



ROSEBUD COUNTY COMMUNITY FIRE PLAN

1. Executive Summary

1.1. Problem Overview

Rosebud County is a large and remote county covering just over 5,000 square miles. It's over 85 air miles from the northern edge of the county to the southern edge. Under the current drought conditions, Rosebud County has a high degree of potential for extended fire seasons ranging from March through October or November. Rosebud County Fire Department, under the leadership of Doug Marten, is in charge with wildland fire protection throughout the county. He has strategically located engines based on historical fire occurrence throughout the county. In contrast to most eastern Montana counties, with few of the apparatus being positioned in the county by Montana Department of Natural Resources and Conservation, under the county coop program. Rosebud County has the potential to interact with not only DNRC, but also the Custer National Forest, Bureau of Land Management and the Northern Cheyenne Indian Reservation, thus providing a high degree of interagency complexity that some other counties in eastern Montana don't experience. As with a lot of counties in Montana, there is increasing development of wildland-urban interface areas with potential access problems and a general lack of understanding by homeowners of the need for asset protection zone to protect the home. As a matter of general occurrence, Rosebud County Fire Department has to deal with multiple ignitions throughout the southern half of the county from lightning storms.

1.2. Process Overview

The Rosebud County Community Fire Plan, hereafter known as "CFP," has been developed to assist Rosebud County, Rosebud 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 CFP is intended to outline the Rosebud 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 Rosebud County. The intent of this planning document will ensure that the health, safety and welfare of Rosebud County's citizen's remain secure from the threats of structural and wildland fires in the county.

1.3. Overall Goals

The CFP will improve planning and fire suppression tools for county and the county fire department alike, which will result in Rosebud County providing it's citizens with tools to live more safely in a fire prone ecosystem. The CFP fosters the preservation of the economy of Rosebud County by maintaining and improving the fire protection capability of the County.

1.4. Methodology

Fire Logistics uses a Geographic Information System (GIS) based analysis approach to development of the fire hazard assessment for Rosebud County. This approach enables personnel from Fire Logistics to look at specific areas of high risk in the county such as wildland-urban interface and focus on items that would be included in the mitigation plan as recommended projects.



1.5. Mitigation Strategy – The Action Plan

This is a summary of the specific actions, which are 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 protection projects and response plans. Several recommended projects and programs are included as part of the mitigation effort for Rosebud County.



2. Introduction

2.1. Background and History

Rosebud County Fire Department retained Fire Logistics, Inc. in April of 2003 to:

1. Develop a training course for Custer & Rosebud county personnel (10-15) to evaluate fuels conduct hazard assessments, and development of a mitigation plan with recommended fuels treatment options.
2. Conduct the training course with practical applications.
3. Coordinate hazard assessments by trained county personnel on identified areas throughout the county, providing the data to Fire Logistics, Inc.
4. Develop a Strategic Wildfire Plan for the county to include the following components:
 - a. Develop a hazard assessment for the county including, at a minimum:
 - i. Terrain
 - ii. Fuels
 - iii. Flammability of structures
 - b. Recommended planning, zoning and ordinances.
 - c. Suggested mitigation and prevention activities.
 - i. Identify appropriate wildland/urban interface survivable space needs.
 - ii. Identify strategies for community involvement.
 - iii. Proposed vegetative management treatments and areas.
 - d. GIS layers associated with the plan, must be provided in an ArcView format acceptable to the county.
 - e. Identify appropriate sites for wildland fire engines throughout the County.
5. Work with the personnel selected by the county to gather data.
6. Identify areas of mutual concern between Rosebud and Custer County.
7. Make any desired associations with the County's computer aided dispatching program.

2.2. Mission

The mission of the Rosebud County Fire Department is to safely protect the lives and property of the residents of Rosebud County and our firefighters to the best of our ability and in the most efficient manner possible.

2.3. Current Relevant Fire Policies

A brief discussion of the relevant fire policies is provided to educate the leaders and residents of Rosebud County.

2.3.1. Federal Policies “Homeland Security is Fire Safety”

We will briefly describe 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

¹ See www.fireplan.gov.

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



2.3.1.2 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 maintenance plan and updating process.

Disaster Mitigation Plans must be approved by 11/04 to receive HMGP funds after that date.³

2.3.1.3. Western Governor’s Association, *10-Year Comprehensive Strategy for Reducing Wildland Fire Risks⁴ 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 establish priorities, cooperation on activities, and increase public awareness and participation to reduce the risks to communities and environments.”⁵

2.3.1.4. Local Implementation of Federal Fire Policies

Fire protection objectives on the state and private lands in Rosebud 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

³ www.fema.gov/pdf/fima/howto1.pdf

⁴ www.westgov.org/wga/initiatives/fire/final_fire_rpt.pdf

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



available. In the latter case, however, certain land management objectives may preclude this approach, i.e., mechanical equipment in a proposed wilderness area.

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 as noted above.

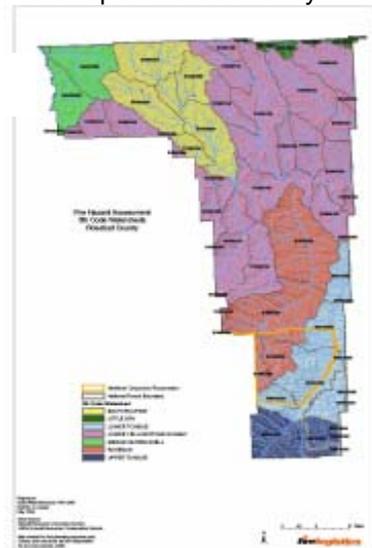
2.3.3. Local Policies

The Rosebud County Commissioners have not adopted an up-dated Growth Policy for the county. The existing Rosebud County Comprehensive Plan was adopted by the county in 1979. One of the goals of the Comprehensive Plan was to encourage growth in or near existing towns and communities. Unfortunately, there has been an increase in wildland-urban interface development in areas that were previously subdivided before the subdivision regulations were adopted by the Legislature. The other land use document that affects fire service delivery by the Rosebud County Fire Department is the Subdivision Regulations of Rosebud County (See Subdivision Regulations in Resources Section). Those subdivision regulations were adopted in October of 1995. The purposes of the Rosebud County Subdivision Regulations are to promote public health, safety and general welfare by regulating the subdivision land etc., providing ingress and egress. They also support the purposes of 76-3-102 MCA. The subdivision regulations are intended to promote the coordination of roads within subdivided lands with other roads, both existing and planned, the avoidance of danger or injury by reason of natural hazard or the lack of water, drainage, access, transportation or other public services, and the avoidance of excessive expenditure of public funds for the supply of public services. There is an existing county disaster plan, which has a wildfire annex; however, there is no pre-disaster mitigation plan adopted in Rosebud County as of the writing of this report. It is currently being drafted and will be adopted at some future date.

2.4. Planning Area Boundaries

The Rosebud County CFP covers Rosebud County in its entirety. The county has been further subdivided into sub-planning areas by the 5th Code Watershed. 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 in Figure 1 (See 5th Code Watershed Map and Planning Area Map in Map Section 10.4).

Figure 1



2.5. Acknowledgements

Fire Logistics, Inc. would like to thank the Rosebud County Fire Department, especially Chief Doug Martens and Brad Adler; Rosebud County Weed District, especially Amy Adler; Bureau of Land Management, especially Dena Sprandel-Lang; Custer National Forest, Ashland Ranger District; Northern Cheyenne Tribe; Rosebud County Disaster & Emergency Services Coordinator; the Rosebud County Local Emergency Planning Committee and Rosebud County Board of County Commissioners for their contributions to this plan.



3. Planning Process

3.1. Stakeholders

The following stakeholders are affected by wildland or wildland-urban interface fires and have a stake in a successfully implemented CFP:

- Rosebud County Fire Department
- Rosebud County Fire Warden
- Rosebud County Board of County Commissioners
- Bureau of Land Management-Miles City Field Office
- Custer National Forest-Ashland Ranger District
- Colstrip Fire Department
- Ashland Fire Department
- Forsyth Fire Department
- Northwestern Energy
- Tongue River Electric Cooperative
- Mid-Yellowstone Electric Cooperative
- Montana Dakota Utilities
- Range Telephone Cooperative
- Qwest
- Froze To Death Grazing Association
- Rosebud County Weed District
- Rosebud County Conservation District
- Rosebud County DES
- City of Forsyth
- City of Colstrip
- Rosebud County Sheriff
- Montana Department of Natural Resources and Conservation
- Bureau of Indian Affairs
- Northern Cheyenne Tribe

3.2. Current Process and Plan Development

In the spring of 2003, the Rosebud County Fire Department awarded a contract to Fire Logistics, Inc. to complete a comprehensive risk assessment of Rosebud 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 Rosebud County Community Fire Plan (CFP) is the result of that effort.

3.2.1. Avenues of Community and Public Input

The draft Rosebud County CFP was submitted for review and comment by:

- Custer National Forest
- Bureau of Land Management
- MT Department of Natural Resources & Conservation – Eastern Land Office
- Rosebud County Board of County Commissioners
- Rosebud County Fire Department
- Rosebud County Disaster & Emergency Services Coordinator
- Northern Cheyenne Tribe
- Bureau of Indian Affairs-Fire Management
- Rosebud County Local Emergency Planning Committee

Comments were incorporated into the final draft of the Rosebud County CFP.



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

The following documents have been analyzed for materials, which may need to be referenced and incorporated in the Rosebud County CFP:

- Cooperative Fire Protection Agreement
- Custer National Forest Plan
 - Wilderness Study Area – Zook Creek
 - Hiking and Riding Area – Tongue River Breaks
- King Mountain
- Research Natural Area – Poker Jim
- BLM Fire Plans – Fort Howes Protection Area
- 1979 Comprehensive Plan

3.4. Local Jurisdictional Involvement, Approval, Adoption

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



4. Community Description

4.1. General Environmental Conditions

Rosebud County is located in southeast Montana. It covers just over 5,000 square miles and has a population of about 9,300 people. There are 1,136 miles of road in the Rosebud County. The county also crosses seven distinct watersheds. Most lands in the county are used for some type of agriculture. It is approximately 85 air miles from the north edge of the county to the south edge. The majority of the land type is relatively flat when compared with the western part of the state and the Little Wolf Mountains in the southwestern portion of the county represents some of the highest elevations in the county. Elevations vary from 2,400 to 4,500 feet. The northern half of the county receives less than 12 inches of rainfall, while the southern half of the county receives less than 18 inches of rainfall and the adapted ecosystems contain vegetative types and quantities commensurate with soil productivity and available moisture.

4.1.1. Topography, Slope, Aspect, Elevation

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 Rosebud 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. The broad vegetative types of Rosebud County are displayed in Land Cover Map, Figure 2 (See Land Cover Map in Map Section 10.4).

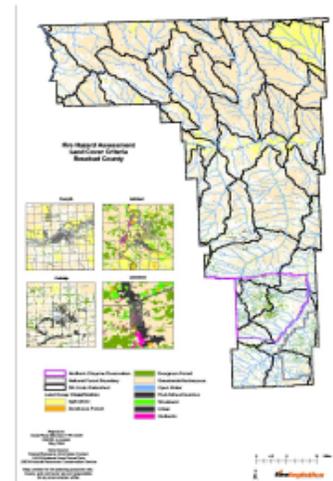


Figure 2

The main drainages are Yellowstone River flowing west to east, Tongue River and Rosebud Creek 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 Rosebud 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.

Rosebud 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 some scattered steep slopes and knobs. These are most common in the vicinity of the Black Buttes and Sand Creek. 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 River and Rosebud Creek from several different directions. Elevational changes are more pronounced and approach 1500 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 Rosebud 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.



The Planning Map shows the topography of Rosebud 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. They 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, steering winds aloft in this area prevail out of the south to west with surface winds southeast to southwest, and are moderate to strong, depending on the elevation and aspect. Southwest and west facing slopes are more exposed to the prevailing winds with drier fuels, which relates to increased fire behavior activity. Fires generally spread from southwest to northeast.

Because of the high frequency of thunderstorm activity in southeast Montana, 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 (See Spot Weather Observation and Request in Resources Section 10.5).

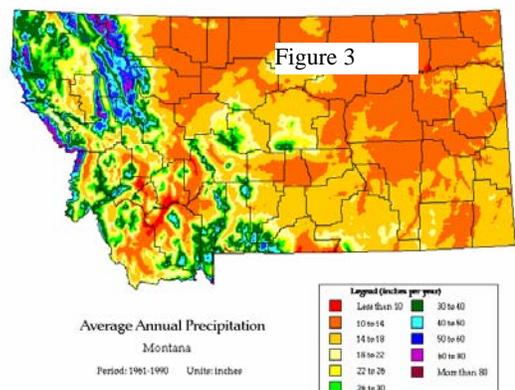
During calm days, fire spread will be dictated by topographic configuration and local upslope-down slope winds. During strong wind events fire spread will be dictated by wind direction and the winds will override the effects of the topographic features.

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 Rosebud 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 in the Wolf Mountains 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 angle of the sun increases from spring into summer while the freezing level increases as the air mass becomes warmer. This allows the lower levels of the atmosphere to dry resulting in thunderstorms that become more dry than wet. These thunderstorms often produce strong down draft winds and produce virga with little, if any, rain reaching the ground. These storms can be 15-30 miles wide at their bases with lightning expected anywhere within a 40-50 mile radius of the storms.

Winters have been mild for the past few years and moisture continues well below normal. Winter and spring snow events have been fewer with less snow accumulating over the mountains with streams and rivers flowing at or near record low levels. In addition, subsurface moisture continues to be short helping stress vegetation of all types.

Figure 3 depicts the average annual precipitation for the State of Montana during the years of 1961 through 1990. 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 Rosebud 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 Rosebud County can best be understood by looking at the larger weather pattern for the entire western United States. 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 Rosebud 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 Rosebud 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 Rosebud 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.
- 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.



- Lightning occurrence usually begins in late May with the heaviest occurrence in June through August. Dry lightning is most prevalent in July and August.

4.2. Population, Demographics

Population and demographics information was derived from the 2000 Census. The population for Rosebud County was 9,383. The area in square miles was given as 5,027. The Census showed 3912 housing units with a density of 0.8 housing units per square mile with a population density of 1.9 per square mile.

The Census also revealed five individual geographic areas with demographic breakdowns. Ashland, with a population of 464 had 170 housing units spread out over 7.55 square miles, which breaks down into a population density of 61.4 and a housing density of 22.5 units per square mile. Birney with a population of 108 had 39 housing units spread out over 15.10 acres, which breaks down into a population density of 7.2 and a housing density of 2.6 per square mile. The City of Colstrip with a population of 2346 had 936 housing units spread out over 4.49 square miles, which breaks down into a population density of 522.6 and a housing density of 208.5 per square mile. The City of Forsyth with a population of 1944 had 976 housing units spread out over 1.11 square miles, which breaks down into a population density of 1759 and a housing density of 883.1 per square mile. Lame Deer with a population of 2018 had 573 housing units spread out over 55.58 square miles, which breaks down into a population density of 36.3 and a housing density of 10.3 units per square mile.

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

Interstate 94, US Highway 12 & 212 and Montana 39 are the major roadways that serve Rosebud County. A spur line of Burlington Northern Santa Fe Railroad extends south along Montana 39 to south of Colstrip. It is used primarily for transportation of coal to the main line in Forsyth. Burlington Northern Santa Fe Railroad follows the Yellowstone River and provides a significant amount of rail traffic. In addition to the Yellowstone River the Tongue River and Musselshell Rivers and Rosebud Creek also flow through the county.

A power generation facility is located in Colstrip with major electric transmission lines extending throughout the county. Power distribution lines along with telephone lines and railroad signal lines are concentrated along the Yellowstone River and into Colstrip. There are portions of the County without utility services.

Many private ranches and developments are provided access utilizing graveled roads. Utilities in the form of overhead transmission and distribution lines are present.

The county has three public airports located at Forsyth, Ashland and Colstrip.

Electric service is provided by Northwestern Energy, Montana Dakota Utilities, Tongue River Electric Cooperative, and Mid Yellowstone Electric Cooperative through an aboveground electrical distribution system, that requires annual inspection and clearing of right of way of flammable vegetation.

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

Telephone service is provided by Range Telephone Cooperative and Qwest through underground lines. Cellular phone service is provided by Verizon and Cellular One and there is reasonable cellular coverage throughout the county.

4.4. Emergency Services

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



4.4.1. Fire Protection

Community fire suppression and protection is provided by several volunteer fire departments - Ashland, Colstrip, Lame Deer, and Forsyth. Wildland fire protection is provided by the Rosebud County Fire Department under the direction of the county fire warden with various fire suppression resources throughout the County under the Rosebud County Co-Op plan (See Engine Locations in Map Section 10.4).

ID	Year	Make	Model	Vin Number	License	4x4	Location
2	1984	Chevy	Custom Deluxe	1GBJK34M7EV123225	DSL28 / Gas	Yes	Forsyth
3	1987	Ford	F250 XLT	1FTHF2613HPA74934	29-295 /	Yes	Forsyth
4	1987	Mack	Econodyne	1M2P141Y1HA005426	29-210 /	No	Forsyth
5	1997	Ford	XL	1FTHL126G2VEA70448	29-234 / Gas	Yes	Hutson
6	1986	Ford	XL	2FTJF35L4GCA57313	29-75 / Gas	No	Bierys
7	1988	Chevy	Scotsdale 2500	1GCGK24KXKE109975	29-268 / Gas	Yes	Sleaford
8	1986	Ford	F-350	1FDHF38L4GPC01091	29-67 / Gas	Yes	Kluser
9	1992	Chevy	Cheyenne	1GCGK24KONE173897	29-221 / Gas	Yes	Baileys
10	1977	Chevy	Custom Deluxe	CCS3375158513	29-133 / Gas	No	Clifton
11	1974	Dodge	Custom 200	W26BB7S060623	DSL 53 / Gas	Yes	Wildhorse
12	1985	Ford	F-250	1FTEF26GE3PA05857	29-227 / Gas	Yes	Hathaway
13	1992	Chevy	Silverado 2500	1GCGK24FXNE219903	29-288 /	Yes	Angela
14	1969	Mack		4P8654	DSL 70 /	No	Wildhorse
15	1980	Chevy	bridge truck	C17DBAU138416	29-77/gas	No	Ingomar
16	1977	Chevy	2500	CCL2472132540	29-25/gas	Yes	Bascom
17	1979	GMC	2500	TKL249J512987	29-47/gas	Yes	Birney
18	1997	Ford	F350		/Diesel	Yes	McRae
19	1975	Ford	LN700	N7CFVV94116	29-179/gas	No	Birney
20	1988	AMC	6X6	NKOD4J30839	29-337/multi	No	Baileys
21	1991	AMC	6x6	024514432	29-317/multi	No	Birney
22	2001	Ford	F550	1FDAW57F41ED62407	29-142/Diesel	Yes	Forsyth
23	2000	Ford	F250	1FTNX21F1YEA15878	29-316/Diesel	Yes	Forsyth
24	2001	Ford	F550	1FDAF57F01ED08098	29-25/Diesel	Yes	Forsyth
25	1995	GMC	3500	1GTHK39N35E509891	29-343/gas	Yes	Forsyth
26	1997	Ford	F250	1FTHW26GOVEA70447	29-344/gas	Yes	Ingomar

Rosebud County is within the Eastern Land Office of the Montana DNRC's geographic area and is a "coop" county. This provides additional resources such as air tankers from Billings and Rapid City, helicopter from Miles City or Ashland/Fort Howes, single engine air tankers from Miles City and crews and overhead through the Eastern Land Office. Single engine air tankers (SEATs) can load retardant at the Colstrip Airport reload facility. During the fire season these resources may be committed to other incidents and may not be available.

Rosebud County has a mutual aid agreement between all the fire protection entities within the county. Rosebud 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 Rosebud County are relatively scarce. They include stock ponds, holes in creeks, etc. Due to the long-term drought in Rosebud 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 brought 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).

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).

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 (NRCCG) and, consequently, applies to all wildland fire fighting personnel in the state of Montana and Rosebud County for mobilization outside of the county. Within the County, local standards would apply.



Experience in mobilizing to wildland fires in the county throughout the southeast Montana Region and the Northern Rockies has allowed Rosebud County to apply and to gain experience training and qualifications in wildland fire management, resulting in the members of the Rosebud County Fire Department being trained as high as county fire advisor, liaison officer, strike team leader for engines, etc. Those experiences have allowed Rosebud County Fire to more efficiently perform and manage fire operations within the county.

4.4.2. Law Enforcement

Law enforcement and evacuation services are provided by the Rosebud County Sheriff and Colstrip Police Department.

4.4.3. Emergency Medical Services

Rosebud County ambulances and ambulance transport services are provided by the Rosebud County Volunteer Ambulance, with ambulances located in Forsyth, Colstrip, and Ashland.

4.4.4. Emergency Management

Overall County emergency preparedness comes under the office of the Rosebud 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 weights of the components are:

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

The rating system produces ten different Public Protection Classifications, with Class 1 receiving the most insurance rate recognition and Class 10 receiving no recognition.⁶ It is important to note that some insurance companies will not insure structures that are outside of the 5 road miles from a fire station.

Throughout Rosebud County there are a number of communities Forsyth, Colstrip, Ashland, and Lame Deer that have individual ISO ratings. Rosebud County, not having a structural fire department, has an ISO Rating of Class 10.

Improvements to the water delivery system dispatch and to the fire district could improve the ISO rating, which would result in some annual insurance premium savings to the county's customers.

4.6. Land Use/Development Trends

The majority of lands in Rosebud County are dedicated to ranching and agricultural but gas/oil production, and coal mining are growing land uses. Increased activity in oil and gas as well as continued coal mining operations will be the dominant land use trends.

Recently there has been an increase in subdivision activity in Rosebud County with a couple of new subdivisions proposed within the county.

⁶ *Fire Protection Handbook*, NFPA 1997
firelogistics



5. Current Fire Environment

The following narratives describe the current fire environment in Rosebud County. These perspectives are a result of an on the ground tour conducted by Rosebud County fire authorities and Fire Logistics personnel in October of 2003.

5.1. Wildfire Problem Definition

As stated in Chapter 4, Rosebud 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 ecosystem is prone to have frequent wildland fire interval. 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 rangeland presents the probability of material losses to man made improvements as well as possible threats to the occupants of those new developments.

Currently, Rosebud County Fire Department has fire protection responsibilities for wildlands within the county. They are also the de facto structure protection organization with the county. There are at least five major challenges facing the county fire protection organization in the performance of their duties:

Water Supply – Rosebud County is a very arid county with little natural water aside from the Yellowstone River.

Access – The terrain of Rosebud County is such that cross-country travel by engines is difficult and much of the area would be considered inaccessible to vehicles other than dozers or all terrain vehicles.

Communications – Rosebud County is a sparsely settled county with limited infrastructure and, as such, does not have good communication's coverage. Rosebud County does not have good telephone and cell phone communications coverage.

Travel Times – Rosebud County is a very large county and the travel times required to respond to wildland fires is often an hour or more.

Multiple Ignitions – Lightning is the main ignition source for wildland fires with the county and thunderstorms normally start multiple fires per episode. Multiple fire starts challenge the capacity and incident management leadership of Rosebud County Fire Department.

Another situation that has complicated fire protection within Rosebud County was the transfer of initial attack responsibilities on national forest lands from the Forest Service to the Bureau of Land Management. Once a fire exceeds the capabilities of the initial attack suppression resources, however, responsibility for continued actions reverts back to the Forest Service.

5.2. Wildland/Urban Interface

During the past several fire seasons of 2000, 2001 and 2002, it has become evident that wildland/urban interface fire losses have increased throughout the Western United States. The expectation under the Federal Fire Policy is "that losses will increase in the future."⁷

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.⁸ Similar terms are wildland/residential interface and wildland/urban intermix.

The Bureau of Land Management assessed the wildland-urban interface areas within the Miles City District in the early 1980's in Rosebud County by the BLM (See Figure 4). No wildland-urban

⁷ Federal Fire Policy, 2001

⁸ Ibid.

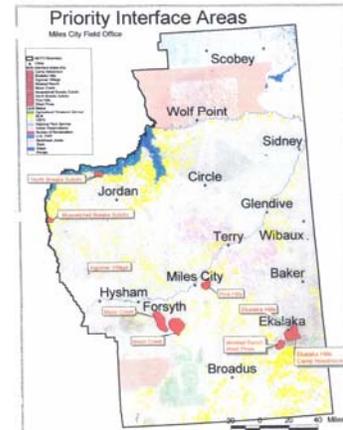


interface areas were identified. However, there are several areas of wildland-urban interface within the county, which have been identified during this planning process (See Planning Area Map in Map Section 10.4).

Areas of wildland-urban interface in Rosebud County include:

- Wildhorse Subdivision
- Hidden Meadow Subdivision
- Bascom Subdivision
- Ashland
- Colstrip
- Forsyth
- Rosebud

Figure 4



The development of portions of Rosebud County into residential lots of varying sizes is contributing to the wildland/urban interface fire problem for the fire protection agencies in Rosebud County. This leads to several complex problems, which need to be addressed in the Fire Plan:

- Access
- Asset Protection Zones
- Water Supply
- Building Construction Requirements
- Fuel Reduction On All Ownerships
- 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

The best way to quantify the structure fire problem in the Rosebud County 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.⁹ Risk categories used in the Self-Assessment Manual developed by the International Commission on Fire Accreditation are:¹⁰

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.

⁹ Fire and Emergency Service Self-Assessment Manual, Commission on Fire Accreditation International, 6th Ed.

¹⁰ Fire and Emergency Service Self-Assessment Manual, Commission on Fire Accreditation International, 6th Ed.



Rosebud County has buildings and occupancies in all three categories with the majority being in the moderate/typical risk category.

There is no structure fire protection outside the city limits of the incorporated cities and towns in Rosebud County. If a structure fire were to occur and Rosebud County Fire requested mutual aid from one of the incorporated cities or towns to fight the structure fire while Rosebud County's Fire Department's responsibility is to keep the fire from spreading to the wildlands. The issue of no entity providing structural fire service to Rosebud County places the Rosebud County Fire Department in a very tenuous position of responding to a wildland fire with what looks like a fire truck, but not being able to fight the fire due to pump capacity, training, equipment, etc. The issue of structure fire protection in Rosebud County should be addressed by the Rosebud County Commission.

5.4. Local Fire Ecology

The prevalent timber type in Rosebud 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 tree's 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 Rosebud 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 and 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.

Figure 5



Since the advent of fire protection, however, the situation has changed considerably. The natural 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, Figure 5.

Today, when a wildland fire occurs it is much more likely to have greater negative consequence. 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 the Land Cover Map, the continuity of heavy fuels, i.e. ponderosa pine, is relatively scattered in Rosebud County. There are areas of continuous pine type covering several thousand acres in size and 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.

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 environment, 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 Rosebud 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 what 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	<p>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.</p> <p>Composition and structure of vegetation and fuels are similar to the natural (historical) regime.</p> <p>Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) are low</p>
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	<p>Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are moderately altered.</p> <p>Uncharacteristic conditions range from low to moderate; Risk of loss of key ecosystem components are moderate</p>



Fire Regime Condition Class	Description	Potential Risks
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	<p>Fire behavior, effects, and other associated disturbances are highly departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are highly altered.</p> <p>Uncharacteristic conditions range from moderate to high.</p> <p>Risk of loss of key ecosystem components are high</p>

5.5.2. Fire Breaks

Since Rosebud 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 Rosebud Creek also provide natural fuel barriers within the county.

There are also areas of open rock and clay bluffs that can prove to be effective barriers to the spread of wildland fire.

5.6. Fire History

Almost all fires experienced in Rosebud 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 60-70 fire starts, which burn a total area of 2000-7500 acres. There have been several large fires in the county over the last ten years. Significant fires in the past include the Early Bird Fire in 1988, Rosebud Fire in 1996 and the Eastern Montana Complex in 2003, Figure 6. These fires occurred on the types of days described in Section 4.1.2 (See Fire History Map in Map Section 10.4).

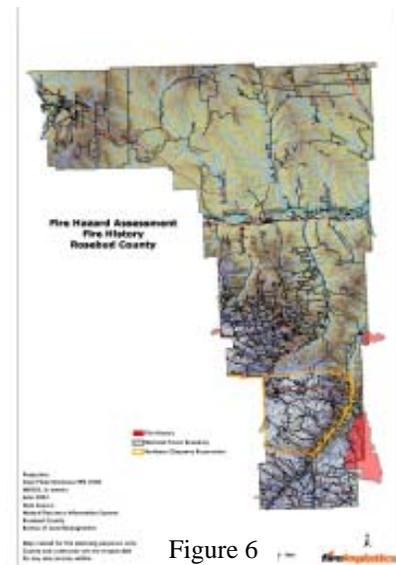


Figure 6

The current performance of wildland fire protection personnel in Rosebud County is admirable considering the size of the county and the travel times required to respond from one end to the other; the frequency of wildland fires and the challenges of keeping local firefighters motivated and qualified to perform fire suppression work. In addition, the overall lack of a water supply in many areas within the county significantly adds to the 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 probable that the supervisory capability and the county resource availability would be quickly exceeded. Mutual assistance agreements with the State of Montana, BLM and the USFS are imperative at a time like this to insure 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 Rosebud 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 Rosebud County. It is important to understand this information to determine what areas contribute to the fire problem in the county.

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

Fuel Type/Model 1: Grass that dominated by short grass where very little shrubs or timber is present over less than 1/3rd 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 1/3rd to 2/3rd 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.

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 10: Older mature timber stands, that have large fuel loads of dead material on the forest floor, are represented by this model. 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 Rosebud 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.

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

	Fuel Moistures	
	Average	Extreme
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

Flame Length	Fireline Intensity	Interpretations
< 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 Eastern Montana Complex 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 the Rosebud 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. These high-risk stands will be available through the BLM some time late in the fall of 2004. This 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.

5.9. 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 Rosebud 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. 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 Rosebud 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

Rosebud 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.

Rosebud County, under current drought conditions, has the potential to have multiple complex wildland fire situations that could conceivably extend for several months. Rosebud County Fire Department should work toward expanding its leadership capability so the county can simultaneously deal with complex multiple 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, see in Resources Section 10.5) 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.

Wildhorse Subdivision is currently in the process of installing water supply tanks and constructing a fire station. Fuel reduction and other mitigation projects designed to enhance the protection of these wildland-urban interface subdivisions are essential.



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 Rosebud 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

The Forest Service is responsible for providing for multiple-use on national forest lands. The western portion of the Ashland Ranger District of the Custer National Forest is located in Rosebud County. The most common uses on this national forest land would include grazing, timber management and recreation use. This is also the predominant land use on the portion of the Northern Cheyenne Indian Reservation located in Rosebud County. The Bureau of Land Management has a scattering of sections within the county rather than a consolidated block of land like the Forest Service. It is similarly tasked with providing rangeland and recreation use on those BLM lands.

Agriculture and grazing are two of the primary uses on the remainder of the private lands in Rosebud County.

6.2. Risk Estimation

The purpose of our fire hazard assessment model is to develop a basic fire risk assessment and to prioritize areas within a county by 5th code watershed. The assessment consists of three sub-models: fuel hazard, values at risk, and risk and was designed with the following criteria in mind:

- The model is descriptive and not predictive.
- The assessment is used to prioritize area for further analysis.
- Each model is analyzed separately before being combined in an overall risk rating in order to avoid conflicts between values.

6.2.1. Fuel Hazard Sub-Model

Hazard parameter is defined as the physical or biological factors resulting in similar fire behavior characteristics and may result in an undesired wildfire event. The model was developed using slope, aspect, elevation and land cover type. Each criteria was weighted with land cover type weighted X 10 the slope, aspect, and elevation. A low, moderate or high rating indicates the potential for extreme fire behavior, Figure 7 (See Fuel Hazard Model Map in Map Section).

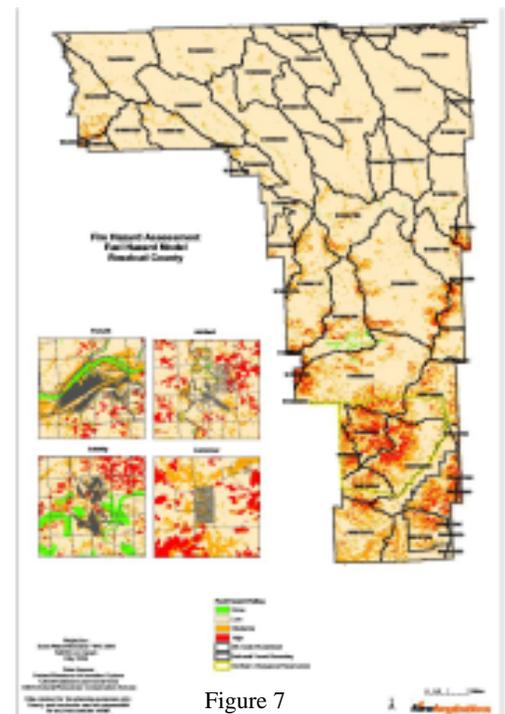


Figure 7

6.2.2. Values at Risk Sub-Model

Values at Risk, or the human development data parameter, are defined as natural or developed features that can be affected by fire. Attributes for parcels with structures are extracted from the CAMA data and a point value is assigned for each parcel based on structure presence. A low, moderate or high ranking is assigned each 5th code watershed based on the number of parcels with structures within the watershed, in Figure 8 (See Values At Risk Model Map in Map Section 10.4).

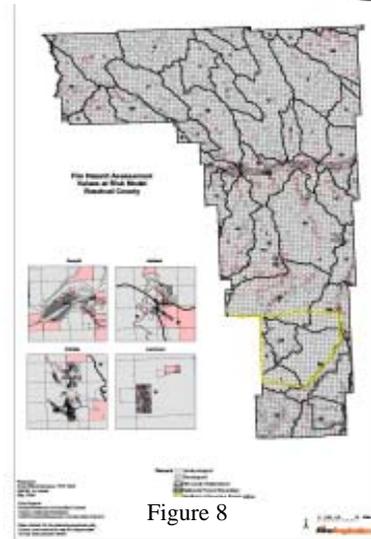


Figure 8

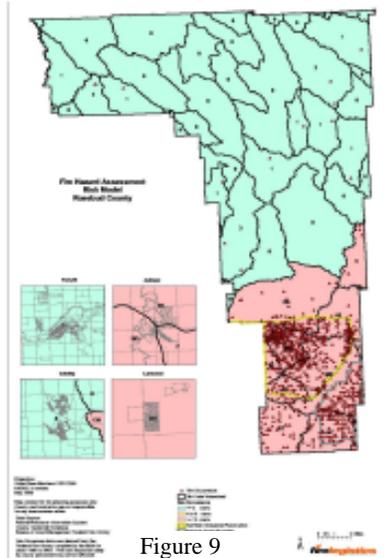


Figure 9

6.2.3. Risk Sub-Model

Risk is defined as potential risk to wildfire and is determined by the number of fire ignitions over a time period. Fire ignition points will be totaled by 5th code watershed and a low, moderate, or high rating assigned, Figure 9 (See Risk Model Map in Map Section 10.4).

6.2.4. Final Fire Hazard Assessment

A grid or vector layer of accumulated point value will be created for each of the three models. The models will be represented separately and assigned a low, moderate or high risk for catastrophic fires by 5th code watershed. The final base map will consist of the fuel hazard model, in 30m raster format, assigned low, moderate, or high fire hazard and delineated by 5th code watershed. This hazard model will be overlaid with the values at risk (structures) and risk (fire occurrences) models. A final rating fire hazard rating of low, moderate or high will be assigned each watershed and will identify areas in need of further assessment, Figure 10 (See Final Fire Hazard Assessment in Map Section 10.4).

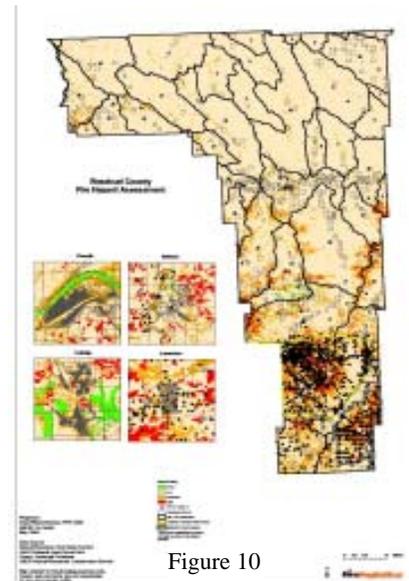


Figure 10

In looking at the GIS generated maps of Rosebud County some areas of potential risk began to take form. When the fuel models are overlain with potential occurrence the areas most likely to experience a wildland fire can be identified. By adding the areas of human occupation or high value one can begin to assign priorities for protection. As with the federal agencies, the county's first priority is protection of human life and secondly, personal property.



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 refusing 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.

The following list represents Rosebud County's current priorities for fire protection.

- Wildhorse Subdivision
- Hidden Meadow Subdivision
- Bascom Subdivision
- Ashland
- Colstrip
- Forsyth
- Rosebud

In looking at the GIS layered map of Rosebud County it is apparent why these priorities have been established. The three subdivisions are particularly challenging from a protection standpoint because of the lack of some basic amenities such as 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 Rosebud County to reduce the wildland fire threats to public, fire fighters and other values at risk.

7.1. Mitigation Goals

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

The mitigation goals of this Community Fire Plan are to:

- A. Rosebud County will evaluate, upgrade and maintain community wildland and structural fire preparation and response facilities, training and equipment to deal with multiple ignitions.
- B. Rosebud 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.
- C. Rosebud County will decrease fuels to reduce wildfire intensity and impact in and around the improvements in the county.
- D. Rosebud County will help educate community members to prepare and respond to wildfire.
- E. Rosebud County will develop and implement a comprehensive emergency response plan.
- F. Rosebud County will improve training and qualifications of their personnel to more effectively interface with incoming Incident Management Teams deployed in the county.
- G. Rosebud County will coordinate fuels reduction opportunities between private landowners and the Custer National Forest, the Miles City Field Office of the Bureau of Land Management and the Northern Cheyenne Tribe.

Planning priorities of the CFP 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 Rosebud County to decrease the risks from wildland or wildland-urban interface fire. Rosebud County and Rosebud County Fire Department should ensure that these efforts are supported and continued.

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 homes and ranch improvements.

The problem lies with either people inexperienced with the fire history in Rosebud 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 (See in Resources Section 10.5).

7.2.2. Neighborhood Preparedness

Wildhorse Subdivision is in the process of installing some water storage tanks for fire protection and they are also constructing a fire station.



7.2.3. Fire Protection Response

Long travel distances for fire suppression resources are the norm in Rosebud County. The County Fire Warden has located the three Department of Natural Resource engines and nineteen county Type VI engines as strategically as he can throughout the county within the opportunities that exist. Each engine must be hosted, maintained and operated by a willing volunteer. Three water tenders and two 6x6's are also located at hosted locations within the county. When a fire is reported the volunteers are notified and they respond on a closest forces concept. They also respond to new ignitions reported on national forest and BLM administered lands. In many cases the actual land ownership cannot be accurately determined until initial attack is in progress. When fires are located on lands other than Forest Service or BLM, the county volunteers continue their actions until the fire is controlled or until relieved by the fire warden.

The opportunity for misunderstanding occurs when the fire is located on federal 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. For all practical purposes the volunteers meet all the standards except for the physical fitness requirement. The test itself involves walking three miles in under 45 minutes while carrying a 45-pound pack. Whether it is the logistical aspect of conducting the test, the perceived intrusion of requiring it or the inconvenience of taking it, the volunteers have not embraced it. As long as the volunteers are acting within the scope of an existing mutual aid agreement and no "hiring" is enacted they may continue to operate on federal lands, albeit under the direction of the federal Incident Commander when he/she arrives. When responding to a fire on federal lands that has already been initial attacked by county volunteer forces through a mutual aid agreement, the federal Incident Commander will either release the county forces or continue using them depending on the situation.

If the fire is already contained the IC will most likely ask the volunteers if they wish to be released and, if so, continue the control and mop up with federal firefighters. When the fire is not contained and the county forces are still needed, the IC should continue to use them as long as they are still operating within the scope of their mutual aid agreement. If at some point, however, the volunteers are to be hired by the IC, i.e. their continued use would require payment from federal funds, they are then required to meet all federal standards, including satisfactory completion of the pack test. This is where the potential for misunderstanding occurs. When a volunteer engine cannot verify that it meets all standards and is released instead of being hired, the volunteer firefighters often feel as if they have been "run off" the fire. While many of the volunteers may prefer to go home it is difficult for them to understand why they would be released when they are clearly needed in the suppression effort. On the other hand, if they were hired and one of the volunteers was seriously injured the subsequent accident investigation would fault the IC for knowingly utilizing a resource that did not meet federal standards on a federal fire.

Various IC's may react differently depending on their knowledge of the rules of engagement but, from a legal standpoint, no engine or firefighter can be reimbursed unless they meet all federal standards, including the pack test. Unfortunately, this difference in firefighter standards, dependent on the status of a particular fire, raises the greatest barrier to smooth working relationships between the federal and volunteer firefighters in Rosebud County or elsewhere in eastern Montana for that matter.

7.3. Coordinated Prevention, Protection Projects, and Response Plan

Future efforts in planning and implementation of prevention, mitigation and response project should be closely coordinated between Rosebud County and their cooperating partners, i.e., BLM, USFS 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. Rosebud County is in the Eastern Montana Zone, Figure 11. Rosebud County Fire Department and its cooperators need to be coordinated in this process to ensure close communications and common actions occur during critical periods of fire danger.



Figure 11

7.4. Prioritization Process

Recommended projects have been prioritized based on the risk estimation in Section 6.2.

7.5. Recommended Projects and Programs

This area describes recommended projects and actions that address the mitigation goals of the Rosebud County CFP.

7.5.1. Vegetation Management/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 and USFS, ranchers, Rosebud County Fire Department, Rosebud County Disaster & Emergency Services, Board of County Commissioners, power companies and other cooperators, and other to plan fuel reduction projects on a landscape basis.

Project Coordinator – Rosebud County FD

7.5.1.1. Thinning and Limbing

Silvicultural 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.



Figure 12

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, Figure 12. 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 is 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.

Project Coordinator – Rosebud County FD

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 – Rosebud County FD and BLM

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 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 unto 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.

Areas that have been previously treated by prescribed fire make effective fuel breaks when attempting to control a wildland fire. The lighter nature of the grassy fuels reduces the resistance to control required of firefighters and if the lands have been grazed, may even cause the fire to burn itself out on its own.

One of the greatest benefits to prescribed burning is the training opportunity it provides for the volunteers. 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. Rosebud County Fire Department should participate in these burns to improve their training, qualifications and experience in wildland fire management. Efforts such as these promote better interagency cooperation and working relationships.

Project Coordinator – Rosebud County FD/Northern Cheyenne/USFS/BLM



Proposed Project 7.5.1.2.2 – Work with the Rosebud County Weed Department to establish a wash requirement for contractors, other local and government apparatus that conduct prescribed burns within the county (see the Weed Management Plan).

Project Coordinator – Rosebud County Weed and Fire Department

7.5.1.3. Grazing

Rosebud County can expect the continued encroachment of fires off of timbered grounds, such as the USFS, BLM, and Northern Cheyenne 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 or tribal ownership.

Project Coordinator – Rosebud 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 – Rosebud 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. If a fire occurs as a result of an ignition along the railroad right-of-way, the Rosebud 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 – Rosebud County FD

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 – Rosebud 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 off of Moon Creek, and try to utilize that sawmill to make timber out of fuel reduction project biomass.

Project Coordinator – Economic Development Groups in Rosebud 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 – Rosebud County FD

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 Rosebud County Fire Department, 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 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. GPS the location of water supply points and work with the Rosebud County Weed Department to develop a water supply map for Rosebud County.

Project Coordinator – Rosebud County FD

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. Placement of water tanks in Wildhorse Subdivision is an innovative approach although the vulnerability of the fiberglass tanks to vandals could be a problem in the future as non-local visitation increases.

Project Coordinator – Homeowners' Associations

7.5.3.2. Utilities

Proposed Project 7.5.3.2.1 – The Rosebud County FD should work with the Northwestern Energy, Tongue River Electric Cooperative, Mid Yellowstone Electric Cooperative, and Montana Dakota Utilities to ensure that the required clearances are maintained for all electrical transmission lines in the Rosebud County.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.2.2 – The Tongue River Electric Cooperative, Mid Yellowstone Electric Cooperative, Montana Dakota Utilities, and Northwestern Energy should provide power line safety demonstrations to the Rosebud County Fire Department members and subdivision and homeowner associations on a biannual basis.

Project Coordinator – Rosebud County FD 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 improvements plan to up-grade fire apparatus and equipment in Rosebud County Fire Department.

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

Proposed Project 7.5.3.3.2 – Either put a radio into rancher's vehicles or authorize them to utilize county fire frequencies in the local ranch radios, especially in the Birney area and throughout the rest of the county, as needed.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.3 – Work with the county commissioners to develop a long-term plan to provide structural fire services to as many structures throughout the county as possible. 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, 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 up to date. 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 bc 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.

Project Coordinator – Rosebud County FD and Rosebud 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 Rosebud County.

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

Proposed Project 7.5.3.3.5 – The Rosebud County Board of County Commissioners should consider making the position of the Rosebud County Fire Chief a full-time position due to the complexity of the wildland fire program.

Project Coordinator – Rosebud 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 – Rosebud County Fire Department and Board of County Commissioners

Proposed Project 7.5.3.3.1.2 – At the existing fire station site, develop a capital plan to finance the construction of a building for a training room and office space for the Rosebud County Fire Department.

Project Coordinator – Rosebud County Fire Department and Rosebud 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 in an 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 in those duties with substantial needs in all sizes of communities.¹¹ Needs Assessment also found that only 26% of the fire departments could handle wildland/urban interface fire affecting 500 acres with locally trained personnel. Rosebud County Fire Department greatly exceeds this capability. It is not unusual for them to handle a fire of 1000 acres or larger, either a wildland/urban interface fire or a wildland fire.

Proposed Project 7.5.3.3.2.1 – Encourage volunteers to meet training requirements, wear their personal protective equipment and to take the firefighter pack test each spring. The County Attorney should determine if existing county standards are adequate to protect the county from any litigation concerning the injury or death of a volunteer firefighter.

Project Coordinator – Rosebud County Attorney

Proposed Project 7.5.3.3.2.2 – Work on qualifying each engine operator as a Type IV or Type V Incident Commanders for greater effectiveness and to provide more relief for the county fire warden and his assistant.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.2.3 – Training Incident Commanders to request and understand a spot fire weather forecast. (Request, data, belt weather kit)

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.2.4 – 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 to the IMT, which would include the management objectives of the local government for the emergency incident.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.2.5 – Develop a limited Type 3 capability in Rosebud County utilizing personnel from the Rosebud County Fire Department, Rosebud County Sheriff's Office, Rosebud County Ambulance Services, and others that might be available within the county to provide some limited Type 3 capability to support an all risk incident, including wildland and wildland/urban interface fires.

Project Coordinator – Rosebud County DES with support from Rosebud County Fire

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 Rosebud County Fire Department. This will give the County Fire Chief a marked advantage in deploying county fire protection assets during periods of lightning activity.

Project Coordinator – Rosebud County FD

¹¹ Needs Assessment US Fire Administration NFPA December 2002



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 GPS units so that they are capable of tracts allowing Rosebud 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 Rosebud County Weed Department.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.4.3 – Rosebud 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 Rosebud County personnel.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.3.3.4.4 – The Rosebud County Weed Plan requires that fire suppression equipment be washed down prior to fire suppression activities to eliminate weed seeds and other noxious species moving into Rosebud County. Selected spots throughout the county should be established, and a wash-down facility, which is transportable, be developed and moved to a site.

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

Proposed Project 7.5.3.3.4.5 – Develop a plan that will alternately schedule a county Duty Officer or Relief Duty Officer to be on call daily during the critical fire season months of July and August. The intent of this recommendation is to insure that key personnel are getting sufficient rest periodically and that they do not go through the entire season without a break.

Project Coordinator – Rosebud County Fire Warden

Proposed Project 7.5.3.3.4.6 – Rosebud County Fire Department needs to keep records on fire responses to all areas within the county to establish a fire history and occurrence map. This information will be invaluable in establishing mitigation activities and future funding requirements. The records should include a GPS location of each fire if not mapped to be included in the fire history maps.

Project Coordinator – Rosebud County FD

7.5.3.4. Access

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

Project Coordinator – Rosebud County Road Department and Rosebud County Commissioners

7.5.4. Asset Protection Zone (Defensible Space)

Figure 13

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). Defensible space 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, Figure 13 (See Asset Protection Zone Guideline Table in Resources Section 10.5.5).





Slope and fuels affect the size of the defensible space. 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.¹² The Rosebud County Commissioners should develop land use plans and ordinances that provide for defensible space and fuel management.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.4.2 – Work with Colstrip Parks and Recreation Department and PPL Montana to ensure that there are fuel mitigation projects accomplished on the common areas within the city of Colstrip. There is an extensive amount of bug kill and dead/dying trees in those common areas and those are beginning to represent a significant fire hazard to the community.

Project Coordinator – City of Colstrip

Proposed Project 7.5.4.3 – City of Colstrip, Ashland and Forsyth Fire Departments should ensure that residences adjacent to common areas within the Cities of Colstrip, Ashland and Forsyth are provided with adequate defensible space and adequate asset protection zones.

Project Coordinator – Colstrip City Fire Chief, Ashland City Fire Chief, and Forsyth City 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 Materials¹³ and Firewise Construction Checklist¹⁴ to developers and homebuilders (See in Resources Section 10.5)

Project Coordinator – Rosebud County FD

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.

Zone D is the property perimeter buffer which is 60 feet to the property line for lots 2 ½ acres or less

¹² See www.westgov.org/wqa/initiatives/fire/implem_plan.pdf

¹³ *Firewise Construction, Design and Materials, Stack, Colorado Forest Service*

¹⁴ www.firewise.org.



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, Firewise Landscaping Checklist¹⁵, Fire and Your Landscape, Fire Scaping Resources for Montana Homeowners¹⁶ in Resources Section 10.5 of the CFP).

Proposed Project 7.5.7.1 – Utilize the Firewise Landscaping Checklist and Fire and Your Landscape (See in Resources Section 10.5).

Project Coordinator – Rosebud County FD

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 – Develop evacuation plans for the Wildhorse Subdivision and Ashland.

Project Coordinator – Rosebud County Sheriff

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 – Sponsor a Firewise Community Program locally within the county for the public and continue that every other year. Integrate weed and fire into any public education that is conducted during the Firewise Community Program.

Project Coordinator – Rosebud County FD

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 Regulations in Resources Section 10.5).

Project Coordinator – Rosebud County FD

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 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 – Rosebud County FD

¹⁵ www.firewise.org

¹⁶ Montana Nursery & Landscape Assoc. 2003



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 completed and insure annual operating plans are completed when specified. The following key points should be adequately covered within the agreements so that there are no unanswered questions:

- Clearly state who has jurisdiction for and will provide an IC for fires on BLM, national forest and county lands, respectively.
- When one agency responds first to another agency's fire, clarify what the rules of engagement, disengagement and expectations are for that agency when the responsible agency arrives at the scene.
- When a complexity analysis indicates a Type III, Type II or Type I Incident Management Team is needed, how is that request processed and who must approve it.
- Who will be the county liaison with that overhead team?
- Detail the process that the county needs to follow in order to obtain aviation resources such as air tankers and helicopters in a timely manner.
- Lay out reimbursement procedures.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.9.2.2 – One issue that it might be helpful to periodically review is the jurisdictional responsibilities for wildland fire on Tribal, Custer National Forest and Bureau of Land Management lands within Rosebud County. The Organic Act, the Protection Act, and the Taylor Grazing Act place the responsibility for fire protection on the respective federal agencies for the lands administered by them. There are exceptions when another agency has been designated as the Protecting Agency by virtue of an agreement, i.e. BLM protects NF lands for the Custer National Forest through the Cooperative Fire Protection Agreement. This assigned protection responsibility only involves initial attack on new fire starts. Once a fire escapes initial attack and extended attack efforts, the responsibility falls back to the home agency. A clear understanding of jurisdictional authorities will help all firefighters understand their roles within the county. Agreements and operating plans with BIA, BLM, USFS, State of Montana and adjoining counties must be current and valid. Without these operating plan requirements being fulfilled, the likelihood of a misunderstanding among the parties concerned continues.

Project Coordinator – Rosebud County FD

Proposed Project 7.5.9.2.3. – 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 – Rosebud County Fire Warden

7.6. Prioritized Actions, Implementation Timeline

Ask Doug for his thoughts on priorities.

7.6.1. Short Term (< 1 year)

Identify your simplest, most ready, or most pressing projects that you can begin almost immediately.

Your project list.



7.6.2. Medium Term (1- 3 years)

Identify those projects that are of high – medium priority that you will address in the next decade. Develop a timeline for which projects to implement when.

Your project list.

7.6.3. Long Term (3 + years)

Identify those projects that are either very long-term, or of low priority, to be addressed in the next decade. These projects can be just as important as your immediate projects, but need to wait to be implemented.

Your project list.



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 Rosebud 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 Rosebud 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 Rosebud County have been able to keep pace with this changing environment through the efforts of the County Fire Warden. The Rosebud 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 Rosebud County Board of Commissioners are strongly encouraged to utilize a grant writer to increase the wildland fire suppression, public education, training and qualifications capability of the Rosebud County and County Fire Department.



10. Appendices

10.1. Bibliography

10.2. Glossary

10.3. Public Education Materials

10.4. Maps

10.5. Resources