattered stands of ponderosa pine in the both the Pleasant Hollow and Cedar Ridge subdivisions present an increased risk of wildland fire. Under normal conditions; however, a fire in this type of open timber would tend to spread quickly along the surface with only occasional torching of individual trees or clumps of trees. Larger flame lengths and small crown fires could be expected under the influence of wind and severe drought.

The agricultural fields and pasture ground currently surrounding the community of Shepherd and dominating the river bottom to the east become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Riparian vegetation along the Yellowstone River is relatively dense. Due to the availability of moisture, thick grasses as well as brush, weeds, and other forbs grow very well. Black cottonwoods and other trees are also common along the river bed. During the summer, these fuels become dry and very receptive to an ignition. The consistent fuel bed afforded by the thicker fuels in the riparian zone could easily carry an uncontrolled fire from an ignition point in the rangelands to populated areas. This type of fire is somewhat difficult to suppress due to the lack of access points and the density of the vegetation.

Ignition Profile

Both natural and human caused ignitions occur around the community of Shepherd. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland throughout the county. Both of the subdivisions near Shepherd may be at increased risk of lightning caused fires due to the slightly increased elevation and surrounding rangelands.

Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened. Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.7.2 Ingress-Egress

Shepherd can be reached by taking the Shepherd-Acton Road east from U.S. Route 87 or via the Shepherd Road from Huntley. Shepherd Road is a paved two lane route with agricultural development adjacent to both sides. The Shepherd-Acton Road is a two lane gravel road abutting rangeland and agricultural fuels. There also numerous other secondary routes crisscrossing the area, most of which are well maintained graveled roads.

The Pleasant Hollow area can be reached by following West Tenny Road off of Shepherd Road. Roads through the housing development are two lane graveled routes abutted by pasture or rangeland fuels.

The Cedar Ridge subdivision is reached via Highway 87. P K Road is a loop road through the development; however, a section of it is not maintained as a drivable route. Stonehouse Road is another access point off of Highway 87, but this is also a dead end route with several dead end spurs leading to clusters of homes.

4.4.2.7.3 Infrastructure

The community of Shepherd and the surrounding area rely on personal or multiple home well systems.

4.4.2.7.4 Fire Protection

The Shepherd Volunteer Fire Department is responsible for structural and wildland fire protection in the town site of Shepherd and the Shepherd Fire Service Area. The Montana Department of Natural Resources and Conservation and the Bureau of Land Management provide wildland fire protection as necessary.

4.4.2.7.5 Community Assessment

Homes located in the agriculturally-based community of Shepherd have low to moderate risk of wildfire. Fires originating in the crop fields are usually suppressed quickly by creating fuel breaks with the available farming equipment. Fires in the rangeland fuels in the surrounding areas are relatively common. Under normal conditions this type of fire can be controlled relatively quickly. Drought and/or high winds can lead to very fast spreading fires with large flame lengths that can be much more difficult to control; therefore, it is imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event. Homeowners adjacent to the riparian zone of the Yellowstone River or other drainages should be aware of the possibility of a fire within the watershed. Keeping structures an adequate distance from these fuels and maintaining a clean and green yard will help insure the safety of their property.

Structures in both the Pleasant Hollow and Cedar Ridge subdivisions have an increased risk of experiencing a wildfire. Homes in these areas usually have a maintained lawn or pasture ground that may serve as a defensible space in the event of a fire, but many do not. Fires in the surrounding rangeland and partially timber fuels could easily move through these communities. Additionally, many homes in these areas were built using wood siding and decking, which make them more susceptible to ignition. Roads and driveways accessing homes should be regularly maintained with the edges mowed to prevent an accidental ignition. Homeowners with structures located on dead end roads or driveways with no alternative escape route should construct loop roads where possible or establish gates in fencing to allow for an emergency evacuation if the primary escape route becomes impassable.

In Shepherd, as well as several other communities in Yellowstone County, availability of water is an issue for rural fire departments, particularly in drought years. Other than the river corridor and a few other minor drainages, there are very few easily accessed water resources available for drafting or pumping to refill fire suppression engines. The lack of water puts many of the more remote subdivisions and communities at greater risk. Some of this risk can be alleviated by establishing water storage tanks, developed drafting sites, or dry hydrants in closer proximity to developments.

It is imperative that homeowners, particularly in higher risk areas, implement fire mitigation measures to protect their structures and families prior to a wildland fire event. As the community grows, more and more homes will be built in the wildland urban interface. It will become increasingly important to educate landowners of the potential fire risk. The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.7.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. “Living with Fire, A Guide for the Homeowner” is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Shepherd and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources available for emergency use and that new roads and driveways are accessible to emergency apparatus will become increasingly important as the community expands.

4.4.2.8 Worden, Ballantine, and Pompeys Pillar

Worden, Ballantine, and Pompeys Pillar are small agricultural communities lying in the Yellowstone River valley along Interstate 94. The Pompeys Pillar community lies along Interstate 94 just south of the Pompeys Pillar National Historical Landmark. The Worden and Ballantine community centers are only about one mile apart; however, the residential and agricultural development extends from the Interstate north to the river, west to Huntley, and east to Pompey's Pillar. There are patches of native rangeland fuels remaining; however, this part of the valley has been almost entirely converted to agriculture.

4.4.2.8.1 Fire Potential

Fuels Assessment

The agricultural fields and pasture ground surrounding Worden, Ballantine, and Pompeys Pillar become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation around structures can be done quickly with available farm equipment and is usually effective in controlling wildfire.

Riparian vegetation along the Yellowstone River is relatively dense. Due to the availability of moisture, thick grasses as well as brush, weeds, and other forbs grow very well. Black cottonwoods and other trees are also common along the river and creek beds. During the summer, these fuels become dry and very receptive to an ignition. The consistent fuel bed afforded by the thicker fuels in the riparian zone could easily carry an uncontrolled fire from an ignition point in the rangelands to populated areas. This type of fire is somewhat difficult to suppress due to the lack of access points and the density of the vegetation.

The native rangeland ecosystem on the north side of the Yellowstone River and south of the Interstate consist of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

Ignition Profile

Both natural and human caused ignitions occur near Worden, Ballantine, and Pompeys Pillar. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and abundant ignition sources; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county.

Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries; however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened. Vehicle use on- and off-road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pick ups are used regularly in farming operations.

4.4.2.8.2 Ingress-Egress

Interstate 94, U.S. Highway 212, and State 568 provide access to these communities. All are paved routes adjacent to agricultural development or rangeland fuels. There are also numerous secondary routes crisscrossing the area to provide access to farms and ranches.

4.4.2.8.3 Infrastructure

The communities of Worden and Ballantine rely on a municipal water system as well as personal or multiple home wells. The scattered homes near Pompeys Pillar typically rely on personal well systems. There are also a few springs providing surface water collection points at remote locations in the rangelands south of the Interstate.

There is a dry hydrant located at Fly Creek near Pompeys Pillar for use by the local fire protection departments and agencies.

4.4.2.8.4 Fire Protection

The Worden Volunteer Fire Department provides structural protection to the Worden, Worden Fire District, Huntley Project Fire Service Area, Ballantine, Pompeys Pillar, and Huntley and wildland protection to the surrounding area. Wildland fire protection is provided by the Montana Department of Natural Resources and Conservation and the Bureau of Land Management as necessary.

4.4.2.8.5 Community Assessment

The communities of Worden, Ballantine, and Pompeys Pillar are at low risk of experiencing a wildland fire. The Yellowstone River and Interstate 94 would, under normal circumstances, serve as effective fuel breaks from fires in the rangeland areas beyond. Fires ignited within the valley bottom could, however, move very quickly through curing agricultural fields; therefore, it is

imperative that homeowners implement fire mitigation measures to protect their structures and families prior to a wildland fire event.

4.4.2.8.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. “Living with Fire, A Guide for the Homeowner” is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Worden, Ballantine, Pompeys Pillar, and the surrounding area should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

4.4.2.9 Molt

Molt is a farming community located in eastern Stillwater County, at the end of Molt Road, which originates in Yellowstone County as Rimrock Road. The majority of the Molt area consists of dryland grain farming and cattle ranching. Areas that are unusable for agricultural are coulees filled with sagebrush, juniper, and ponderosa pine.

Ten miles east of Molt are the McFarland and Echo Canyon subdivisions. Echo Canyon straddles Molt Road, which offers good access. Homes in Echo Canyon abut light rangeland fuels; however, many landowners graze horses or other livestock near their homes. The steep, rocky slope of a plateau rises behind the development to the east. Rangeland fuels tend to be somewhat inconsistent with patches of sagebrush and bare ground throughout.

Hidden Valley and Chief Joseph subdivisions are five miles southeast of Molt along Buffalo Trail Road. Some homes are accessible from Buffalo Trail, but many more are located off both sides of the highway on gravel loop roads that are not maintained. Vegetation consists of grasses, juniper, and ponderosa pine.

Canyon Creek and Clappers Flat Road are in the southern part of the Molt Fire District. Both roads are well maintained. Some homes are set in among trees and rimrocks.

4.4.2.9.1 Fire Potential

Fuels Assessment

The agricultural land in Molt consists of open grassland and strip farming for grain. Sagebrush is present in some of the pastures. The canyons south and east of Molt consist of grassland, juniper, and ponderosa pine. Most of these canyons consist of rimrocks with grassy areas on top and between them.

Ignition Profile

The vast majority of fires surrounding Molt are lightning caused. Field burning and slash fires are normally done with the consent of the fire department under favorable conditions. Occasionally, fires start from farming operations due to equipment malfunction.

4.4.2.9.2 Ingress-Egress

There are only two paved roads in the Molt Fire District, Molt Road and Buffalo Trail Road (from Laurel to Molt Road). Molt Road is the main highway leading to Molt from Billings. The pavement ends there and the graveled Molt-Rapelje Road begins. The Echo Canyon development has several entrances off of Molt Road. These roads are two-lane graveled routes traveling adjacent to developed lots, pasture ground, or low risk rangeland fuels.

Buffalo Trail crosses Molt Road two miles east of Molt. This is the main highway between Laurel and Broadview. North of Molt Road, it is gravel.

4.4.2.9.3 Infrastructure

Water sources in the Molt area consist of wells and cisterns. The fire department uses water from a storage tank and wells. Several gas and oil pipelines cross the Molt area. A natural gas compressor station is west of Molt. A power substation with high-voltage power lines is the eastern boundary of the Molt fire area.

4.4.2.9.4 Fire Protection

Molt Volunteer Fire Department is responsible for wildland and structural fire protection in the area. Mutual aid agreements in each county help with this protection.

4.4.2.9.5 Community Assessment

Homes and businesses in the community of Molt all have grassland or cropland adjoining their property. The risk of fire is relatively low.

The subdivisions along Molt Road and Buffalo Trail Road all include steep slopes with grassland, juniper, and ponderosa pine. Because of recent drought these areas are extremely dry. All homes in these areas need to have clean and clear areas around their homes.

4.4.2.9.6 Mitigation Activities

Education is the key to protecting rural subdivisions in the Molt area. Homeowners need to be shown techniques that can be used to make protection of their homes from fire much easier.

Roads in these rural subdivisions are privately owned, which is why upkeep on them is minimal. Homeowners need to keep these roads in the best shape possible so that emergency vehicles can enter and leave quickly and safely. Driveways should be built with enough room for emergency vehicles to turn around.

City and County planning boards should require developers to install water resources, such as cisterns and wells, in new subdivisions. Adequate water resources would make protection of these areas much easier.

4.4.2.10 Blue Creek

The community of Blue Creek lies south of the Yellowstone River between Billings and the Crow Indian Reservation. The community itself is surrounded by agricultural development. Several rural housing developments have become established in the rangelands south and southwest of the Yellowstone River. Included in this assessment is the Vista View Subdivision, Hillcrest Views, and the Hill Subdivision.

The Vista View area consists of several housing projects off of Basin Creek Road. Vista View Road travels to the top of the hill that is made up of rangeland grass with patches of sagebrush and juniper. The entire area is predominantly newer homes extending from the roadside up a gentle slope to a large plateau where 24 large lots have been established for construction. Structures near the road generally sit on fairly large open lots. These homes are more closely intermixed with the rangeland fuels.

The Hill Subdivision is just southwest of the Vista View Subdivision. There are several homes at the top of this hill that overlook most of the Blue Creek area.

The Hillcrest Views area is a large plateau lying southwest of Billings and is characterized by rangeland fuels with clumps of juniper and stunted ponderosa pine along the edges. Homes are typically built on large lots intermingled with the semi-wooded areas.

4.4.2.10.1 Fire Potential

Fuels Assessment

The native rangeland ecosystem around the outskirts of the community and abutting several of the rural subdivisions consists of short to medium length grasses with scattered clumps of sagebrush and juniper. This type of fuel is typically very flashy. Fires spread quickly, particularly upslope, but tend to burn at lower intensities. In some areas, the lack of a consistent fuel bed may slow the spread of fire. The rangelands of eastern Montana, including Yellowstone County, historically burned at frequent intervals. 5 to 25 year return intervals helped maintain the grassland ecosystem by limiting the establishment of slower growing species.

The partially timbered areas in Blue Creek are almost exclusively made up of ponderosa pine. Stringers and patches of trees typically exist in the coulees and canyons where moisture is more readily available. In most cases, fires in this type of timber will stay on the surface with only occasional torching of individual trees or clumps of trees, particularly where juniper offers a ladder fuel. Under extreme conditions, such as drought or high winds, fires will spread very rapidly with larger flame lengths.

The agricultural fields that currently dominate the surrounding foothills become very dry during the summer months. These cured grasses can be very flammable, especially under extreme weather conditions, such as drought or wind. In the event of an uncontrolled wildfire, these light fuels would tend to support very fast moving, yet lower intensity fires. Modification of the vegetation with available farm equipment is usually effective in controlling wildfire.

Ignition Profile

Both natural and human caused ignitions occur in Blue Creek. The community center is more prone to human caused ignitions than lightning strikes due to the flat topography and agricultural development; however, lightning strikes occur fairly frequently in the rangeland and forestlands throughout the county. Annual field burning, debris fires, and vehicle use are common potential ignition sources. Stubble fires seldom escape landowner's boundaries;

however, there are a few incidences each year. These fires are generally easily suppressed by modifying the vegetation and homes are rarely threatened.

Vehicle use on and off road is also a significant source of ignitions. Not only do sparks from vehicles ignite fuels along roadways, but fires are also commonly started by vehicles driving through dry fields or on unimproved trails. Grain trucks, ATV's, and pickups are used regularly in farming operations.

4.4.2.10.2 Ingress-Egress

The primary access into Blue Creek is via Blue Creek Road from the north or south; however, there is another transportation route coming into the area. This is Duck Creek Road to Keller Road. Most of the rural housing is accessed from gravel roads branching off of these primary routes.

Blue Creek Road provides the main access into the Vista View Subdivision. This two lane highway abuts rangeland fuels and provides an escape route out of this subdivision. Vista View Road is the primary access route for homes in this subdivision. Vista View is a loop road; however, it branches off near the top and it is fairly well maintained. Potholes and severe washboards may hinder the speed of emergency response. Better signing of the roads and house numbers at the end of driveways would help reduce confusion for emergency response personnel and for residents during an evacuation. The Vista Blue Road provides access to a couple of homes; however, this route dead ends at the last house. The lack of an alternate escape route significantly decreased the safety of residents in an emergency situation.

Homes in the Hill Subdivision area are accessed via the Vandever Road off of Blue Creek Road. This is a two lane, graveled road that extends past the fire service area to the west. For the most part, this route is well maintained; however, the further west you travel, it is for the most part, impassible.

Hillcrest Views is reached by following Hillcrest Road off of Blue Creek Road. This is also a two land paved road that is kept in good condition. Most of the homes in this area are accessed off of Hillcrest Road, which continues south to the Crow Indian Reservation. This road starts out as a paved two lane route; however, it tapers into a two lane gravel road towards the end. There are several dead end spur roads and driveways branching from the Hillcrest Road, none of which seem to have alternate escape routes. The safety of residents in the Hillcrest area would be drastically improved with the development of some thru roads.

4.4.2.10.3 Infrastructure

Blue Creek has a municipal water system for residents within the city limits. Rural subdivisionsx and individual homes rely on personal or multiple home well systems and storage tanks.

There are several high tension power lines crisscrossing the Blue Creek area, most of which travel over surrounding rangeland fuels. These fuels are highly receptive to sparks originating from the downed lines, arcing, or malfunctioning transformers.

4.4.2.10.4 Fire Protection

The Blue Creek Volunteer Fire Department is responsible for EMS, structural, and wildland protection for the community of Blue Creek and the immediately surrounding areas.

4.4.2.10.5 Community Assessment

Residential development is expanding along Blue Creek Road to the south. There are few remaining patches of native rangelands; however, this area is primarily used for the production of agricultural products. The banks of the Yellowstone River are lined with dense riparian vegetation that could support an intense fire. Homes directly adjacent to these fuels could be at high risk; however, the development of irrigated lawns and crop fields next to the channels will help keep the fire contained.

Subdivisions built near or within higher risk rangeland fuels or wooded areas have an increased risk of wildland fire. Homes located in the Vista View area, Hill subdivision, and near Hillcrest Views are surrounded by fuels that have a moderate to high wildland fire risk due to the higher density of sagebrush, juniper, and timber.

The Vista View Subdivision has a moderate risk of wildfire. Many homes have created an adequate defensible space; however, there are several homes that have juniper and ponderosa pine directly abutting structures. Furthermore, many of these homes are built along the upper slopes of that area. Fires originating near the road could spread upslope very rapidly giving residents little time to escape. Road and house number signage, as well as road widening and maintenance would significantly improve the safety of residents in the Vista View area.

Hillcrest View is a relatively large drainage with thick grasses in the valley bottom and ponderosa pine and juniper lining the upraising slopes. Homes in this area have been built in the valley bottom with small agricultural crops or livestock pasture surrounding home sites. For the most part, landowners have created defensible space around structures. Homes built closer to the timber may benefit from clearing brush and other ladder fuels from the understory and pruning trees within at least 50 to 100 feet.

Homes in the Hill Subdivision area have a moderate to high risk of experiencing a wildfire. Not only are many of the houses intermixed with heavy rangeland fuels, but access into the area is very poor. Ponderosa pine, juniper, and sagebrush commonly abut these homes. Additionally, not only does the main access route dead end, there are several unmarked spur roads that dead end at home sites. Homeowner education regarding the value of a defensible space, especially in areas with hazardous fuels would help increase community awareness of the wildfire risk. The safety of residents and emergency response personnel would be improved by road and house number signing as well as construction of a thru road to provide an alternate escape route.

It is imperative that homeowners, particularly in higher risk areas, implement fire mitigation measures to protect their structures and families prior to a wildland fire event. As the community grows, more and more homes will be built in the wildland urban interface. It will become increasingly important to educate landowners of the potential risk of fire. The receptive nature of the rangeland fuels in Yellowstone County and their natural tendency towards frequent burn intervals increases the likelihood of a fire start. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds; however, there is still a need to inform others of the potential danger.

4.4.2.10.6 Mitigation Activities

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Yellowstone County must be made aware that home defensibility starts with the home. Once a fire has started and is moving toward a structure or other valued resources, the probability of

that structure surviving is largely dependent on the structural and landscaping characteristics of the home. “Living with Fire, A Guide for the Homeowner” is an excellent tool for educating the homeowners as to the steps to take in order to create an effective defensible space. Residents of Blue Creek and the surrounding area should be encouraged to work with the local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations.

Community defensible space projects can also help improve the safety of groups of homes. Rural subdivisions adjacent to wildland fuels can create fuel breaks along their perimeter that also increase the value of the homes in the community.

Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event. In many cases, homes’ survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles. Roads and driveways accessing homes should be regularly maintained with the edges mowed to prevent an accidental ignition. Homeowners with structures located on dead end roads or driveways with no alternate escape route should construct loop roads where possible or establish gates in fencing to allow for an emergency evacuation if the primary escape route becomes impassible.

New developments in the wildland urban interface should be regulated by building codes that protect residents from the effects of wildfire. Insuring that there are adequate water resources in the case of an emergency.

4.5 Firefighting Resources and Capabilities

The Fire Fighting Resources and Capabilities information provided in this section is a summary of information provided by Yellowstone County Fire Organizations and Representatives of the Wildland Fire Fighting Agencies listed. Their answers to a variety of questions are summarized here. These summaries indicate their perceptions and information summaries.

4.5.1 Rural and City Fire Protection

4.5.1.1 Billings Fire Department

Marv Jochems, Chief
(406) 657-8420 or (406) 657-8423
JochemsM@ci.billings.mt.us
2305 8th Avenue North, Billings, MT 59101

District Summary:

The Billings Fire Department provides services to the City of Billings and surrounding contracted areas in Yellowstone County commonly referred to as the Billings Urban Fire Service Area (BUFSA). The total response area is approximately eighty-four square miles. The fire department provides emergency services such as fire suppression, emergency medical response, hazardous materials response, high angle rescue, confined space rescue, vehicle accident extrication, and fire investigations. There are currently six fire stations within the city limits with plans for an additional station on the west end of Billings.

Personnel include a Fire Chief, an Assistant Fire Chief, A Sr. Administrative Coordinator, an Administrative Secretary, a Fire Marshal, an Assistant Fire Marshal, 3 Deputy Fire Marshals, a Training Officer, a Maintenance Officer, 4 Battalion Chiefs, 27 Captains, 27 Engineers, and 39 Firefighters.

Under the direction of the Billings Fire Department, the City/County 9-1-1 Center provides the critical link between the community and public safety resources. Twenty-seven (27) full-time employees and three (3) 9-1-1 supervisors receive, coordinate, and process emergency and non-emergency radio and telephone traffic twenty-four (24) hours a day. Additionally, the 9-1-1 Center oversees the maintenance and usage of the citywide 800 MHz radio system.

Priority Areas:

Residential Growth:

The Billings area is growing at a steady rate. Growth is not expected to slow, in part, due to the population exceeding 100,000 people. At this population level, planners anticipate the community to become 'self generating' and continue to grow at a steady and significant rate.

Communications:

Communications within the Billings City Fire, Police and EMS systems are relatively effective and efficient, all using an 800 MHz radio system with a central dispatch center. However, communications with organizations outside of the City, such as other fire departments, is challenging, as many of these organizations are still using VHF or other systems not compatible with the 800 MHz system.

Fire Fighting Vehicles:

With the steady expansion of City limit boundaries, the amount of wildland urban interface area in the jurisdiction is increasing. The City's wildfire fighting apparatus, such as brush trucks, may be inadequate to handle potentially large wildfire events which include interface with urban development, such as in Rehberg Ranch Subdivision. Additional wildland firefighting resources are needed.

Burn Permit Regulations:

The current burn permit regulations appear to be adequate. The Billings Fire Department administers and regulates burn permits within the city limits. The Yellowstone City-County Health Department administers and regulates burn permits in the county.

Effective Mitigation Strategies:

The Department is making great efforts to expand the number of stations, equipment and personnel to meet the increasing demands resulting from population growth. The Department actually employs fewer firefighting personnel in 2005 than it did 30 years ago. From 1974 to 2004, the fire service area has expanded from 18 to 84 square miles. During the same period, staffing has decreased from 112 to 104 personnel. While the demand for firefighting and prevention efforts has dramatically increased, staffing has decreased, resulting in longer response times on calls and an inability to maintain relative levels of service to the public. Staffing and equipment resources are at a critical level.

Education and Training:

The Billings Fire Department provides annual wildland firefighting training. This includes a pre-fire season firefighter safety and survival course of instruction. Also provided is training for pumper drafting, tender and water shuttle operations, collapsible tank deployment, and a

sawyer class. This takes place in the context of 12 hours minimum of training. Additional training takes place at individual stations at the discretion of station Captains. Many of the firefighters certify on their own to carry wildland firefighting certifications such as red cards, engine boss, and various other positions.

Cooperative Agreements:

Billings has formal and signed mutual aid agreements with ConocoPhillips, ExxonMobil, and Cenex refineries, the communities of Laurel and Lockwood, and the Billings Logan International Airport ARFF. Billings generally offers mutual aid to all requesting fire departments surrounding the Billings area, pursuant to MCA 1-3-209, the State Mutual Aid Law.

Current Resources:

Station #1 – 2305 8th Avenue North:

Table 4.2. Billings Fire Department Station #1 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2003	HME	Pumper	750 Gallons	1500 GPM
1997	Sutphen	Aerial Ladder	750 Gallons	1500 GPM
1997	Freightliner	Water Tender	2500 Gallons	300 GPM
2004	Ford	4x4 Brush Truck	450 Gallons	100 GPM
1991	E-1	Reserve Pumper	750 Gallons	1500 GPM
1992	Dodge	Utility Pickup	N/a	N/a
2002	Chevrolet	Suburban (Battalion Chief)	N/a	N/a
1996	Chevrolet	Suburban (Training Officer)	N/a	N/a

Station #2 – 501 South 28th Street:

Table 4.3. Billings Fire Department Station #2 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2001	Sutphen	Pumper	750 Gallons	1500 GPM
1998	Chevrolet	Rescue	N/a	N/a

Station #3 – 1928 17th Street West:

Table 4.4. Billings Fire Department Station #3 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1993	3D MFG.	Pumper	750 Gallons	1500 GPM
1991	E-1	Reserve Pumper	750 Gallons	1500 GPM

Station #4 – 475 6th Street West:

Table 4.5. Billings Fire Department Station #4 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
2003	HME	Pumper	750 Gallons	1500 GPM
2004	Freightliner	Haz-Mat Van	N/a	N/a

Station #5 – 605 South 24th Street West:**Table 4.6. Billings Fire Department Station #5 Equipment List.**

Year	Make	Model	Tank Capacity	Pump Capacity
2001	Sutphen	Pumper	750 Gallons	1500 GPM
2004	Freightliner	Water Tender	2600 Gallons	300 GPM
2002	Ford	4x4 Brush truck	450 Gallons	100 GPM
2005	Sutphen	Quint	500 Gallons	1500 GPM

Station #6 – 1601 St. Andrews Drive:**Table 4.7. Billings Fire Department Station #6 Equipment List.**

Year	Make	Model	Tank Capacity	Pump Capacity
1993	3D MFG	Pumper	750 Gallons	1500 GPM
1992	Ford	4x4 Brush Truck	300 Gallons	100 GPM
1986	Chevrolet	Air (SCBA) Van	N/a	N/a

Future Considerations:

A 7th Fire Station is currently being planned and is tentatively scheduled to begin construction in early 2006.

There is a need for City and County regulations to require minimum levels of wildland fuel mitigation in urban interface areas to protect lives and property. Virtually no regulations currently exist in City and County Code. Some individuals may view these new regulations as unnecessarily restrictive, but these changes could reduce insurance rates and the loss of life and property within the community.

4.5.1.2 Broadview Rural Fire District #3**District Summary:**

Broadview Rural Fire District #3 is based in Broadview, Montana. The Broadview Rural Fire District covers four counties, northwestern Yellowstone County, northeastern Stillwater County, southeastern Golden Valley County, and southwestern Musselshell County. The fire hall is located in Broadview, Montana. They have mutual aid agreements with the surrounding fire departments. At the present time, the Broadview Rural Fire District does not respond to structural fires within their district; they are solely a wildland fire response organization. As a recommendation for this plan, they believe it would be in the best interests of the community for the department to assume structural suppression responsibilities.

Broadview Rural Fire District #3 has a few interface areas in Yellowstone County. More are located in the surrounding counties where they have people moving into timbered areas.

Their needs at the present time are a repeater/pager tower in the Broadview area to help with communications, a Type 6 Wildland Fire Truck, a Pro-PAC foam kit, a floater pump, and any kind of PPE that they can get. They also need basic wildland fire training. For the future needs of the BRFD, they would like to get a Type 3 truck and the training necessary to use this truck.

Current Resources:

Table 4.8. Broadview Rural Fire District #3 Equipment List.

Year	Make	Model	Tank Capacity (gal)	Pump	Comments
1973	Ford	F-250	200 gal w/ Vanguard 9 hp motor	Davy pump	Midland radio, 100' of 1" hose with hand reel, 5 gal gas can and 5 gal foam can, 4 bladder packs, 20' log chain, First Aid kit, 1 flapper, 2 axes, 1 shovel, and 1 rake
1989	Chevrolet	1-ton	215 gal w/ 18 hp	Briggs & Stratton pump	Kenwood radio, 100' of 1" hose w/ electric reel, 8' suction hose, 2 ½ gal gas can, 2 ½ foam can, First Aid kit, 2 flappers, 2 Pulaski's, 1 brush rake, and 1 shovel
1976	GMC	25	200 gal slide in		100' hose and reel, 3 bladder packs, 4 Pulaski's, 1 brush rake, 2 shovels, 2 flappers, and 1 axe
		6x6 Military Truck	1000 gal w/ 5 hp engine	Centrifugal pump	100' of ¾" hose w/ hand reel and 50' of 1 ½" hose
1974	Peterbuilt	Tender	5000 gal	300 gpm (50 psi)	20' of 2" hose, 40' of 3" hose, and 1500 gallon drop tank
1967	International	1300	300 gal w/ Vanguard 9 hp motor	Davy pump	Regency radio, 100' of 1 ¼" hose w/ hand reel, 2 Indian backpacks, 1 fire shelter, 2 ½ gal gas can, 5 gal foam can, 3 shovels, 1 brush rake, 1 Pulaski, 20' 3/8" log chain
1979	Ford	F-350	215 gal w/ 18 hp Twin Briggs engine	Davy pump	Midland radio, 12' suction hose, 150' of 1" hose w/ electric reel, 25' of 1 ½" hose, 5 gal gas can, 5 gal foam can, 3 bladder packs, 3 fire shelters, 4 tire chains, 1 oxygen kit, 1 flare kit, 20' of 3/8" log chain, burn First Aid kit, 2 shovels, 3 flappers, 1 Pulaski, 1 brush rake, and 1 axe

Other items: 8 SCBA's, 3 sections of 50' of 1 ½" water hose, 6 cots, 11 hp Wisconsin engine with 2" pump, 50 gallons of foam, aluminum extension ladder, one bladder pack, 1000 gallon water tank, 1000 gallon propane tank, 500 gallon propane tank, 2 slide in 200 gallon tanks with engine, pump, hose, and reel, 1 state lands slide in tank, engine, pump, hose, and reel, 1 ½" socket set, various sizes and amounts of structural and brush turnouts, helmets, pants, and fire shirts (all are hand-me-downs), 2 Bendix King radios, 2 Kenwood Radios, 2 Johnson Radios, 3 Kenwood Radios, and 9 handheld radios.

4.5.1.3 Lockwood Fire Department

Alan Riley, Chief
 (406) 855-0400
 Officer1198@yahoo.com
 3329 Driftwood Lane
 Billings, MT 59101

District Summary:

Lockwood Fire District is responsible for structural and wildland fire protection, hazmat, rescue, and emergency medical service in the unincorporated area east of the city of Billings. Lockwood Fire District covers 80 square miles and has both Interstate 90 and Interstate 94 within its district boundaries.

Lockwood Fire District is a combination department with 14 career firefighters, 1 administrative aid, and 8 volunteer firefighters. All aspects of the district response are major concerns due to the limited manpower and equipment. Lockwood Fire District has mutual aid agreements with the city of Billings and surrounding volunteer fire departments. Additional resources are available from the Department of Natural Resources and Conservation and the Bureau of Land Management for larger wildland incidents.

Priority Areas:

Residential Growth:

The residential growth in the district has far exceeded the expected growth for the area. New subdivisions are being developed from the flat farm lands to the steep wooded Hills on the eastern edge of the district. The wildland urban interface area is a major “red flag” for the district with the placement of houses with high risk indefensible landscapes.

Communications:

The communications in the district are barely adequate to meet the needs. Topographical features within the district make radio communications difficult to impossible in some areas. Frequently, “dead spots” are found where communications are nonexistent. Furthermore, inadequate common frequencies make for dangerous situations during interface fires.

Fire Fighting Vehicles:

Due to limited funding, the age and capabilities of the firefighting vehicles in our District has been an on-going concern.

Effective Mitigation Strategies:

The Fire District has strived to keep pace with the growth in the district, but due to a drop in the district’s taxable value, this has not been possible. Over the last ten years the Fire District has added one aerial truck and one front line pumper with the aid of state grants and low interest loans. The District has been unsuccessful in attempts to fund a quick response wildland urban interface truck to replace the 1985 truck currently in operation.

Future plans to build a new fire station are now being explored. The current location does not have adequate space to house the number of vehicles or firefighters the District has at this time and there is no room for further expansion.

Education and Training:

Our department provides continued training for all firefighters in the Fire District. Several of our members teach classes for the County through the Department of Resources and Conservation. The department has planned and participated in a number of countywide mutual aid drills. At this time our training room has been converted into an additional bay to house another vehicle.

The Fire District has provided public education through the schools as well as providing public informational meetings. The firefighters have gone door to door talking to the homeowners about defensible space and making their homes more defensible in the event of wildfire. A video was produced and distributed statewide on how the home owner can protect their homes. Firefighters in this district have made themselves available to do on-site evaluations of property

in this district. Efforts have been made to assist the homeowner in clearing brush from the property.

Cooperative Agreements:

The Lockwood Fire District has a mutual aid agreement with Yellowstone County, which covers all fire departments within the county including the City of Billings. In addition, the fire District has a mutual aid agreement with the Bureau of Indian Affairs through Yellowstone County. The County Fire Warden can provide additional help from the Department of Natural Resources and Conservation and from the Bureau of Land Management.

Current Resources:

Station #1 – 2305 8th Avenue North:

Name	Year	Make/Model	Tank Capacity	Pump Capacity
Engine 1	1997	Pierce Saber	750 gal	1250 gpm
Engine 2	1992	Pierce Arrow 65' Telesquirt	500 gal	1500 gpm
Engine 3	1985	GMC 1-ton	300 gal	200 gpm
Engine 4	1979	International 4x4	1400 gal	1000 gpm
Tender 1	1979	GMC General	3700 gal	PTO
Squad 1	1995	E-350 Type 3 Ambulance		
Squad 2	1993	Ford 4x4 Type 1 Ambulance		
Squad 3	1997	Suburban Multi-Use Vehicle		
Unit 20	2001	Dodge Intrepid (Chief's Car)		

Proposal for New Fire Station:

The Lockwood Fire District operates out of one station. Over the years, we have steadily been running out of room. When the Fire District was first formed in 1988, we had two trucks and operated out of a garage and a Boise Cascade house. Today, the department has multiple vehicles consisting of four trucks, one tender, and four utility vehicles. The department also operates an Advanced Life Support (ALS) service with two ambulances and three paramedics. The Lockwood Fire District has recently purchased five acres of land on Johnson Lane. This piece of property has direct access onto Johnson Lane both north and south. It was decided that no tax dollars would be used for the construction of a facility except for the purchase of the land. After several conceptual meetings, it was decided to consider a building that encompasses a fire station, clinic, pharmacy, and community hall. The firehouse would be approximately 11,728 square feet and the apparatus bay would be 14,760 square feet. The clinic/community hall would be 5,112 square feet. The total square footage of the whole area would be approximately 110,000 square feet. The construction of this facility would create at least sixteen new jobs.

Future Considerations:

Lockwood Fire District will continue to be proactive in protecting the community and the firefighters. New information and projects will be provided to the residents in the District to reduce fire hazards and make the community safe. Building the new fire station and training facility will allow the Fire District to keep pace with the needs of the District, the community, and

the firefighters. Additional and upgraded equipment will be necessary to protect the citizens in the District. The new fire station and equipment should reduce insurance costs to the homeowners and reduce the loss of life and property within the District.

4.5.1.4 Worden Volunteer Fire Department

Monte Dvorak, Chief
(406) 967-4946
P.O. Box 369
Worden, MT 59088

District Summary:

The Worden Fire Department is all volunteer. They have 32 members in all and provide structure, wildland, and EMS. The district covers over 550 square miles. Both Worden Fire District #4 and the Huntley Project Fire Service Area contract with the Worden Volunteer Fire Department to provide structural and wildland fire protection to their constituents. Worden VFD borders two other counties, which are Musselshell and Big Horn. This department has mutual aid agreements with all other surrounding departments, specifically the Billings, Blue Creek, Broadview, Custer, Duck Creek, Haley Bench, Homewood Park, Laurel, Lockwood, Molt, and Shepherd. Also, BLM helps whenever requested. They have three fire stations located in Worden (our main station), Huntley, and Pompeys Pillar. In all they have 6 small communities that make up the Huntley Project.

Priority Areas:

Residential Growth:

The greatest concern lies in the Huntley - Pryor Creek area. There are numerous subdivisions that have been built in that area without any water storage tanks with dry hydrants. Most of the subdivisions are built in dryland areas where water is not readily available. They are also getting a lot more subdivisions in the valley, but most are on irrigated ground.

The Worden VFD is asking that any subdivisions proposed to have five or more residential dwellings be required to put in a 10,000 gallon dry hydrant.

Communications:

Communications is always a concern. At this time all of their fire vehicles have radios and all personnel have handheld radios. Their concern is that when they go to narrow band some of their radios won't be compatible.

Fire Fighting Vehicles:

The Worden VFD has upgraded substantially in the last 10 years, but they still have two Type 6's that are very hard to order parts for. One is owned by the DNRC and definitely needs to be replaced. It would be in the DNRC's best interest if they could replace theirs with a newer model.

Burning Permit Regulations:

Burning permits have been an issue for years. The County now has stricter laws in effect, but they are not always enforced by law enforcement when they are called on. The Worden VFD gets hundreds of calls during the spring to fall period when people are wanting to burn ditches, limbs, and old grass. It keeps more than one person busy just taking these calls. The department would like these calls to be recorded and used for

future references if a fire gets away. This way the calls would not tie up our lines in case there is a real emergency.

Effective Mitigation Strategies:

The department has been upgrading their vehicles and buildings as is affordable. They have updated the Huntley Station from a cold storage station to a heated station after they got a fire service area formed in 1994-95. They also built a fire station at Pompeys Pillar and supplied it with structural and wildland vehicles. The department is also in the process of buying two more lots in Worden, so they can expand the station there. The department has upgraded much of their equipment from FEMA grants and VFA/RFA grants. They are in the process of getting a new tender through a FEMA grant. All of their wildland firefighting vehicles have been fitted for foaming capabilities and our main structure vehicles have foam as well. The department has tried to keep up with the times and changes, but it takes a lot of money. Even the department's Humvees that were bought almost new are now 10 years old.

Education and Training:

The Worden VFD has had an open house the last two years at which they explain to the people where they are at and where they are going. The department hands out information on how to make their dwellings safer. In 2004, the firefighters went from door to door in the Huntley-Pryor Creek area handing out information and explaining how to make their homes more firewise.

The department was unable to go back to that area this year, but plan to go there again in 2006. They also have the kindergarten and first graders come to the Worden Fire Station and the firefighters explain and demonstrate what they do. They also give the teachers and pupils some helpful hints on how to be firewise.

Training for the department is always an important factor. They train twice a month on fire and once on EMS. Every department is always looking for new training skills and classes that will make the department better and their personnel safer. They have been struggling with DNRC to get the classes they want. For the last several years, many classes have been held out of county so it makes it hard to attend and also very expensive. Some of these classes are 2-4 days long and it gets awful expensive and time consuming for the volunteers. Some people just can't afford to take off work and the added expense. There also seems to be many people that like to join the departments, but don't like to train regularly.

Cooperative Agreements:

The department has a good mutual aid agreement with all surrounding fire departments. BLM is also very helpful if resources are needed. It is not always easy to get help from the DNRC when there is more than one fire in the area.

Current Resources:

Station #1 –Worden:

Table 4.10. Worden Volunteer Fire Department Worden Station Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1975	Ford	F-750	750	750
1995	Freightliner	EEI	1000	1250
1995	HummVee	AmGeneral	250	350
1995	HummVee	AmGeneral	250	350
1968	Kaiser 6x6		1000	350
1969	White	9000	4200	350

Station #2 – Pompeys Pillar:

Table 4.11. Worden Volunteer Fire Department Pompeys Pillar Station Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1996	HummVee	AmGeneral	250	350
1969	Kaiser 6x6		1000	350
1969	Chevy	C70	750	750
1965	Jeep		250	350

Station #3 – Huntley:

Table 4.12. Worden Volunteer Fire Department Huntley Station Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1965	International		1000	1000
1968	Jeep		250	250

Future Considerations:

- All new subdivisions will have 10,000 gallon dry hydrants when 5 or more houses are to be built.
- Putting more dry hydrants and storage tanks in existing subdivisions like White Buffalo and Shadow Canyon.
- A storage tank and dry hydrant at Scouthern and Bundy and one on Arrow Creek Road.
- We have 3 250 gallon slide-in tanks with pumps that we lent out to ranches north and east of Pompeys Pillar.
- We would like to put a Type 6 out at Clair Temprow's.

4.5.1.5 Worden Fire District #4

Daniel Krum, President
406-967-3281
P.O. Box 213
Worden, MT 59088
danielk@be-quik.com

District Summary:

We have no assets. We have a taxing district, but contract fire suppression services from the Worden Volunteer Fire Department.

4.5.1.6 Custer Volunteer Fire Department

Milton Mothershed, Chief
(406) 856-4261
Milton@midrivers.com
P.O. Box 47
Custer, MT 59024

Current Resources:

Station #1

Table 4.13. Custer Volunteer Fire Department Station #1 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1967	AMG	2 ½ ton 6x6 Tender	1800	150
1982	AMG	2 ½ ton 6x6 Tender	2100	150
1993	Ford	350 4x4 Type 6	400	150
1983	Ford (DNRC)	350 4x4 Type 6	250	150
1967	Ford 850	Structural	1000	750

Station #2

Table 4.14. Custer Volunteer Fire Department Station #2 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1965	Jeep	Type 6	250	150

4.5.1.7 Molt Volunteer Fire Department

Greg Smith, Chief
(406) 669-3139
1438 Buffalo Trail
Molt, MT 59057-2101
buffalo@ttc-cmc.net

District Summary:

The Molt Volunteer Fire Department is responsible for wildland and structural fire protection in western Yellowstone County and eastern Stillwater County. The fire station is located in the town of Molt, which is in Stillwater County. One truck is kept at a member's home in the southern part of our area. Our main emphasis is wildland protection. We are not structure rated, but will do what we can at a structure fire. We have mutual aid agreements with each county.

Priority Areas:

Residential Growth:

The Buffalo Trail area has experienced a large increase in home building in recent years. Some homes have been built in areas where it will be hard to defend them from wildfires.

Communications:

We are constantly upgrading our radio and pager systems. All our members have pagers. We are working towards all members having radios.

Fire Fighting Vehicles:

With the exception of a new vehicle provided by the State of Montana, our vehicles are old and probably not capable of adequately protecting our wildland/urban interface.

Burning Permit Regulations:

The county government needs to come up with an enforceable burn permit system. Most of our residents do call and ask permission if they want to burn and have worked with us very well.

Effective Mitigation Strategies:

The county planning departments need to develop a process that will make sure homeowners and developers build homes that are well protected from fire. This could include sprinkler systems in homes, fire resistant construction materials, and landscaping designed to minimize exposure to a wildfire. Dry hydrants in developments would be assets. Roads and driveways need to be wide enough for safe access by fire trucks.

Our department needs to replace several old firefighting vehicles. Structure rated engines are much needed. Our low income has kept us from replacing vehicles as needed.

Education and Training:

Our volunteers attend training sessions sponsored by the State and sometimes attend training at neighboring departments. Our department also holds monthly training sessions.

Cooperative Agreements:

Molt Volunteer Fire Department has mutual aid agreements with Stillwater and Yellowstone Counties. The State of Montana and Bureau of Land Management are available for fires that exceed the resources of the local fire department.

Current Resources:

Station #1

Table 4.15. Molt Volunteer Fire Department Station #1 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1992	Ford	Tender	2500 gal	350 gpm pto, 300 gpm portable
1987	Dodge 4x4	Type 6 engine	300 gal	120 gpm
1975	International 4x4	Mini-pumper	300 gal	350 gpm pto, 120 gpm portable
1976	Military 6x6	Type 6 engine	1000 gal	120 gpm
2005	Ford 4x4	Type 6 engine	300 gal	120 gpm
1968	Jeep 4x4	Type 6 engine	200 gal	120 gpm

Station #2

Table 4.16. Molt Volunteer Fire Department Station #2 Equipment List.

Year	Make	Model	Tank Capacity	Pump Capacity
1978	Military 6x6	Type 6 engine	1000 gal	120 gpm

4.5.1.8 Shepherd Volunteer Fire Department

Stuart Andersen, Chief
 406-373-5802
 Cell: 406-698-6339
 P.O. Box 1
 Shepherd, MT. 59079
 Wildfire_engines@hotmail.com

District Summary:

Shepherd Volunteer Fire Department (SVFD) covers approximately 520 square miles. The District runs north to the Musselshell County line, south to the city of Billings north boundary, west to the railroad tracks to Acton and east to the Yellowstone River to Worden. There are two SVFD fire stations in the district and two satellite stations. There are 30 members, all volunteer. In most cases, out of the 30 members, 10 to 15 are active, depending on what time of day it is. The reason for this is that most of the members work in Billings, so at times during the work week, they have only two to five people available. The Bureau of Land Management (BLM), Billings Field Office has been a lifesaver the last couple of years in responding to some of their wildland fires near or adjacent to BLM lands. The department also uses Worden, Blue Creek, City of Billings, Custer, Haley Bench, Molt, Lockwood, Homewood Park, Laurel, Duck Creek and Broadview for mutual aid.

Shepherd VFD covers a wide variety of topography. There are more “leap frog” residential areas into urban interface type zones. Yellowstone County has done little in the way of regulations for road access, rural addressing, road design and water supply, etc. Individual fire departments have had to go it alone.

Priority Areas:***Residential Growth:***

The entire Shepherd area has almost doubled in population in the last 8 to 10 years and the way it looks, it will double again in the next ten years.

We are getting people that don't keep their yards or property up resulting in higher wildland fuel loadings in these areas. Some of the rural public burn any time they so desire. We need strict regulations. Possibly Yellowstone County needs to make better laws for people that are burning and letting weeds, grass and combustible fuels build up around their property. And when these laws are approved, enforce them.

Effective Mitigation Strategies:

1. Upgrade to newer equipment
2. We have had five dry hydrants installed and two more are on the way
3. We upgraded the Communication System with a new paging system
4. We built a new five bay fire station
5. Purchased a new 1250 gpm structure engine

Future Plans:

1. To replace station 2 with a fire department owned one in a better location.
2. Upgrade the 6 x 6's to newer Type 3 engines.
3. Purchase a new 3000 gal water tender.
4. Plan to develop more dry hydrants in the north half of the protection area.
5. Rural addressing system needs to be reviewed.
6. Fuels reduction around home sites and increase public awareness.

Education and Training:

The Shepherd VFD has experienced a lack of interest from our members for training and education. How can we resolve this issue? We have had a problem with getting training from DNRC in a timely manner.

Communications:

Due to topography, sometimes it is impossible without going through dispatch. It would be nice Shepherd had their own repeater system.

Fire Fighting Vehicles:

The Shepherd VFD needs one new structure engine, for station 2. All three 6 x 6's need to be replaced with Type 3 engines. They also need one new Type 2 water tender.

Current Resources:

Station #1 – Shepherd

Table 4.17. Shepherd Volunteer Fire Department Station #1 Equipment List.

Year	Make/Model	Type	Tank Capacity (gal)	Pump Capacity (gpm)
1970	American General 6x6 Brush Tender		1000	
1986	GMC Water Tender	Type 2	3000	
1995	Ford Engine	Type 6	220	
1983	Dodge Engine	Type 6	210	
2003	Almonte Structural Engine	Type 1	1000	1250
1975	Hendrickson Ladder Truck	Type 1	1000	1500
1996	Chevy Suburban (EMS only)			

Station #2

Table 4.18. Shepherd Volunteer Fire Department Station #2 Equipment List.

Year	Make/Model	Type	Tank Capacity (gal)	Pump Capacity (gpm)
1972	American General 6x6 Brush Tender		1500	
1975	Ford Darley Structural Engine	Type 2	1000	500

Station #3

Table 4.19. Shepherd Volunteer Fire Department Station #3 Equipment List.

Year	Make/Model	Type	Tank Capacity (gal)	Pump Capacity (gpm)
	Brush Truck, 1 ton (DNRC owned – assigned to Bar Diamond Initial Attack)			

Station #4

Table 4.20. Shepherd Volunteer Fire Department Station #4 Equipment List.

Year	Make/Model	Type	Tank Capacity (gal)	Pump Capacity (gpm)
1975	American General 6x6 Brush Tender		800	

4.5.1.9 Blue Creek Volunteer Fire Department

Rick Cortez III, Chief
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Billings, MT 59101

District Summary:

Blue Creek VFD is responsible for EMS, structure, and wildland fire protection for 54 square miles south of the Yellowstone River. The department is flanked on the west by Duck Creek IAA, on the east by Lockwood Fire District, and bordered to the south by the Crow Indian Reservation/BIA. There is one fire station in the service area. The station is located at the north end of our coverage area. We are an all-volunteer department with a total of 24 firefighters. Our primary areas of concern are structural fire protection and EMS, but due to the nature of our service area, the majority of our responses are wildland fires in wither grassland or timber environments. We are capable of handling most Type 4 wildland incidents. Because of overlapping areas of responsibility, we have a mutual aid agreement with the Bureau of Indian Affairs.

Priority Areas:

Residential Growth:

The south and west ends of the fire service area have been experiencing significant residential growth over the last several years and indications are that this trend will continue into the foreseeable future.

The use of improper building materials, and/or construction practices for new construction in “high risk” wildland-urban interface areas and indefensible ground surrounding existing structures is a problem in some areas.

Communications:

Communications capabilities in our area are barely adequate. Topographical features within the area make radio communications with county dispatch and other agencies, difficult to impossible in some areas.

Firefighting Vehicles:

Due to limited funding, the age and capabilities of the firefighting vehicles in our department has been a concern.

Burn Permit Regulations:

The careless and unregulated use of fire to remove trash, weeds, and other burnable materials in addition to burning during stat burn ban periods needs to be addressed.

Effective Mitigation Strategies:

The department continues to keep pace with expansion in the area and has been successful in the upgrading of equipment and resources through the use of state and federal grants. The intent of the department is to continue to replace our aging equipment. Over the past six years, the fire service area has replaced two vehicles and is currently in the process of replacing two more.

Future plans include building a new fire station on the land the department owns in the area. Our current station is now located in a newly annexed area to the City of Billings. We are also looking to replace present vehicle and portable radio communications equipment.

County development of stricter building codes for designated “high risk” wildland-urban interface areas is needed. These codes should focus on the use of fire proof or fire retardant roofing,

siding materials, and roof ventilation systems that inhibit entry of airborne burning materials into roof and attic areas. Recommendations to persons building new homes to consider earthen terraces and patios constructed of non-flammable materials instead of highly flammable wooden decks should be developed. Additional considerations should also be made for the possible regulation of non-“Fire Wise” landscaping treatments and the mandatory inclusion of defensible space with green zones in these “high risk” areas.

Education and Training:

The department continues to emphasize the importance of continued training to our firefighters, and this issue could have just as easily been included in the “Priorities” section of the discussion. The department’s members participate in training activities provided to us through our mutual aid agreement with surrounding departments and agencies in addition to local training activities conducted at our fire department drills. However, the department feels a countywide training program, if one were to be developed, would benefit us and the other departments by creating a more standardized level of training and familiarizing each agency to the other’s equipment, personnel, and operating procedures.

The Blue Creek VFD participates in community education by hosting child fire safety education promotions in local schools. They familiarize the children to the appearance of firefighters in full turnout gear with SCBA and instruct them in safe evacuation techniques. Also, we do on-site evaluations of property to assist owners in making their homes more defensible in the event of a wildland fire.

Cooperative Agreements:

Blue Creek VFD has mutual aid agreements with Yellowstone County and the Bureau of Indian Affairs. The department believes they have very good working relationships with these agencies and enjoy the cooperative nature of this mutually beneficial association.

Current Resources:

Year	Make/Model	Tank Capacity (gal)	Pump Capacity (gpm)
1976	Ford Boardman	750	1000
1989	Ford Marion Mini-pumper	200	250
1986	Ford Type 6 ¾ ton 4x4	200	105
1991	Chevy Type 6 ¾ ton 4x4	200	100
1990	Chevy Type 6 1ton 4x4	200	105
1972	International Tender	3000	150 pto
1979	Ford F600 Heavy Type 6	300	100

The 1979 Ford F600 is on loan to Blue Creek VFD from the Department of Natural Resources through the Montana Department of State Lands. Though this truck is owned by the state government, the fire service area is responsible for the equipping and operating costs.

Future Considerations:

Blue Creek VFD will continue to be actively engaged in upgrading and modernizing existing vehicles and equipment assets. Protecting our community and our firefighters is our paramount objective. The building of a new fire station in the Blue Creek area is in the initial stages at this time (November 2005), with anticipated completion within the next three to five years. This station will provide the fire department with much needed space and training facilities to allow the department to keep pace with the needs of the firefighters and the community.

As previously stated, there is a need in the County for new regulations concerning new construction in “high risk” wildland-urban interface areas and stricter burn permit regulations. Some individuals may view these new regulations as unnecessarily restrictive, but these changes could reduce insurance rates and the loss of life and property within our communities.

4.5.1.10 Laurel Volunteer Fire Department

Current Resources:

Table 4.22. Laurel Volunteer Fire Department Equipment List.

Year	Make/Model	Name	Tank Capacity (gal)	Pump Capacity (gpm)
1996	Freightliner	Engine #1	750	1250
1990	Becker	Engine #4	750	1000
1976		Engine #3	750	1000
2002	Freightliner	Tender #1	4000	
1976	Kenworth	Tender #2	4000	
1978	Ford F-350	Brush #1	250	
1958	2 ½ ton Truck	Brush #2	750	
1992	Oheo 1 ton	Brush #3	250	
1960	Engine (converted)	Brush #4	750	
1974	Ford Truck (converted)	Support #1		
1993	Suburban	Support #2		

4.5.2 Wildland Fire Protection

4.5.2.1 Bureau of Land Management

Irv Leach, Fire Management Officer
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 Irv_Leach@blm.gov
 1299 Rimtop Dr.
 Billings, MT 59105

District Summary:

The Following information was excerpted from the Billings Field Office Fire Management Plan. For more detailed information please visit the web at: <http://www.mt.blm.gov/fire/fireplans/index.html>.

There are approximately 78,500 acres of BLM administered lands within Yellowstone County. An Interagency Fire Dispatch center is located within the City of Billings to assist wildland suppression forces under the direction of the Billings BLM Field Office (BIFO). This dispatch center directs the wildland fire response of two Type-6 engines and two 800 gallon Single Engine Air Tankers (SEATs), as well as numerous operational and administrative wildland fire support personnel. The Billings BLM Fire Program conducts all wildland fire management actions in compliance with the 1995 Federal Wildland Fire Policy and the 2001 Federal Wildland Fire Policy Update guiding principles. These principles are:

- Firefighter and public safety are the highest priority in every fire management activity.
- Provide an appropriate management response (AMR) on all wildland fires, with emphasis based on risks to firefighter and public safety, consistent with resource objectives weather and fuels conditions, threats and values to be protected, cost

efficiencies and standards and guidelines . AMR allows land managers to tailor preplanned wildland fire responses to meet objectives established in resource management plans and their associated implementation plans.

- Work with communities at risk to assess risk in terms of direct wildland fire impacts and implement programs to mitigate that risk through collaborative planning and projects.
- Establish partnerships with all interagency cooperators to facilitate coordinated fire management activities.
- Encourage close coordination and collaboration among specialists within the BIFO and among the BIFO and federal, interested organizations, private landowners, state, and local partners.
- Develop and use the best scientific information available to deliver technical and community assistance to support ecological, economic, biological, physical and sociological factors.
- Wildland fire use is not approved in the current land use plan so fire use objectives and goals will not be addressed in this plan.

Priority Areas:

The BLM has on-going hazard mitigation projects in WUI areas including the Shepherd Ah-Nei Recreation Area, the Pompeys Pillar National Monument, Acton area, South Hills area, Four Dances Natural area, and Sundance Lodge SRMA (maps of these areas are included in Appendix I). They are also dedicated to identifying other higher risk WUI areas within their ownership with the intention of implementing fuels mitigation projects for the safety of public users.

Education and Training:

All training and education is done in accordance with NWCG and Northern Rockies Coordination Group/ Northern Rockies Geographic Area Interagency Wildland Fire Training program standards. Any information pertaining to this process can be accessed through: <http://nationalfiretraining.net/nr/>

BLM is an active participant throughout the Billings protection zone working with county and local government, as well as private entities in education, prevention and mitigation activities. Community education presentations are frequent throughout the county to interested persons upon request, as well as local school presentations with a “prevention” theme covering various younger age groups.

One of the most facilitative projects within the county is the cooperative fire restrictions coordination between the various agencies. The BLM works extremely well with local governments when evaluating the need for fire restrictions and when processing requests for and implementing fire restrictions. This allows for uniform restrictions across the county.

Cooperative Agreements:

All cooperative agreements with county and state entities within the Billings Field Office fire protection boundary are currently under revision.

Current Resources:

Table 4.23. Bureau of Land Management Available Equipment List for Yellowstone County

ENGINES				
Year	Make	Model	Tank Capacity	Pump Capacity
2001	Ford F-550	BLM Brush Model Type-6	300 gal	90 gpm
2005	GMC 5500	BLM Brush Model Type-6 (CAFs Unit)	400 gal	125 gpm
AIRCRAFT				
Make/Model			Capacity	Availability
Air Tractor 802 Single Engine Air Tanker			800 gal	Available July 4 th through Sept 1 st
Air Tractor 802 Single Engine Air Tanker			800 gal	Available July 4 th through Sept 1 st

Bureau of Land Management Project Area Maps are included in Appendix I.

4.5.2.2 Bureau of Indian Affairs, Crow Agency Wildland Fire and Aviation Management Program

Ed Morgan, Forest Manager
 Steve Collins, Fire Management Officer
 BIA Crow Agency, Forestry
 P.O. Box 69
 Crow Agency, MT. 59022

District Summary:

There are approximately 139,983 acres of Tribal lands administered by the U.S. Bureau of Indian Affairs within the southeast part of Yellowstone County. These lands are within the exterior boundaries of the Crow Indian Reservation. Additionally, north of the reservation boundary lays an area known as the Crow Ceded area, in which approximately 41 tribal tracts exist, totaling roughly 2,000 acres and about 108 allotted tracts, totaling roughly 12,000 similar acres. Some of these lands are within Yellowstone County.

Wildland fire activities, including suppression within the Crow Reservation, are coordinated from the Crow Agency Forestry complex. This station has eight garage bays that house wildland fire suppression vehicles. A 100 person fire cache for equipping Type II MIF crews is available at the Crow Forestry Station. This cache is used for both agency and off-reservation fire dispatches.

The B.I.A. Crow Agency Wildland Fire and Aviation Management Program only fights wildland fires. Structure fires, vehicle fires, and dump fires are the responsibility of the local city, county, or tribal fire departments. Wildland fire management engines will not be used for structural firefighting.

Helicopter operations are housed at a separate helibase just down the street from the main forestry complex. There is one helipad with room for one additional helicopter on an emergency or temporary basis. In 2005, a new helibase operations building was built at Crow Agency to support the BIA Helitack Crew and contract helicopter. There is also a temporary helipad behind the Pryor Forestry Station, just south of the Yellowstone County line.

All personnel hired by or through B.I.A Crow Agency will meet minimum wildland fire qualification requirements which are equal to or exceed those recommended by the NWCG.

The BIA Crow Agency Wildland Fire and Aviation Management Program objectives include the following:

- * Take aggressive and continued suppression action on wildland grass, brush, and timber fires that threaten human life, structures, or high value resources without compromising firefighter safety.

- * Strive to prevent disastrous conflagrations that impact management objectives, have adverse environmental consequences, and affect the socioeconomic conditions of the area by conducting a fire prevention program that will reduce human caused wildfires.

- * Provide guidelines for the implementation of an Appropriate Management Response (AMR) type fire management strategy, based on protection of human life, identified private property, high value resources, and fuel types, and burning conditions.

- * Encourage good interagency relationships with adjacent federal, tribal, state, county and local fire fighting agencies in the spirit of mutual support and interagency cooperation.

Wildland Fire Organization - Initial Attack (IA) Resources/Equipment

Crow Agency:

- 3 - Type 6 Wildland Fire Engines, 4x4, 200 gallon, Model 52
- 1 - Type 4 Wildland Fire Engine, 4x2, 750 gallon, Model 52
- 1 - Type 3 Helicopter with bucket and helitack personnel (7/1 to 9/30)
- 1 - Helitack Crew Carrier with equipment
- 1 - Type 7 Slip-on Unit, 4x4 crew cab, 100 gallon
- 1 - Type 2 Water Tender, 6x4, 4000 gallon, 200 gpm (Branch of Roads)
- 1 - Road Grader (Branch of Roads)
- 1 - Type 2 Bulldozer, Cat D-6H & Transport (Branch of Roads)

Pryor:

- 2 - Type 6 Wildland Fire Engines, 4x4, 200 gallon, Model 52
- 1 - Road Grader (Branch of Roads)

4.6 Current Wildfire Mitigation Activities in Yellowstone County

4.6.1 Yellowstone County Coop Program

The County Coop Program is a formal written agreement between the Montana DNRC and all of the counties in eastern Montana. The plan is based on the following elements:

- The county is responsible for the suppression of all wildland fires on private and State land.
- If the suppression effort exceeds the counties capabilities, the county fire warden or commissioners call for assistance.
- The county must put the request in writing and submit to the DNRC Land Office (Southern-Billings, Eastern-Miles City, or Northeastern-Lewistown) within 48 hours of the request. Yellowstone County falls into the Southern Land Office area of responsibility.

- The DNRC/State of Montana pays the full cost for everything that is ordered on the fire.
- The county resources on the fire are in a non-pay status as far as the DNRC financial end of the incident is concerned. (The county road equipment costs are paid for by that particular county). The fire district(s) of the particular fire within the county maintain the Incident Command and use their own equipment to help with the extended attack. Once the fire is controlled and contained, the DNRC turns the incident back to the county, department, or district.

The other layer to the County Coop Program is that the DNRC also offers NWGG fire course training and fire equipment (Fed Excess Property or DNRC developed equipment) to the counties. Usually the county fire council and DNRC Rural Fire Coordinator decide which departments within the county get this particular equipment and what courses are needed.

4.6.2 Lockwood Fire District Education and Awareness Campaign

The Lockwood Fire District currently maintains a public education program for citizens within their district. This includes having firefighters go door-to-door with brochures and advice regarding home defensible space in the wildland-urban interface. Firefighters also explain to homeowners how maintaining a clean defensible space can help save their property and families during a wildfire event. As part of this program, other home defensibility issues are recognized and identified to interested homeowners such as access and water availability concerns.

4.7 Issues Facing Yellowstone County Fire Protection

4.7.1 Augmentation of Emergency Water Supplies

Residential growth will likely accelerate in the coming years in all areas of Yellowstone County. Growth will continue to stress rural and wildland fire suppression abilities into the future. It is prudent to address development practices before they become significant issues. Of primary concern to fire departments will be water availability and access. County zoning and planning officials need to address this issue in order to assure that new development is built following specifications that will result in a safe and prosperous community.

In many rural areas of Yellowstone County, there are no readily accessible, year-round water resources available for use by local fire departments. Thus, it is necessary for firefighters to keep large amounts of water loaded on trucks at all times. In the event of a large fire situation, additional water supplies must be transported to the site. The Yellowstone County fire departments feel that establishing permanent augmentations to emergency water supplies is necessary throughout the County. This includes establishment of pressurized water delivery systems in subdivisions as well as establishment of dry hydrants and drafting sites where immediate access to water is limited. Retrofitting dependable, year-round irrigation water sources with necessary fittings for use by emergency response equipment would also be highly beneficial. Once developed, these water sources need to be mapped and use agreements need to be made between landowners, local fire departments, the Crow Indian Reservation, the Montana Department of Natural Resources and Conservation, and the Bureau of Land Management.

4.7.2 Recruitment and Retention, Funding, Equipment Needs, Etc.

There are a number of pervasive issues that challenge volunteer districts within Yellowstone County. A short list of such issues include recruitment and retention of volunteers, lack of funding for equipment needs, keeping pace increases in training requirements, as well as numerous other factors that test district's abilities. The members of all fire protection districts should be recognized for the dedication they have shown and the excellent level of protection they provide for residents throughout the county. Volunteers take time out of their lives every day in order to assure the safety of the community.

The demands on volunteer departments are considerable. Keeping pace with ever-increasing training requirements can lead to burn-out of volunteers who are scantily compensated for their time and efforts. Keeping pace with the growing needs of the communities the districts serve is a constant challenge as well. Although there are many potential funding sources available for local districts to acquire equipment and other needs, grant writing and chasing of funding sources takes considerable time and effort. Recommendations that can help to reduce these challenges will be presented in Chapter 5.

4.7.3 Persistent Rapid Growth

Growth will continue to present the greatest challenge to fire management in the urban interface over the long term. The dramatic increase in demand for homes throughout Yellowstone County has resulted in significant changes in land use patterns. Many agricultural lands and private non-industrial rangelands have been sold and subdivided over the last few decades, pushing residential development further into the wildlands. This trend will continue into the future, as forestland and rangelands are sold for real estate development. This will have a dramatic effect on the ability of emergency resources to maintain current levels of fire protection without considerable increases in funding for equipment, personnel, and training. Indeed, many emergency response resources in Yellowstone County are already at a critical threshold. Further increases in protection responsibility will come at the expense of preparedness, as emergency resources are increasingly spread over an expanding protection area.

4.7.4 Accessibility

Fire chiefs throughout the County have identified home accessibility issues as a primary concern in some parts of Yellowstone County. It appears as though many homes and driveways have been constructed without regard to access requirements of large emergency vehicles. Lack of accessibility precludes engagement by suppression resources. Many homes within fire protection districts in Yellowstone County effectively have no fire protection simply because access is not possible or is potentially dangerous. Enforcement of the International Fire Code, regarding road and driveway construction standards for fire apparatus would prevent accessibility issues in new developments.

4.8 *Proposed Home Defensible Space and Education Projects*

The following are areas specifically identified by the committee as needing fuels treatments around homes. These projects would consist of individual home site assessments conducted by professionals to identify needed actions to help homeowners prepare for wildland fires. The assessments generally benefit the homeowner by providing specific wildfire information and preventative measures that they can do to improve the safety of their homes and families. If the homeowner agrees to these recommendations, the defensible space project would then be completed by a professional contractor. Individual home projects vary, but usually consist of

brush clearing, very selective tree removal, pruning, weed eradication, and slash removal. These projects along with estimated costs are included in Table 5.2.

Billings Area/Blue Creek Area

- Rehberg Ranch Estates
- Briarwood Subdivision
- Indian Cliffs
- Alkali Creek
- Hills Estates
- Secret Valley

Molt Area

- Echo Canyon

Laurel Area

- Clapper Flats
- Buffalo Trails

Shepherd/Huntley/Worden Area

- Pleasant Hollow
- Shadow Canyon
- Cedar Ridge
- White Buffalo

Lockwood Area

- Emerald Hills
- Pine Hills
- High Trails