

CARTER COUNTY COMMUNITY FIRE PLAN

1. Executive Summary

1.1. Problem Overview

Carter County is a large and very remote county covering just over 3,348 square miles, without a paved road running the length of the county. Under the current drought conditions, Carter County has a high degree of potential for extended fire seasons ranging from March through October or November. Carter County Fire Department, under the leadership of Rusty Jardee, is in charge with wildland fire protection throughout the county. He has strategically located engines based on historical fire occurrence throughout the county. Carter County has the potential to interact with not only DNRC, but also the Custer National Forest, and the Bureau of Land Management, thus providing a high degree of interagency complexity that some other counties in eastern Montana don't experience. As a matter of general occurrence, Carter County Fire Department has to deal with multiple ignitions throughout the southern half of the county from lightning storms. During these periods of high fire occurrence, the leadership of Carter County Fire Department has the potential to be over extended.

1.2. Process Overview

The Carter County Community Fire Plan -- hereafter known as "CFP," has been developed to assist Carter County, Carter 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 Carter 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 Carter County. The intent of this planning document will ensure that the health, safety and welfare of Carter 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 better building and development codes and regulations, as they relate to the development of the WUI. The CFP fosters the preservation of the economy of Carter 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 Carter 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 Carter County.

2. Introduction

2.1. Background and History

Carter County Fire Department retained Fire Logistics, Inc. to:

Complete a wildland and wildland/urban interface fire assessment for the County to include:

1. Identify and describe the areas to be evaluated, which would include a detailed discussion of the community, including location, topography and fire history.
2. Develop a risk assessment, which identifies the primary sources of risk to values and any patterns or trends.
3. Develop a hazard assessment, which identifies and provides an assessment of the vegetative, structural fuels and conditions in the area being evaluated.
4. Develop an assessment of values to be protected which identifies and prioritizes values to be protected or those things, places, activities, resources or qualities that agencies, citizens and stakeholders consider as a significant and that would be severely impacted by wildfire.
5. Identify the level of emergency preparedness and the response capability of local infrastructure and area fire protection personnel and resources.
6. Work with the personnel selected by the county to gather data.
7. All assessments will include appendices, which with maps, photos and any supporting information.

Develop a Mitigation Plan, which includes the priority values to be protected as determined in the assessment process. The plan will include recommended projects and actions to be implemented.

2.2. Mission

The Carter County Fire Department will work as a team to provide quality and cost-effective wildland fire protection services, preserving life and property, to meet the needs of its customers – the citizens of Carter County.

The purpose of this plan is to position Carter County, its leaders, residents, land owners and fire protection agencies to be better prepared to protect the County, its economy and natural resources from the potentially devastating impacts of wildland fires.

2.3. Current Relevant Fire Policies

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

2.3.1 Federal Policies “Homeland Security is Fire Safety”

This section briefly describes the relevant policies at the national level, which affect fire planning on the local level.

2.3.1.1 National Fire Plan

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

2.3.1.2 Disaster Mitigation Act 2000

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

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

Disaster Mitigation Plans must be approved by 11/04 to receive HMGP funds after that date.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 Carter County are addressed indirectly in the Cooperative Fire Management Agreement between USDOl’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 County Cooperative Fire Management Program. 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.

¹ See www.fireplan.gov.

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

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

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

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 fire investigators when the situation is warranted.

2.3.2 State Policies

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

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

2.3.3 Local Policies

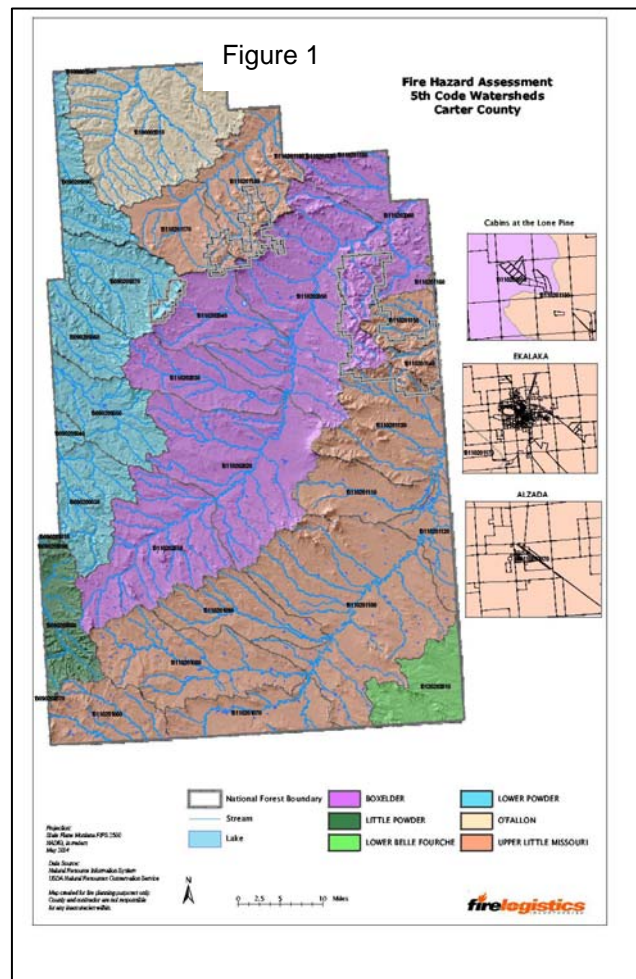
The Carter County draft Pre-Disaster Mitigation Plan has several policies related to wildland fire protection including:

- More fire fighting equipment
- Forestry management
- Improvement of communications

Carter County Commissioners have not adopted a current Growth Policy for the county. The existing Carter County Comprehensive Plan, if completed, is more than 30 years old. A copy was not able to be located to review for this report.

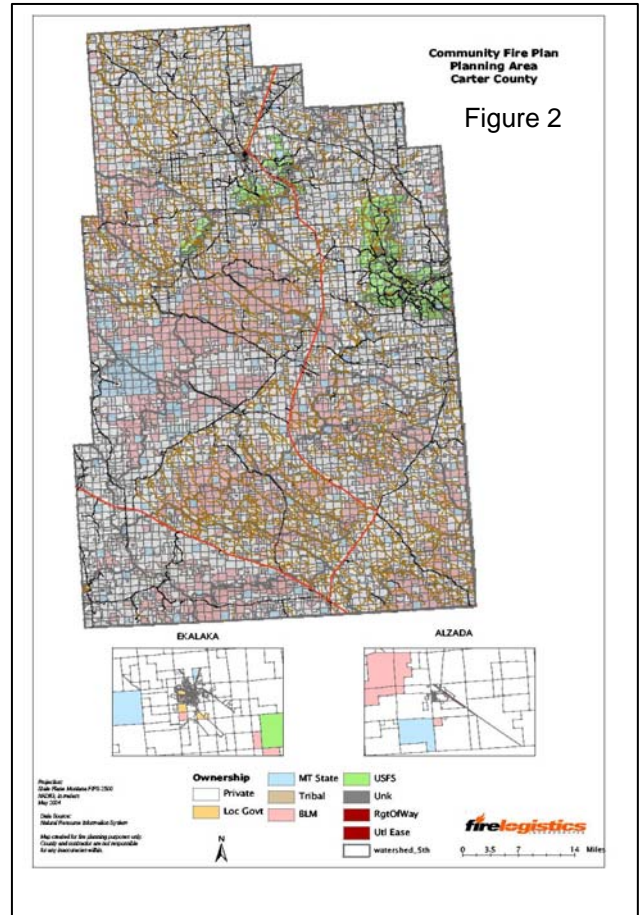
2.4. Planning Area Boundaries

The Carter County CFP covers Carter County in its entirety. The 5th Code Watershed has further subdivided the county into sub-planning areas. 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 Figures 1 & 2 (See 5th Code Watershed Map and Planning Area Map in Map Section 10.5)



2.5. Acknowledgements

Fire Logistics, Inc. would like to thank the Carter County Fire Department; Carter County Sheriff's Office, especially Sheriff Jardee and Undersheriff Bill Walker, Bureau of Land Management, especially Dena Sprandel-Lang; Custer National Forest, Sioux Ranger District; Carter County Disaster & Emergency Services Coordinator; the Carter County Local Emergency Planning Committee and Carter 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:

- Carter County Fire Department
- Carter County Fire Warden
- Carter County Sheriff's Office
- Carter County Board of County Commissioners
- Bureau of Land Management
- Custer National Forest
- Ekalaka Fire Department
- Alzada Fire Department
- Southeast Electric Cooperative
- West River Cooperative
- Mid Rivers Telephone Cooperative
- Range Telephone Cooperative
- Little Missouri River Basin State Cooperative Grazing District
- C & B State Cooperative Grazing District
- Carter County Conservation District
- West River Cooperative

3.2. Current Process and Plan Development

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

3.2.1 Avenues of Community and Public Input

The draft Carter 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
- Carter County Board of County Commissioners
- Carter County Sheriff & Fire Warden
- Carter County Disaster & Emergency Services Coordinator
- Peggy Iba, PDM Plan Contractor

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

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

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

- Cooperative Fire Management Plan
- Custer National Forest - Sioux Ranger District:
 - Environmental Assessment – Ekalaka Hazardous Fuel Project

BLM Fire Plans – Camp Crook Protection Area
Carter County – Fire Action Plan
Carter County - Pre-Disaster Mitigation Plan (1st Draft)
Carter County – Evacuation Plan

3.4. Local Jurisdictional Approval and Adoption

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

4. Community Description

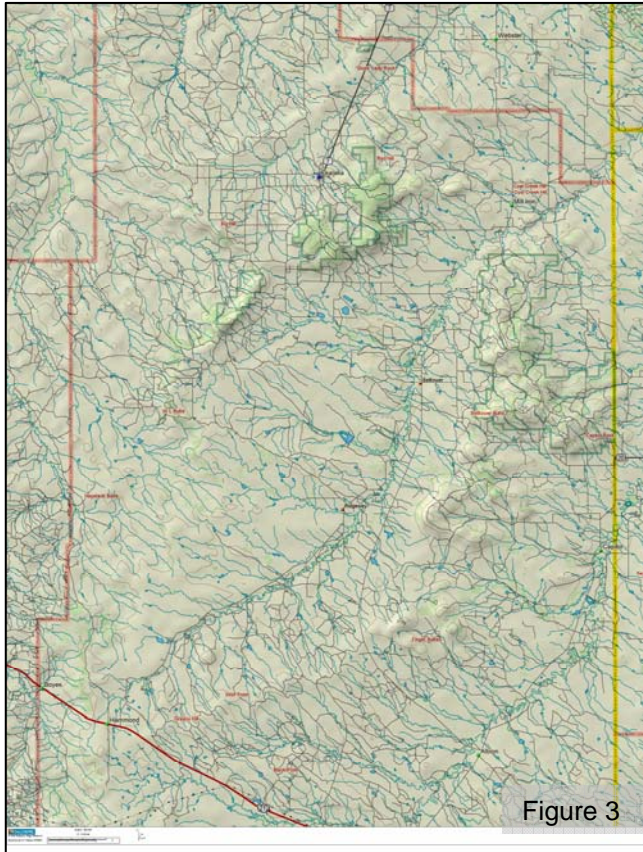
4.1. General Environmental Conditions

Carter County is located in the southeast corner of Montana adjacent to South Dakota and Wyoming. It covers some 3,348 square miles and the lands in the county are primarily used for agriculture. The majority of the land type is relatively flat when compared with the western part of the state and there are no mountain ranges located within the county. The county has less than 14 inches of rainfall and the adapted ecosystems contain vegetative types and quantities commensurate with soil productivity and available moisture. Generally, northern aspects and drainage bottoms support a greater amount of plant life than southern aspects and other dry sites. Grasses and shrubs cover the greater share of the landmass in Carter County. There are scattered areas of pine forest as well as some hardwoods stands, especially along river bottoms. These broad vegetative types are displayed in Figure 3.

4.1.1 Topography, Slope, Aspect, Elevation

Carter County can best be described as a gentle lay of the land, but has a number of timbered ridges throughout the county. Its elevations only vary from 2800 to 4200 feet. A number of broad drainages flow from south to north through the county. The main drainages are Box Elder Creek, Little Beaver, and the Little Missouri River. There are numerous side drainages that potentially can flow water during periods of heavy precipitation or during snowmelt.

Slopes generally are flat, with slopes becoming steeper on the ridges. Along the broad drainages the hummocky slopes are less than 10-20%. Along the ridges, slopes can change to 35-40% and in some cases may be much steeper.



Aspect means the direction toward which a slope faces. Because of the topographic nature of Carter County all aspects are represented throughout the county.

Figure 3 gives an indication of the topography of Carter 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 and grain 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, winds in this area prevail out of the northwest, and are moderate to strong, depending on the elevation and aspect. Southwest and west facing slopes are more exposed to the prevailing wind, which relates to

increased fire behavior activity. Fires generally spread from north to south, which can be attributed to the prevailing surface winds. These winds are caused by low level winds tracking north along the mid continent from the Gulf of Mexico and generally bring higher humidity from Texas northward to the Canadian border. This weather pattern skirts along the east side of the Black Hills to about Williston, ND. At that point, the pattern shifts to the northeast generating the north to northeasterly winds in Carter County.

Carter County is faced with extremely variable wind patterns. It is not unusual to experience winds blowing from any quadrant of the compass. Large fires like the Brewer and Kraft Springs complicated the actions of the fire suppression resources due to winds shifting throughout the duration of the wildland fire incident. This wind anomaly challenges all wildland fire suppression efforts and leads to fire fighter safety concerns and the potential for large wildland fire growth. In 1988, winds as described above resulted in a fire shelter deployment by the Wyoming Hotshots on the Brewer Fire. As the current and protracted drought continues, fire suppression personnel need to keep current on the fire weather, especially predicted wind direction, through spot weather forecasts from the National Weather Service in Billings.

During calm days, fire spread will be dictated by topographic configuration and local diurnal 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. The storm track affecting the analysis area starts in the vicinity of the Rosebud and Powder River county line near Ashland, MT 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 county. However, lightning associated with these storms can continue to contribute to a significant number of fire starts along the storm's path. These dry lightning events increase in number as the sun angle increases with the seasons. As the lower atmosphere dries, the height of the freezing level increases and available low level moisture diminishes. This low level moisture continues to diminish as the dominant Bermuda High pressure cell expands westward into Mexico shutting down the low-level jet transport of moisture into the mid section of the United States. All these factors combine to bring high based cumulus clouds that bring virga and gusty down draft winds.

Figure 4 depicts the average annual precipitation for the State of Montana during the years of 1961 through 1990.

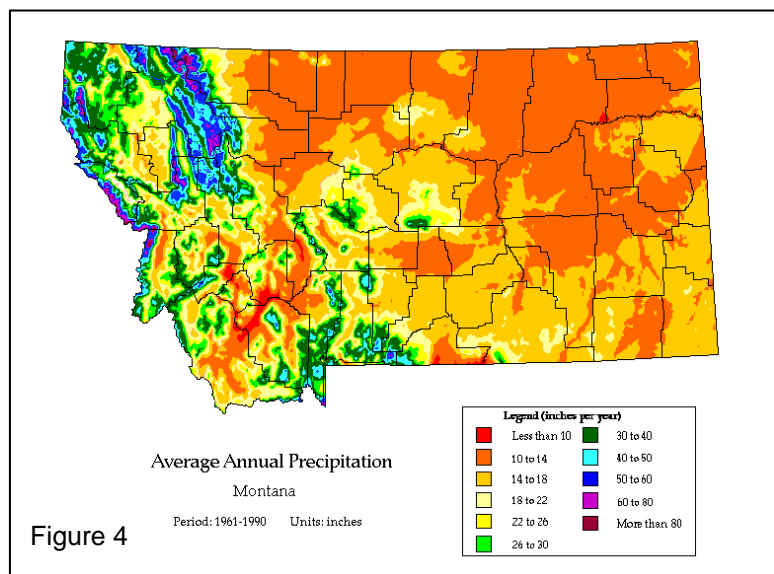


Figure 4

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 increase the complexity of the July to October fire season.

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 accompanied by strong surface winds become common and can promote conditions of extreme fire behavior, similar to those

experienced with the Johnstone Fire of 1999 (See Figure 5).

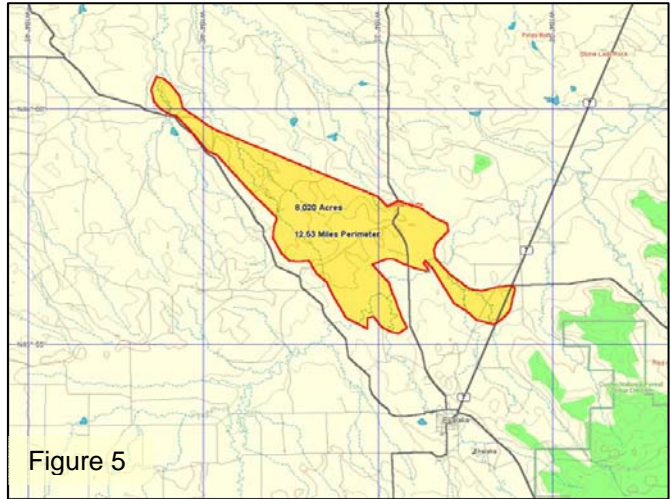


Figure 5

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 Carter 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 the Four Corners area into Montana with subsidence in the high pressure that dries the atmosphere. This subsidence does two things; it brings very warm temperatures (90-105 degrees) 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.

The drying of the lower atmosphere also affects thunderstorms that might develop. These thunderstorms are usually five to seven miles wide at their bases and are sufficiently dry to evaporate any moisture falling from the cells. These "Dry" thunderstorms are good at developing very strong outflow winds. These thunderstorms also produce lightning that can occur within 25 miles of the thunderstorm.

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 Carter County indicate that the current wildland fire suppression actions are effective when the energy release component (ERC) is below the 97th percentile (See Figure 6). When the ERC is above the 97th percentile, wildland fire suppression actions are historically not effective (see Page 18, Fire Suppression Interpretations of Flame Lengths table). Since 1988, Carter County area has experienced 8 significant fire seasons. The fire seasons of 1988 and 2002 are considered the benchmark years for the county.

U.S. Drought Monitor

February 8, 2005

Valid 7 a.m. EST

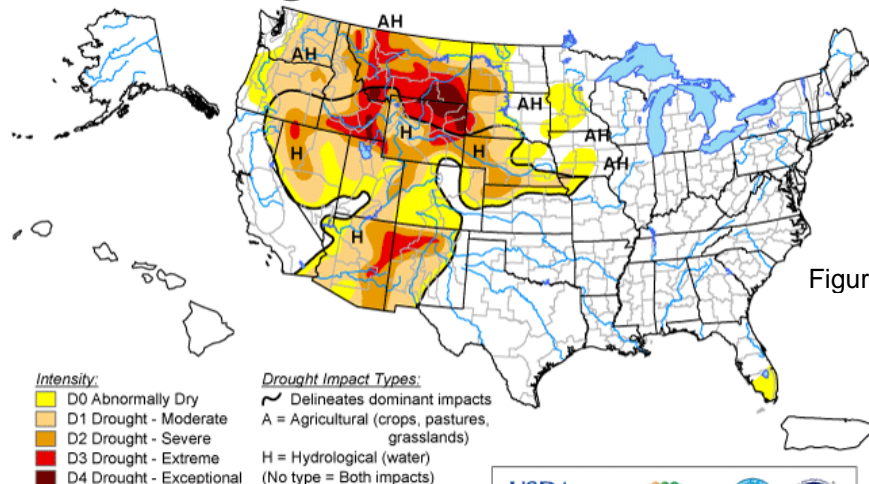


Figure 6

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- ✓ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



Released Thursday, February 10, 2005
 Author: Rich Tinker, NOAA Climate Prediction Center

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

<http://drought.unl.edu/dm>

- Average maximum temperature 88-96 degrees.
- Average wind speed was 7-12 mph consistently from the southwest. Wind gusts from 30-40 mph were common and often exceeded 55 mph. These gusty winds were most common through out the year.
- August is consistently the driest month with weather records showing poor nighttime relative humidity recovery. During the day light hours the relative humidity begins to drop substantially beginning at 0900 and remains low until 2100. These lows bottom at the lower teens around 1700-1800. The August time frame from consistently remains the time period with the lowest relative humidity and poorest humidity recovery. In reviewing the weather history, these are also days in the month where relative humidities remained low for multiple twenty-four hour periods.
- Moisture events did occur in August, but were limited in location, content and duration. The remnants of these events kept the maximum relative humidity high in that particular area for a period of seven days after initiation.
- ERC were recorded above the 90th percentile for the majority of the time for the months of July, August and September.
- Continued drought conditions are causing stress on live plant species resulting in ERC levels approaching the 90th percentile in the spring months of 2004.
- Lightning occurrence usually begins in late May with the heaviest occurrence in June through August. Dry lightning is most prevalent in July and August.
- Conifer stands contributed to large fire spread, where high fire intensities did not allow for aggressive initial attack or fire suppression with ground forces due to safety concerns.

4.2. Population, Demographics

The resident population of Carter County is approximately 1360 people. In the last three decades of the 1900's, the population has declined by 30.5%. On the other hand, the non-resident recreational use within the county has gained in popularity due to the hunting and other recreational opportunities in the county. In 2002, educational services were the largest employer in the county. The county has an unemployment rate of between 2-3%.

Approximately 81.3% of the homes in Carter County were constructed prior to 1979. There has not been a new subdivision in Carter County in a very long time; however, a new subdivision is being proposed just east of the Ekalaka Hazardous Fuels Project area in the vicinity of McNab Pond.

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

The transportation infrastructure within Carter County is primarily unpaved roads. There is an effort underway in early 2004 to pave MT 323 from Ekalaka to Alzada. Currently the highway is only paved for approximately 20 miles south of Ekalaka. Highway 7 is a state highway providing access from Baker to Ekalaka.

Electric service is provided by Southeast Electric Cooperative and Black Hills Power through an aboveground electrical distribution system, that requires annual inspection and clearing of adjacent flammable vegetation.

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

Mid Rivers and Range Telephone Cooperatives provide telephone service through underground lines. Cellular phone coverage is reasonable throughout much of the County. Cellular phone service is Mid Rivers Telephone Cooperative.

4.4. Emergency Services

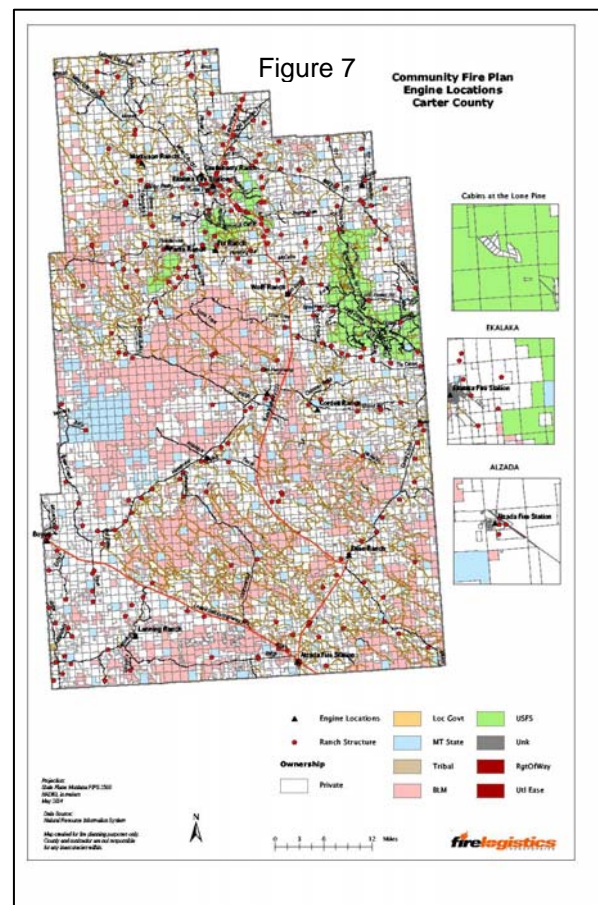
4.4.1. Fire Protection

Carter County is providing fire protection through two fire protection agencies, Carter County Fire Department and Ekalaka Volunteer Fire Department. There are no rural fire districts or fire service areas in the county, which would provide structural fire services to the homes and businesses outside of the Town of Ekalaka. Fire Logistics, Inc. attempted to evaluate the fire service by their capability, operational effectiveness, staffing, equipment and training as portrayed in the Community Profiles (See Appendix 1). Additional wildland fire response capability is provided from Montana Department of Natural Resources and Conservation (DNRC) thru the county co-op program.

Both Carter County Fire Department and Ekalaka Volunteer Fire Department rank in the moderate capability ranking. Limitations of the service delivery are in structural fire suppression, staffing for wildland fire suppression, wildland/urban interface capability and fire and incident management training opportunities.

The following is an inventory and location of wildland engines located in Carter County (See Figure 7 and Engine Locations Map in Map Section 10.5):

- Alzada Fire Station
 - Alzada 1
 - Alzada 3
 - Alzada 4
 - Alzada 232
- Ekalaka Fire Department
 - Ekalaka 1
 - Ekalaka 2
 - Ekalaka Tender
- County Shop
 - Carter County Tanker
- Boyes
 - Carter County 11
- Dean Ranch
 - Alzada 2
- Lanning Ranch
 - Alzada 5
- Markuson Ranch
 - Carter County 1 (DNRC 1082)
- Castleberry Ranch
 - Carter County 2 (DNRC 684)
- Brence Ranch
 - Carter County 3 (DNRC 801)
- Fix Ranch
 - Carter County 4 (DNRC 713)
- Parks Ranch
 - Carter County 5 (Carter County 42-60)
- Wolff Ranch
 - Carter County 6 (DNRC 783)
- Cordell Ranch
 - Carter County 7 (DNRC 7904)
- Richards Ranch
 - Carter County 8 (DNRC 1062)
- Rosencranz Ranch
 - Carter County 9 (Carter County 42-13)



Carter County is within the Eastern Land Office of the Montana DNRC's geographic area. This provides additional resources such as air tankers from Billings or 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 Ekalaka Airport reload facility. During the fire season these resources may be committed to other incidents and may not be available.

Carter County has a mutual aid agreement between all the fire protection entities within the county along with separate agreements with Butte and Harding Counties in South Dakota, Crook County in Wyoming, and Fallon, Custer, and Powder River Counties in Montana. Many of these agreements have not been recently up-dated.

4.4.2. Fire Engine Pump/Draft Source Sites, Turnaround Sites

Water supply sources for wildland fire protection and structural fire protection throughout Carter County are relatively scarce. They include water tenders, a 10,000-gallon tank at Alzada Fire Station, stock ponds, holes in creeks, and etc. Due to the long-term drought in Carter 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.

4.4.3 Training, Certification, and Qualification

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

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

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

Type 5 Incident

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

Type 4 Incident

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

Type 3 Incident

- In-briefings and out-briefings are more formal.
- Some or all of the command and general staff positions may be activated, usually at the division/group supervisor and/or unit leader level.
- Type 3 organizations manage initial attack fires with a significant number of resources, an

extended attack fire until containment/control is achieved, or an escaped fire until a Type 1 or Type 2 team assumes command.

- Resources vary from several resources to several task forces or strike teams.
- The incident may be divided into divisions.
- The incident may involve multiple operational periods prior to control, which may require a written IAP.
- A documented operational briefing will be completed for all incoming resources and before each operational period. See Briefing Checklist in Resources Section.
- Staging areas or an incident base may be used.

By completing an Incident Complexity Analysis, an agency administrator can assess the hazards and complexities of an incident and determine the specific positions needed (See Incident Complex Analysis in Resources Section 10.6).

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

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 (e.g., pay less) insurance rate recognition and Class 10 receiving no (e.g., pay more) recognition.⁶

Carter County currently has an ISO Rating of Class 10. Ekalaka has an ISO insurance rating of Class 10.

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

In order to develop a Public Protection Classification other than class 10, the following minimum facilities must be available:

Organization:

- The fire department shall be organized on a permanent basis under applicable state or local laws. The organization shall include one person responsible for operation of the department, usually with the title of chief.
- The fire department must serve an area with definite boundaries. If a city is not served by a fire department operated solely by or for the governing body of that city, the fire department providing such service shall do so under a legal contract or resolution. When a fire department's service area involves one or more cities, a contract should be executed with each city served.

⁶ Fire Protection Handbook, NFPA 1997

Membership:

- The department shall have sufficient membership to assure the response of at least 4 members to fires in structures. The chief may be one of the 4 responding members.

Training:

- Training for active members shall be conducted at least 2 hours every 2 months.

Alarm Notification:

- Alarm facilities and arrangement shall be such that there is no delay in the receipt of alarms and the dispatch of fire fighters and apparatus.

Apparatus:

- There shall be at least one piece of apparatus meeting the general criteria of National Fire Protection Association (NFPA) Standard 1901, Automotive Fire apparatus.

Housing:

- Apparatus shall be housed to provide protection from the weather.

4.6. Land Use/Development Trends

Predominate land use of Carter County has been an agriculture use, primarily livestock ranching and grain production (See Figure 8). The trend over the last decade has been the development of rural. There has not been a new subdivision in Carter County since the late 1970's. However, there is currently (Summer 2004) a proposed subdivision in the vicinity of Mac Nab Pond. There is no reason to expect that Carter County will escape this trend. Adequate subdivision regulations, which address wildland/urban interface development, water supply and other fire protection requirements, need to be developed and adopted by the Board of County Commissioners.

New subdivisions proposed could be expected to locate next to adjacent Federal lands. These lands are highly desirable to developers for their locations; however, they typically lead to increased complexity of fire protection for both wildland and structural fire entities. In Carter County, where there is no structural fire protection agency such as a rural fire district or fire service fee area, developments in the wildland/urban interface need to mitigate the problems associated with these subdivisions.

Figure 8



5. Current Fire Environment

The following narrative describes the current fire environment in Carter County. These perspectives are a result of an on the ground tour conducted by the Carter County Sheriff and Undersheriff with Fire Logistics personnel in January of 2004.

5.1. Wildfire Problem Definition

As stated in Chapter 4, Carter County does have some areas of forested lands. 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. The impacts of those frequent fires can be quite variable depending on what gets in their way. At the present time, aside from humans and livestock, their potential is to threaten ranch improvements, two special interest areas or the half dozen small communities in Carter County. Fortunately, there have been few subdivisions developed in Carter County to date. If and when subdivisions emerge within the large open blocks of rangeland, the probability of monetary losses to additional man made improvements, as well as possible threats to the occupants of those new developments, will increase significantly.

The Carter County Sheriff has fire protection responsibilities for wildlands within the county. There are four objectives he has that he would like to see addressed in this plan.

Fuels Projects – Carter County personnel, as well as some private concerns, would like to know where and what kinds of hazard reduction treatments would be most cost effective for the county or private landowners to undertake. This concern applies primarily to the two special interest areas. The first of these is Camp Needmore, a special use permit on Custer National Forest land and the other is Trails End Ranch, a sports camp for youth on privately owned land.

Improved Apparatus – Carter County, as is the case for most eastern counties, needs to look at upgrading their fire apparatus as well as consider any changes in number or placement of equipment.

Structure Protection – Currently the only structure protection capability is in Ekalaka. The Ekalaka Fire Department's responsibility extends to the town limits of Ekalaka and includes mutual aid responses at the request of the County Fire Warden. Equipment and firefighter training is needed to provide safe and effective structure protection capability for the remainder of the county.

Interface with Northern Rockies Coordinating Groups Incident Management Teams – Carter County would like some guidance on how best to work with any NRCG IMT that happens to be deployed in the county for wildland fire suppression or for any other type of natural disaster.

Another situation that has complicated fire protection within Carter 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.

⁷ Federal Fire Policy, 2001

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

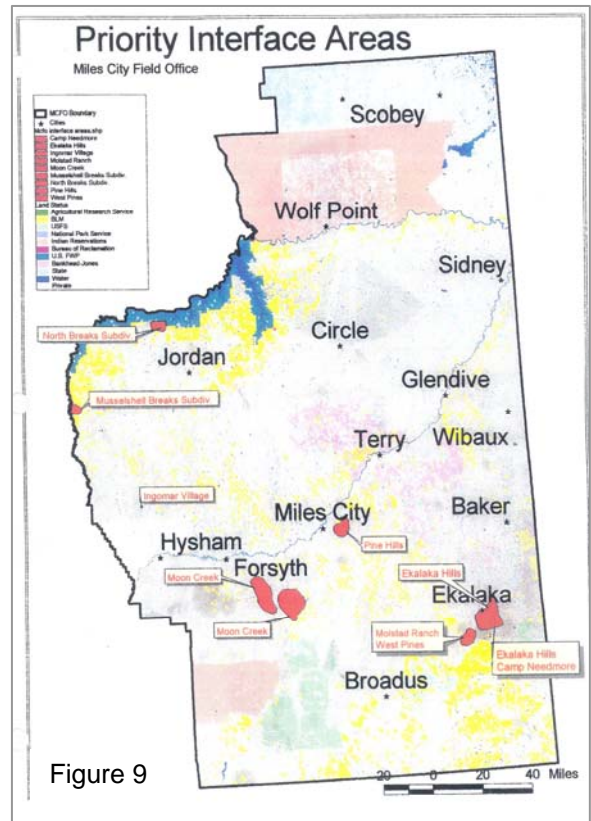
- Wooden construction and wood shake roofs
- Poor access and narrow congested one-way roads
- Inadequate water supply
- Natural fuels closer than 30 feet to structures
- Extreme fire behavior
- Strong winds
- Need to evacuate the public
- Structures located in chimneys, box or narrow canyons, or on steep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

Areas of wildland-urban interface in Carter County include:

- Long Pines – Cabin Sites
- Camp Needmore and vicinity
- Trails End Ranch and vicinity
- Harkin's Proposed Subdivision
- Ranch homes and buildings adjacent to the National Forest

An increasing awareness of the wildland/urban interface fire problem in Carter County, leads to several complex problems, which need to be addressed in the Fire Plan:

- Subdivision Development
- Defensible Space Requirements
- Building Construction Requirements
- Fuel Reduction on all ownerships
- Kinds and types of fire apparatus required for fire protection
- Structural fire protection for structures outside the town of Ekalaka.



5.3. Structure Fire Problem Definition

The best way to quantify the structure fire problem in the Carter 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.

⁸ Ibid.

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.

Category

Description (continued)

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.

Carter County has buildings and occupancies in all three categories with the majority being in the moderate/typical risk category (See Figures 10 & 11). Plans need to be developed in Carter County to provide some form of structural fire suppression capability.

5.4. Local Fire Ecology

The prevalent timber type in Carter County is ponderosa pine. This type is a fire adapted tree species that has developed natural mechanisms to cope with frequent fire. It has a thick corky bark that insulates the trees cambium from heat generated by wildland fires. The cambium is the living layer of cells between the bark and the woody portion of the tree stem and is responsible for the growth of both new wood and new bark. Ponderosa pine can be found on hot dry sites such as those found in Carter 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

Figure 10



Figure 11

frequency fuel loadings were traditionally low in the stands as dead limb 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 (See Figure 12).

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



Figure 12

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. 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.

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

5.5. Hazardous Fuels

As displayed in Figure 13, the continuity of heavy fuels, i.e. ponderosa pine, is very scattered in Carter County. There are areas of continuous pine type covering thousands of acres in size and these are the areas that have the greatest potential for supporting large intense fires. In those stands where fire has been absent for several decades the presence of ladder fuels and ground litter is much more evident thus increasing the vulnerability of the stand to mortality from fire. Wildfires in the ponderosa pine type may be either terrain driven or wind driven (See Fire Hazard Assessment Land Cover Criteria Map in Map Section 10.5).

Areas of big sage and sagebrush also have potential for large intense fires but they are less likely except under wind driven conditions. There are also 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.

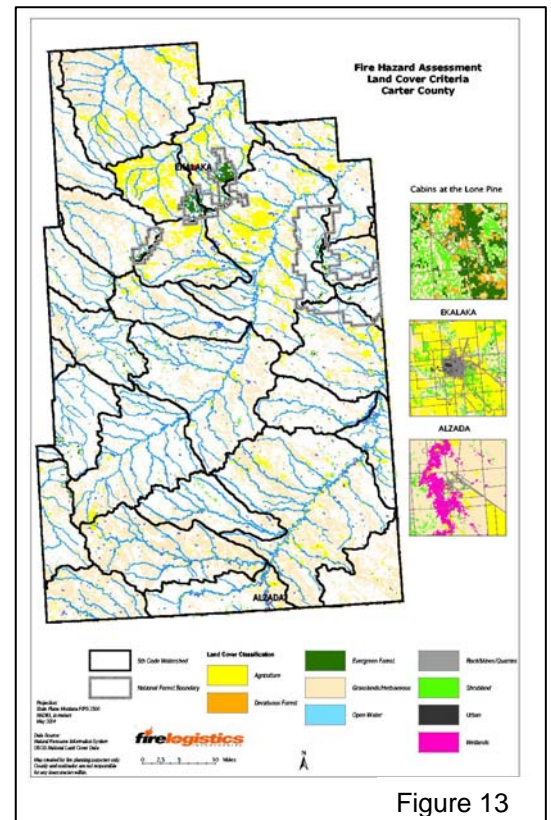


Figure 13

5.5.1. Fire Regime Condition Class

To best understand hazardous fuels ranking, a definition system called “vegetative condition class” is one approach to define and interpret the importance of fire frequency in the ecosystem. Current “Condition Class” is defined in realms of departure from the historic fire regime, as determined by the number of missed fire return intervals. Fire has always been a part of the wildland, changing and shaping the

structure and composition of vegetation in the area. The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

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

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

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

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

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

In Carter County, the predominance of fire dependent tree species was maintained by fire. Low intensity surface fires burned, keeping ground vegetation and prolific pine regeneration from becoming ladder fuels. As fire became less of a factor (due to fire suppression) in maintaining the vegetation in these areas, the fuel structure has 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 occurred historically. This has increased the threats to people and human resource values within the wildlands and wildland-urban interface.

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;</p> <p>Risk of loss of key ecosystem components are moderate</p>
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>

Good fire regime condition class mapping for Carter County does not presently exist. Two projects are underway which will further quantify the fire regime condition class for fuels in Carter County, one is the Ekalaka Hazardous Fuels Project and the other is a fire regime condition class mapping project sponsored by the BLM for the east side of Montana.

The environmental assessment for the Ekalaka Hazardous Fuels Project states that 83% of the project area is classified as Condition Class 3.

5.5.2. Fire Breaks

Since Carter 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 Little Missouri River and Box Elder Creek are the only significant stream courses in the county that could provide a natural barrier to fire.

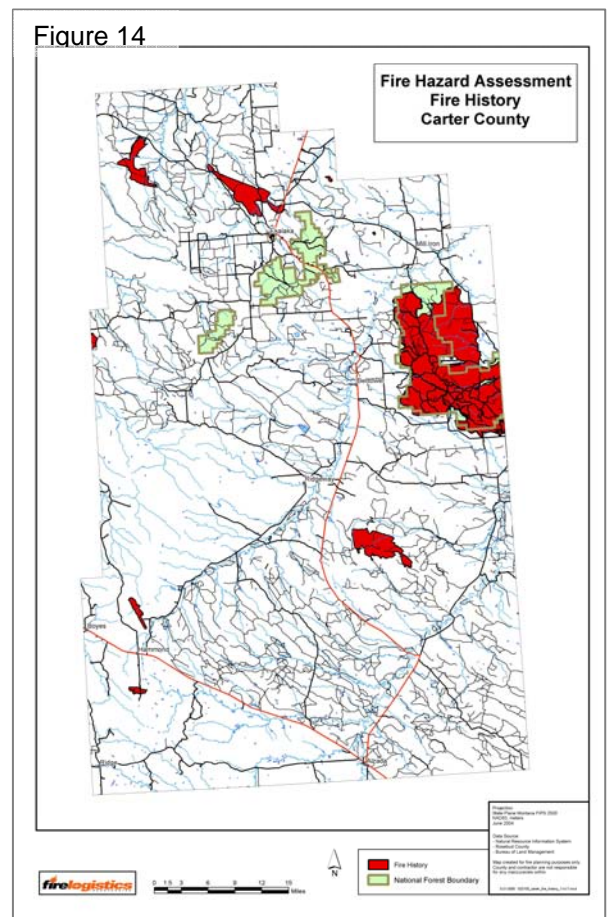
There are also areas of open rock and clay bluffs that can prove to be effective barriers to the spread of wildland fire.

5.6. Fire History

Almost all fires experienced in Carter 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. Using BLM fire data, the data indicates that in an average year there are 29 fire starts, which burn a total area of 7,093 acres. There have been 4 large fires in the county over the last twenty years. Significant fires in the past include the Brewer Fire in 1988 and the Kraft Springs Fire in 2002. These fires occurred on the types of days described in Section 4.1.2.

The current performance of wildland fire protection personnel in Carter County is admirable considering the scattered nature of lightning starts and the lengthy travel times required to respond; the frequency of wildland fires; the challenges of keeping local firefighters motivated and qualified to perform fire suppression work and the budget the County Sheriff must operate within. 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 (See Figure 14 and Fire History Map in Map Section 10.5).

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

Fire behavior calculations for these fuel models were made using the fuels, weather, and topographic conditions prevalent for the Carter 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, 0-¼ in.	6%	3%
Small Fuels, ¼ - 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 ¼ to ¾ 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 Kraft Springs Fire in 2002. 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.

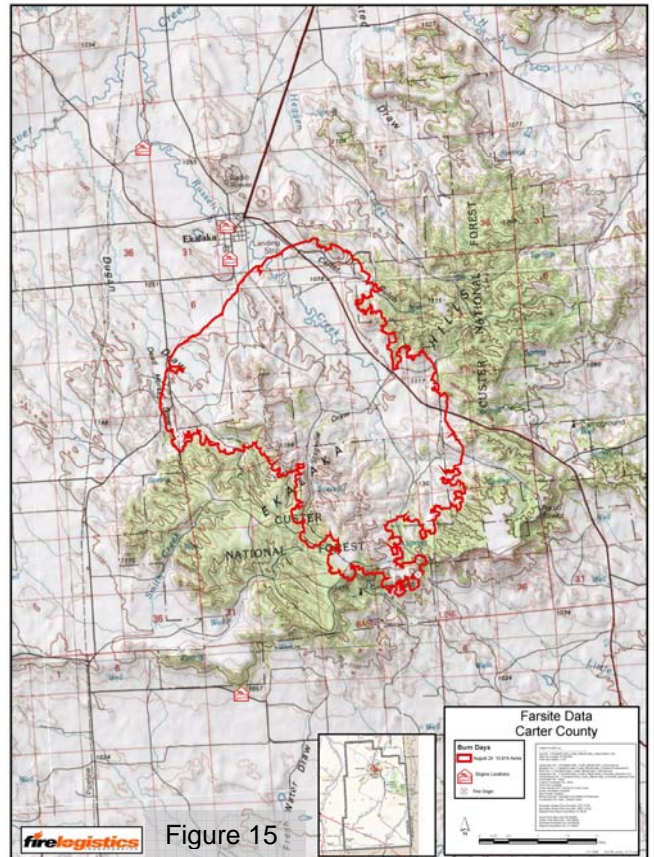
Many of the mature timber stands in the Carter County are ripe for crown fires because of the presence of ladder fuels, heavy, down woody debris on the forest floor and mature or over-mature age classes of the timber stands. This is why private landowners, county, state and federal agencies in the county need to implement a hazardous fuels treatment program on a landscape scale.

5.8. FARSITE

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

The Farsite fire behavior run was made using climatic parameters in the historic weather data (See Appendices 10.). The Farsite run projects fire spread for burning periods over two days. A two-day time period was selected due to the historical nature of fire behavior experienced in eastern Montana. If the wildland fire is not contained it will continue to burn in somewhat similar fashion until the climatic or fuel conditions change.

The ignition originates at 1600 on day one (August 23rd) and burns until 2400. The second burning period begins at 0001 and continues for a twenty-four hour period (August 24th) (See Figure 15 and attached map in Map Section 10.5). The initial ignition did not become large until the second burning period. Once the temperatures begin to rise and the humidity dropped in the early morning hours of the second day, the fire changes to a free burning event that reached 10,919 acres at the end of that burning period.



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

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

5.9. Fire Effects Assessment

Wildland fires generally have three possible outcomes on forested areas. They can be lethal, non-lethal or mixed. 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 Carter 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 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. Fuel modification zones, which may include grazing, can be in place around areas needing protection. This is particularly effective on the down slope from such areas since most fires will progress 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 forests. The purpose of a successful fire management program is to reduce the risks associated with values that are important to county, its citizens, and the natural resources. Values at risk will be used to assist fire protection agencies in prioritizing areas for hazardous fuels treatments.

Some of the values at risk in Carter County are:

- Health & Safety – Public & Firefighters
- Property, Improvements & Facilities – Private & Public
- Recreation/Community Impacts – Economic & Social
- Forest/Ecosystem Health
- Grazing/Timber
- Historical/Cultural
- Aesthetics/Scenery
- Air Quality

6.1.2. Health and Safety

Fire fighter safety should never be compromised.

Carter 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. Firefighting resources could become trapped during one of these events if they do not maintain a constant situational awareness. The prospects to gain this awareness are uncommon as training opportunities and out of county dispatches are infrequent.

Carter County, under current drought conditions, has the potential for complex wildland fire situations, which potentially could extend for several months. Because the staffing of the Carter County Fire Warden's office is limited to the Sheriff and the Undersheriff, experienced leadership capability for incidents over the length of the fire season would be severely taxed. Carter County Fire Department should expand its leadership capability so the county can simultaneously deal with a significant fire, an evacuation, and a law enforcement incident.

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, structures, fences, power lines, communication sites, or some other type of infrastructure. Fuel treatments in the immediate area around structures, designed to reduce fire intensity, can dramatically improve their survival potential. 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.

Trails End Ranch and Camp Needmore contribute significantly to the economy of Carter County. Fuel reduction and other projects designed to enhance the protection of these facilities are essential.

6.1.4. Recreation

Opportunities to enjoy the outdoor recreation activities can also be severely hampered by wildland fire and has an adverse effect on the economy of Carter County. Areas can be closed to the public for extended periods of time. Often this occurs in early fall during up-land bird and big-game hunting seasons because of high fire danger.

Recreational activities contribute to the economy of the county, but at the same time unattended campfires in the campgrounds cause impacts to the fire protection system.

6.1.5. Forest/Ecosystem Health

Forest Health is a direct reflection of the forest stand conditions that are vulnerable to a major disturbance agent, i.e., insects, disease and fire. When a forest ecosystem lacks resistance and is not resilient to the impacts of these changing agents, it is an indication of declining forest health.

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 Camp Crook Ranger District of the Custer National Forest is located in Carter County. The most common uses on this national forest land would include grazing, timber management and recreation use. 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.

Fuel management activities on private, state and federal lands within Carter County will have a beneficial affect on grazing within the project areas.

6.1.7. Cultural Resources

There are cultural resource sites located in Carter County that need to be protected during fire suppression and fuel reduction activities.

6.1.8. Aesthetics/Scenery

Picturesque long-distance vistas are an important component of our landscape. Wildfires impact the aesthetics of an area, which can further impact the economy of the county (See Figure 16).



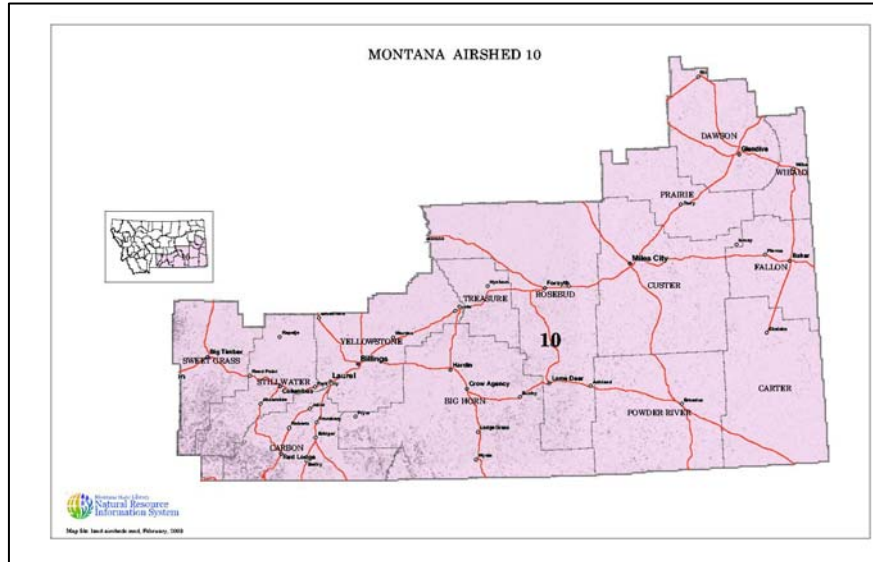
Figure 16

6.1.9. Air Quality

The State of Montana's air quality is regulated by the Montana State Airshed Group through the Department of Environmental Quality. Generally, open burning is permitted from March 1 through November 30 when such burning is coordinated with the Montana State Airshed Group.

Figure 17

For Carter County, this would be accomplished by obtaining a burning permit from the local authority since the county is not designated as a major open burner. Carter County is located in Airshed 10 (See Figure 17). Airshed 10 is in the geographic part of the state that normally has good smoke dispersal coupled with a low occurrence of prescribed burning or other point sources of air pollution. Aside from the impacts from Colstrip in Rosebud County, there is a general lack of significant air quality issues such as those experienced in the western part of the state.



Technically, open burning is prohibited from December 1 through February 28 except by special approval of DEQ. For major open burners, an exemption can usually be obtained from DEQ for any essential burning projects in Airshed 10. Should Carter County have a project that would be advantageous to burn during this period because of favorable weather conditions they might consider involving BLM or the USFS as cooperators. This might allow them to group their project with one or both of these two major burners and get permission from DEQ to conduct the project during the December 1 to February 28, timeframe.

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 shown in Figure 18 (See Fuel Hazard Model Map in Map Section 10.5).

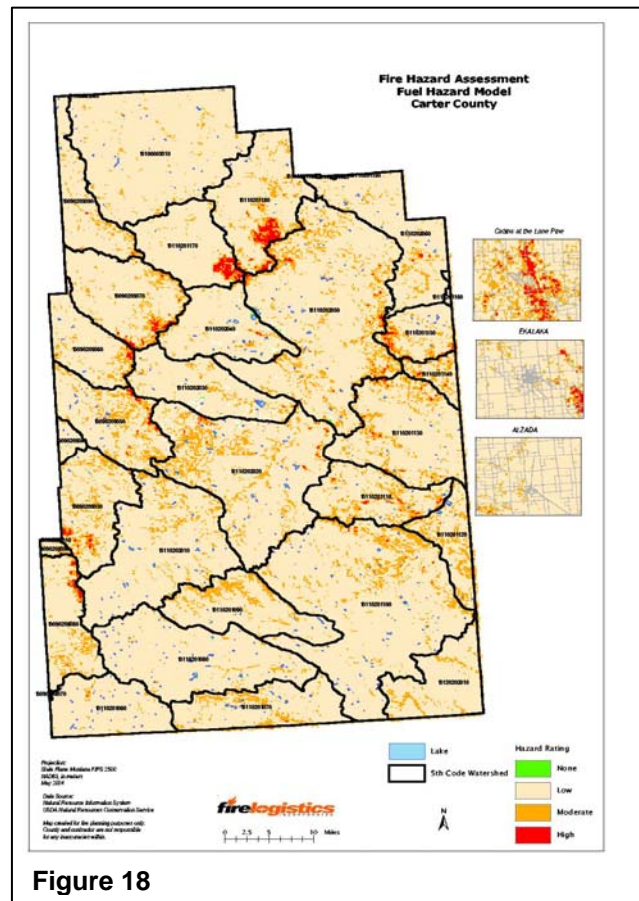


Figure 18

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 19 (See Value At Risk Model Map in Map Section 10.5)

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 20 (See Risk Model Map in Map Section 10.5).

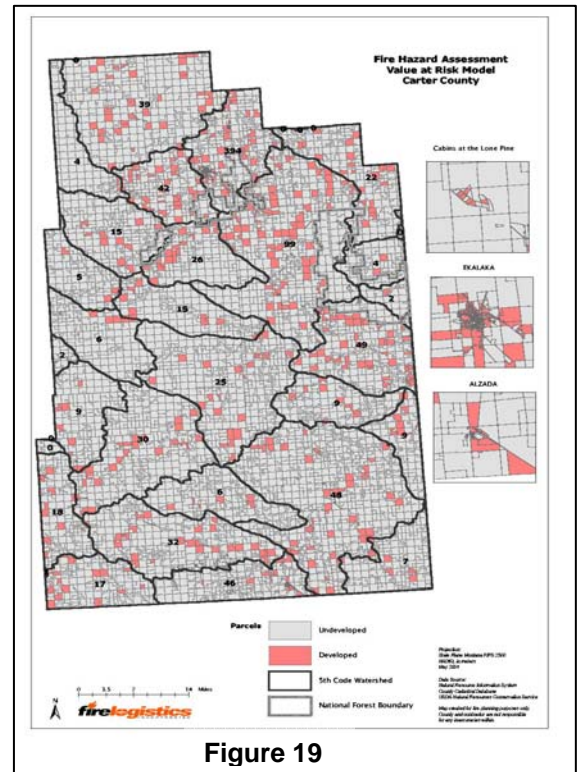
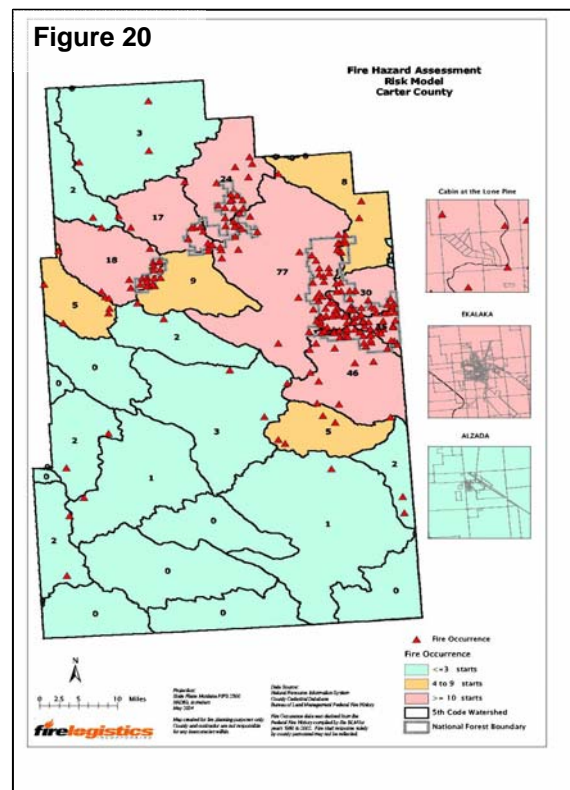


Figure 19



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

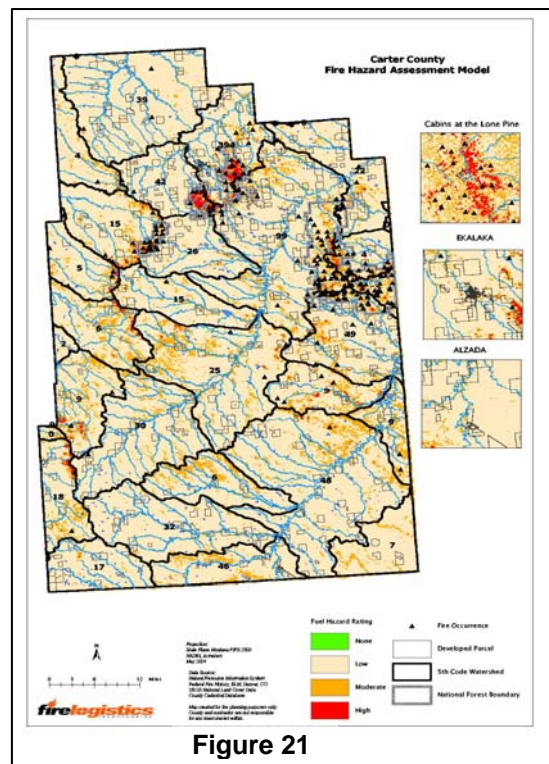


Figure 21

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 21 (See Final Fire Hazard Assessment in Map Section 10.5).

In looking at the GIS generated maps of Carter County some areas of potential risk begin 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.

6.3. 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 Carter County's priorities for fire protection:

- Camp Needmore and vicinity
- Trails End Ranch and vicinity
- Long Pines – Cabin Sites
- Ekalaka
- Alzada
- Harkin's Proposed Subdivision
- Ranch homes and buildings adjacent to the National Forest

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

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 Carter 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. Carter County will decrease fuels to reduce wildfire intensity and impact in and around the improvements in the county.
- B. Carter County will evaluate, upgrade and maintain community wildland and structural fire preparation and response facilities, training and equipment.
- C. Carter County will help educate community members to prepare and respond to wildfire.
- D. Carter County will develop and implement a comprehensive emergency response plan.
- E. Carter County will improve training and qualifications of their personnel to more effectively interface with incoming Incident Management Teams deployed in the county.
- F. Carter County will prevent degradation of health and loss of life from fire.
- G. Carter County will prevent threats to and destruction of property from wildland fire.
- H. Carter County will coordinate fuels reduction opportunities between private landowners and the Custer National Forest – Sioux RD and the Miles City District of the Bureau of Land Management.
- I. Carter County will educate citizens and local businesses on the content of the CFP.

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 Carter County to decrease the risks from wildland or wildland-urban interface fire. Carter County and Carter 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 firebreak around their homes and ranch improvements.

The problem lies with either people inexperienced with the fire history in Carter County or people who build summer cabins who do not want to or think 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.

The Trails End Ranch has been and is currently implementing a fuel reduction and asset protection zone (defensible space) project on the ranch property (See Figure 22).

7.2.2 Neighborhood Preparedness

Camp Need more is making preparations to replace the existing wood shake/shingle roof coverings with a fire resistant roof covering (metal) on their main building.

7.2.3 Fire Protection Response

This section addresses how adequate local fire protection efforts are for stopping a wildland fire. It is important to do these assessments for critical times/severe fire weather. This occurs generally in the late summer/fall in Montana, when local fire fighters and equipment can be fighting fires far away, water supply can be limited, and vegetation extremely flammable.

The Sheriff has located 7 Department of Natural Resource engines and 13 county engines and water tenders as strategically as he can within the opportunities that exist. Each engine must be hosted, maintained and operated by a willing volunteer. 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 sheriff.

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 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 an 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 agreement. If at some point, however, the volunteers are to be hired by the IC, i.e. there 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,



Figure 22

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 Carter County or elsewhere in eastern Montana for that matter.

Carter county fire should work with its interagency fire suppression partners to ensure:

- Those local government resources are utilized on incidents where their (local government) standards apply and are met by county fire forces.
- That the goals and objectives of Carter County Fire are included in a Delegation of Authority to an incoming Incident Management Team.
- That it is understood that there is not structure fire suppression entity in Carter County, except for Ekalaka VFD and that structure protection is the responsibility of all fire suppression entities.

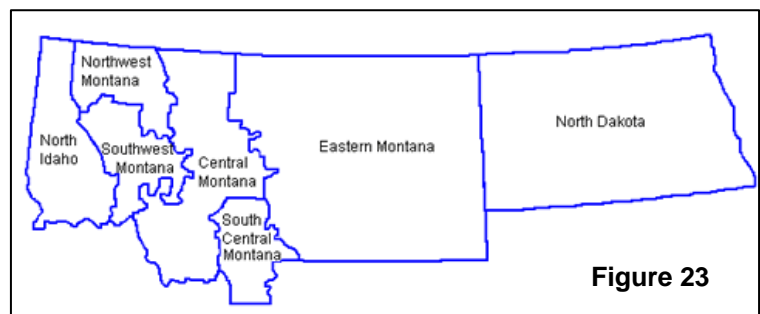
7.2.4. Hazardous Fuel Mitigation

Mitigation of hazardous fuels around wildland-urban interface area, such as Camp Needmore and Trails End Ranch, are being planned and implemented coordinated with the Custer National Forest.

7.3. Coordinated Prevention, Restrictions & Closures, Protection Projects, and Response Plan

Future efforts in planning and implementation of prevention, mitigation and response project should be closely coordinated between Carter 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. Carter 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 (See Figure 23).



7.4. Prioritization Process

Recommended projects have been prioritized based on the risk estimation in Section 6.2 (See Prioritized Actions, Implementation Time Table in Section 7.6 and Discussion of Risk in Section 6.3).

7.5. Recommended Projects and Programs

This area describes recommended projects and actions that address the mitigation goals of the Carter 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, Carter County Fire Department, Carter County Disaster & Emergency Services, Board

of County Commissioners, utility companies, pipeline & petroleum companies and others to coordinate pre-suppression, fire prevention, training, implement restrictions and closures and promote interagency cooperation.

Project Coordinator – Carter County FD

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

- Camp Needmore and vicinity
- Trails End Ranch and vicinity
- Long Pines – Cabin Sites
- Ekalaka
- Alzada
- Harkin's Proposed Subdivision
- Ranch homes and buildings adjacent to the National Forest

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

Project Coordinator – Carter County Fire Warden and Board of County Commissioners

7.5.1.1. Thinning and Brushing

Thinning is used to reduce fuels in forested areas. This is accomplished by removing the lowest branches of the trees (*limbing up*), to remove *ladder* fuels, which would allow a fire to climb into the forest canopy. As well, the smallest trees are often removed to create more space between the larger trees (this usually increases your timber values as well). Brushing means to go through and remove most of the brush — especially that which is already dead — on the forest floor.

Proposed Project 7.5.1.1.1 – Reduce the vegetation in key locations within the special interest areas where the continued presence of those fuels represents a clear potential to generate adverse fire behavior. Adverse fire behavior could be defined as that which would threaten structures, their inhabitants or firefighters. Changing crown density and breaking the ladder fuel continuity would be highest priority. Accomplish this with commercial timber sales whenever possible. Look for areas of active tree or shrub encroachment where the absence of periodic fire 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 is especially effective upwind from improvements.

Project Coordinator – Carter County FD

Proposed Project 7.5.1.1.2 – Work to maintain fuel reduction efforts on the north end of the Long Pines Cabin Sites area, which is a wildland-urban interface area. Two significant fires in 1988 and 2002 have changed the fuel type in most of the Long Pines from a timber fire behavior fuel model to a grass fuel model. Fire suppression and protection in a grass fuel is generally more successful than in a timber fuel model. Maintenance of the grass model is easier and less costly than maintaining an asset protection zone in a timber model. Long-term maintenance of the asset protection zone around the structures should focus on keeping the area in a grass fuel model.

Project Coordinator – Carter County FD and BLM.



Figure 24

Proposed Project 7.5.1.1.3 – Implement fuel reduction projects around ranch buildings that are adjacent to National Forest or BLM lands.

Project Coordinator – Carter County FD

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 onto grasslands where this is a problem. Forage levels have been increased two to four times the pre-burn levels on many sites in Montana and big 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 things the way they would like to see them happen. 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. Carter 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 Coordinators – Carter County FD, BLM, and USFS

Proposed Project 7.5.1.2.2 – Consider implementing a burn permit system, which would enable the Carter county Fire Department and Sheriff's Office to monitor where prescribed, controlled and debris burns are occurring.

Project Coordinator – Carter County Fire Depart., Sheriff's Depart. and the Board of County Commissioners

7.5.1.3. Grazing

Carter County can expect the continued encroachment of fires off of timbered grounds, such as the USFS or BLM, onto the private ownership.

Proposed Project 7.5.1.3.1 - Landowners should be encouraged to modify available grassy fuels through grazing and control tree encroachment in areas adjacent to federal ownership, especially when these

lands are heavily timbered.

Project Coordinator – Grazing Districts and Carter County Conservation District

7.5.1.4. Industrial Resource Management

Proposed Project 7.5.1.4.1 – Ensure that the pipeline pumping stations develop a fire prevention plan, one component of which is to maintain a fuel break around the pumping station. Another component of the plan should address what will occur when a wildland fire is encroaching on the pumping station.

Project Coordinator – Carter County DES

Proposed Project 7.5.1.4.2 – Timber harvest activities that take place in Carter County need to keep slash hazard reduction current. This will keep the fire hazard and potential insect infestation problems to a minimum.

Project Coordinator – Individual landowners & MT Dept. of Natural Resources and Conservation.

Proposed Project 7.5.1.4.3 - Develop fire plans, which address fire prevention and protection for any future gas exploration work in Carter County.

Project Coordinator – Carter County Fire Warden and the gas exploration company.

7.5.1.5. Biomass Utilization

Proposed Project 7.5.1.5.1 – There is limited opportunity in Carter County to produce and utilize woody biomass materials. Ranchers and other private landowners should be encouraged to utilize those products that become available for firewood, posts, poles and rails.

Project Coordinator – Carter 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 businesses or potential businesses to utilize timber and other fuel reduction project biomass.

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

7.5.1.6. Camp Needmore

Some things that should be specifically looked at on the Camp Needmore site include; building materials, especially the roofs; maintenance of roofs and foundations with regard to the buildup of readily ignitable material on or around them; vegetative growth down slope from or in close proximity to structures; water sources that may be used in any suppression effort; evacuation plans for the facility (See Figure 25);

Proposed Project 7.5.1.6.1 – Continue to replace the wood shake/shingle roof coverings with Firewise roofing materials in Camp Needmore.

Project Coordinator – Camp Needmore Board of Directors



Proposed Project 7.5.1.6.2 – Create and maintain an asset protection zone (defensible space) around all of the buildings in Camp Needmore. Special emphasis should be given to the first 5 feet adjacent eliminating potential brand receptors (See www.firewise.org).

Project Coordinator – Camp Needmore Board of Directors

Proposed Project 7.5.1.6.3 – Develop pre-fire plans, which address structure protection and evacuation of the Camp Needmore site. Water supply, structure protection tactics, resources needed, alternate escape routes and potential timeframes should be addressed.

Project Coordinator – Carter County FD

7.5.1.7. Trails End Ranch

Proposed Project 7.5.1.7.1 – Replace any wood shake/shingle roof coverings with Firewise roofing materials in Trails End Ranch.

Project Coordinator – Director – Trails End Ranch

Proposed Project 7.5.1.7.2 – Create and maintain an asset protection zone (defensible space) around all of the buildings in Trails End Ranch. Special emphasis should be given to the first 5 feet adjacent eliminating potential brand receptors (See www.firewise.org).

Project Coordinator – Director - Trails End Ranch

Proposed Project 7.5.1.7.3 – Develop pre-fire plans, which address structure protection and evacuation of the Trails End Ranch site. Water supply, structure protection tactics, resources needed, alternate escape routes and potential timeframes should be addressed (See Figure 26).

Project Coordinator – Carter County FD



Proposed Project 7.5.1.7.4 – A strategic fuel modification effort should be undertaken around the entire Trails End Ranch facility. By utilizing old and existing road and utility rights-of-way and well planned and executed harvesting techniques, the site could be isolated so that its probability of surviving a running crown fire would be significantly improved. At the least, it will give firefighters a much more effective place to conduct their control operations, including a place to burn out from if necessary. The areas of highest priority for treatment would be on the west and south sides of the facilities and any slopes leading up to the site. These are the most likely approach paths of a serious wildfire coming towards the site.

Project Coordinator – Director – Trails End Ranch

Proposed Project 7.5.1.7.5 – The Trails End Ranch should consider the benefits of building a swimming pool, which could also serve as a fire protection water supply on the property.

Project Coordinator – Director – Trial End Ranch

7.5.2. Infrastructure Improvements

Improvements to improve local infrastructure are discussed in this section.

7.5.2.1. Water Supply

Although water supply is not a direct function of the Carter 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 7.5.2.1.1 – Carter County should require all new subdivisions to provide fire protection water supplies.

Project Coordinator – Carter County Board of County Commissioners

Proposed Project 7.5.2.1.2 – Develop water supply points in stock ponds at strategic locations throughout the county.

Project Coordinator – Carter County FD

7.5.2.2. Utilities

Proposed Project 7.5.2.2.1 – The Carter County FD should work with the Southeast Rural Electric Cooperative to ensure that the required clearances are maintained for all electrical transmission lines in the Carter County (See Utilities Map in Map Section 10.5).

Project Coordinator – Carter County FD.

Proposed Project 7.5.2.2.2 – Work with the Southeast Rural Electric Cooperative to install radios capable to communicate with Carter County FD to facilitate response to emergency incidents.

Project Coordinator – Carter County Sheriff

7.5.2.3. 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 7.5.2.3.1 – Investigate forming either a fire service fee area or a rural fire district, or a general county mil levy, as a mechanism to provide much needed funding to the Carter County Fire Department.

Project Coordinators – Carter County Fire Warden with assistance of the Carter County Attorney and the Board of County Commissioners.

Proposed Project 7.5.2.3.2 – Develop a capital improvements plan to up-grade fire apparatus and equipment in Carter County Fire Department.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.3 – Integrate Carter County Disaster & Emergency Service Coordinator into the Carter County Fire Program to avoid overhead shortages and overload to Carter County personnel.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.4 – Consider the development of county-wide pre-attack plans which would show water sources, helispots, staging areas, ICP locations, fire camp locations, potential control line locations, etc.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.5 – Carter County Fire Department should work toward meeting the minimum requirement to be a recognized fire department by the Insurance Service Office.

Project Coordinator – Carter County FD

7.5.2.3.1 Fire Apparatus

Proposed Project 7.5.2.3.1.1 – Obtain 2 interface engines and position them in the northern and southern ends of Carter County. Make sure that the engines purchased meet the minimum standards of the NFPA1901 to qualify ISO credit. Grant funds and other funding sources should be investigated.

Project Coordinators – Carter County Fire Department.

7.5.2.3.2. Fire Stations

Proposed Project 7.5.2.3.2.1 – Establish protection from the elements (fire stations) 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 should increase the overall reliability of the equipment.

Project Coordinators – Carter County Fire Chief and Board of County Commissioners

Proposed Project 7.5.2.3.2.2 – Construct a new fire station in Ekalaka, which includes a meeting and training room, ICP location, community meeting facility and equipment bay for fire and EMS apparatus.

Project Coordinator – Carter County FD

7.5.2.3.3 Training, Certification, and Qualification

Proposed Project 7.5.2.3.3.1 – Encourage volunteers to meet training requirements, wear their personal protective equipment and to take the firefighter pack test each spring. The county attorney and the county fire warden should determine the minimum wildland fire PPE and training/experience standards as required by the MT Department of Labor and Industry's adoption of the OSHA requirements.

Project Coordinator – Carter County Fire Warden and County Attorney.

Proposed Project 7.5.2.3.3.2 – Work on qualifying each engine operator, at a minimum, as a Type V Incident Commander to provide the expertise for initial attack incidents.

Project Coordinator – Carter County FD.

Proposed Project 7.5.2.3.3.3 – Develop a pool of Type III and IV Incident Commanders for greater effectiveness and to provide more relief for the County Sheriff and Undersheriff.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.3.4 – Training Incident Commanders to request and understand a spot fire weather forecast. (Request, data, belt weather kit)

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.3.5 – Work with the BLM and USFS to support training costs for Carter County

FD personnel.

Project Coordinator – Carter County FD

7.5.2.3.4 Operational Procedures & Programs

Proposed Project 7.5.2.3.4.1 – Work with BLM to obtain a real time representation of their Lightning Detection System for the Carter County Sheriff. This will give the sheriff an advantage in deploying county fire protections assets.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.4.2 – GPS all fires that are 100 acres or larger. Ensure these perimeters are collected and displayed on a fire history map for Carter County.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.4.3 – Carter County Fire Department should order the County Assistance Team (CAT) as early as possible to avoid overhead shortages and overload to Carter County personnel.

Project Coordinator – Carter County FD

Proposed Project 7.5.2.3.4.4 – Adopted a dispatch protocol based on the relative fire danger.

Project Coordinator – Carter County FD

The availability and response times of firefighters should be geared to the relative fire potential as determined by some type of fire danger rating mechanism. The initial response procedures to an incident should be geared toward the type of day that is being experienced. For example, when there is minimal fire spread potential due to low ERC levels a response could be considerably less than what would be needed in mid-August when ERC levels are above the 90th percentile. See Chapter 4.

The following generic matrix reflects a model of dispatch protocol.

	<u>Fire Danger/ERC Percentile</u>		
	<u>Low/Moderate</u> <90%	<u>High/Very High</u> 90-97%	<u>Extreme</u> >97%
	<u>Yellow Dispatch List</u>	<u>Orange Dispatch List</u>	<u>Red Dispatch List</u>
Wildland Fire	1 Engine	2 Engines	4 Engines 2 Water Tenders County Dozer

Proposed Project 7.5.2.3.4.5 – Carter 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.

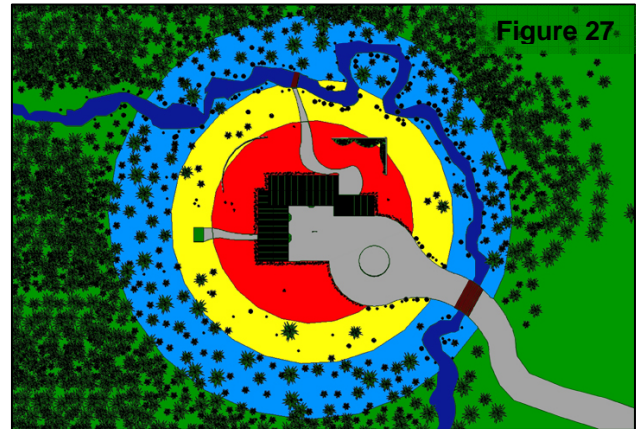
Project Coordinator – Carter County FD

7.5.3. Asset Protection Zone (Defensible Space)

One of the single most important mitigating factors to increase the chances for the home's survival during a wildland-urban interface fire is the creation and maintenance of an asset protection zone (defensible

space). 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 (See Figure 27).

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 in native vegetation that is fire resistant.



Proposed Project 7.5.3.1 - 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.¹¹ The Carter County Commissioners should develop land use plans and ordinances that provide for defensible space and fuel management.

Project Coordinator – Carter County Board of Commissioners

7.5.4. Recommended Building Materials /Firewise 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 a home catching fire, or resist further damage if it does catch fire.

Proposed Project 7.5.4.1 – Recommend the use of Firewise Construction, Design and Materials¹² and Firewise Construction Checklist¹³ (See Resources Section 10.6).

Project Coordinator – Carter County FD

7.5.5. Roads: Ingress, Egress

Paving the highway between Ekalaka and Alzada will improve response times to emergency incidents.

Proposed Project 7.5.5.1 – Elected officials in Carter County and the school district(s) should support the efforts to pave the remaining stretch of gravel highway between Ekalaka and Alzada.

Project Coordinator – All Elected Officials and the School District



Proposed Project 7.5.5.2 – As road signs are replaced throughout the county, replace them with non-combustible reflective road signs that would withstand a wildland fire.

Figure 28

Project Coordinator – Carter County Road Department and Carter County Commissioners

Proposed Project 7.5.5.3 – Ensure that all bridges providing access to private properties are capable of carrying the heaviest piece of fire apparatus required (See Figure 28).

¹¹ See www.westgov.org/wga/initiatives/fire/implem_plan.pdf

¹² *Firewise Construction, Design and Materials*, Stack, Colorado Forest Service

¹³ www.firewise.org.

Project Coordinator – Carter County Road Department

7.5.6. Fire-Resistant Landscaping

The landscaping plan of the homeowner is an integral component of the asset protection zone (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 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 Checklist¹⁴, Fire and Your Landscape, Fire Scaping Resources for Montana Homeowners¹⁵ in Resources Section 10.6 of the CFP)

Proposed Project 7.5.6.1 – Utilize the Firewise Landscaping Checklist and Fire and Your Landscape (See in Resources Section 10.6).

Project Coordinator – Carter 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 – Test and revise evacuation plans for Trails End Ranch and Camp Needmore, if necessary.

Project Coordinator – Carter County Sheriff and Carter County DES Coordinator

7.5.8. Public Education

Educating residents about wildland fire issues is one of the most effective ways to reduce fire hazards, whether that be in K-12 schools, or programs designed for adults. Because prescribed burning projects may have air quality smoke impacts associated with them, describe the public outreach approaches that will be used to inform the public about potential prescribed burns, their potential smoke impacts, and

¹⁴ www.firewise.org

¹⁵ Montana Nursery & Landscape Assoc. 2003

efforts to minimize smoke impacts.

Proposed Project 7.5.8.1 – Utilize BLM and USFS resources to conduct public education programs in the schools and during the county fair.

Project Coordinator – BLM & USFS

7.5.9. Legal Requirements

7.5.9.1 Subdivision Regulations

Proposed Project 7.5.9.1.1 – The Board of County Commissioners needs to direct the development of a County Growth Policy prior to October 2, 2006. Any revisions to the subdivision regulations should be consistent with the adopted Growth Policy.

Project Coordinator – Carter County Commissioners/County Attorney.

Proposed Project 7.5.9.1.2 – Adopt appropriate subdivision regulations, which address the wildland-urban interface (See Resources Section 10.6)

Project Coordinator – Carter County Commissioners/County Attorney

Proposed Project 7.5.9.1.3 – The County Sheriff/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 protection organization and they all can directly affect its ability to be effective.

Project Coordinator – Carter County FD

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 – Carter County FD/DNRC

Proposed Project 7.5.9.2.2 – One issue that needs to be cleared up as soon as possible is the question of who has jurisdiction on national forest and Bureau of Land Management lands within Carter County. The sheriff is of the opinion that he has jurisdiction on all lands with the county. The Organic Act and the Protection Act and Taylor Grazing act are the authorities which places 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 Cooperative Fire Protection Agreement (FS-01-98-20-5100). This assigned protection via agreement usually involves only initial attack on new fire starts.

Once a fire escapes initial attack and extended attack efforts and becomes a Type I or II incident, management responsibility falls back to Custer National Forest. A clear understanding and acceptance of jurisdictional authorities must occur among all wildland protection entities within the county. Agreements and operating plans with BLM, USFS, State of Montana and adjoining counties must be current and valid. With out this basic concept being fulfilled, the likelihood of misunderstandings continues and the associated human tendencies of turf protection and harboring of bad feelings is perpetuated.

Project Coordinator – Carter County FD/DNRC/BLM/USFS

Proposed Project 7.5.9.2.3 – Incorporate language in agreements, MOU's and operating plans, which provides for a Type I or II IMT that is transitioning into an incident with a Type II IMT. The Type III IMT should leave a DIVS/Group Supervisor at a minimum to interface with the local county fire personnel.

Project Coordinator – Carter County FD, DNRC, BLM and USFS

Proposed Project 7.5.9.2.4 – Maintain involvement in the Eastern Montana wildland fire community and expend involvement where possible with such organizations as the Eastern Montana Fire Alliances, Montana Fire Wardens Association, NRCG – Eastern Zone and with interagency partners such as the BLM and USFS.

Project Coordinator – Carter County Fire Warden

7.5.10. Economic Development

This strategy involves identifying, developing and expanding economic opportunities related to traditionally under-utilized wood products and to expand the utilization of biomass removed through hazardous fuel reduction treatments.

Proposed Project 7.5.10.1 – Support and promote private contractors in the Carter County area who perform **Firewise** mitigation work (See Figure 29).

Project Coordinator – Carter County FD & Board of County Commissioners

Proposed Project 7.5.10.2 – 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 – Carter County FD

Proposed Project 7.5.10.3– Explore involving the local Eastern Plains RC&D or other economic development agencies within southeastern Montana to work with companies to utilize biomass materials produced as a result of fuel reduction projects.

Project Coordinator – Economic Development Groups in Carter County



Figure 29

7.6. Prioritized Actions, Implementation Timeline

Now that you have all of these wonderful projects that you prioritized in item 10.6, you need to prioritize them in terms of time.

Proposed Project Table

Proposed Project	Short Term (< 1 Year)	Medium Term (1-3 Years)	Long Term (3+ Years)
7.5.1.1	X		
7.5.2.2	X		
7.5.1.1.1		X	
7.5.1.1.2	X		
7.5.1.1.3		X	
7.5.1.2.1		X	
7.5.1.2.2		X	
7.5.1.3.1		X	
7.5.1.4.1		X	
7.5.1.4.2	X		
7.5.1.4.3		X	
7.5.1.5.1		X	
7.5.1.5.2		X	
7.5.1.6.1		X	
7.5.1.6.2	X		
7.5.1.6.3	X		
7.5.1.7.1		X	
7.5.1.7.2	X		
7.5.1.7.3	X		
7.5.1.7.4		X	
7.5.1.7.5		X	
7.5.2.1.1		X	
7.5.2.1.2			X
7.5.2.2.1		X	
7.5.2.2.2		X	
7.5.2.3.1			X
7.5.2.3.2		X	
7.5.2.3.3		X	

Proposed Project Table (continued)

Proposed Project	Short Term (< 1 Year)	Medium Term (1-3 Years)	Long Term (3+ Years)
7.5.2.3.4		X	
7.5.2.3.5			X
7.5.2.3.1.1			X
7.5.2.3.2.1		X	
7.5.2.3.2.2		X	
7.5.2.3.3.1	X		
7.5.2.3.3.2		X	
7.5.2.3.3.3		X	
7.5.2.3.3.4		X	
7.5.2.3.3.5		X	
7.5.2.3.4.1	X		
7.5.2.3.4.2	X		
7.5.2.3.4.3	X		
7.5.2.3.4.4		X	
7.5.2.3.4.5	X		
7.5.3.1			X
7.5.4.1	X		
7.5.5.1	X		
7.5.5.2		X	
7.5.5.3		X	
7.5.6.1	X		
7.5.7.1		X	
7.5.8.1	X		
7.5.9.1.1		X	
7.5.9.1.2		X	
7.5.9.1.3		X	
7.5.9.2.1	X		
7.5.9.2.2	X		
7.5.9.2.3	X		
7.5.9.2.4			
7.5.10.1	X		
7.5.10.2		X	
7.5.10.3		X	

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

8.1. Timeline

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 (Chapter 10: Action Plan), and update it.

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 Carter 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

The complexity of the wildland fire program has significantly changed in Carter County over the last 15 years, due to long-term drought, and changes in the wildland ecosystems. The leadership and the level of fire preparedness within Carter County have been unable to keep pace with this changing environment in spite of the efforts of the County Fire Warden. The Carter 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 Carter 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 Carter County and County Fire Department.

10. Appendices

- 10.1. Bibliography
- 10.2. Glossary
- 10.3. Community Profiles
- 10.4. Farsite Data
- 10.5. Maps
- 10.6. Resources