

Custer County Community

April 2005

Wildfire Protection Plan

Prepared By
firelogistics
INCORPORATED
PMB 2164, 1 Jackson Creek, Montana City, MT 59634

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The Custer County Community Wildfire Protection Plan has been Reviewed and Approved by the following Signatories:

Custer County Commission - Chair

Custer County Fire Warden

BLM – Miles City

Reviewed By: DNRC – Eastern Land Office

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CUSTER COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

1. Executive Summary

1.1. Problem Overview

Custer County is a relatively large county covering just over 3,793 square miles. Under the current drought conditions, Custer County has a high degree of potential for extended fire seasons ranging from March through October or November. Custer County technically has a fire department, which is responsible to the Custer County Board of County Commissioners. Custer County staffs the fire department through a contract with Miles City Fire Department and provides wildland fire protection throughout the county. Custer County FD has strategically located engines based on historical fire occurrence throughout the county. In addition to the County resources, there are a number of engines positioned in the county by Montana Department of Natural Resources and Conservation (DNRC), under the county coop program. Custer County has the potential to interact with not only DNRC, but also the Bureau of Land Management, Miles City Field Office thus providing a moderate degree of interagency complexity. As with numerous counties in Montana, there is an increasing development of wildland-urban interface areas with potential access problems and a general lack of understanding of the need for an asset protection zone to protect the improvements. As a general matter, Custer County Fire Department has to deal with multiple ignitions throughout the county from lightning storms.

1.2. Process Overview

The Custer County Community Wildfire Protection Plan -- hereafter known as "CWPP," has been developed to assist Custer County, Custer County Fire Department and the federal and state wildland agencies in the identification of private and public lands at risk of severe wildland fires and to explore strategies for the prevention and suppression of such fires. The CWPP is intended to outline the Custer County Fire Department's plans and activities targeted at reducing the risk of a catastrophic wildland and/or wildland/urban interface (WUI) fire event in Custer County. The intent of this planning document will ensure that the health, safety and welfare of Custer County's citizen's remain secure from the threats of structural and wildland fires in the county.

1.3. Overall Goals

The CWPP will improve planning and fire suppression tools for county and the county fire department alike, which will result in Custer County providing its citizens with tools to live more safely in a fire prone ecosystem. The CWPP fosters the preservation of the economy of Custer County by maintaining and improving the efficiency of fire protection in the County.

1.4. Methodology

Fire Logistics, Inc. uses Geographic Information Systems (GIS) based analysis approach to development of the fire hazard assessment for Custer County. This enables personnel from Fire Logistics to look at specific areas of high risk in the county such as wildland-urban interface or subdivision areas and focus on issues that should be included in the wildland fire mitigation plan as recommended projects.

Personnel from Fire Logistics, Inc. spent 3 days in Custer County and Miles City in October of 2003 gathering data and touring around the county gathering intelligence for the CWPP.

Fire Logistics staff developed a rough draft of our approach to the Custer County CWPP between October and June of 2004. In June, the rough draft was reviewed with the senior staff of the Miles City FD to determine if our approach to the project was consistent with the staff's direction. Additional information was gathered from the County during the June visitation to Custer County.

In March 2005, the comment draft was submitted to the collaborators for review and comment. Custer County FD and Fire Logistics, Inc. met with the Board of County Commissioners and provided a comment draft for their input.

In early April 2005, comments from the responding collaborators were incorporated into the final version of the Custer County CWPP.

1.5. Mitigation Strategy – The Action Plan

Summary of the specific action is provided, which were developed in the *mitigation plan* of Chapter 7 to include mitigation goals such as evaluate upgrade and maintain emergency wildfire protection responsibilities, decrease fuels, etc. The assumptions for planning priorities of the community fire plan are: protect human health and life, protect critical community infrastructure, protect private property, and protect natural resources. The existing mitigation efforts are described, which include asset protection zones, neighborhood preparedness and fire protection response, and the coordination of prevention programs, protection projects and response plans. Several recommended projects and programs are included as part of the mitigation effort for Custer County.

2. Introduction

2.1. Background and History

The Custer County Community Wildfire Protection Plan -- hereafter known as "CWPP," has been developed to assist Custer County, Custer County Fire Department, Ismay Rural Fire District, Custer County Rural Volunteer Fire Company and the federal and state wildland agencies in the identification of private and public lands at risk of severe wildland fires and to explore strategies for the prevention and suppression of such fires. The CWPP is intended to outline the Custer County Fire's plans and activities targeted at reducing the risk of a catastrophic wildland-urban interface (WUI) fire event in Custer County. The intent of this planning document will ensure that the health, safety and welfare of Custer County citizens remains secure from the threats of structural and wildland fires in the county.

The CWPP will improve planning tools for county and the fire departments alike, which will result in better building and development codes and regulations, as they relate to the development of the WUI and urban development. The CWPP fosters the preservation of the economy of Custer County by maintaining and improving the fire protection capability of the County.

Miles City Fire Department retained Fire Logistics, Inc. to assist them in developing:

- Develop a Strategic Wildfire Plan for the county to include the following components:
 1. Develop a hazard assessment for the county covering private, state and federal lands, including, at a minimum:
 - ✧ Terrain
 - ✧ Fuels
 - ✧ Risk
 - ✧ Values at Risk
 - ✧ Flammability of structures
 2. Verify draft of hazard assessment map.
 3. Recommended planning, zoning and ordinances.
 - ✧ Mechanism to identify new structures within the county.
 4. Suggested mitigation and prevention activities.
 - ✧ Identify appropriate wildland/urban interface survivable space needs.
 - ✧ Identify strategies for community involvement.
 - ✧ Propose vegetative management treatments and areas.
 5. Propose improvements to the Custer County Evacuation Plan:
 - ✧ Include pre-determined evacuation routes.
 - ✧ Identification of adequate numbers of evacuation plans from each identified hazard area.
 - ✧ Recommendations for improvement of trails, two-tracks, etc. to serve as evacuation routes with the work being done by the County.
 - ✧ Recommend any shelter-in-place concepts, which might be appropriate for the area.
 6. Evaluation and enhancement of community capabilities to respond to wildland and wildland/urban interface fires.
 - ✧ Identify key infrastructure problems – i.e., inadequate bridges, poor access, inadequate roads, etc.
 - ✧ Recommend any improvements to the fire protection systems, i.e., radio towers, communications frequencies, radio, communications problems, and additional engines.
 - ✧ GIS layers associated with the plan, must be provided in an ArcView format acceptable to the county.
- Work with the personnel selected by the county to gather data.
- Identify areas of mutual concern between Rosebud and Custer County.
- Make any desired associations with the County's computer aided dispatching program.

In addition Fire Logistics, Inc. conducted a deployment analysis, which is incorporated into this document and includes:

- Identification of appropriate sites for wildland fire engines throughout the County.
- Evaluate the need for a fire service area or rural fire district in the areas outside of the City of Miles City.
- Development of proposed solutions to the needs identified.
- Recommendation of an agency to provide services to areas outside of the city limits.

2.2. Mission

The mission of the Custer County Fire Department is:

“To prevent or minimize loss of life and property from fire, injury, illness, or other sudden hazardous situations which can be dealt with by the resources of the Department and cannot be managed by other public or private services.”

2.3. Current Relevant Fire Policies

A brief discussion of the relevant fire policies is provided to educate the community.

2.3.1 Federal Policies “Homeland Security is Fire Safety”

We have briefly described the relevant policies at the national level, which affect fire planning on the local level.

2.3.1.1 National Fire Plan

“The National Fire Plan (NFP) is a long-term investment that will help protect communities and natural resources, and most importantly, the lives of firefighters and the public. It is a long term commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics.” It mandates community participation in its implementation.¹ The NFP also mandates that local governments develop and adopt local land use plans and ordinances that provide for the maintenance of defensible space and fuel management on municipal and private property.²

2.3.1.2 Western Governor’s Association, *10-Year Comprehensive Strategy for Reducing Wildland Fire Risks³* and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment—Implementation Plan*

The goals of the 10-Year Comprehensive Strategy are to:

- Improve Prevention and Suppression
- Reduce Hazardous Fuels
- Restore Fire Adapted Ecosystems
- Promote Community Assistance.

This is done through a “Framework for Collaboration... Local Level—Successful implementation will include stakeholder groups with broad representation including Federal, State, and local agencies, tribes and the public, collaborating with local line officers on decision making to ⁴establish priorities, cooperation

¹ See www.fireplan.gov.

² See www.westgov.org/wqa/initiatives/fire/implement_plan.pdf

³ www.westgov.org/wqa/initiatives/fire/final_fire_rpt.pdf

⁴ The full text of the Act is available at <http://thomas.loc.gov/>. Type HR 1904 in the Bill Number box and then select the enrolled bill from the list of options.

on activities, and increase public awareness and participation to reduce the risks to communities and environments.”⁵

2.3.1.3 Healthy Forests Restoration Act

The Healthy Forests Restoration Act (HFRA) represents the legislative component of the Healthy Forests Initiative, introduced by President Bush in January 2003. Title I of the HFRA authorizes the Secretaries of Agriculture and Interior to expedite the development and implementation of hazardous fuel reduction projects on federal land managed by the US Forest Service or Bureau of Land Management when certain conditions are met.

Priority areas for use of expedited authorities include the wildland-urban interface, municipal watersheds, areas impacted by wind throw or insect and disease epidemics, and critical wildlife habitat that would be negatively impacted by catastrophic wildfire.

The HFRA emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects and places priority on treatment areas identified by the communities themselves in a CWPP.

2.3.1.4 Disaster Mitigation Act 2000

Disaster Mitigation Act 2000 (DMA 2000) sets policies for “disaster mitigation plans”—plans designed to avoid disasters such as fires and floods. DMA 2000 requires 4 elements in these plans:

1. A planning process.
2. An assessment of risks.
3. A mitigation strategy (action plan) and,
4. A plan maintenance and updating process.

Disaster Mitigation Plans must be approved by 11/04 to receive HMGP funds after that date.⁶

2.3.1.5 Local Implementation of Federal Fire Policies

Fire protection objectives on the state and private lands in Custer County are addressed indirectly in the Cooperative Fire Management Agreement between USDI’s Bureau of Land Management, National Park Service – Intermountain Region, Bureau of Indian Affairs – Portland and Billings Area, US Fish and Wildlife Service – Rocky Mountain Region; USDA’s Forest Service – Northern Region; and the State of Montana – Department of Natural Resources and Conservation. This agreement requires that Annual Operating Plans be developed and approved by May 1 of each year specifying how the terms of the agreement will be carried out between the cooperating agencies and the state. Cooperation with local county governments is encouraged and additional agreements may be made with counties through the State of Montana. These agreements are to validate the arrangements desired between the county and a federal agency or the state in respect to assistance with their fire management programs.

Generally, the county may not have the skills, resources or the interest to pursue a comprehensive fire use program. They are interested in, and in some cases dependent upon, help with their fire suppression program, however. As a minimum, those procedures for obtaining state and federal assistance for large wildland fire needs to be included in any agreements prepared at the local level. They should include an articulation of the suppression standards that need to be employed by federal or state agencies working on a fire on state and private land. The reverse is also true for county resources working on federal or state lands. In the former case the objective will most likely be to suppress the fire at the smallest size possible utilizing the full range of suppression resources available. In the latter case, however, certain land management objectives may preclude this approach. i.e. mechanical equipment in a proposed wilderness area.

⁵ www.westgov.org/wga/initiatives/fire/implement_plan.pdf

⁶ www.fema.gov/pdf/fima/howto1.pdf

There may be circumstances where a fire is human caused and assistance in an investigation is needed. The skill to be a fire investigator can either be developed within the county or it can be brought in from another agency on an as needed basis. Whichever route is chosen, there should be no delay in utilizing a fire investigator when the situation is warranted.

2.3.2 State Policies

Currently there are no State policies that require a rural fire district or county fire organization to develop a community fire plan.

It is the policy of the State to complete pre-disaster mitigation plans in compliance with the Federal direction noted above.

2.3.3 Local Policies

Miles City-Custer County established a planning district in 1973 that includes the City of Miles City plus 4.5 miles beyond the corporate city limits. A Master Plan also known as a Comprehensive Plan was adopted in 1978 with the most recent update being adopted in 1996. In 1999, the Montana Legislature revised this community development and planning tool and renamed it the Growth Management Policy. The requirements of a Growth Management Policy are detailed in 76-1-601, Montana Code Annotated. The Miles City – Custer County Growth Policy provides guidance as the community grows and develops. Special attention is given to specific land uses and the need for infrastructure to support those identified uses. Preparing a growth policy includes describing the historical base, establishing key indicators and monitoring the growth trends, and developing policies to accommodate the potential growth and changes in the community.

There are not specific public safety goal statements or policies in the Growth Policy.

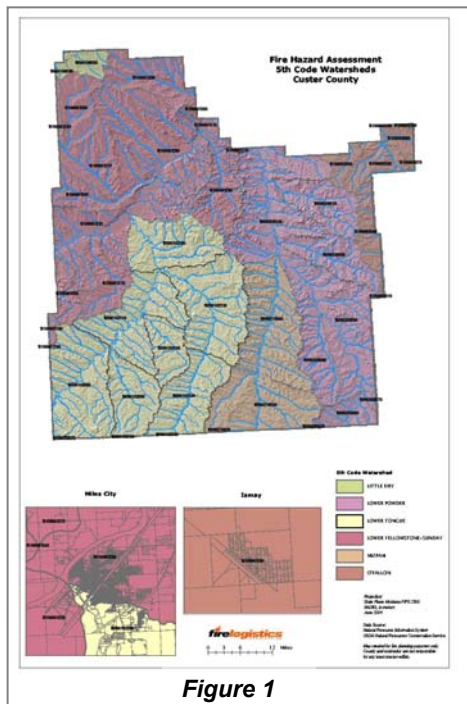


Figure 1

Subdivision regulations are normally developed after completion and adoption of the Growth Policy.

A Pre-Disaster Mitigation Plan (PDM), developed by Beck Consulting, is another tool developed to provide Custer County with insight into the potential events, which might impact the County. Wildland fire was ranked in the top 5 natural hazards in Custer County. As a result, Custer County’s PDM has a goal statement which states the County should “Protect Human Life and Property from Wildland Fire.”

2.4. Planning Area Boundaries

The Custer County CWPP covers Custer County in its entirety. The county was further subdivided into sub-planning areas by the 5th Code Watershed (See Figure 1). The purpose of the 5th Code Watershed is to provide a uniquely identified and uniformed method of subdividing large drainage areas. These smaller 5th Code Watershed units are approximately 40,000 acres to 250,000 acres and are useful for fire planning purposes as well as other programs by the Natural Resources and Conservation Service and other agencies (See 5th Code Watershed Map and Planning Area Map in Map Section 10.5).

2.5. Community Legal Structure, Jurisdictional Boundaries

There is a mixture of fire protection organizations providing fire services to Custer County. These include Miles City Fire Department (MCA 7-33-4101-4133), Custer County Rural Volunteer Fire Company (MCA 7-33-2311-2316), Custer County Fire Department (MCA 7-33-2201-2211), Ismay Rural Fire District (MCA 7-33-2101-2129), MT Department of Natural Resources and Conservation – County Cooperative Program, and Bureau of Land Management (See Figure 2 and Jurisdictional Areas Map in Map Section 10.5).

Miles City FD provides fire and emergency services within the incorporated city limits, provides fire services under contract to homes and business outside the city limits, provides ambulance service county-wide, and contracts with Custer County to provide wildland fire services county-wide through the Custer County Fire Department. Mutual aid is provided to Ismay RFD, West Glendive RFD, Baker, Terry, Glendive, Forsyth and Billings.

Custer County Rural Volunteer Fire Company (CCRVC) provides structural fire services to subscribers and non-subscribers throughout the county. There are no existing written mutual aid agreements with local government fire services agencies. The CCRVC provides mutual aid to Ismay RFD and Custer County FD. The Custer County Rural Volunteer Fire Company has tried to form a Fire Service Fee Area as an organizational structure and funding mechanism.

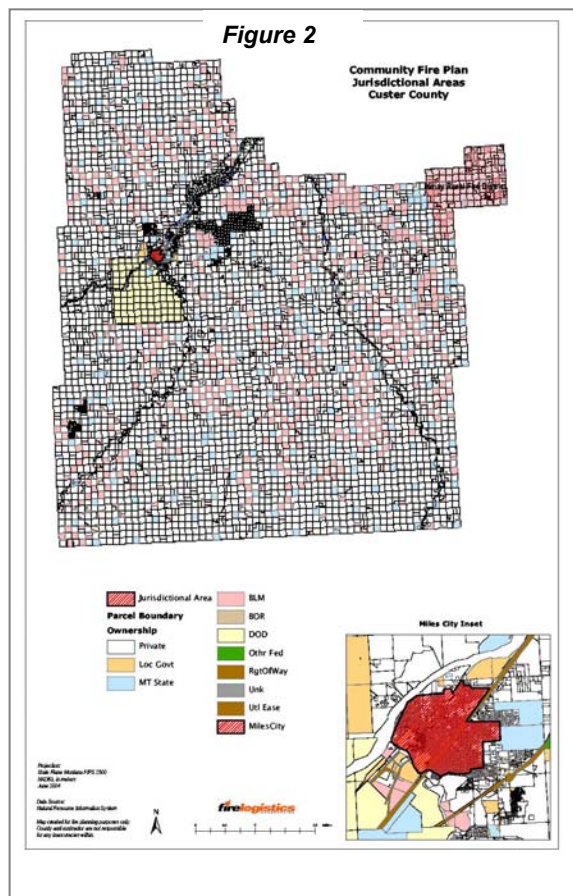
Ismay Rural Fire District provides structural and wildland fire services to the residents of the Ismay RFD and mutual aid to Custer County, Plevna and Miles City Fire Department.

The Bureau of Land Management is the responsible land management agency for BLM lands and assists the local agencies as needed.

The Department of Natural Resources and Conservation – County Cooperative Program provides fire support to counties when the county’s capability has been exceeded and assistance is requested.

2.6. Acknowledgements

Fire Logistics, Inc. would like to thank the Custer County Fire Department; Miles City Fire Department and staff; Custer County Rural Volunteer Fire Company; Bureau of Land Management, especially Dena Sprandel-Lang; Custer County Disaster & Emergency Services Coordinator; Barb Beck, Beck Consulting; the City-County Planning Office, Ismay Rural Fire District, the Custer County Local Emergency Planning Committee and Custer County Commission for their contributions to this plan.



3. Planning Process

3.1. Stakeholders

The following stakeholders are affected by wildland fire and have a stake in a successfully implemented CWPP:

Miles City Fire Department
Custer County Rural Volunteer Fire Company
Ismay Rural Fire District
MT Dept. of Natural Resources and Conservation
Bureau of Land Management
County Assistance Team (CAT)
City of Miles City
Burlington Northern Santa Fe Railroad
Montana Dakota Utilities
Tongue River Electric Cooperative
Western Area Power Administration
Qwest
Mid-Rivers Telephone Cooperative
Range Telephone Cooperative
Custer County Local Emergency Planning Committee
Pine Hills Ranchettes Homeowners
Custer County Road and Bridge Department
Custer County DES
Board of County Commissioners – Custer County
Residents of Custer County

3.2. Current Process and Plan Development

In the spring of 2003, the Miles City FD awarded a contract to Fire Logistics, Inc. to complete a comprehensive risk assessment of Custer County and to develop a mitigation plan which provides recommendations for improvements to the county's fire protection system, mitigation measures for treating the fuels and providing protection to structures. The Custer County Community Fire Plan (CWPP) is the result of that effort.

3.2.1 Avenues of Community and Public Input – Collaboration

The Custer County FD determined the level of collaboration for the CWPP. The draft Custer County CWPP was submitted for review and comment by to the following entities:

Bureau of Land Management
MT Department of Natural Resources & Conservation – Eastern Land Office
Custer County Board of County Commissioners
Custer County Fire Department
Ismay Rural Fire District
Custer County Rural Volunteer Fire Company
Custer County Disaster & Emergency Services Coordinator

Comments were incorporated into the final version of the Custer County CWPP.

3.3. Review of Existing Plans, Studies, Reports, Technical Documents

The following documents have been reviewed for data, which may need to be referenced and incorporated in the Custer County CWPP:

Custer County Cooperative Fire Management Plan, 1998
BLM Fire Plans – Miles City Protection Area

Custer County Emergency Operations Plan
Custer County – Incident Evacuation Plan, 2002
Mutual Aid Agreement between Custer County and the City of Miles City, 1990.
Mutual Aid Agreement between Custer County and the Ismay Rural Fire District, 1999.
Mutual Aid Agreement between the Cities of Miles City, Glendive, Terry, Forsyth, Baker and the West Glendive RFD, 1998.
Miles City – Custer County Growth Policy – Draft 3
Custer County Subdivision Regulations – Design Standards, 1998
Improvement Statements – Insurance Services Office, Inc.
Custer County Pre-Disaster Mitigation Plan
East Zone MT Fuels and Prevention Management Plan
Eastern Montana Fire Zone – Aviation Operations Plan, 2003
Eastern Montana Fire Zone – Helicopter Operations Supplement, 2003
Miles City Field Office – Fire Management Plan (Draft), 2003
Memorandum of Agreement between BLM, DNRC, Big Horn, Custer, Powder River & Rosebud Counties, and the Tongue River Railroad Company.

3.4. Local Jurisdictional Involvement, Approval, Adoption

Once the Custer County CWPP is reviewed and approved by the Board of County Commissioners, it should be adopted and amended into Custer County's Pre-Disaster Mitigation Plan as the fire component.

4. Community Description

4.1. General Environmental Conditions

Custer County is located in southeast Montana. It covers just over 3,793 square miles and has a population of about 11,696 people. The county also crosses six distinct watersheds. Most lands in the county are used for some type of agriculture and as a result, agriculture is the county's number one industry. The majority of the land type is relatively flat when compared with the western part of the state and the elevations vary from 2,244 feet in the north to 3,475 feet in the south. The county receives less than 10-16 inches of rainfall and the adapted ecosystems contain vegetative types and quantities commensurate with soil productivity and available moisture.

Generally, northern aspects and drainage bottoms support a greater amount of plant life than southern aspects and other dry sites. The greater share of the land mass in Custer County is covered by grasses and shrubs. There are scattered areas of pine forest as well as some hardwoods stands, especially along river bottoms. The portion of the county north of the Yellowstone River is much sparser than the area to the south. It does not experience the same lightning activity as the south end of the county and consequently has far fewer fire problems.

4.1.1. Topography, Slope, Aspect, Elevation

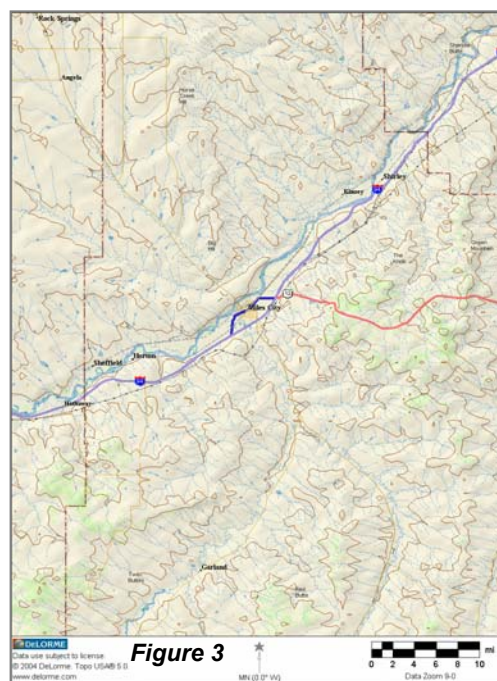
The main drainages are Yellowstone River flowing west to east, Tongue River, and Powder River flowing southwest to northeast. There are no perennial drainages north of the Yellowstone River. There are a few smaller perennial streams and numerous other intermittent streams scattered throughout Custer County. The northern portion of the county drains south into the Yellowstone River, while the southern half of the county drains to the north into the Yellowstone River.

Custer County north of the Yellowstone River is best described as open arid grazing land with sparse grass, grease wood and sage fuels. Numerous escarpments resembling badland type topography break up the vegetative continuity. The area south of the Yellowstone River can be described as a mix of grazing land with scattered timbered ridges. The vegetation in the southern portion of the county is much heavier and the continuity of the fuels is more conducive to large wildland fire spread.

This area north of the Yellowstone River contains rolling topography with some scattered steep slopes and knobs. These are most common in the vicinity of the Little Sheep Mountains. Overall, the elevational change north of the Yellowstone River is less than 500 feet. South of the Yellowstone River the terrain is more varied with drainages flowing into the Tongue and Powder River and Custer Creek from several different directions. Elevational changes are more pronounced and approach 1,000 feet toward the southern boundary of the county. Along the conifer covered ridges, the slopes fluctuate widely, with some steep pitches approaching 60% plus.

Aspect is the direction toward which a slope faces. Because of the topographic nature of Custer County, the area north of the Yellowstone River has a higher representation of southern aspects, whereas south of the Yellowstone River the terrain is more conducive to all aspects being more or less equally represented.

Figure 3 shows the topography of Custer County and it is



evident that there is some correlation between slope, elevation and vegetative cover types. The pine forest is generally located on higher ground in distinct bands where soil and moisture conditions are conducive to its survival. The ponderosa pine type is usually denser on north and east aspects where the soils can retain moisture somewhat longer than they can on south and west aspects.

The tillable lands that can be irrigated are used for hay; grain and root crops while the remaining lands are left in a more natural state. These latter areas are either grazed by domestic stock or they remain unused except for wildlife.

4.1.2. Meteorology, Climate, Precipitation and Fire Weather

Climate directly affects fire behavior, with wind being the major influencing factor. Generally, winds in this area prevail out of the southwest, and are moderate to strong, depending on the elevation and aspect. Southwest and west facing slopes are more exposed to the prevailing wind, which relates to increased fire behavior activity. Fires generally spread from southwest to northeast.

Because of the high frequency of thunderstorm activity in Custer County, it is not unusual to experience winds blowing from any quadrant of the compass. This wind anomaly challenges all wildland fire suppression efforts and leads to fire fighter safety concerns and the potential for large wildland fire growth. As the current and protracted drought continues, fire suppression personnel need to keep current on the fire weather, especially predicted wind direction, through spot weather forecasts from the National Weather Service in Billings.

During calm days, fire spread will be dictated by topographic configuration and local upslope-down slope winds. During strong wind events fire spread will be dictated by wind direction and the winds will override the effects of the topographic features.

Moisture regimes can be defined in terms of storm tracks, which generally move across the county from west to east. The storm track affecting the analysis area starts along the western edge of Custer County and tracks from west to east across the county. Typically, any significant moisture associated with these storm tracks has often been depleted prior to reaching the northern half of the county.

The higher elevations provide the orographic lifting that results in more moisture to this forested area. However, heavy lightning activity associated with these storms contributes to a significant number of fire starts along the storm's path. These dry lightning events increase in number as the sun angle increases in elevation. As the lower atmosphere dries, the height of the freezing level increases and available low level moisture diminishes. The low level moisture continues to diminish as the dominant Bermuda High pressure cell expands westward into Mexico shutting down the low-level jet transport of moisture into the mid section of the United States. This dries the atmosphere and increases the elevation of building cumulus clouds. Strong down drafts can be produced and are often accompanied by dry lightning. Moisture associated with building cumulus rarely hits the ground, but becomes virga and evaporates before reaching the ground. These thunderstorms can be five to seven miles wide at their bases and lightning can occur within 25 miles of them.

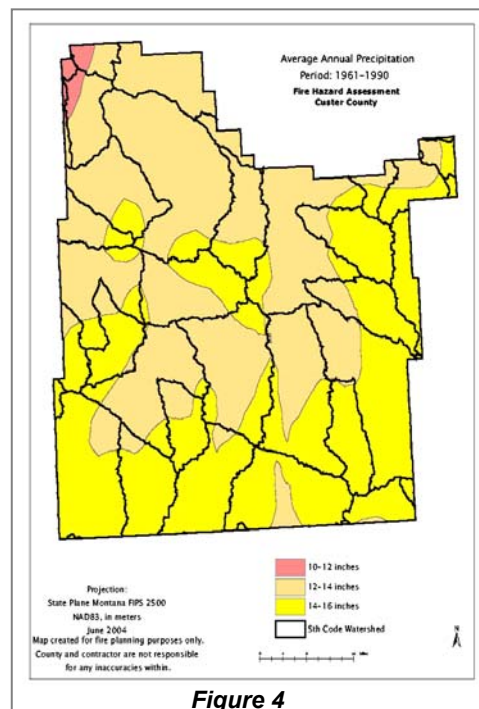
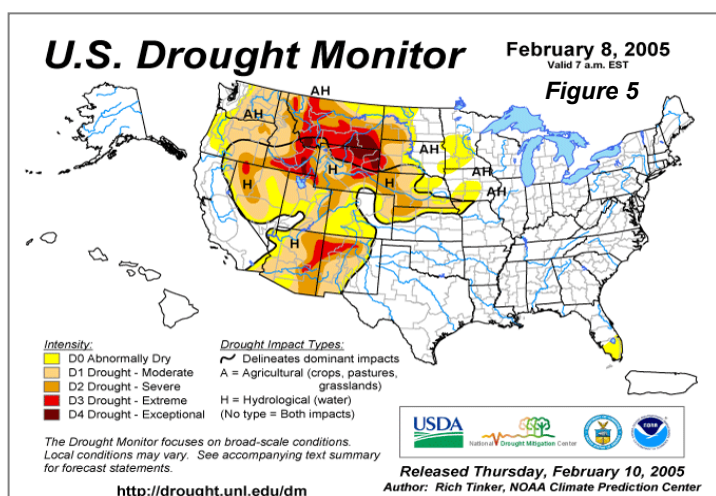


Figure 4

Figure 4 depicts the average annual precipitation for Custer County during the years of 1961 through 1990 (See Average Annual Precipitation Map in Map Section 10.5).

Climatic seasonal changes can influence fire behavior as well. Winter months of December through February are generally non-fire months, but snow pack accumulations can be a key factor in potential fire activity for any given fire season. In the last half of the 20th century, spring seasons (April through June) were generally moist months with low fire frequencies. The ignitions that did occur resulted in mostly low intensity fires. Since 1988, the weather patterns have been changing to a warmer and dryer cycle resulting in extended fire seasons; spring months no longer can be counted on as a low fire period of the year. Long-term drought conditions have increased the complexity in Custer County and it is not unusual for significant pre green up fire to occur.

As the season turns to summer, grasses and shrubs begin to lose their live fuel moisture, down fuels begin to dry, and fire conditions normally peak by late August. As autumn approaches, conditions generally begin to cool, but the presence of dry cold frontal passages become common and can promote conditions of extreme fire behavior, similar to those experienced with the Horse Creek Fire in 2003. Late fall conditions in November mark the transition into winter, but again, dry cold frontal passages at this time of year and the lack of snow pack can lead to conditions of rapid fire growth and high intensity fire behavior during wind events.



The normal summer weather pattern for Custer County can best be understood by looking at the larger weather pattern for the entire western United States (See Figure 5). As discussed previously, the Bermuda High makes it way across Texas and New Mexico in July; it cuts off a supply of low-level moisture. As this moisture is diminished, general thunderstorm activity decreases across eastern Montana and allows the lower atmosphere to dry. This is timed with the development of a high-pressure system that sets up across Montana with subsidence in the high pressure that dries the atmosphere. This subsidence does two things; it brings very

warm temperatures (90-105) to the area and it lowers the relative humidities. This lower relative humidity begins to dry the fuels of all size classes (1 hour, 10 hour, 100 hour, and 1000 hour plus time lag fuels). The 1-100 hours time lag fuels will show evidence of drying within 3-5 days. The 1000 hours fuels will take significantly longer to dry, usually in the 3-5 weeks range.

Long-term drought poses another significant challenge because of its effect on current vegetative conditions i.e., reduction in live fuel moisture content. Fire records for Custer County indicate that the current wildland fire suppression actions are effective when the energy release component (ERC) is below the 97th percentile. When the ERC is above the 97th percentile, wildland fire suppression actions are historically not effective. Since 1988 Custer County area has experienced 10 significant fire seasons. The fire seasons of 1988, 1996 and 2003 are considered the benchmark years for the county.

A review of the fire history for Custer County for these years showed the following correlations:

- Average maximum temperature 88-96 degrees.
- Average wind speed was 7-12 mph consistently from the southwest. Wind gusts from 30-40 mph were common and often exceeded 55 mph. These gusty winds were most common through out the year.
- August is consistently the driest month with weather records showing poor nighttime relative humidity recovery. During the day light hours the relative humidity begins to drop substantially beginning at 0900 and remains low until 2100. These lows bottom at the lower teens around 1700-1800. The August time frame from consistently remains the time period with the lowest relative humidity and poorest humidity recovery. In reviewing the weather history, these are also days in the month where relative humidities remained low for multiple twenty-four hour periods.

- Moisture events did occur in August, but were limited in location, content and duration. The remnants of these events kept the maximum relative humidity high in that particular area for a period of seven days after initiation.
- ERC were recorded above the 90th percentile for the majority of the time for the months of July, August and September.
- Continued drought conditions are causing stress on live plant species resulting in ERC levels approaching the 90th percentile in the spring months of 2004.
- Lightning occurrence usually begins in late May with the heaviest occurrence in June through August. Dry lightning is most prevalent in July and August.
- Conifer stands contributed to large fire spread, where high fire intensities did not allow for aggressive initial attack or fire suppression with ground forces due to safety concerns.

4.2. Population, Demographics

Population and demographics information was derived from the 2000 Census. The population for Custer County was 11,696. The population of Miles City is 8,487. The area the county in square miles was given as 3,793. Miles City covers approximately 3.3 square miles. The Census showed 5360 housing units with a density of 1.4 housing units per square mile with a population density of 3.1 per square mile. The Census did not identify other population areas like Moon Creek, Wolfe Creek or Pine Hills Ranchettes, which are a concern from a wildfire fire suppression perspective.

Approximately 84.8% of the homes in Custer County were constructed prior to 1970. There has not been a new major subdivision in Custer County in a very long time. As with many counties in Montana, there have been numerous minor subdivisions completed annually.

A more significant change in the demographics of Custer County is the transition away from the family ranch to the corporate farm or ranch and the absentee ranch owner. This has caused a shift in fire protection from the ranch family members to Custer County Fire because the corporate ranch may have a manager and a ranch hand or two in contrast to generations of a ranch family showing up to fight a range or wildland fire.

4.3. Infrastructure: Roads, Driveways, Utilities, Communication, and Water Supply

Interstate 94 (I-94) traverses Custer County, east to west, following the Yellowstone River drainage. U.S. Highway 59 from Miles City traverses Custer County northwest and to the south. From U S 59 south of Miles City, County Road 332 also traverses south and eventually into Custer County. US Highway 12 traverses east towards Ismay and into Fallon County. Custer County has a number of graveled roads that can be utilized to provide access for fire suppression activities. Private ranches and subdivision developments have narrowed roadways, these may be accessible with a 4 wheel drive, however, occasionally they will be blocked or in accessible. There were no bridges, gates, or culverts that would prove to be a significant problem denying access for fire suppression activities (See Figure 6). The most significant problem that fire suppression activities would face with access during the wildfire season is the gumbo road conditions following a rain or thunderstorm event and the subsequent heavy rains.



Figure 6

Burlington Northern Santa Fe Railroad follows the Yellowstone River and provides a significant amount of rail traffic. The Tongue River Railroad is proposed to run south through the county to the Otter Creek Coal Tracts.

Large propane tanks are located throughout Custer County at ranch and home sites.

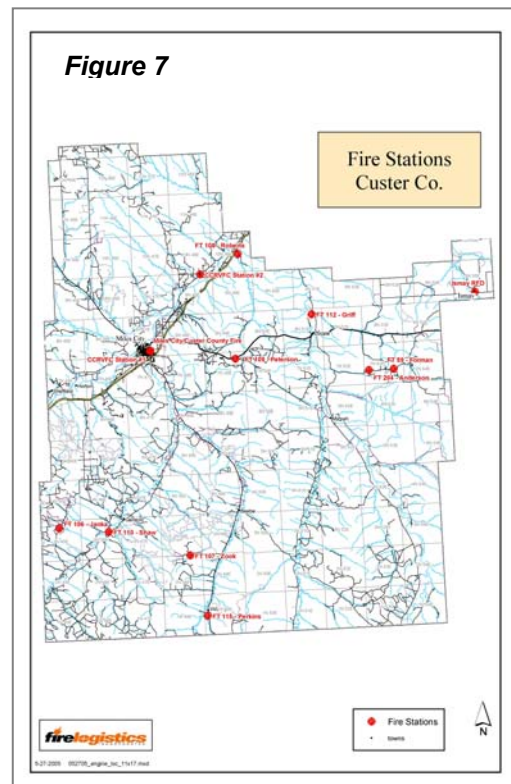
Electric transmission lines and distribution power lines along with telephone lines and railroad signal lines are concentrated along the Yellowstone River and local distribution lines to some populated areas. Montana Dakota Utilities and the Tongue River Electric Cooperative provide electrical power to the county. There are portions of the County without utility services.

Qwest, Range Telephone Cooperative and Mid-Rivers Telephone Cooperative provide telephone service to Custer County.

Cellular phone service is generally available; however, there are areas within the county that do not have cellular phone service. Cellular phone service is provided Mid-Rivers Telephone Cooperative, Verizon, Cellular One and Qwest.

There is a municipal water system serving the City of Miles City for fire protection purposes. In the County, there is no developed water supply and water tenders must transport fire protection water to the fire scene. Stock ponds and creeks are available at times for a water supply point, but during this extended drought, water is a premium to ranchers.

Radio communication for Custer County Fire Department and Ismay RFD can be improved. The southern portions of the county are not served adequately from existing fire repeater sites. Ismay RFD also needs a repeater to improve communications in the fire district and to be better able to page volunteer fire fighters to respond to incidents.



4.4. Emergency Services

Emergency services within Custer County include fire protection, emergency medical services including ambulance transportation, law enforcement, and emergency preparedness.

4.4.1. Fire Protection

The Miles City Fire Department, the Ismay Rural Fire District, and the Custer County Rural Volunteer Fire Company provide community structural fire suppression and protection.

Wildland fire protection is provided by Miles City Fire Department under contract with Custer County under the direction of the county fire warden with various fire suppression resources throughout the County under the Custer County Co-Op plan. In addition, Ismay RFD provides wildland fire protection in the northeast portion of the county. The wildland fire apparatus is located strategically throughout the county (See Figure 7 and Fire Station Location Map in Map Section 10.5).

Miles City Fire Department	
Location	Apparatus
Miles City FR	
	Aerial 17 – 100' LTI Ladder
	Engine 5 – 1956 Type 2
	Engine 6 – 1972 Type 2
	Engine 7 – 1990 Type 1
	Engine 8 – 2000 Type 1
	Ambulance 18
	Ambulance 16
	Ambulance 14
	Ambulance 12
	Water Tender 20 – 1200 gallon
	Van 315 – Command Vehicle
	Car 275 – Command Vehicle



Miles City FD Engine



Miles City FD Ambulance



Custer County Fire Department	
Location	Apparatus
Locate	FT 112 – Type 6 Engine
Tongue River	FT 110 – Type 6 Engine
Knowlton	FT 204 – Type 6 Engine
Ash Creek	FT 107 – Type 6 Engine
Moon Creek	FT 106 – Type 6 Engine
Diamond Ring Ranch	FT 108 – Type 6 Engine
Wayne Perkins	FT 115 – Type 6 Engine (County Owned)
Bud Peterson	FT 109 – Type 6 Engine (County Owned)
Knowlton	FT 59 – Type 6 Engine
Miles City FR	
	FT 118 – Type 6 Engine
	FT 117 – Type 6 Engine
	FT 116 – Type 6 Engine
	T 205 – Water Tender – 1500 gallons
	T 203 – Water Tender – 2500 gallons
	256 – Command Vehicle
	R 60 - Rescue
	171 Command Vehicle



← **Custer County FD Engine**



Custer County FD Water Tender →

Ismay RFD (continued)	
Location	Apparatus
Ismay Fire Station	
	Truck 16 – Type 6 - 1979 Ford
	Truck 19 – Type 6 – 1973 6 X 6
	Truck 102 – Type 6 – 1952 6 X 6
	New Truck – Type 6 – 2005 F550
Custer County Rural Volunteer Fire Company	
Location	Apparatus
Miles City Station	
	R-2 Type 1 Engine
	R-4 Water Tender – 3000 gallon
	R-8 Water Tender – 2000 gallon
	R-1 Fast Response Truck
Kinsey Station	
	R-3 Type 2 Engine
	R-9 Water Tender – 1500 gallon

CCRVFC Water Tender →



← **CCRVFC Engine**

As a "Coop County," Custer County is required to make a significant commitment to a wildland fire before requesting assistance from the Montana DNRC. As part of the county equipment, Custer County furnishes dozers and motor graders from the County Road & Bridge Department for wildland fire suppression efforts in the county.

Custer County is within the Eastern Land Office of the Montana DNRC's geographic area. This provides additional resources such as air tankers from Billings, helicopters from Miles City or Ashland/Fort Howes, single engine air tankers from Miles City and crews and overhead through the Eastern Land Office. During the fire season these resources may be committed to other incidents and may not be available.

Custer County Disaster Emergency Services has agreements with surrounding counties and these have recently been updated.

4.4.1.1. Fire Engine Pump/Draft Source Sites

Water supply sources for wildland fire protection and structural fire protection throughout Custer County are relatively scarce. They include rivers, creeks, stock ponds and etc. Due to the long-term drought in Custer County, most ranchers would not authorize fire protection entities to utilize their scarce water resources for fire protection. As a result during this extended drought period, water supply sources need to be delivered to the fire, through fire apparatus such as water tenders.

4.4.1.2. Training, Certification, and Qualification

All incidents require different skill levels of incident management personnel. To assist in assigning appropriate incident commanders to wildland fire incidents, an incident analysis can be used as a guide to identify and mitigate certain complexity and safety issues by selecting a different strategy, tactic, or higher qualifications of incident command personnel. Certain assumptions are made in this analysis:

- As an incident becomes more complex, the need for an incident management team or organization increases.
- To facilitate assembling an efficient and effective organization, key managers should be involved during the early stages of the complexity analysis; this should include federal, state, and local officials.
- The analysis is not a cure-all for the decision process; local fire history, current fire conditions, and management experience must be considered.

All wildland fires, regardless of size, should have an assigned Incident Commander (IC). The training, certification and qualifications of the Incident Commander (IC) vary by the type of fire. General guidance is:

Type 5 Incident

- Resources required typically vary from two to six firefighters
- The incident is generally contained within the first burning period and often within a few hours after resources arrive on scene.

Type 4 Incident

- Command staff and general staff functions are not activated.
- Resources vary from a single resource to several resources.
- The incident is usually limited to one operational period in the control phase.
- No written incident action plan (IAP) is required. However a documented operational briefing will be completed for all incoming resources. (See Briefing Checklist in Resources Section 10.6).

Type 3 Incident

- In-briefings and out-briefings are more formal.
- Some or all of the command and general staff positions may be activated, usually at the division/group supervisor and/or unit leader level.
- Type 3 organizations manage initial attack fires with a significant number of resources, an extended attack fire until containment/control is achieved, or an escaped fire until a Type 1 or Type 2 team assumes command.
- Resources vary from several resources to several task forces or strike teams.
- The incident may be divided into divisions.
- The incident may involve multiple operational periods prior to control, which may require a written IAP.
- A documented operational briefing will be completed for all incoming resources and before each operational period. See Briefing Checklist in Resources Section.
- Staging areas or an incident base may be used.

By completing an Incident Complexity Analysis, a fire county fire warden can assess the hazards and complexities of an incident and determine the specific positions needed (See Incident Complexity Analysis in Resources Section 10.6).

Required training, experience and prerequisites for various wildland fire management positions are contained in PMS 310-1 (Wildland and Prescribed Fire Qualification System Guide). PMS 310-1 has been adopted by the Northern Rockies Coordinating Group (NRCG) and, consequently, applies to all wildland fire fighting personnel in the state of Montana and Custer County for mobilization outside of the county. Within the County, local standards would apply.

Members of the Custer County Fire Department, i.e., MCFD, have extensive training and qualifications in the wildland fire arena. Over the years, many members of Custer County FD have advanced their qualifications to the point where members of the department are on a national interagency Type II Incident Management Team (IMT). Several members of the department are also qualified as strike team leaders, division/group supervisors, and many other positions. This training and experience allows Custer County FD to safely and efficiently manage wildland and wildland-urban interface fires for the county. Their experience on IMT's allows representatives of Custer County Fire Department to effectively deal with incoming IMT's when they are deployed in Custer County. If the Custer County FD personnel were not so well trained, Custer County would most likely experience more catastrophic wildland fires with higher costs and more damage to the lands in the county.

The level of training of Custer County FD personnel allows the Custer County FD to assist the BLM with initial attack efforts on BLM lands due to occasional shortages of initial attack resources. The level of training also allows Custer County FD personnel to manage incidents on BLM lands for the BLM because Custer County FD personnel meet the same standards of training that BLM personnel must meet.

The United States Fire Administration and the National Fire Protection Association conducted a needs assessment of the fire service in the United States; one of the findings was that only 26% of the fire departments in the US can handle a wildland-urban interface fire affecting 500 acres with local trained personnel.⁷ Miles City Fire & Rescue and Custer County Fire is one of the only fire departments in Montana that can manage such an incident.

4.4.2. Law Enforcement

The Custer County Sheriff's Department and Miles City Police Department provide Law enforcement and evacuation services. Due to limited resources in the Sheriff's Department, a significant evacuation during a wildland-urban interface fire will be a challenge.

⁷ A Needs Assessment of the U.S. Fire Service, USFS & NFPA, 2002

4.4.3. Emergency Medical Services

Miles City Fire Department provides ambulance service to the entire county.

4.4.4. Emergency Management

County emergency preparedness comes under the office of the Custer County Disaster and Emergency Services.

4.5. Insurance Ratings

The insurance premiums that residential and commercial customers pay are based on a rating system established by the Insurance Services Office (ISO). In its evaluation of a community, ISO considers the water system and the fire protection provided by the fire department. The relative weight of the components is:

- Water Supply -50
- Fire Department-40
- Fire Dispatch -10

The ISO rating system produces ten different Public Protection Classifications, with Class 1 receiving the most insurance rate recognition and Class 10 receiving no recognition.⁸ **A split rating such as Class 6/9 & 10 means that a department is rated as a Class 6 within 1,000 feet of a fire hydrant or certified water point, a Class 9 when over a 1,000 feet from a hydrant and within 5 miles of a fire station, and a Class 10 rating applies when the insured is more than 5 road miles from a fire station.**

The majority of Custer County currently has an ISO rating of Class 10. Custer County Rural Volunteer Fire Company has recently been re-graded and has achieved an ISO rating of Class 7/9 & 10.

Miles City FD has a rating of Class 5. Many corrections have been made since the City of Miles City was last evaluated. Recent staffing changes will certainly affect the city's on-duty staffing strength and might have some impacts on the city's overall rating. Another factor that will eventually impact the ISO classification in the City of Miles City is that **"All sections of the city with hydrant water supply protection should be within 1½ miles of a fully equipped engine company"**.⁹ (See Figure 8 - 1.5 Mile Distance Map in Map Section 10.5).

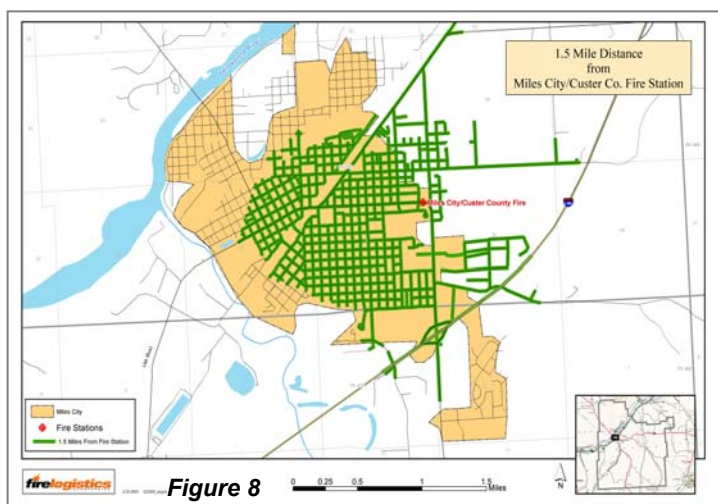


Figure 8

In the extreme northeastern corner of Custer County, Ismay RFD provides primarily wildland fire protection to the fire district. Ismay Rural Fire District has an ISO rating of Class 10 and is in the process of being re-graded. According to Chief Schumaker, the district is in the process of making up-grades to the department to achieve an ISO rating of Class 9. One mechanism might be what is called an ISO Engine, which is basically a beefed-up brush engine with ladders, breathing apparatus and some minor equipment. To qualify for Class 9 Fire Protection insurance rating, an apparatus needs to have a pump capable of delivering 50 gpm or more at 150 psi and a tank of at least 300 gallons. There should be training records, which indicate date and time, location of fires, number of members, meetings, training sessions, maintenance of apparatus, etc. A roster of fire department personnel should be kept.

⁸ Fire Protection Handbook, NFPA 1997

⁹ ISO Grading Schedule, Chicago, IL 1980

Equipment is 250 foot lengths of ¾ inch or 1 inch booster hose, 1 ½ pre-connects or equivalent with a nozzle, 2 portable fire extinguishers. Minimum size should be 20 lbs with 10 BC 2A rating, one 12 ft ladder with folding hooks, one 24 foot extension ladder, one pick head axe, 2 electric hand lights, one pike pole, one bolt cutter, one closet tool and one crow bar These standards qualify an engine and meets ISO to get your rating from a 10 to a 9.They need some equipment to achieve this goal, which includes:

- A water tender
- 24 foot ladder
- Re-chargeable flashlight
- Pike Pole
- Bolt Cutter
- Closet Tool
- Crowbar

Improvements to the water delivery system, dispatch and the fire departments could improve the ISO rating for the individual fire protection agencies. This would result in potential annual insurance premium savings to the fire department's customers, e.g., home and business owners. It is important to note that some insurance companies will not insure structures that are outside of 5 road miles from a fire station.

4.6. Land Use/Development Trends

The majority of land use in Custer County is agricultural based (See Figure 9 and Land Cover Map in Map Section 10.5).

Generally new land development is at a slow pace. There are small pockets of new construction on existing platted lots in wildland areas causing additional concern from a wildfire perspective. Of significant concern to the fire agencies providing structural and wildland fire services are the significant parcels that have been platted and were developed without the benefit of subdivision review. There are more than 20 sections of existing platted parcels in an area northeast of Miles City known as The Knob and Green Mountain.

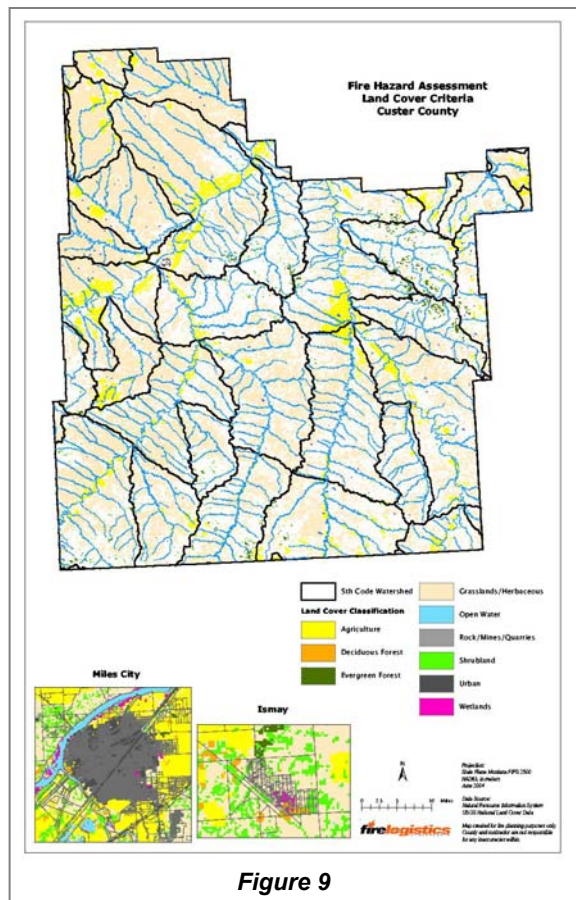


Figure 9

4.7. Air Quality

The State of Montana's air quality is managed by the Montana State Airshed Group through the Department of Environmental Quality. Generally, open burning is permitted from March 1 through November 30 when such burning is coordinated with the Montana State Airshed Group. Technically, open burning is prohibited from December 1 through February 28 except by special approval of DEQ. In most cases this approval can be obtained for any proposed open burning in eastern Montana because of good smoke dispersal and the lack of significant air quality issues such as the valley inversions experienced in western Montana.

4.8 Summary

The impacts of the elements of the community have on the wildland fire program and the delivery of wildland fire fighting services in Custer County is summarized in Table 4.8.1.

Table 4.8.1

Element	Summary of Impact on Custer County's Wildland Fire Program
Topography, Slope, Aspect, Elevation	Accessibility Increased rates of spread
Meteorology, Climate, Precipitation and Fire Weather	Accessibility of water Increased number of high fire danger days Increased flammability of fuels
Population, Demographics	Reduced availability of volunteers Reduced availability of skills and experience Need for increased recruitment and training Changing distribution of fire occurrence Need for fire protection planning
Infrastructure	Reduced accessibility
Fire Protection	Lack of fire protection Implementation of local government fire protection services Increased damage from structure fires High cost wildland-urban interface fires Risk transfer to Custer County Fire
Fire Engine Pump/Draft Source Sites	Accessibility of water
Training, Certification, and Qualification	Availability of personnel Financial Constraints Mitigate potential liability
Law Enforcement	Capacity to deliver evacuation services, security Operational Cooperation
Insurance Ratings	Predictor of service capability Increase or decrease in insurance premiums paid
Land Use/Development Trends	Changing fire protection risk profiles Risk transfer to Custer County Fire
Air Quality	Ability to conduct prescribed burns

5. Current Fire Environment

The following narratives describe the current fire environment in Custer County. These perspectives are a result of an on the ground tour conducted by Miles City Fire Department personnel with Fire Logistics, Inc. personnel in October of 2003.

5.1. Wildfire Problem Definition

As stated in Chapter 4, Custer County does have areas of forested land. Almost all of these are the ponderosa pine ecosystems typical of eastern Montana. As will be discussed in the next section, this is a fire prone ecosystem is subject to repeated wildland fires. The impacts of those frequent fires can be quite variable depending on the values at risk. The emergence of subdivisions within the large open blocks of range and forest lands raises the probability of material losses to man made improvements as well as possible threats to the occupants of those new developments (See Figure 10).



Figure 10

Currently, Miles City Fire Department (MCFD) is responsible for wildland protection through an inter-local agreement with Custer County for state and private lands within Custer County. The Bureau of Land Management – Miles City provides wildland fire protection to federal lands within Custer County. In the northeastern corner of the county, Ismay RFD provides wildland fire protection to the residents of the Ismay RFD.

An analysis of the placement of wildland engines through out Custer County indicates that there are wildland engines generally located throughout the areas of the county where fire occurrence is the highest and where there is a willing host (typically a rancher or resident) who will make a commitment to attending required training and respond to wildland fires in the areas and throughout the county.



Figure 11

5.2. Wildland/Urban Interface

During the past several fire seasons of 2000 through 2003 it has become evident that wildland/urban interface fire losses have increased throughout the Western United States (See Figure 11). The expectation under the Federal Fire Policy is “that losses will increase in the future.”¹⁰

The wildland/urban interface is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.¹¹ Similar terms are wildland/residential interface and wildland/urban intermix.

¹⁰ Federal Fire Policy, 2001

¹¹ Ibid.

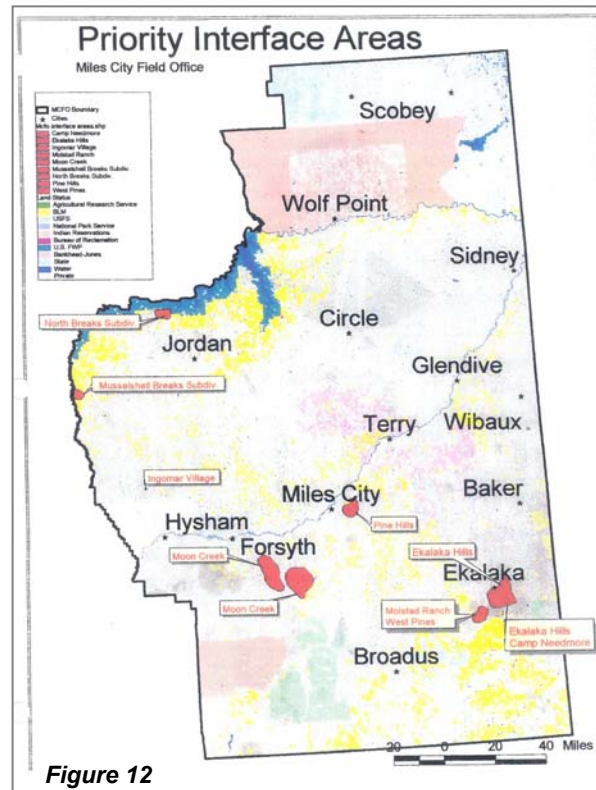
From a fire fighter’s perspective there are nine Wildland/Urban Interface "Watchout" Situations that are significant to the safety of wildland fire fighters:

- Wooden construction and wood shake roofs
- Poor access and narrow congested one-way roads
- Inadequate water supply
- Natural fuels closer than 30 feet to structures
- Extreme fire behavior
- Strong winds
- Need to evacuate the public
- Structures located in chimneys, box or narrow canyons, or on steep slopes in flashy fuels
- Inadequate bridge load limits

Both Ismay and Miles City are listed in the Federal Register as “Communities at Risk” from wildland fire. The Bureau of Land Management assessed the wildland-urban interface areas within the Miles City District in the early 1980’s in Custer County (See Figure 12). The Moon Creek area and the Pine Hills were identified as wildland-urban interface areas. There are several additional areas of wildland-urban interface within the county, which have been identified during this planning process (See Planning Area Map in Map Section 10.5).

Specific areas of wildland-urban interface in Custer County include:

- Miles City (portions)
- Ismay
- Moon Creek Subdivision
- Pine Hills Ranchettes Subdivision
- Wolf Creek/Evergreen Estates
- Squirrel Ridge Subdivision
- Sun Dial Subdivision
- Bergerson Ranchettes
- Sunday Creek Ranchettes



The development of portions of Custer County into residential lots of varying sizes is contributing to the wildland/urban interface fire problem for the fire protection agencies in the county. Development occurring in areas of Custer County that has no structural fire suppression department compounds the wildland-urban interface problem. This leads to several complex problems, which need to be addressed in the CWPP:

- Access
- Asset Protection Zones
- Water Supply
- Building Construction Requirements
- Fuel Reduction On All Ownerships
- High costs of wildland fires when the structure protection resources need to be acquired from other areas of the state.
- Kinds And Types Of Fire Apparatus Required For Fire Protection
- Structural Fire Protection For Structures Outside Organized Fire Protection Jurisdictions

5.3. Structure Fire Problem Definition

Currently, Miles City Fire Department (MCFD) has fire protection responsibilities for all structure protection within the incorporated city limits and provides structure protection for other structures within the county if they have a contract for fire protection with MCFD. CCRVFC has responsibility for their subscriber’s property, and responds to non-subscriber structure fires outside the city limits and will then bill the landowner for suppression costs. There are a few businesses, outside the city limits, that contract with both the CCRVFC and MCFD. It is possible that both of these entities could be taking suppression action on the same fire outside the city limits. Coordination between the two entities is limited in these situations and should be governed by some kind of operating agreement. In the northeastern corner of the county, Ismay RFD provides structure fire protection to the residents of the Ismay RFD.

The best way to quantify the structure fire problem in the Custer County outside of the city limits is to conduct an occupancy risk assessment, which evaluates the severity of a specific structure in relation to the fire districts ability to handle the types and severity of emergencies with that structure.¹² Risk categories used in the Self-Assessment Manual developed by the International Commission on Fire Accreditation are:¹³

Category	Description
Maximum/Worst Risk	Occupancies classified as maximum risk will be of substantial size and contain a concentration of properties, which present a very high risk of life loss, loss of economic value to the community or large loss damage to property in the event of a fire. These risks impact the need for the fire department to have multiple alarm capability and have an adequate assessment of their ability to concentrate resources.
High Hazard/Key Risk	Built-up areas of substantial size with a concentration of property presenting a substantial risk of life loss, severe financial impact on the community or unusual potential damage to property in the event of fire.
Moderate/Typical Risk	Built up areas of average size, where the risk of life loss or damage to the property in the event of a fire in a single occupancy is usually limited to the occupants. In certain areas, such as small apartment complexes, the risk of death or injury may be relatively high. The moderate/typical risks are often the greatest factor in determining fire station locations and staffing due to the frequency of emergencies in this category. To assure an equitable response and to provide adequate initial attack/rescue capability to the majority of incidents, the typical risk is often used in determining needed resources.

The area outside the city limits in Custer County has buildings and occupancies in all three categories with the majority being in the moderate/typical risk category.



Maximum/Worst Risk

¹² Fire and Emergency Service Self-Assessment Manual, Commission on Fire Accreditation International, 6th ed.

¹³ Ibid



Moderate/Typical Risk ←

Maximum/Worst Risk or High Hazard/Key Risk →
Depending on Time of Year and Use.



The Commission on Fire Accreditation International, *Fire and Emergency Service Self-Assessment Manual* outlines the needed staffing levels for incidents occurring in the different types of risk occupancies, which are detailed in the following table.¹⁴

Staffing Resources for Risk Type Occupancies.

Task	Maximum/ Worst Risk	High Risk	Moderate Risk	Low Risk
Attack Line	4 (16-18*)	4	2	2
Search and Rescue	4	2	2	
Ventilation	4	2	2	
Back-up-Line	2	3	3	
Pump Operator	1	1	1	1
Water Supply	1	1	1	
Utilities Support	1	1	1	
Command/Safety	2	2	1	1#
Forcible Entry	*			
Accountability	1			
Salvage	*			
Overhaul	*			
Communication	1*			
Chief's Aid	1	1		
Operations Officer	1			
Administration	1			
Logistics	*			
Planning		1*		
Staging		1*		
Rehabilitation	1			
Sector Officers	1-4*			
High-Rise Evacuation	10-30*			
Stairwell Support	10*			
Relief	*			
Investigation	*			
TOTALS	25-65*	17	13	3-4

Can often be handled by the first due officer.

* At maximum and high-risk fires, additional fire fighting personnel are needed

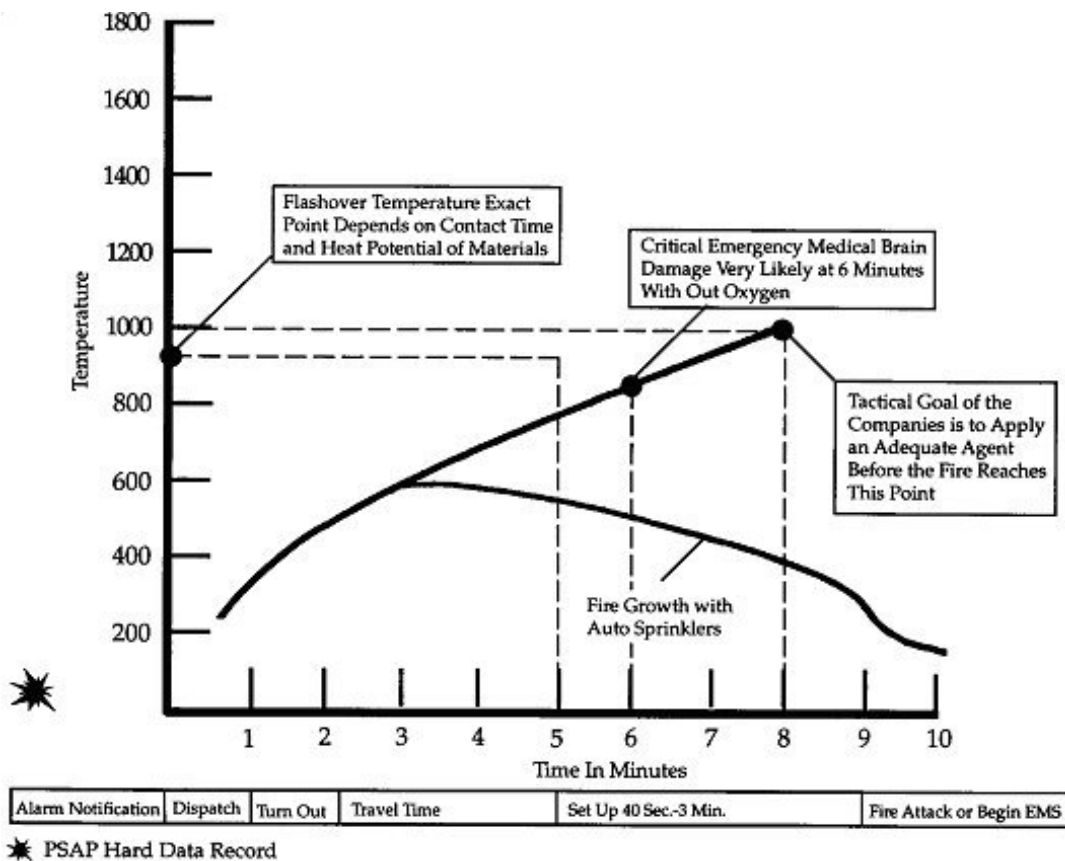
Structural fire suppression whether in a rural environment or in one of our cities requires the accomplishment of the above listed tasks, many of which must occur almost simultaneously to ensure

¹⁴ *Fire and Emergency Service Self-Assessment Manual, Commission on Fire Accreditation International, 6th ed.*

effective and safe operations at the incident scene. To ensure an effective fire fighting force on the scene of significant fires in these kinds of risks, current staffing levels need to be augmented with paid-call fire fighters, volunteers and mutual aid from other fire departments.

A principal difference between rural fire departments and their municipal counterparts is that the rural departments must typically solve the water supply issues in addition to fighting the fire. Typical rural departments incorporate water tenders, portable tanks, draft points, etc. into their fire protection strategies for rural areas of Custer County.

To be minimally effective in controlling a structure fire, the initial responding apparatus should reach the scene of the fire before “flashover” occurs.¹⁵ The time from ignition to flashover varies based on the materials involved in the fire, but generally occurs somewhere between 4 and 10 minutes. The following chart illustrates the relationship between the response time or reflex time and flashover and/or critical brain damage in an EMS incident.



The Significance of Flashover

Pre-Flashover	Post-Flashover
Limited to one room	May spread beyond the room of origin
Requires smaller attack streams	Requires more larger attack lines
Search & Rescue is easier	Search and Rescue is difficult
Initial assignment can handle	Requires additional fire companies

For municipal departments in small and medium sized cities, all of the first alarm apparatus will not arrive at the fire scene simultaneously. In a department like Miles City Fire, the on-duty personnel responds with

¹⁵ Evaluation & Planning of Public Fire Protection, John Granito

their assigned apparatus, while additional fire personnel are either called back to duty or paid call fire fighters respond to the station to man and respond with additional fire apparatus.

There is currently no written mutual aid agreement between Miles City FD and the Custer County Rural Volunteer Fire Company to provide additional resources to fire incidents. This agreement will continue to be problematic for the City of Miles City until the CCRVFC becomes a governmental entity. Section 7-33-4112 MCA does not authorize the City of Miles City to enter into mutual aid agreements with a volunteer fire company. The challenge for City of Miles City is that they (the community) will be providing free services to people who do not live in the city. Competition for coverage of the areas around Miles City that are not incorporated within the city limits, has resulted in the inability of the two departments to cooperatively solve the fire protection problems for the residents of Custer County that live in these areas. While in many areas of the country, fire services agencies are now transcending the traditional fire service hierarchy and geopolitical boundaries to meet increased service demands and reduce expenditures.¹⁶ This is able to be accomplished because the vast majority of fire service agencies are governmental agencies, supported by public funds.

The cities of Miles City, Baker, Glendive, Terry, and Forsyth, and West Glendive RFD have executed a mutual aid agreement to assist each other during significant fire incident. The City of Miles City and the City of Billings have also developed a mutual aid agreement. The limitations to this agreement are the travel times that are required to get assistance to each other. The Ismay RFD has mutual aid agreements with Custer County, CCRVFC and Fallon County.

Policy makers in the city and the county need to be concerned with what level of service is provided to the community, i.e., the number of personnel and apparatus that can arrive at the fire scene within a stipulated time frame and a percent of time that it will occur. Sample performance statement for a maximum risk structure fire might be:

The first unit shall arrive within 6 minutes total reflex time, for 90% of all requests for emergency service. The second-due engine and first-due truck company shall arrive within 10 minutes total reflex time, for 90% of all requests for emergency service. Remaining units, including battalion chiefs, shall arrive within 13 minutes total reflex time, for 90% of all requests for emergency service. The rescue company shall arrive within 15 minutes total reflex time, for 90% of all requests for emergency service.

A low risk structure fire performance measure might be:

The first engine shall arrive within 6 minutes total reflex time, for 90% of all requests for emergency service. The second-due engine shall arrive within 10 minutes total reflex time, for 90% of all requests for emergency service. Remaining units, including battalion chiefs, shall arrive within 15 minutes total reflex time, for 90% of all requests for emergency service.

Clearly levels of service need to be established by the community for each of the services provided by the typical fire department to include:

- Structure fires
- Wildland fires
- Hazardous Materials
- Emergency Medical Services
- Special Operations, including confined space and trench rescue
- Auto Extrication

The fire departments will then be able to measure how successful they are in delivering quality services to their customers. Other tools that can be used to measure the effectiveness of fire service organizations are:

¹⁶ Klamath County Fire District No. 1 Deployment Process, 2000

- NFPA 1710 - Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments
- NFPA 1720 - Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments
- Insurance Services Office – Fire Suppression Rating Schedule

None of the fire service organizations in Custer County have NFPA 1710 or 1720 plans.

The fact is there is no governmental structure fire protection entity outside the city limits of the incorporated city of Miles City in Custer County, except for Ismay RFD, contracted fire protection Miles City FD and the subscribers of the CCRVFC. The issue that is most evident in Custer County is the lack of clarity between the jurisdictions of MCFD and CCRVFC. There is competition for the needed fire protection services between these two entities and it has not been well managed by the city or county government. The poor relationship between the fire protection providers will most likely lead to a serious incident involving loss of life or serious injury at some point in the future and the city and county may be held liable for allowing this situation to continue. The issue of structure fire protection outside of Miles City and throughout the rest of Custer County is addressed by recommendations in the Mitigation Plan.

5.4. Local Fire Ecology

As it is in the neighboring counties of eastern Montana, the prevalent timber type in Custer County is ponderosa pine. This type is a fire adapted tree species that has developed natural mechanisms to cope with frequent fire. It has a thick corky bark that insulates the trees cambium from heat generated by wildland fires. The cambium is the living layer of cells between the bark and the woody portion of the tree stem and is responsible for the growth of both new wood and new bark. Ponderosa pine can be found on hot dry sites such as those found in Custer County. Because of the frequency of lightning storms in the county, it is estimated that fire burned in and under most of the natural pine stands at a 10-20 year interval and less than that in some areas. Because of this frequency fuel loadings were traditionally low in the stands as dead branch wood and needle litter were consumed during these fire events. The fires also tended to thin out patches of heavy regeneration that resulted from good cone crop years coupled with favorable moisture conditions. The fires kept the density of trees lower by selectively killing some of the thinly barked seedlings and smaller individual trees. The trees that did survive had a greater supply of nutrients and water to nourish them and were stronger and healthier. In the absence of the heavy fuel loadings, periodic low intensity fires would have had no significant impacts on the older trees that remained.

Since the advent of fire protection, however, the situation has changed considerably. The natural wood litter occurring from the trees in these stands has accumulated for decades. In most areas there are many more trees per acre than there would have been historically. There are also more situations where continuous fuel exists from the ground to the crowns of mature trees (ladder fuels). This results when too many seedlings survive and, because of intense competition for water and nutrients, form overcrowded pockets of spindly trees. These trees will survive to intermediate heights with many of them bent or broken by snow loads.

Today, when a wildland fire occurs it is much more likely to have greater negative consequences. The higher fire intensity caused by a greater amount of fuel, results in an increased amount of heat. This increased heat can have adverse effects on the soil and, subsequently, the productivity of the site. Higher intensity fires are also more difficult to keep away from improvements that landowners and firefighters wish to protect. Most importantly, they increase the risk to firefighters.

5.5. Hazardous Fuels

As displayed in Figure 13 the continuity of heavy fuels, i.e. ponderosa pine, is relatively scattered in Custer County. There are areas of continuous pine type covering several thousand acres in size and these are the areas that have the greatest potential for supporting large intense fires. Fires may be terrain driven, plume dominated, or wind driven in this fuel type. This is also the ecosystem type most attractive to developers for the placement of subdivisions.

Areas of sage and brush species also have potential for large intense fires but they are less likely except under wind driven conditions. There are many thousands of acres of this fuel type in the county.



Figure 13

The most common fuel type is grassland. Fires will normally be of a lower intensity level in this type and will be easier to control. In addition, fires are less likely to start from lightning in this ecosystem.

5.5.1. Fire Regime Condition Class

Fire has always been a part of the wildland, changing and shaping the structure and composition of vegetation in the area. The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced);

II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);

III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced);

IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced);

V – 200+ year frequency and high (stand replacement) severity.

In southern Custer County the predominant tree species of ponderosa pine, a fire dependent tree species, was maintained by fire. Low intensity surface fires burned relatively frequently, keeping ground vegetation and prolific pine regeneration from becoming established and producing ladder fuels. As fire became less of a factor, due to fire suppression, in maintaining the vegetation in these areas the fuel structure changed. As a result, there are more ladder and ground fuels (litter mat and down woody material) that contribute to higher intensity crown fires than would have occurred historically. This has increased the threat of fire to people and human resource values within the wildlands and wildland-urban interface.

Current “Condition Class” is defined in realms of departure from the historic fire regime, as determined by the number of missed fire return intervals. There are three “Condition Classes” that have been developed to categorize the current condition with respect to each of the historic fire regime groups.

The following table describes each Condition Class:

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) are low
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate; Risk of loss of key ecosystem components are moderate
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components are high

5.5.2. Natural Fire Breaks

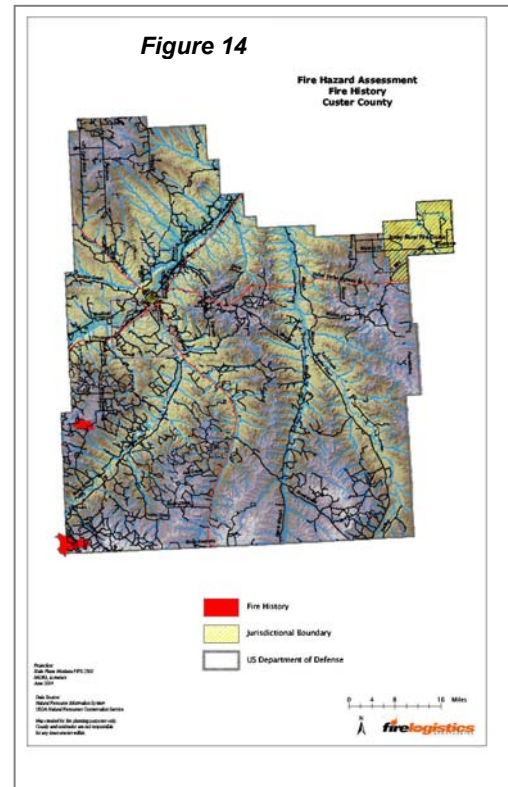
Since Custer County is primarily an agricultural based county there are many land use activities that break up the continuity of the fuel types, particularly in the sage and grassland types. Cropland, grazed land and roads all contribute to interrupting continuous fuel beds thus giving firefighters an opportunity to safely take effective action on wildland fires.

The Yellowstone River, Tongue River, and Powder River, as well as several tributaries, may provide natural fuel barriers within the county.

There are also areas of open rock and clay bluffs, particularly in the northern portion of the county that can prove to be effective barriers to the spread of wildland fire.

5.6. Fire History

Almost all fires experienced in Custer County are the result of lightning fires resulting from thunderstorms. These starts occur in the ponderosa pine forested areas and are relatively fast spreading in the grass and needle cast understory. They are also relatively easy to control unless they are located in an area where the topographic or fuel conditions are conducive to the fire getting into the crowns of the trees or when high winds move the fire rapidly through the prevalent fuel type. The current long-term drought has made control more difficult in recent years. In an average year there are 46 wildland starts, which burn an average area of 4,500 - 7,500 acres (See Figure 14 and Fire History Map in Map Section 10.5). Significant fires in the past



include the Swain Fire, Powderville Complex, Knowlton Fire, and Bradshaw Fire. These fires occurred on the types of days described in Chapter 4.1.2.

As with other eastern counties, Custer County is faced with the challenges of keeping local firefighters motivated and qualified to perform fire suppression work. In addition, there are other challenges to the success of any fire protection organization in Custer County. These include the large size of the county, the travel times required to respond from one end to the other and the overall lack of a water supply in many areas within the county. These all contribute to the overall difficulty of maintaining an effective suppression effort on wildland fires.

On a severe burning day with extreme fire danger and multiple new ignitions it is certain that the supervisory capability and the resource availability in Custer County would be quickly exceeded. Up to date mutual assistance agreements with the State of Montana, BLM, and the neighboring counties are imperative at a time like this to ensure losses are kept to a minimum. Unfortunately, it is likely that local cooperators will have fire problems of their own under these conditions and rapid mobilization and deployment of resources from outside the area will be needed.

5.7. Expected Fire Behavior

Fire behavior describes the way fires ignite and spread. Topography, fuel conditions, and weather all influence fire behavior and how wildland fires burn in Custer County. Fuel is the only factor influencing fire behavior that we have the ability to manage. The following fire behavior assessment shows fire intensities and fire spread rates in different fuel types/models that are found in Custer County. It is important to understand this information to determine what areas contribute to the fire problem in the county (See Figure 15).

The following fuel types/models were used for analyzing potential fire behavior:



Figure 15

Fuel Model 1: Grass that dominated by short grass where very little shrubs or timber is present over less than $\frac{1}{3}$ rd of the area. The fine, porous, and continuous fuels that have cured or are nearly cured govern fire spread.

Fuel Model 2: Grass with open timber overstory that cover $\frac{1}{3}$ rd to $\frac{2}{3}$ rd of the area. This model represents the open grass and ponderosa pine and harvested areas where an overstory of timber remains. Fire spread is primarily by a surface fire through the curing or dead grasses with the litter and dead down wood from the open shrub or timber overstory contributing to fire intensity. This fuel model also includes scattered sagebrush within grasslands without ponderosa pine overstory.

Fuel Model 6: Shrubs are older and require moderate winds for fire spread, but can be extremely flammable. Fire will fall to ground at low wind speeds. This fuel model includes sage and pinion juniper shrub lands. Under drought conditions, live fuel moisture is less than normal, causing shrubs to be more flammable.

Fuel Model 9: This model is represented by both hardwoods and long needle pines. Fire run through the surface litter faster than Model 8 and have a higher flame height. In Custer County this model is represented by Ponderosa Pine and concentration of natural accumulation of ground fuels. These ground fuels can significantly contribute to torching out of trees, spotting and crowning. Fires burning on steep and high-energy slopes may see erratic fire behavior during extended period of drying.

Fuel Model 10: this model represents older mature timber stands that have large fuel loads of dead material on the forest floor. This would include areas that are insect and disease ridden, wind-thrown stands, and over mature stands with deadfall or heavy accumulations of debris. Ladder fuels are usually present. Fire burns in the surface and ground fuels with greater intensity than the other timber types. Crowning, spotting, and torching of individual trees are more frequent in this fuel type.

Fire behavior calculations for these fuel models were made using the fuels, weather, and topographic conditions prevalent for Custer County. One is for normal August fire season conditions, called Average, and one for extreme August fire season conditions, called Extreme. The extreme case also takes into consideration severe drought conditions. These conditions would be present in August and September when all the vegetation has cured and dried.

<u>Weather</u>	<u>Average</u>	<u>Extreme</u>
High Temperature	80 degrees	90 degrees
Low Relative Humidity	20%	10%
Mid Flame Wind Speed	5 mph	15 mph

<u>Fuel Moistures</u>		
	<u>Average</u>	<u>Extreme</u>
Fine Fuels, 0-1/4 in.	6%	3%
Small Fuels, 1/4 - 1 in.	9%	4%
Medium Fuels, 1-3 in.	10%	5%
Large Fuels, >3in.	14%	8%
Shrubs, Live Fuel Moisture	80%	50%
Trees, Live Crown Moisture	100%	60%

The following table is the fire behavior interpretations that should be used for the fire behavior outputs.

Fire Suppression Interpretations from Flame Length

<u>Flame Length</u>	<u>Fireline Intensity</u>	<u>Interpretations</u>
< 4 feet	< 100 BTU/ft/sec	Fires can generally be attacked at the head or flanks by fire fighters using hand tools. Handline should hold fire.
4 – 8 feet	100 – 500 BTU/ft/sec	Fires are too intense for direct attack on the head with hand tools. Handline cannot be relied upon to hold the fire. Bulldozers, engines, and retardant drops can be effective.
8 – 11 feet	500 – 1000 BTU/ft/sec	Fires may present serious control problems: torching crowning, and spotting. Control efforts at the head will probably be ineffective.
> 11 feet	> 1000 BTU/ft/sec	Crowning, spotting and major fire runs are probable. Control efforts at the head of the fire are ineffective.

Fires are classified according to the fuels they are burning in; ground fires, surface fires, and crown fires. Each burns with different intensities and spread rates depending on fuel, wind, and topography. The following fuel types/models were used for analyzing potential fire behavior:

Fire Behavior Outputs Average and Extreme

Fuel Type/Model	Rate of Spread (Chains/hour)		Flame Length (Feet)		Fire Size after 1 hour (Acres)	
	Average	Extreme	Average	Extreme	Average	Extreme
1	101	446	5	10	385	4,812
2	40	372	7	20	61	2,333
6	31	212	7	18	57	752
10	10	68	6	15	4	77

The transition from a fire burning in the surface fuels on the forest floor to a fire that burns in the crowns of the trees is determined by the amount of available fuel, the fire intensity or flame length, the presence of ladder fuels to carry the fire into the standing trees, and the wind. A fire may start out torching a single tree or small group of trees. When a fire becomes established in the tree crowns, the wind will usually carry the fire in the crowns creating fire intensities that cannot be dealt with by fire suppression forces.

Crown fires are normally driven by the wind but the dryness of the fuels and tree crowns can cause what is known as a plume dominated crown fire. Crown fires of this type occur because of dry, explosive, and cumulative drought conditions present in the forest. A plume dominated crown fire does not necessarily need wind to keep it sustained. Because of successful fire suppression efforts for the last 100 years, the increased fuel complex in many areas increases the potential for a plume dominated wildland fire.

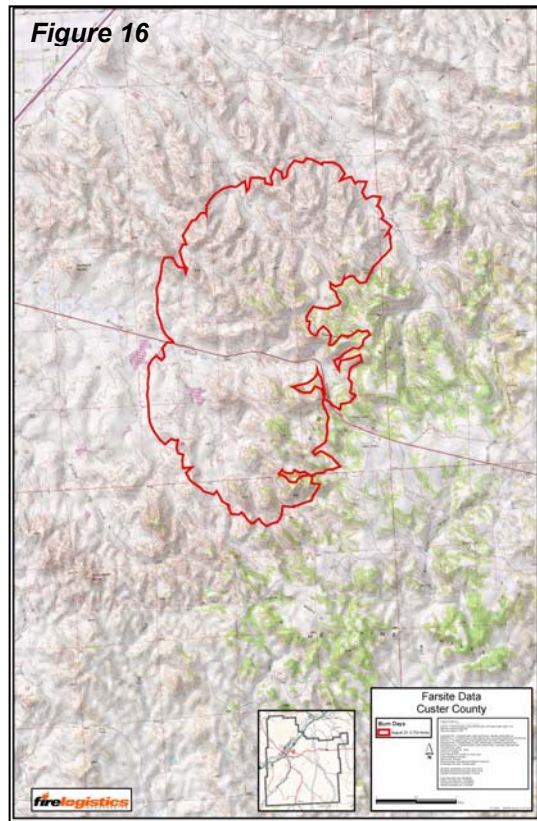
Spot fires are caused by burning embers carried aloft by the wind and smoke column and dropped ahead of the main fire front. Spot fires need a dry fuel bed to ignite and it is not uncommon for these fires to start $\frac{1}{4}$ to $\frac{3}{4}$ of a mile ahead of the main fire front. These spot fires create serious problems for fire suppression forces trying to protect lives and property well ahead of an advancing fire front. As spot fires start and gain intensity, they can become as active as the main fire front. This was experienced during the Swain Fire in 2003. Some fires travel so quickly through a combination of crowning and spotting that there is absolutely no way for fire suppression forces to gain control.

Many of the timber stands in Custer County are ripe for crown fires because of the presence of ladder fuels, heavy, down woody debris on the forest floor and mature or over-mature age classes of the timber stands. A condition class map of these high-risk stands will be available through the BLM some time in 2005. The existence of these stands within the county is an incentive for private landowners, county, state and federal agencies in the county to implement a hazardous fuels treatment program on a landscape scale.

5.8 FARSITE

Farsite is a fire behavior computer-modeling program that allows the user to project the spread of a wildland fire over a time period that may be days and/or weeks in length. The location of the Farsite run for Custer County was determined using long-term historical fire data and potential ignition sources that may result in a large wildland fire. The Farsite model allows a fire to burn freely and does not show the results of any suppression actions.

The Farsite fire behavior run was made using climatic parameters in the historic weather data (See Section 10.3 Farsite Data Input in Appendices). The Farsite run projects fire spread for a burning period. A one-day time period was selected due to the historical nature of fire behavior experienced in eastern



Montana and the proximity of the selected site to the wildland-urban interface in the Pinehills area. If the wildland fire is not contained it will continue to burn in somewhat similar fashion until the climatic or fuel conditions change.

The ignition originates at 1600 on day August 23rd and burns until 2400 (See Figure 16 and Farsite Map in Map Section 10.5). While the initial ignition did not become very large (5,754 acres) by Custer County standards, it burned into a wildland-urban area, which would significantly complicate the fire suppression efforts.

The overall complexity of any ignition that escapes initial attack or a set of weather and fuel conditions, which indicate the potential for large fire growth, could adversely affect public health and safety, property and resources values requires a coordinated public safety effort in Custer County.

Custer County has the potential to experience and has experienced large wildland-urban fires similar to that as illustrated by the Farsite run. As a result, the County needs to ensure that a coordinated planning, warning, communication and evacuation system is in place. In addition, the Custer County Fire Department staff needs the knowledge, skill and ability to manage a large and complex wildland fire management workload.

5.9. Fire Effects Assessment

Wildland fires generally have three possible outcomes on forested areas. They can be lethal, non-lethal or mixed. These outcomes are alluded to in 5.1 Fire Regime Condition Class. A broad definition of each follows:

- Lethal – Fire is of high enough intensity and long enough duration to cause mortality in all or most of the trees and shrubs in the burned area. This result is likely in a hardwood ecosystem but the exception in a healthy ponderosa pine ecosystem. It can result, however, from severe burning conditions and/or unnaturally high fuel accumulations in the forest. When a lethal fire occurs it will be evident for decades that the area has been burned.
- Non-lethal – Fire is not of high enough intensity or long enough duration to kill the trees in the burned area. This is a more normal result in a healthy ponderosa pine ecosystem since the trees have adapted to fire by producing a thick bark. This bark protects the tree's cambium from heat. Within two years of a non-lethal burn almost all evidence of the fire has disappeared.
- Mixed – Fire will create significant areas of both lethal and non-lethal effects within the burned area.

Unless a lethal or mixed fire is experienced, any wildland fire burning in Custer County has a much higher probability of negatively impacting human improvements, livestock and forage than it does creating any long term damage to natural resources. While a wind driven, high intensity fire can certainly occur in the county, most fires are expected to be non-lethal or mixed. They may kill pockets of trees in places like draws and steep slopes but many trees will survive. A ponderosa pine can have over 60% of its crown scorched and it can still produce new needles the following year. The most significant natural resource loss from a non-lethal fire may be the short-term loss of forage for livestock.

Landowners can reduce the exposure of their buildings, structures and themselves to a spreading fire. Asset protection and fuel modification zones, which may include grazed areas, should be in place around sites needing protection (See Figure 17). This is particularly effective on the south and west sides or down slope from such areas since most fires will progress to the north and east or upslope. Exceptions to this general rule can occur when a thunderstorm is in the vicinity of the fire and downdrafts from it cause the fire to spread erratically.

It is imperative that any new start be controlled as soon as possible. If a fire goes unattended it will continue to spread making eventual control more labor intensive and probably more difficult as it gets into new fuel sources. It also increases the chances of the fire being exposed to some type of severe weather event that can create a dangerous situation for life and property including those of the firefighters.



6. Risk Assessment

A fundamental part of any fire plan is identifying what you might lose in a wildland fire, known as assets or values at risk.

6.1. Values at Risk

The primary intent of fire protection is to protect the values at risk and maintain healthy forest and grassland ecosystems. The purpose of a successful fire management program is to reduce the risks associated with values that are important to the county, its citizens, and natural resources. Values at risk will be used to assist fire protection agencies in prioritizing mitigation projects.

Some of the values at risk in Custer County are:

- Health & Safety – Public & Firefighters
- Property, Improvements & Facilities – Private & Public
- Recreation/Community Impacts – Economic & Social
- Forest/Ecosystem Health
- Timber and Grazing

6.1.2. Health and Safety

Fire fighter safety should never be compromised.

Custer County needs to maintain the safety of their firefighters. Thorough situational awareness on the part of the firefighter and strong incident management by the fire department leadership is critical to the safety of personnel. Wildland fires are capable of moving over significant distances in a short period of time. It is possible that firefighting resources could become trapped during one of these events if they do not maintain a constant situational awareness.

Custer County has the potential to have a series of multiple wildland fire situations during any fire season. A fire season of this nature could conceivably last for several months. MCFD should work toward expanding its leadership capability so the department can deal with simultaneous complex ignitions.

In 1997, the “TriData Study: Wildland Firefighter Safety Awareness Study” was commissioned to find ways to improve firefighter safety. Of the 114 recommendations, the #1 recommendation was to “Implement a large-scale, long-range fuel management program.” Fire protection agencies, county officials, and the public must insist on hazardous fuel reduction efforts on a landscape-basis if they are truly serious about improving safety of not only firefighters but the public in general.

6.1.3. Property, Improvements & Facilities

Few wildland fires burn where there is not some threat to homes, ranch out buildings or other structures, fences, power lines, communication sites, or some other type of infrastructure. Fuel treatments (asset protection zones) in the immediate area around structures, designed to reduce wildland fire intensity, can dramatically improve their probability of survival. However, restricting treatments to these areas does little to protect other values-at-risk, some of which may be equally or more important from a neighborhood and/or a community standpoint.

One of the largest problems facing wildland protection agencies in Custer County is the unwillingness of subdivision occupants to realistically look at the fire environment they are building their homes in and their failure to correct hazardous fuel situations around those homes. In lieu of homeowners undertaking any kind of hazard abatement actions that would mitigate fire behavior potential, the protection organizations have no choice but to take only such actions that will facilitate orderly

evacuation of occupants and will insure the safety of their firefighters. This will mean writing off some structures where the Incident Commander cannot reasonably expect the apparatus or the fire fighters to safely withstand an oncoming fire front.

The Moon Creek settlement recently had a close encounter with a large wildland fire (See Figure 18). This event should have made clear the potential benefits of fuel reduction and other mitigation projects designed to enhance the protection of these wildland-urban interface subdivisions.



Figure 18

6.1.4. Recreation

Opportunities to enjoy outdoor recreation activities can also be severely hampered by wildland fire and fires can have an adverse effect on the economy of Custer County. Areas can be closed to the public for extended periods of time during high fire danger. Often these closures and restrictions occur in early fall during up-land bird and big-game hunting seasons when many non-county residents have plans to travel to the area.

6.1.5. Forest/Ecosystem Health

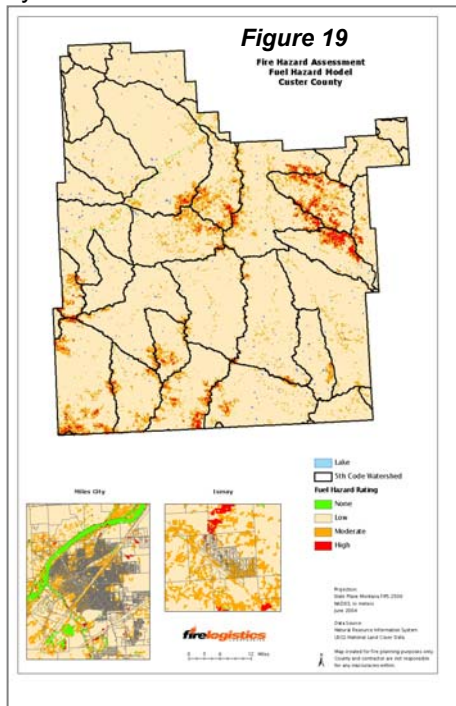
See Section 5.4 Local Fire Ecology.

6.1.6. Grazing and Timber

Agriculture and grazing are two of the primary uses on the private lands in Custer County. Haying and hay storage are at risk during large wildland fire. During the Powderville Complex Fires, ranchers affected by the fire were more concerned about the losses to their grazing and hay storage than they were about their homes and improvements on their ranches.

The Bureau of Land Management has a scattering of sections within the county and is tasked with providing rangeland and recreation use on those BLM lands.

There is some potential for timber harvest within the county with some harvests occurring on private ranches.



6.2. Risk Estimation

As with the federal agencies, the county’s first priority is protection of human life and secondly, personal property.

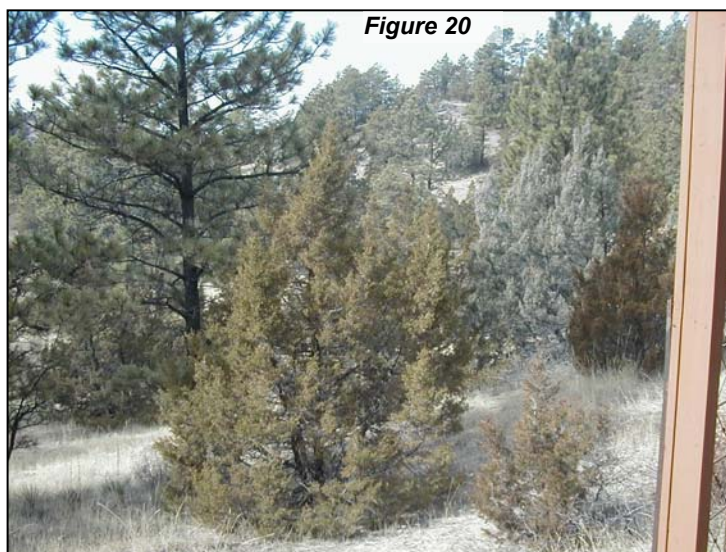
In order to identify the problem areas in Custer County a process was developed by Fire Logistics to look at hazard (fuels), risk (potential fire starts) and values in a collective manner (See Figure 19 and Fuel Hazard Model, Risk Model, Values at Risk and Fire Hazard Assessment Model Maps in Map Section 10.5). The first step was to develop a vegetative layer that placed the prevalent cover types into a high, moderate, low or inflammable category. This was overlain with a map of the historical fire occurrence for the county for

the past 22 years. This created a good representation of where fires traditionally occur and what their potential for growth would be. The third factor incorporated was the location of structures by parcel. This helped identify where the priorities, in terms of life and property, for protection existed. This composite map gave Fire Logistics a basis for their recommendations to Custer County for focusing prevention, protection and fuels modification efforts in the areas where they would be of most benefit.

6.2.1. Discussion of Risk

Most working ranches have adequate clearing around them to hypothetically protect them from crown fire or a running surface fire. A problem can occur if there is too much clutter or untended vegetation around their structures however, that would allow for a simple surface fire to ignite those structures.

Subdivision structures are inherently more vulnerable. People who own them often fail to recognize the relationship between the amount of vegetation around their structures and the threat to that structure from a wildfire. Some are even obstinate about that point and they refuse to remove any vegetation even though its continued presence reduces the probability that their home will survive a wildfire to almost zero. Firefighters must be very careful to look out for their own welfare first when asked to protect a structure where the owner has refused to do any work to enhance that structure's probability of surviving a wildland fire (See Figure 20).



The following list represents current priorities for fire protection within Custer County.

- Miles City (portions)
- Ismay
- Moon Creek Subdivision
- Pine Hills Ranchettes Subdivision
- Wolf Creek/Evergreen Estates
- Squirrel Ridge Subdivision
- Sun Dial Subdivision
- Bergerson Ranchettes
- Sunday Creek Ranchettes

In looking at the GIS layered map of Custer County it is apparent why these priorities have been established. The

subdivisions are particularly challenging from a protection standpoint because of the lack of some basic amenities such as access, telephone service and a water supply. The response times are also lengthy for wildland firefighters because of the remoteness of the subdivisions.

History has proven the possibility for large wildland fires in this part of the state when enough continuous fuels are available and when certain weather conditions are present. During one of these events, the actions that have been taken beforehand will generally prove to be much more effective than any actions taken during the event. When conditions of extreme fire behavior exist little can be accomplished aside from evacuating people from harms way and keeping firefighters in safe positions. Any fuel modification efforts that have been completed prior to the event will greatly enhance the firefighter's efforts to protect property during the event.

7. Mitigation Strategy -- The Action Plan

This Chapter provides the steps that are being taken or should be taken in Custer County to reduce the wildland and structure fire threats to public, fire fighters and other values at risk.

7.1. Mitigation Goals

An overarching principle of this Community Wildfire Protection Plan is that fire fighter and public safety is the highest priority!

The mitigation goals of this Community Wildland Protection Plan are to:

- Custer County will identify, designate and map areas of wildland-urban interface in the county.
- Custer County will set up a local government structural fire organization for areas of the county that are outside the city limits of the City of Miles City and Ismay RFD.
- Evaluate, upgrade and maintain community wildland and structural fire preparation and response facilities, training and equipment to deal with multiple ignitions.
- Custer County will prevent threats to and destruction of property from wildland fire by adopting subdivision regulations, which include access, water supply, communications and fire stations.
- Custer County will develop and maintain regulations to ensure asset protection zones are created and maintained around structures and improvements in the county.
- Custer County will help educate community members to prepare for and respond to wildland fire and to mitigate wildland fire damage.
- Custer County will develop and implement a comprehensive emergency response plan.
- Custer County will improve training and qualifications of their personnel to more effectively interface with incoming Incident Management Teams deployed in the county.
- Custer County will work as a partner to identify and implement fuels reduction projects between private landowners and the Miles City Field Office of the Bureau of Land Management.

Planning priorities of the CWPP in order of importance are:

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

7.2. Existing Mitigation Efforts

The following sections describe the existing mitigation measures that are being utilized in Custer County to decrease the risks from wildland or wildland-urban interface fires. Custer County and Custer County fire agencies should ensure that these efforts are supported and continued.



Figure 21

7.2.1. Asset Protection Zone (Defensible Space)

Generally when you look at a county in Eastern Montana, where the residents are native to Montana and have experience with the fire history in a county, you will see that these residents generally construct, on an annual basis, a fire break around their home and ranch improvements (See Figure 21).

The problem lies with either people inexperienced with the fire history in Custer County or people who build summer cabins who do not realize they need to protect themselves from wildland fires. As future

development occurs within the county, the Board of County Commissioners should ensure that *Firewise* principles are adopted and that there are adequate development regulations to provide and maintain asset protection zones in these developments.

7.2.2. Neighborhood Preparedness

A resident of the Pinehills Subdivision installed an 18,000-gallon water storage facility in the subdivision to serve as a fire protection water supply.

Private homeowners in Pinehills Subdivision and the Moon Creek area have private fire engines and water trucks that respond to assist Custer County Fire.

7.2.3. Fire Protection Response

Long travel distances for fire suppression resources are the norm in Custer County. The Custer County Fire Department has located the seven Department of Natural Resource engines and five county Type VI engines and two county water tenders as strategically as they can throughout the county within the opportunities that exist. Each engine must be hosted, maintained and operated by a willing volunteer, i.e., a rancher. When a fire is reported the Custer County fire personnel are notified and they respond on a closest forces concept. They also respond to new ignitions reported on BLM administered lands.

The federal agencies have developed strict requirements for wildland firefighters including an annual physical fitness-testing requirement. These are the result of a myriad of reviews and investigations of serious incidents that have occurred in wildland firefighting over the years. All Custer County FD personnel meet the same standards as their federal counterparts and easily integrate into a fire suppression organization working for a BLM Incident Commander.

7.3. Coordinated Prevention, Protection Projects, and Response Plan

Future efforts in planning and implementation of prevention, mitigation and response projects should be closely coordinated between Custer County and their cooperating partners, i.e., BLM and the State of Montana. It is likely that some projects would be more effective if implemented on the lands of two or more jurisdictions rather than by a single entity. Cooperation and coordination will also result in avoiding duplicating efforts or overlooking opportunities to protect values at risk.

In an effort to reduce new fire starts during periods of very high or extreme fire danger, there is a statewide process for instituting fire restrictions and closures by zone in the Northern Rockies Geographic area (See Figure 22). Custer County Fire Department and its cooperators are coordinated in this process to ensure close communications and common actions occur during critical periods of fire danger.

7.4. Prioritization Process

Recommended projects have been prioritized based on the risk estimation in Section 6.2. See 7.6 Prioritized Actions.

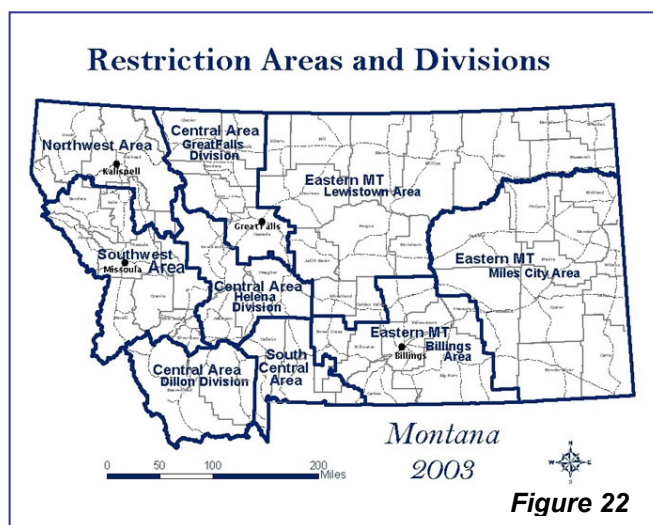


Figure 22

7.5. Recommended Projects and Programs

This area describes recommended projects and actions that address the mitigation goals of the Custer County CWPP.

7.5.1. Fuel Modification Projects

This section addresses specific actions to reduce fuel loads, whether in forests, brush, or grasslands.

Proposed Project 7.5.1.1 – Form a collaborative planning group (Fire Safe Council) with the BLM, ranchers, Custer County fire agencies, Custer County Disaster & Emergency Services, Board of County Commissioners, power companies, BNSF and other cooperators to plan fuel reduction projects on a landscape basis.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.1.2 – The Custer County Board of County Commissioners should designate the following as wildland-urban interface areas in Custer County:

- Miles City (portions)
- Ismay
- Moon Creek Subdivision
- Pine Hills Ranchettes Subdivision
- Wolf Creek/Evergreen Estates
- Squirrel Ridge Subdivision
- Sun Dial Subdivision
- Bergerson Ranchettes
- Sunday Creek Ranchettes

This will support decisions regarding fuel reduction efforts on adjacent Federal Lands.

7.5.1.1. Vegetation Management

Sivilcultural treatment of fuels is a technique used to eliminate a portion of the fuels in forested areas. Some of the smaller trees are cut and removed to create more growing space between the larger trees. This basic forestry practice of thinning will usually increase timber values for the landowner by concentrating annual growth in a few larger trees rather than many small trees.

Limbing is another technique accomplished by removing the lower branches of trees and like thinning it reduces the ladder fuels that allow a fire to climb from the ground up into the forest canopy. General litter cleanup is the removal of dead and downed woody debris on the forest floor that can contribute significantly to fire behavior, as these fuels tend to be very dry and readily combustible.

Proposed Project 7.5.1.1.1 – Reduce the vegetation in those areas within the subdivisions where the continued presence of the fuels represents a clear potential to generate high fire intensities. Wildland fires burning under high intensities will pose the greatest threat to structures, their inhabitants or firefighters. The county could start in those areas where fuel modification projects would have the most potential to positively impact the greatest number of people or structures. Normally, these areas would be on the western or southern edges of the subdivisions or down slope from improvements. Changing crown density and interrupting the ladder fuel continuity should be highest priority. Fuel modification areas need to be a minimum of 50 feet wide and closer to 100 feet whenever possible. Look for areas of active tree or shrub encroachment where the absence of periodic natural fires has allowed vegetation, like juniper or heavy ponderosa pine regeneration, to survive. Eliminating these plants while they are young are relatively inexpensive and over time it will significantly reduce the resistance to control factor for

firefighters when fighting a fire in that area. This is a treatment that can be especially effective upwind from subdivisions (See Figure 23).

Project Coordinator – Custer County Fire Warden and BLM

Proposed Project 7.5.1.1.2 – Once the fuels in an area have been reduced to an acceptable level it is critical that they not be allowed to return to the condition they were in prior to treatment. Treated areas should be inspected at 5-10 year intervals to determine if they would still be effective during a wildland fire. Most likely they will need some type of follow up maintenance, at that point in time, but this work should require less effort and at a reduced cost from the original treatment. If it is not accomplished periodically the full treatment costs will be required again in 20-30 years.



Project Coordinator – Custer County Fire Warden and BLM

Proposed Project 7.5.1.1.3 – Develop a thinning project or a grazing plan for the common areas and road rights of way in the Pine Hills Ranchettes Subdivision.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.1.1.4 – Develop a pre-commercial thinning project on the BLM (Section 12) south of Pine Hills Ranchettes Subdivision.

Project Coordinator – BLM Fuels Management Specialist

Proposed Project 7.5.1.1.5 – Develop a fuel reduction plan and a pre-commercial thinning project on the State Section, (Section 36) immediately north of Pine Hills Ranchettes.

Project Coordinator – DNRC Area Manager

Proposed Project 7.5.1.1.6 – Dispose of the road construction slash associated with the road construction in the Evergreen (Wolf Creek) Estates.

Project Coordinator – Homeowners’ Association & Custer County Fire Warden

Proposed Project 7.5.1.1.7 – Develop a funding mechanism to employ a seasonal fuels crew of 20 people. This crew would be employed during the fire season and would be used to complete priority fuels projects and aid in wildland fire suppression operations as needed.

Project Coordinator – Custer County Fire Warden

7.5.1.2. Prescribed Burning

Prescribed burning—or controlled burning—is a relatively quick and inexpensive way to reduce fuel loads. However, in many situations, especially where there are structures nearby, preparatory work needs to be done to reduce the overall flammability of the site.

The county may wish to explore the opportunities for using prescribed fire on private lands within the county. There are some tangible benefits to local ranchers and when they use low to moderate intensity

prescribed fire to increase the quantity and palatability of grass on pastures, especially on those now occupied by sagebrush or other brushy hardwood species. It will also set back the encroachment of ponderosa pine onto grasslands where this is a problem. Forage levels have been increased two to four times the pre-burn levels on many sites in Montana and sage has been reduced to about 10 percent of pre-burn levels. One drawback to prescribed fire is that the area to be burned should not be grazed for one season prior to burning and one season after burning. The reasons are to insure enough fine fuels are present on the site to adequately carry the fire during burning and to allow the new and/or rejuvenated grass plants adequate time to develop healthy root systems the following growing season. Several research publications completed by the Intermountain Research Station discuss the types of results that can be expected.

One of the greatest benefits to prescribed burning is the training opportunity it provides for the firefighters. On a wildfire they are often forced to be reactive rather than to plan and execute actions in a more orderly fashion. When conducting a prescribed burn they will be able to observe fire behavior in a non-emergency setting. They will also learn how to effectively ignite the area to be burned and how to deploy the holding forces to make the best use of available skills and equipment. All of this can be accomplished while functioning in the serious but more controlled environment of a prescribed fire.

Proposed Project 7.5.1.2.1 – Opportunities may arise from planning efforts to jointly conduct prescribed fire projects. Custer County fire agencies should participate in these burns when practical to improve their training, qualifications and experience in wildland fire management. Efforts such as these promote better interagency cooperation and working relationships.

Project Coordinator – Custer County Fire Warden and BLM

Proposed Project 7.5.1.2.2 – Work with the Custer County Weed Department to establish a wash requirement for contractors, local and government apparatus that conduct prescribed burns within the county.

Project Coordinator – Custer County Weed and Fire Department

7.5.1.3. Grazing

Custer County can expect the continued encroachment of fires off of timbered grounds, such as BLM lands, onto private ownership.

Proposed Project 7.5.1.3.1 - Landowners should be encouraged to sustain grass ecosystems through grazing and to control tree encroachment in those areas, particularly where they are adjacent to heavily timbered federal lands.

Project Coordinator – Custer County FD

7.5.1.4. Industrial Resource Management

Proposed Project 7.5.1.4.1 – Ensure that the Tongue River RR develops and maintains the fire management plan required by the Memorandum of Agreement between the counties and the railroad.

Project Coordinator – Custer County FD

Proposed Project 7.5.1.4.2 – Ensure that railroads within the county control the fire hazard along their right-of-way according to Section 69-14-721 MCA. If a fire occurs as a result of an ignition along the railroad right-of-way, the Custer County Fire Department should ensure that a fire investigation occurs to document that the cause and origin of the fire was the railroad and then bill the railroad for suppression costs for all railroad fires.

Project Coordinator – Custer County Fire Warden

7.5.1.5. Biomass Utilization

Proposed Project 7.5.1.5.1 – Explore any opportunities to dispose of biomass material on either a profit or break even basis. If there is no market for chips or hog fuel in the area and no possibility of utilization for posts or poles, look at designating a site or sites where material can be safely piled and burned during low fire danger periods.

Project Coordinator – Custer County FD

Proposed Project 7.5.1.5.2 – Explore involving the local RC&D or other economic development agencies within southeastern Montana to work with Chuck Waldie's Portable Sawmill, which is located in Moon Creek or Eric Peterson's Sawmill to try to utilize these sawmills to make timber or other marketable products out of fuel reduction project biomass (See Figure 24).



Figure 24

Project Coordinator – Economic Development Groups in Custer County in southeastern Montana

7.5.2. Safety Zones

Location of safety zones within some of the subdivisions is probably the best approach to protecting human life during a fast moving fire, especially when residents are faced with the alternative of trying to navigate narrow roads under smoky conditions. Any required clearance work on these identified areas should be accomplished prior to fire season as labor and equipment become available. One important point is to insure that the development of procedures, such as when to occupy them and what should and should not be taken into them, are clearly understood by anyone who may need to use them.

Proposed Project 7.5.2.1 – Review each subdivision and determine if safety zones may be necessary considering ingress and egress issues as well as the surrounding fuel type. Where they are appropriate, assist the subdivision residents in determining where to locate them, what maintenance work needs to be done and how and when they should be used.

Project Coordinator – Custer County Fire Warden

7.5.3. Infrastructure Improvements

Improvements to improve local infrastructure are discussed in this section.

7.5.3.1. Water Supply

Although water supply is not a direct function of the Custer County fire agencies, water supply unquestionably impacts the structure fire suppression performance of the department. Water supply, or lack of water supply, indirectly affects the whole community through the insurance rates they pay.

Proposed Project 7.5.3.1.1 – Prepare a strategic water source plan for the county, which shows the most efficient sources of water needed to support wildland firefighting efforts. It may be necessary to develop new sources in some isolated dry locations in order to reduce refill times to an acceptable level. Explore opportunities to use dry hydrants and stored water facilities. GPS the location of water supply points to develop a water supply map for Custer County.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.3.1.2 – Continue to encourage homeowners associations and individuals to develop water sources that can be used by fire protection personnel. Water supply facilities are needed in all of the existing subdivisions in the county.

Project Coordinator – Homeowners' Associations

7.5.3.2. Utilities

Proposed Project 7.5.3.2.1 – The Custer County fire agencies should work with the Tongue River Electric Cooperative and Montana Dakota Utilities to ensure that the required clearances are maintained for all electrical transmission lines in the Custer County.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.3.2.2 – The Tongue River Electric Cooperative and Montana Dakota Utilities should provide power line safety demonstrations to the Custer County fire agencies and subdivision and homeowner associations on a biannual basis.

Project Coordinator – Custer County Fire Warden and Power Company Managers

7.5.3.3. Emergency Response

Emergency response to wildland, wildland-urban interface and structure fires includes the placement of stations, apparatus and personnel to meet the needs of the community.

Proposed Project 7.5.3.3.1 – Develop a capital improvement plan to up-grade fire apparatus and equipment, within Custer County Fire Department.

Project Coordinators – Custer County Fire Warden with assistance of the Board of County Commissioners.

Proposed Project 7.5.3.3.2 – The City of Miles City should develop a policy for annexation of adjacent lands that are developing or may be developed in the foreseeable future. All lands within the urban area of Miles City should be annexed into the City of Miles City.

Project Coordinator – Miles City Council

Proposed Project 7.5.3.3.3 – Work with the county commissioners to develop a long-term plan to provide local government structural fire services to as many structures throughout as much of the county as possible. A fire service area should be developed to cover all structures within the county that are outside the incorporated city limits of Miles City and the boundaries of Ismay RFD.

Project Coordinator – Custer County FD and Custer County Commissioners

Proposed Project 7.5.3.3.4 – Ensure that potential impacts from the Lewis and Clark Bicentennial are anticipated during the 2006 fire season. Bicentennial events will occur in mid-to late summer during 2006 and will have a high impact on fire protection entities in Custer County.

Project Coordinator – Custer County Fire Department, Custer County Sheriff, and Custer County DES

Proposed Project 7.5.3.3.5 – The Custer County Board of Commissioners should maintain their relationship with Miles City Fire Department as their wildland fire service provider.

Project Coordinator – Board of County Commissioners and Miles City Fire Chief

Proposed Project 7.5.3.3.6 – The Miles City Fire Department should continue to maintain and enhance the interagency cooperation between the fire department and MT Department of Natural Resources and Conservation and the Bureau of Land Management.

Project Coordinator – Miles City Fire Chief, DNRC Area Manager, and BLM Fire Management Officer

Proposed Project 7.5.3.3.7 – Ismay RFD needs a repeater in the northeast portion of the county to improve paging and communications capability for the rural fire district and Custer County Fire.

Project Coordinator – Ismay RFD Fire Chief and Custer County Fire Warden

Proposed Project 7.5.3.3.8 – Either install a new County Fire repeater system and communications plan to enable communications throughout the county during wildland fire incidents or work with the Custer County Sheriff's Department to utilize existing repeater sites for County Fire communications.

Project Coordinator – Custer County Fire Warden, Custer County LEPC and Custer County Board of County Commissioners.

Proposed Project 7.5.3.3.9 – The Custer County wildland fire program is significant enough to warrant a full-time County Fire Warden. This enable facilitation of fuel reduction projects, *Firewise* programs, and public education of Custer County residents.

Project Coordinator – Custer County Fire Warden and Custer County Board of County Commissioners.

7.5.3.3.1. Fire Stations

Proposed Project 7.5.3.3.1.1 – Establish protection, i.e., fire stations, from the elements for strategically located county and state engines and tenders where it is not currently provided. Getting this equipment under some type of cover will greatly extend the life of rubber and synthetic components such as tires and hoses. It will also reduce oxidation of metal components and will increase the overall reliability of the equipment.

Project Coordinators – Custer County Fire Department and Board of County Commissioners

7.5.3.3.2. Training, Certification, and Qualification

In a needs assessment of the US Fire Service conducted by US Fire Administration and NFPA in December of 2002, one of the items that was found regarding training was that an estimated 41% of the fire department personnel involved in wildland fire fighting lack formal training.¹⁷ Needs Assessment also found that only 26% of the fire departments could manage a wildland/urban interface fire of 500 acres or more with locally trained personnel. Custer County Fire Department significantly exceeds this capability. It is not unusual for them to manage a wildland/urban interface fire or a wildland fire of 1000 acres or larger.

Proposed Project 7.5.3.3.2.1 – Develop a training program which encompasses County Fire Wardens, County Sheriff's, Disaster and Emergency Service officials, Mayors, City Councils and Fire Chiefs, and other government officials, to maintain currency with their fire program to include their roles and responsibilities as government officials. This training would provide the skill level to determine the appropriate level of Incident Management Team (IMT) and the ability to write a delegation of authority to the IMT, which would include the management objectives of the local government for the emergency incident.

Project Coordinator – Custer County Fire Warden

¹⁷ Needs Assessment US Fire Administration NFPA December 2002

Proposed Project 7.5.3.3.2.2 – Adopt the National Wildfire Coordinating Group’s 310-1 as the minimum training standard for Custer County Fire personnel as a tool to mitigate liability issues.

Project Coordinator – Custer County Fire Warden and Custer County Board of County Commissioners.

7.5.3.3.4. Operational Procedures & Programs

Proposed Project 7.5.3.3.4.1 – Work with BLM to obtain a real time representation of their Lightning Detection System for the Custer County Fire Department. This will give the County Fire Warden a marked advantage in deploying county fire protection assets during periods of lightning activity.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.3.3.4.2 – GPS the perimeters of all fires that are 100 acres or larger and develop a fire history database and maps for the county utilizing GIS. Upgrade GSP units so that they are capable of tracks allowing Custer County Fire personnel to map the perimeter of fires larger than 100 acres so that they interface with the county’s GIS program at the Custer County Road Department.

Project Coordinator – Custer County FD

Proposed Project 7.5.3.3.4.3 – Custer County Fire Department should order the County Assistance Team (CAT) as early as possible during an emerging incident to avoid experiencing key overhead shortages and overloading Custer County personnel.

Project Coordinator – Custer County FD

Proposed Project 7.5.3.3.4.4 – The Custer County Weed Plan should be amended to require that fire suppression equipment be washed down prior to fire suppression activities to eliminate weed seeds and other noxious species moving into Custer County.

Project Coordinator – Custer County Weed Department with support from the Custer County FD

7.5.3.4. Access

Proposed Project 7.5.3.4.1 – As road signs are replaced throughout the county, they should be non-combustible reflective road signs that would withstand a wildland fire.

Project Coordinator – Custer County Road Department and Custer County Commissioners



Figure 25



Figure 26

Proposed Project 7.5.3.4.2 – Install road name signs that are non-combustible and reflective on all roads that currently do not have signs (See Figure 25).

Project Coordinator – Custer County Road Department

Proposed Project 7.5.3.4.3 – Install street address signs on all access points for residences within the county (See Figure 26).

Project Coordinator – Rural Addressing Coordinator

Proposed Project 7.5.3.4.4 – The Custer County Fire Warden should work with the homeowners associations in the developed subdivisions (Pinehills, Moon Creek & Evergreen) to widen road surfaces to a minimum of 20 feet. This will allow fire apparatus ingress while the residents are evacuating an area.

Project Coordinator – Custer County Fire Warden

7.5.4. Asset Protection Zone (Defensible Space)

One of the single most important mitigating factors to increase the chances for the home's survival during a wildland-urban interface fire is the creation and maintenance of an asset protection zone (defensible space). An asset protection zone refers to an area around the home where the native vegetation has been modified to reduce the wildland/urban interface fire threat to the home and provides a safe area for fire fighters to work effectively and safely (See Figure 27).



Figure 27

Slope and fuels affect the size of the asset protection zone. Homes near steep slopes and in heavy fuels will need to clear additional vegetation to mitigate the effects of the radiant and convective heat currents and flame lengths. The slopes should be planted to native vegetation that is fire resistant.

Proposed Project 7.5.4.1 - The National Fire Plan also mandates that local governments develop and adopt local land use plans and ordinances that provide for the maintenance of defensible space and fuel management on municipal and private property.¹⁸ The Custer County Commissioners should develop land use plans and ordinances that provide for asset protection zone (defensible space) and fuel management (See Asset Protection Zone Guidelines in Resources Section 10.6 of CWPP).

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.4.2 – The City of Miles City and the Town of Ismay should ensure that residences adjacent to wildland areas in the communities of Miles City and Ismay are provided with adequate defensible space and adequate asset protection zones.

Project Coordinator – Miles City Fire Chief and Ismay RFD Fire Chief

7.5.5. Recommended Building Materials/Fire Wise Construction

A home may be vulnerable to a wildland/urban interface fire because of its design, construction and/or location. There are steps a homeowner or developer can take to reduce the chance of home catching fire, or resist further damage if it does catch fire.

Proposed Project 7.5.5.1 – Recommend the use of Firewise Construction, Design and Materials¹⁹ and Firewise Construction Checklist²⁰ to developers and homebuilders. See Resources Section 10.6 of CWPP.

Project Coordinator – Custer County FD

¹⁸ See www.westgov.org/wga/initiatives/fire/implement_plan.pdf

¹⁹ Firewise Construction, Design and Materials, Stack, Colorado Forest Service

²⁰ www.firewise.org.

7.5.6. Fire-Resistant Landscaping

The landscaping plan of the homeowner is an integral component of the defensible space developed by the homeowner. Each lot should be thought of in terms of four zones, with each zone having a different purpose and emphasis in the overall defensible space concept for the property.

Zone A consists of the area from immediately next to the home to a distance of approximately five feet. The primary purpose of this zone is to have the least flammable type of landscaping immediately adjacent to the home to prevent ignition from firebrands and direct flame contact.

Zone B lies between five feet and at least 30 feet from the home. This zone provides the critical area where fire fighters can defend the home and where the fuels have been substantially reduced in height and volume.

Zone C represents the lot from 30 feet to approximately 60 feet from the structure. This area lies outside the formal landscape area and should be modified as described in the asset zone guidelines, which are attached (See Asset Protection Zone Guidelines in Resources Section 10.6 of CWPP).

Zone D is the property perimeter buffer which is 60 feet to the property line for lots 2 ½ acres or less or 60 feet to 200 feet around the perimeter of lots larger than 2.5 acres. This serves as a transition zone where you want to reduce the wildfire rate of spread and intensity, begin bringing the fire from a crown fire into a ground fire so that fire department resources can safely respond.

Provisions should be made as each phase is submitted for review to ensure the landscaping plans are reviewed for their appropriateness as a component of the defensible space requirement for the property. Provisions also need to be made by the developer to ensure long-term continuing maintenance for the defensible space surrounding the homes and businesses in the project (See Asset Protection Zone Guidelines in Resources Section 10.6 of the CWPP).

Proposed Project 7.5.6.1 – Utilize the Firewise Landscaping Checklist²¹ and Fire and Your Landscape, Fire Scaping Resources for Montana Homeowners²² (See Resources Section 10.6 of the CWPP).

Project Coordinator – Custer County Fire Warden

7.5.7. Evacuation Plan

Getting people out of harms way in a fire is critical. This section addresses specific projects designed to move people quickly, safely, and effectively.

Proposed Project 7.5.7.1 – Annually update evacuation plans for county subdivisions and conduct a tabletop exercise biannually.

Project Coordinator – Custer County Sheriff & County Disaster & Emergency Services Coordinator

7.5.8. Public Education

Educating residents about wildland fire issues is one of the most effective ways to reduce fire hazards, whether that be in K-12 schools, or programs designed for adults.

Proposed Project 7.5.8.1 – Continue to sponsor a Firewise Community Program locally within the county for the public and conduct it biannually. Integrate weed and fire management into any public education that is conducted during the Firewise Community Program.

Project Coordinator – Custer County Fire Warden

²¹ www.firewise.org

²² Montana Nursery & Landscape Assoc. 2003

7.5.9. Legal Requirements

7.5.9.1. Subdivision Regulations

Proposed Project 7.5.9.1.1 – Adopt appropriate subdivision regulations which address the wildland-urban interface (See Model Subdivision Regulations in Resources Section 10.6 of CWPP).

Project Coordinator – Custer County Board of County Commissioners

Proposed Project 7.5.9.1.2 – The county fire warden needs to ensure that wildland fire concerns are addressed in the subdivision review process for any future planned subdivision. The purpose for his input is to avoid creation or perpetuation of any untenable situations, from a fire protection standpoint. Issues such as road systems, water supply, building materials, asset protection zone and covenants covering vegetation management are all of concern to the fire warden and they can directly affect his ability to be effective.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.9.1.3 – Develop a mechanism to track new development and structures, which are in the wildland-urban interface areas of the county to enable structure fire agencies and Custer County Fire to pre-plan evacuations and fire attack.

Project Coordinator – Custer County Fire Warden

7.5.9.2. Agreements, MOU's & Operating Plans

Proposed Project 7.5.9.2.1 – Review all agreements and memorandums of understanding with cooperators. Follow up on those that have not yet been up-dated and insure annual operating plans are completed when specified.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.9.2.2 – Develop materials and training programs to ensure that a delegation of authority is properly executed between the appropriate “Authority Having Jurisdiction” and the Type III, II, or I Incident Commanders.

Project Coordinator – Custer County Fire Warden

Proposed Project 7.5.9.2.3 – Up-date and expand the existing mutual aid agreement to include all cities and local government fire jurisdictions in Eastern Montana.

Project Coordinator – Southeastern Montana Fire Alliance

7.6. Prioritized Actions, Implementation Timeline

Proposed Project	Short Term (< 1 Year)	Medium Term (1-3 Years)	Long Term (3+ Years)
7.5.1.1	X		
7.5.1.2	X		
7.5.1.1.1		X	
7.5.1.1.2			X
7.5.1.1.3		X	
7.5.1.1.4		X	
7.5.1.1.5		X	
7.5.1.1.6	X		
7.5.1.1.7			X
7.5.1.2.1		X	
7.5.1.2.2	X		
7.5.1.3.1		X	
7.5.1.4.1			X
7.5.1.4.2		X	
7.5.1.5.1		X	
7.5.1.5.2	X		
7.5.2.1		X	
7.5.3.1.1		X	
7.5.3.1.2	X		
7.5.3.2.1		X	
7.5.3.2.2		X	
7.5.3.3.1		X	
7.5.3.3.2	X		
7.5.3.3.3	X		
7.5.3.3.4	X		
7.5.3.3.5	X		
7.5.3.3.6		X	
7.5.3.3.7		X	
7.5.3.3.8		X	

Proposed Project Table (continued)

Proposed Project	Short Term (< 1 Year)	Medium Term (1-3 Years)	Long Term (3+ Years)
7.5.3.3.9		X	
7.5.3.3.1.1		X	
7.5.3.3.1.2		X	
7.5.3.3.2.1	X		
7.5.3.3.2.2		X	
7.5.3.3.4.1	X		
7.5.3.3.4.2	X		
7.5.3.3.4.3	X		
7.5.3.3.4.4	X		
7.5.3.4.1		X	
7.5.3.4.2		X	
7.5.3.4.3	X		
7.5.3.4.4		X	
7.5.4.1		X	
7.5.4.2		X	
7.5.5.1	X		
7.5.6.1	X		
7.5.7.1	X		
7.5.8.1		X	
7.5.9.1.1		X	
7.5.9.1.2	X		
7.5.9.1.3		X	
7.5.9.2.1		X	
7.5.9.2.2		X	
7.5.9.2.3		X	

8. Plan Monitoring and Review: How to Keep this Plan Active and Up-to-Date

8.1. Timeline (5 years)

DMA 2000 requires that plans be updated every five years. This does not mean you have to rewrite it or redo this entire process. Rather, you are required to review your mitigation plan.

Proposed projects should be updated as the keeper of the plan becomes aware of new projects that might be implemented to mitigate a wildland fire problem. The prioritized project list should be revised every year based on new data and available dollars. The entire plan should be updated or reviewed on the same cycle as the pre-disaster mitigation plan.

8.2. Incorporation into Local Jurisdictional Plans

This plan should be adopted by local Custer County and the recommendations be incorporated into their other planning mechanisms, such as a County Growth Policy and Pre-Disaster Mitigation Plan.

9. Summary and Conclusions

9.1. Analysis and Findings

The complexity of the wildland fire program has significantly changed in Custer County over the last 15 years, due the development of wildland/urban interface, long term drought, and changes in the wildland ecosystems. The leadership and the level of fire preparedness within Custer County have been able to keep pace with this changing environment through the efforts of the County Fire Warden. The Custer County Board of Commissioners need to recognize this effort and also need to be supportive of future needs of the County's fire forces to further respond to a changing fire environment and the associated public safety risks.

In the recommended projects and programs section of this report, Section 7.5, significant changes are recommended. Funding for many of these suggested projects and programs can be obtained through the National Fire Plan and FEMA grant programs. The Custer County Board of Commissioners is strongly encouraged to utilize a grant writer to increase the wildland fire suppression, public education, training and qualifications capability of the Custer County and County Fire Department.