BLACKFOOT WATERSHED FUELS ASSESSMENT
DECEMBER 2008

ASSESSMENT PREPARED BY THE
ECOSYSTEM MANAGEMENT RESEARCH INSTITUTE
SEELEY LAKE, MONTANA

TABLE OF CONTENTS

1.0 INTRODUCTION

Various factors are combining to make fire an increasing threat to people living in forest ecosystems in the northern Rockies and to the future integrity of these ecosystems. Many years of fire exclusion policies linked with past forest practices have increased fuel loadings in some forest types to unprecedented levels. Climate change is now exacerbating this increase in fuels, creating longer fire seasons and creating dryer fuel conditions, causing fires to increase in number, size, and intensity. In response, many communities are becoming proactive with efforts to increase the defensibility of their homes and communities to catastrophic fire. Federal legislation has been enacted to provide financial support for some of these efforts. To increase the effectiveness and appropriate use of these funds, legislation called for development of Community Wildfire Protection Plans (CWPP) designed to prioritize areas for fuel thinning. The legislation specified various components and steps that needed to be followed in development of a CWPP. However, considerable flexibility was allowed in how methods, classifications, and outputs could be used in development of these plans. Consequently, a variety of CWPP's have been produced.

The Blackfoot Challenge Forestry Work Group (BCFWG) was formed to provide a collaborative effort to address forestry needs and issues in the Blackfoot Watershed. One of the first problems the BCFWG identified was the need to address fire risks in the Watershed. Various CWPP's have been prepared within the Watershed. The Seeley/Swan Fire Plan was the first document that was prepared, and has led to the establishment of the Seeley Lake Fuels Mitigation Task Force. This Task Force, consisting of representatives of the Clearwater Resource Council, DNRC, USFS, Bitter Root RC&D, and local fire departments has been successful in coordinating fuel mitigation efforts among agencies, obtaining fuel mitigation funds, and assisting landowners in using these funds to reduce fuels on their lands. The BCFWG is interested in seeing similar efforts established in other communities within the Watershed and in helping coordinate fuel mitigation work on a Watershed basis. However, they recognize that the differences among the existing CWPP's made a coordinated effort at fuel mitigation difficult. They identified a need to develop a consistent fuel assessment for the Blackfoot Watershed. This fuel assessment and associated report and maps were produced to meet this need.

OBJECTIVES

This assessment was prepared to address the following specific objectives:

1. Develop a watershed-wide, cohesive fuel assessment to improve wildfire prevention and suppression activities in the Blackfoot River Watershed,
2. Prioritize efforts to reduce hazardous forest fuels,
3. Describe a framework for identifying forest restoration goals, and
4. Promote community involvement in hazardous fuel reduction programs.

METHODS

The Blackfoot Watershed Fuel Assessment was developed with 3 primary steps required to complete the overall process. Step 1 included the development of a GIS and Database Support System. Available information to support wildfire mitigation or response within the project region was compiled and entered in a GIS and database system. Step 2 included using the information gathered in step 1 to conduct a risk assessment for the wildland/urban interface. The risk assessment used information on forest fuel loadings, slope, structure densities, and evacuation routes to identify areas of high, moderate, and low risk to wildfire. Specifics of this assessment are described with the resulting maps. Step 3 used the information obtained in Step 1 and 2 to develop a wildfire mitigation and fuels

reduction priority list that can be used by local, state, and federal agencies to coordinate fuel reduction programs within each community of the watershed.

Baseline data and GIS support system

Access and Escape Routes

Current maps of roads were acquired from appropriate public agencies and private landowners. A preliminary map of escape routes was reviewed by the BCFWG to identify access and escape routes to be included within the planning area. Escape routes were divided into primary, secondary, and tertiary escape routes, with different fuel mitigation widths assigned to each category. Primary escape routes were designated for the main travel corridors in the watershed and a 1.5 mile buffer established around these routes. Secondary escape routes were identified that could be used if one or more of the primary escape routes were blocked. A 0.5 mile buffer was used on either side of the secondary escape routes. Tertiary escape routes were designated for high use areas, such as significant recreational areas, but that weren't required for general evacuation from the area. A 0.25 mile buffer was established around these routes.

Ownership Information

GIS maps of land ownership, including County cadastral information on platted lots were compiled.

Forest and Fuel Conditions

GIS layers were obtained from appropriate public agencies or private organizations to characterize forest conditions and current fuel status, including:

- Forest habitat types
- Current vegetation cover types
- Forest fuel loadings/classes

The LANDFIRE fuels map was selected as the primary layer for fuel mapping because of its use as a standard map of fuels. The fuel classes from LANDFIRE were then converted to the fuels models classification system described in "Aids to determining fuel models on the Clearwater Unit" (D.M. Geyer, MT DNRC unpublished report).

The map of fuel loading, mapped as fuel classes was checked in the field for accuracy. Existing plot data from recent fuel assessment work in the watershed, such as the Blackfoot-Clearwater Fuel Mitigation Plan and a recent check on fuel accuracy conducted for an update of the Seeley/Swan Fire Plan were compiled, and where appropriate, used as data points. In addition, additional points were delineated using a stratified random sample of the mapped fuel classes. Random points were generated for each fuel class and identified by GPS coordinates. These points were visited on the ground to determine the actual fuel class occurring at the random point. A detailed description of each fuel class was provided to field crews to determine the specific fuel class occurring at each random point. Primary criteria used were tree sizes and densities, canopy closure, structural condition of stands including presence of ladder fuels, and amounts of understory fuels.

Fire-start and Past Fire Information

Maps were compiled on available information on fire starts and causes, and for lightening strike frequency.

2.0 CURRENT RELEVANT FIRE LEGISLATION AND POLICIES

NATIONAL LEGISLATION AND POLICIES

National Fire Plan

The National Fire Plan was initiated as a result of the 2001 Interior and Related Agencies Appropriations Act (P.L. 106-291) and is a long-term investment that will help protect communities and natural resources, and the lives of firefighters and the public. It is a commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics. The federal wildfire management agencies worked closely with these partners to prepare a 10-year Comprehensive Strategy, completed in August 2001. The primary goals of the 10-Year Comprehensive Strategy are: 1) improve fire prevention and suppression, 2) reduce hazardous fuels, 3) restore fire-adapted ecosystems, and 4) promote community assistance. In May 2002, the Secretaries of Interior and Agriculture worked with the Western Governors to develop "A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment – 10-Year Comprehensive Strategy Implementation Plan". See Western Governor's section below, for a discussion of the Implementation Plan.

The National Fire Plan recognizes the important role of state and local fire organizations, and of communities and individuals, in meeting the challenges of fire management across the landscape. The National Fire Plan includes a suite of programs that enable better fire planning and prevention, reducing fire risk in forests adjacent to communities, and strengthening state and local capabilities to supplement Federal fire management efforts. The following provides a brief discussion of these programs:

a) Through Cooperative Fire Protection, State Fire Assistance and Volunteer Fire Assistance programs at the State and local level, the National Fire Plan provides resources to enhance local firefighting capabilities, improve preparedness of state and volunteer firefighting organizations, and streamline communication and coordination across organizational boundaries to prevent, manage, and put out fire more effectively.

b) Through the Community and Private Land Fire Assistance programs, the National Fire Plan promotes local action in impacted areas by increasing public understanding and providing tools to enhance local and individual responsibility and actions to reduce fire risk and prevent the outbreak of fire around homes and communities.

c) Through Economic Action Programs, the National Fire Plan supports technology development and market expansion to stimulate local economies by diversifying jobs and business activities. The emphasis is on products generated from woody material removed from dense forest stands.

d) These programs provide training, information, technical assistance and financial support to States, communities and local organizations, and individual landowners. Over the long-term, the National Fire Plan will reduce fire risk to communities and people, while offering economic growth opportunities that enable them to maintain their rural character and ties to the land.

Disaster Mitigation Act 2000

The Disaster Mitigation Act (DMA) of 2000 requires all local governments to have an approved pre-disaster mitigation plan (PDMP) in place to be eligible to receive Hazard Mitigation Grant Program project funding. Missoula, Powell, and Lewis and Clark Counties have all completed a County level pre-disaster mitigation plan. The county PDMP's are further submitted to the State to support the overall state PDMP. DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster

planning, and promotes sustainability as a strategy for disaster resistance. This enhanced planning network will better enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

Western Governors' Association

Improving forest health and reducing the risk of wildfires are identified as top priorities for the Western Governors' Association (WGA). To that end, the WGA is engaged in a multi-year effort working with regional stakeholders and the federal Wildfire Leadership Council to implement the 10-Year Comprehensive Strategy for Reducing Wildfire Risks. The Comprehensive Strategy recognizes that key decisions in setting restoration and fire and fuel management project priorities should be made at the local level. The Implementation Plan identifies the desired outcome to be achieved by each goal, measuring progress toward achieving the goals, and the specific steps that must be taken to realize measurable progress.

Local Implementation of Federal Fire Policies

According to the Federal Wildland and Prescribed Fire Management Policy (2001, revised 2003), a major aim of the Federal Fire Policy is to promote a consistent federal approach to wildland fire through coordinated planning among local agencies. The primary mechanism for this is fairly straightforward: Every federally managed area with burnable vegetation must have an approved Fire Management Plan that meets certain requirements. Fire Management Plans, or FMPs, are "strategic plans that define a program to manage wildland and prescribed fires based on the federal agency's land management plans." The FMP must account for:

- Protection of firefighter and public safety;
- Fire management strategies, tactics, and alternatives, including mitigation, suppression, fuels reduction, etc.;
- Natural and cultural resources to be protected, including plans for burned-area rehabilitation;
- Resource management objectives and activities; and
- Compliance with environmental laws and regulations.

FMPs must include not only a discussion of fire management objectives and activities, but also a discussion of any public health and environmental issues. FMPs are the responsibility of individual operating units, and any response to fire within that unit must be based on an approved plan. Any other guidelines to FMP development are agency-specific.

In addition to FMPs, the National Forests and Bureau of Land Management may derive their fire management direction from other multiple plans and policy documents such as Land Management Plan (1986), the Forest Service Manual 5100, the Thirtymile Hazard Abatement Plan (2003), the Fire and Aviation Operations Management 2003 Operations Action Plan and the Interagency Standards for Fire and Aviation Operations (2003). Each of the local agencies has a Fire Management Team that establishes the annual program priorities based on national, regional, and local direction.

State Fire Policies

A primary mission of the Montana Department of Natural Resources and Conservation (DNRC) is the protection of the State's natural resources from wildfire. Forest fire protection is defined in 76-13-102(6) as the "work of prevention, detection, and suppression of forest fires and includes training required to perform those functions." In addition, Montana State law requires that all privately owned forested lands in the State be provided with wildfire protection (76-13-201 MCA). This is accomplished through DNRC's Division of Forestry and includes those State and private classified forestlands lying within the protection boundaries, as well as areas not classified as forestland where agreements are in place. Large tracts of federal lands, within protection boundaries, are also being protected through contract or offset. The DNRC's current program direction is to take suppression actions that are both offensive and defensive on farm, range, forest, watershed, or other uncultivated lands in private and public

ownership. DNRC accomplishes its mission of protecting these private and public lands through a combination of three primary methods. These methods are labeled as direct, contract, and State/County cooperative fire protection. These methods are outlined as follows:

a) Direct Protection: This type of protection occurs within a Forest Fire Protection District or an Affidavit Unit, which are generally referred to as direct protection areas. Within these areas there is only one recognized agency assigned wildfire protection, usually the DNRC, USFS, BLM, or Salish and Kootenai Tribe. These are defined as forested lands and they are provided this protection based on an assessment for services rendered, paid through the county tax rolls to the State. Prevention, pre-suppression and suppression work is all considered DNRC direct fire protection responsibility. DNRC hires personnel and purchases equipment necessary to fulfill wildfire protection responsibilities for assigned lands. Assigned lands are within established wildfire protection districts or units.

b) Contract Protection: This is another type of direct protection provided to state, private and federal lands. A federal agency that has been recognized by the DNRC can protect state and private lands. Recognized federal fire protection agencies are required to provide protection at the same or higher level as they do on their own lands. DNRC may provide direct protection to federal lands. An offset acreage protection program exists within Montana to provide uniform fire protection areas and to avoid payments from one agency to another. Contracting by the offset method (the State provides fire protection on an approximately equal area of federal land) is how we currently operate in Montana. Contract protection may be by direct payment to the federal agency for their services or to the state for protection of federal acres.

c) State-County Cooperative Protection: The State and county cooperative fire program is a lower intensity fire protection than that of direct or contract protection but fully meets the legal requirements for protecting natural resources. The county provides the basic level of fire protection through a system of volunteers, county personnel, rural fire districts, etc. The county may be supported by the State in matters of organization, planning, prevention, equipment, training, and fire suppression. If a county reaches the point that it can no longer handle a wildfire situation it can call the DNRC for assistance. DNRC will then provide expertise and resources to handle the wildfire situation.

Local Fire Policies

The next level of wildfire protection occurs at the local or county level. Rural Fire Districts are responsible for all fires occurring within their boundaries. There is no distinction in the law regarding what type of fire so all fires are included (structural, vehicle, and wildland). This applies regardless of the vegetative cover on the land so forested lands are also included even if these lands are already protected by a recognized wildland protection agency. It is these forested lands, lying within established rural fire districts that are referred to as having "overlapping jurisdiction." ((7-33-2202 MCA). RFD's are supported by taxes paid on all property within their district. Local fire districts also play an important role in assisting with prioritization of fuel mitigation needs. Local fire districts can be part of coordinated efforts such as Firewise (www.firewise.com), or more locally, FireSafe Montana (www.firesafemt.org).

3.0 BLACKFOOT PROJECT AREA DESCRIPTION

PLANNING AREA BOUNDARY

Figure 1. Location of the Blackfoot Plan boundary within west-central Montana.

The Blackfoot project area is located in west-central Montana and represents a land area of approximately 1,480,180 acres. The project boundary spans 75 miles from east to west and 55 miles from north to south. Figure 1 identifies the actual boundary of the project within Missoula, Powell, and Lewis & Clark Counties. Seven primary communities lie within the project region; Seeley Lake in the north, Lincoln in the east, Ovando and Helmville in the center, and Potomac/Greenough and Bonner in the west.

COMMUNITY LEGAL STRUCTURES

The Blackfoot project boundary encompasses the rural communities of Seeley Lake, Ovando, Helmville, Potomac-Greenough, Bonner, and Lincoln, Montana. The communities of Seeley Lake, Potomac-Greenough, and Bonner are unincorporated and reside within Missoula County. The communities of Ovando and Helmville are also unincorporated and reside in Powell County. The community of Lincoln is unincorporated and resides in Lewis & Clark County. Missoula, Powell, and Lewis & Clark Counties are each governed by a Board of County Commissioners. All legislative, executive and administrative powers and duties of the local government not specifically reserved by law or ordinance to other elected officials reside in the Commission (MCA-7-3-401). The Board of County Commissioners has jurisdiction and power to represent the County and has care of the County property and the management of the business and concerns of the County.

COMMUNITY DESCRIPTIONS

Population and Housing Unit Statistics

Table 1 presents the estimated population of the project area according to data acquired by the U.S. Census Bureau in 2000. While the census area boundaries did not precisely represent the Fire Plan boundaries, the data presented are believed to generally reflect the population estimates. Additional information is provided on housing units and types of occupancy to illustrate the level of seasonal, recreational, or occasional use within the planning area.

Table 1. Estimated population and housing unit status for project area (Source: U.S. Census Bureau, 2000).

	Seeley Lake Area (59868)	Ovando Area (59854)	Helmville Area (59843)	W. Potomac/ Greenough (59836)	Bonner/East Potomac (59826)	Lincoln Area (59639)	TOTALS
Population							
Year-round occupants	1884	258	243	250	576	1326	**4537**
Summer occupants	1302	134	158	336	739	992	**3661**
Total	**3186**	**392**	**401**	**586**	**1315**	**2318**	**8198**
Total Housing Units							
Occupied year-round	776	106	97	105	249	581	**1914**
Seasonal, recreational or occasional use	538	55	63	141	320	441	**1558**
Vacant	74	20	21	25	50	62	**252**
Total	**1388**	**181**	**181**	**271**	**619**	**1084**	**3724**

Land Ownership

Figure 2 represents the primary land ownership distribution within the project area. Federal ownership comprises 49.7% of the land area, State of Montana (including University of Montana) ownership comprises 7.8%, Plum Creek Timber Company comprises 13.4%, and other private ownership comprises 28.6%. The ownership map of the Watershed has been and will be changing with substantial sales of Plum Creek lands to The Nature Conservancy and the Trust for Public Lands. These organizations have then been transferring lands to Federal, state, and private ownership, creating a rapidly changing ownership map. Thus, the ownership map will need to be updated frequently to keep up with such changes.

Non-governmental Organizations, Homeowners' Associations

A number of non-governmental organizations and homeowner's associations are present in the project area that could provide support to wildfire mitigation planning and fuels reduction efforts.

Non-governmental organizations include:

Blackfoot Challenge – Ovando (www.blackfootchallenge.org)
Clearwater Resource Council – Seeley Lake (www.crcmt.org)
Ecosystem Management Research Institute – Seeley Lake (www.emri.org)

Homeowners/Landowners Associations and Subdivisions include (may not be an inclusive list):

Alpine Meadows
Arrowhead
Bear Creek
Beavertail Point
Beavertail Villa
Big Sky Lake
Big Waters Ranch
Blackfoot
Canyon Pines
Coopers Lake
Crescent Meadows
Double Arrow
Eagle Point Ranch
Elk Trail Park
Hillcrest Heights
Lake Inez
Last Chance Villa
Lincoln Flats
Lincoln Heights
Lincoln Villa
Many Rivers
Milltown
Montana Vista
Mountain Vista
National Forest
Placid Lake
Pineridge
Rainbow Bend
Rainbow Villa
River Bend
River Watch
Riverlands
Salmon Lake
Seeley Lake
Seven Up
Stonewall
Sunny Meadows
Sunset Pines
The Fly Inn
Twin Creeks
Turah Meadows
Washoe Estates

Ownership within the Blackfoot Watershed

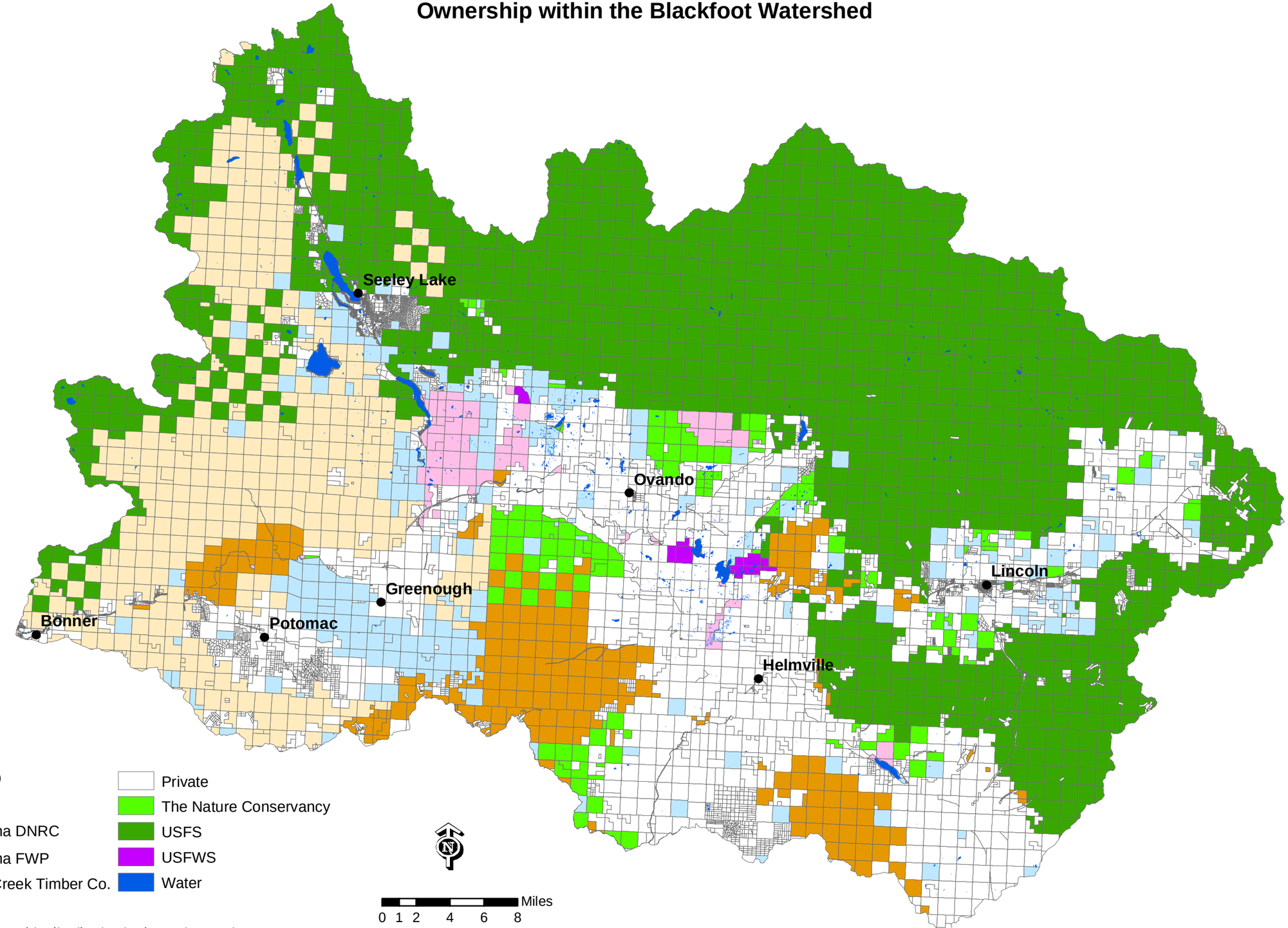

Figure 2. Land ownership distribution in the project region.

Emergency Services

Wildfires occurring within a Rural Fire Department's (RFD's) jurisdiction are dispatched through the Missoula, Powell, or Lewis & Clark County 911 systems as appropriate. The Missoula Interagency Dispatch Center in Missoula currently dispatches Lolo National Forest and DNRC resources, depending on the location of a wildfire within the project area. Helena National Forest resources are dispatched through the Helena Interagency Dispatch Center in Helena. RFD's and volunteer fire stations in the project area also serve as an emergency operations centers during a wildfire event depending on the location of the wildfire.

Rural Fire Departments

The Blackfoot-Clearwater project area is represented by six Rural Fire District stations within the overall Missoula, Powell, and Lewis & Clark (County) Rural Fire Districts. The following provides contact information as well as information on the number of firefighters and type and number of firefighting/emergency equipment.

Seeley Lake Rural Fire District

Address: 200 Firehouse Lane, P.O. Box 309
Seeley Lake, MT 59868
Phone (non-emergency): 677-2400
Fire Chief: Frank Maradeo

Volunteer firefighters/QRU: 23/17
Fire Engines: 1-Structure Type 1
1-Structure Type 2, 1 Type 3 (DNRC)
Water Tender/Engine: 2-Type 2/Type 1
Rescue: 1-Type 6

Ovando Rural Fire District

Address: Ovando, MT 59854
Phone (non-emergency): 793-5520

Helmville Rural Fire District

Address: Main Street
Helmville, MT 59843
Phone (non-emergency): 793-5746
Fire Chief: Bill Baker

Volunteer firefighters/EMS: 28/7
Fire Engines: 2-Type 6, 1-Rescue/Type 6
2 Structure
Water Tender: 1-Type 3

Greenough-Potomac Rural Fire District

Address: 30039 Potomac Rd., P.O. Box 349A
Potomac, MT 59823
Phone (non-emergency): 244-5796
Fire Chief: Doug Hall

Volunteer firefighters/QRU: 31/20
Fire Engines: 1 Type 1, 2 Type 2,
1 Type3, 2 Type 6
Water tenders – 2 Type 2
Rescue - 1

Missoula Rural Fire District-Bonner

Address: 9480 Hwy. 10 East
Bonner, MT 59823
Phone (non-emergency): 258-6061
Station Captain: Shannon Brownlee

Fulltime firefighters - 38
Volunteer firefighters - 30
Fire Engines – 5 Type 1, 5 Type 6
Water tenders – 4 unclassed

Lincoln Rural Fire District

Address: 114 Stemple Pass Rd.
Lincoln, MT 59639
Phone (non-emergency): 362-4377
Station Captain: Kathy Cockerham

Volunteer firefighters/QRU: 17/12
Fire Engines: 2-Structure Type 1,
1-Type 3, 1-Type 6
Water tenders: 1-Type 2, 1-Type 3
Rescue: 1-Type 1, 1-Type 3

Disaster Emergency Services

The Montana Department of Disaster Emergency Services (DES) deals with "emergency management" which applies science, technology, planning, and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life. DES uses a variety of resources, techniques, and skills to reduce the probability and impact of extreme events and should a disaster occur, to ensure responsibility, authority, and channels of communication are clearly delineated. DES is also responsible for cleanup and removal of hazardous materials that result from accidental spills.

Contact:

MT Dept. of Transportation DES	444-6153 (non-emergency)
Missoula County DES	523-4760 (non-emergency) 911 (emergency) 542-HMAT (emergency hazardous materials)
Powell County DES	846-2711 (non-emergency/emergency)
Lewis & Clark County DES	447-8285 (non-emergency) 911 (emergency)

Structures/Density

Approximately 3695 structures, including permanent and seasonal residential and commercial are present in the project area according to Missoula, Powell, and Lewis & Clark county records. Figure 3 represents a map of structure densities for the project area that was developed using Missoula, Powell, and Lewis & Clark county cadastral information for the project area. As evidenced by the density map, the majority of residences within the project area are located near the communities of Seeley Lake, Ovando, Helmville, Potomac/Greenough, Bonner, and Lincoln as well as adjacent to the Highway 200 and 83 corridors.

Using county tax information, the estimated replacement value of structures in the project area is calculated at approximately $313,390,901. The estimated value of private land without structures is $278,705,272. The combined value of privately held assets in the project area totals $592,096,173. This figure does not include the value of contents or intangibles that could also be lost to wildfire.

Businesses/Commercial

Local economic impacts from catastrophic wildfires include disruptions to both sale and production of local goods and services. Immediate effects may include decreased recreation/tourism and timber harvest in the fire region, as well as disruptions from evacuations and transportation delays. Increased use of local goods and services for fire protection also impacts local economies. Other effects include direct property losses (in the form of buildings, timber, livestock, and other capital), damage to human health, and possible changes in the long-term structure of the local economy.

Most businesses and commercial operations are clustered in the communities of Seeley Lake, Ovando, Greenough/Potomac, Helmville, Bonner, and Lincoln. A few additional businesses and commercial operations occur in the project area but these are primarily located along or in close vicinity to Highway's 200 and 83.

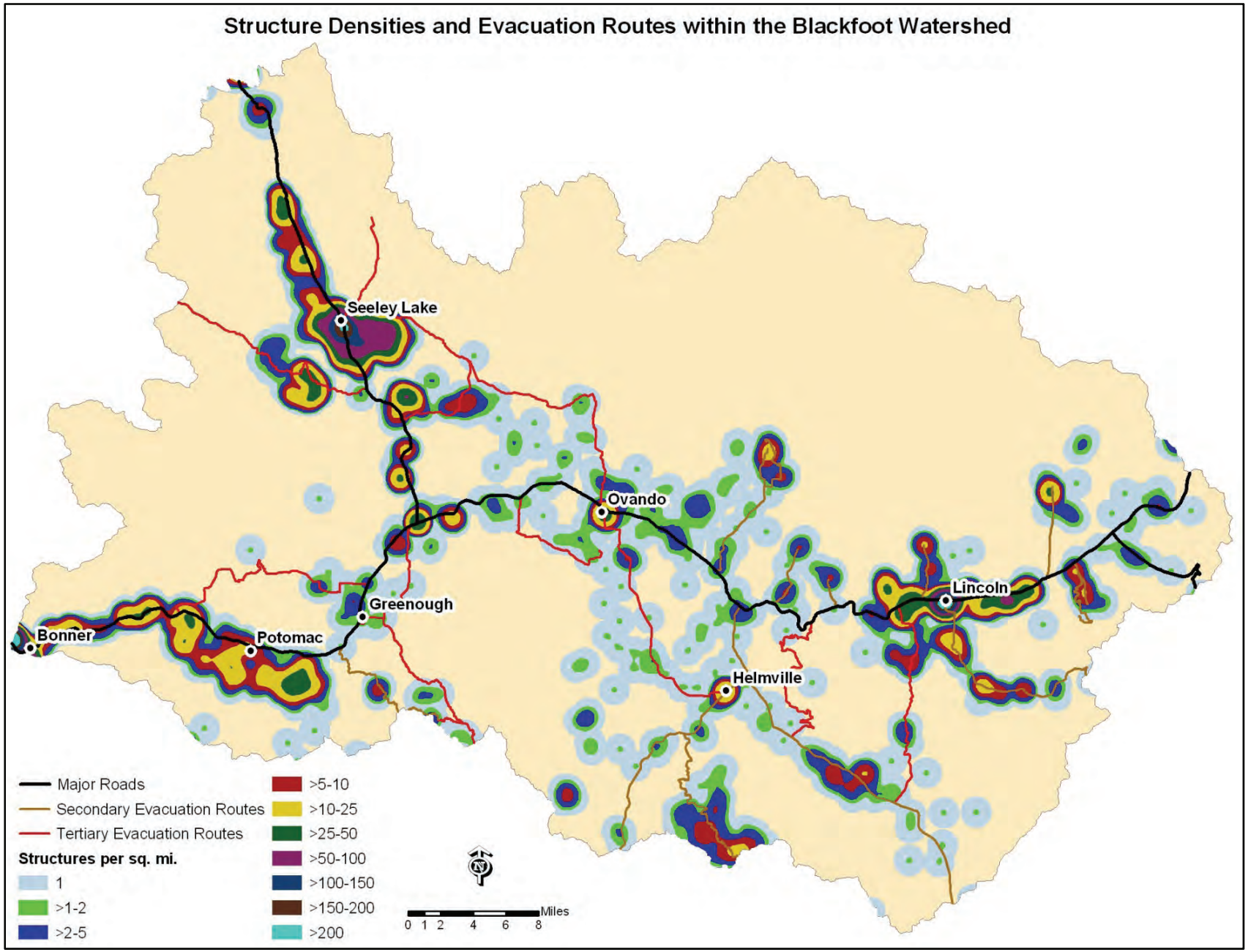

Figure 3. Density of structures per square mile and evacuation routes in the project region.

Infrastructure

Roads

The primary public roads for ingress and egress to the project area are Highway 200, which runs east to west through the central part of the project area, Highway 83, which runs north to south through the northern quarter of the area, and Highway 279, which runs north to south in the eastern corner of the area. All three highways are maintained by the Montana State Department of Transportation. Other secondary public roads identified as important for evacuation during the fire season include Highways 141 and 271, Garnet Range Road, Cooper Lake Road, Hoover Creek Road, Stemple Pass Road, Copper Creek Road, and Hogum Creek Road. These secondary roads are primarily maintained by the Missoula, Powell, and Lewis & Clark County Road Departments, except for Highways 141 and 271, which are maintained by Montana Department of Transportation. Tertiary public roads identified for evacuation during the fire season include Woodworth to Cottonwood Lakes loop, Placid Lake/Jocko Road, Ovando-Helmville Road, Johnsrud Park-Ninemile Prairie Road, Elk Creek Road, and Sunset Hill Road. These tertiary roads are maintained by Missoula, Powell, and Lewis & Clark County Road Departments.

Figure 3 also identifies the existing road system in terms of primary, secondary, and tertiary roads. Additional forest roads occur in the project area, particularly on Plum Creek Timber Company lands. Many of these forest roads are maintained by individual agencies or landowners including the U.S. Forest Service, DNRC, or Plum Creek Timber Company. These additional forest roads are not shown on this map as many are not actively maintained, and others have been gated or bermed to obstruct vehicle access or to meet the land management objectives of the individual landowner or agency. Locations of project area roads and in some instances gates and berms, are maintained in the project GIS system.

Contacts:

State Highways	
Montana State Department of Transportation - Missoula	523-5800
Seeley Lake	677-2599
Montana State Department of Transportation – Great Falls	454-5880
Lincoln	362-4607
County Roads	
Missoula County Road Department	258-4753
Seeley Lake	677-2222
Powell County Road Department	
Helmville	793-5737
Ovando	793-5608
Lewis & Clark County Road Department	447-1631
Lincoln	362-4295
Montana Highway Patrol	543-6368
Missoula County Sheriff	721-5700
Powell County Sheriff	846-2711
Lewis & Clark County Sheriff	447-8235
Montana Department of Natural Resources and Conservation	
Missoula Office	542-4300
Clearwater Office	244-5857
Lincoln Office	362-4899
U.S. Forest Service	
Seeley Lake Ranger District, Lolo National Forest	677-2233
Missoula Ranger District, Lolo National Forest	329-3814
Lincoln Ranger District, Helena National Forest	362-4265
Northern Region Fire and Aviation	329-3401

Plum Creek Timber Company	
Missoula	728-8350
Seeley Lake	677-2320
Bureau of Land Management	
Missoula Field Office	329-3914

Critical Facilities

Critical facilities are defined as facilities critical to government response and recovery before, during or after a wildfire. Critical facilities for the Blackfoot area include emergency operation centers, fire stations, public works facilities, medical centers, and public shelters. Critical facilities also include those that are essential to the continued delivery of community services such as the U.S. Postal Service facilities and public and private schools. In addition, propane distribution facilities that could jeopardize public safety in the event of a wildfire, also qualify as critical facilities. The location of critical facilities within the project area and associated contact information are maintained in the project's GIS system.

Utilities

Most residences in the project area use electric and/or propane to heat and operate their homes. Missoula Electric Cooperative (MEC) and NorthWestern Energy both provide electricity to the area. NorthWestern Energy is also the primary provider of natural gas for the area. Propane distribution facilities are maintained in the fire plan communities by the vendors listed below. Energy Partners/Five Valley's Gas has prepared a Disaster and Emergency Plan that contains contact and general information that would be useful to fire fighting agencies in the event of a wildfire.

Contacts:	Electric –	Missoula Electric Cooperative		800-352-5200
	Gas & Electric -	Northwestern Energy		888-467-2669
	Propane –	Energy Partners - Cenex	Seeley Lake	677-3656
			Missoula	541-6800
		Mountain View Cooperative	Seeley Lake	677-0180
			Lincoln	362-4246
		Amerigas		543-3598

Communications

Telephone services are the primary means of communication within the project area. Blackfoot Telephone Company operates the landline communication grid as well as provides internet service to the area. The Lincoln Telephone Company provides telephone and internet service to Lincoln and the surrounding area. Verizon Wireless, Alltel, and Cellular One provide cellular service to the region through towers near Placid Lake, Double Arrow Lookout, Lincoln, Rogers Pass, and Bonner. Much of the area outside the Seeley Lake, Bonner, and Lincoln communities is without cell phone coverage. The location of critical communication equipment and radio towers are maintained in the project GIS system and available to firefighting agencies in the event of a wildfire emergency.

Contacts:	Blackfoot Telephone Company	800-649-4108
	Verizon Wireless – cellular service	800-922-0204
	Alltel – cellular service	800-255-8351
	Cellular One – cellular service	877-424-4666

Public and Private Schools

Seven public schools operate within the project area and include the following contact numbers:

Contacts:	Seeley Lake Elementary – enrollment 280	677-2265
	Seeley Swan High School – enrollment 140	677-2224

Lincoln Public School – enrollment 170	362-4201
Potomac Elementary and 7-8 – enrollment 439	244-5581
Ovando Elementary – enrollment 16	793-5722
Helmville Elementary – enrollment 36	793-5656
Sunset Public School (Greenough) -	244-5542

Community Medical Centers

Depending on the location within the Blackfoot project area, medical care can be obtained within Missoula at multiple hospitals or clinics throughout the city or within the project area. The Seeley Lake area is served by the Seeley-Swan Medical Center located on Highway 83 at the south end of Seeley Lake. This center is a non-profit organization and is associated with St. Patrick's Hospital in Missoula. The medical center also has a helipad site that is primarily serviced by Life-flight emergency transport services. The Lincoln area is served by the Parker Medical Center located on Highway 200 at the west edge of Lincoln. This center is associated with the Cooperative Health Center in Helena.

Contacts:	Seeley-Swan Medical Center	677-2277
	Parker Medical Center	362-4603

Local Airports/Helipad Sites

Two fixed-wing airstrips are located within the project area. The Seeley Lake Airstrip is located on Airport Road on the northeast side of Seeley Lake and the Lincoln Airport is located 2 miles east of Lincoln on Highway 200.

Helipad sites used by Lifeflight for emergency rescue and medical calls or by firefighting efforts are located and maintained throughout the project area. Helipad locations continue to be identified and added each year. During a wildfire response, helipads are used to drop off firefighting crews and deploy water buckets to assist an initial attack crew with water. Because of the remoteness and limited road access this is an extremely valuable tool for firefighters. The locations of helipad sites are maintained in the project GIS and are available to fire fighting agencies in the event of a wildfire.

Land Use/Development Trends

Approximately 6.6% (98,308 acres) of the land base in the Blackfoot project area has been developed, as defined by property with an existing building present. Of this over 97% is private land with the small remainder of developed land occurring on public lands.

Land uses of the Blackfoot project area have historically been closely linked and very dependent upon the abundant natural resources such as timber in the surrounding forests, agricultural resources, summer cabins on the abundant lakes and streams, and hunting, fishing and other recreational opportunities in the project area and adjacent National Forests and Wilderness Areas. Changes in National Forest Policy have lead to a decline in timber resource output from Federal lands and concerns about threatened and endangered species have further restricted state and federal management actions on public lands in the project area. A checkerboard ownership pattern characterizes parts of the project area and is a particular challenge for mitigating fire at the landscape level. In the last decade, the area has also observed an increase in seasonal tourists and year-round residential development resulting from relocating retirees and work-at-home professionals. The value of private property has significantly increased in recent years. As a result, Plum Creek Timber Company has and may continue to sell select residential/recreational properties as part of its corporate objectives for "higher and better use" of company real estate. MT DNRC also has a higher and best use policy that evaluates potential sale of state land for development. The result may be an increase in residential development outside the historical boundaries of the communities and less forest management occurring on non-industrial forestlands surrounding these communities. In an effort to reduce these potential impacts on land use patterns in the project area, The Nature Conservancy of Montana and The Trust for Public Land has recently entered into an agreement (Montana Legacy Project) to purchase approximately 160,000 acres of Plum Creek lands within the watershed over a multi-year schedule. Many of these lands will

in turn be acquired by interested federal and state agencies when adequate funding is available. Thus, land use and ownership patterns are in flux, so frequent updates to ownership maps are recommended.

General Environmental Conditions

Topography, Slope, Aspect, Elevation

The project area was formed by continental glaciation when the Cordillerian ice sheet advanced through northern Montana. Smaller mountain glaciers formed in the mountain ranges and moved along the valley bottoms, as well. Topography within the area is highly variable, ranging from high-elevation glaciated alpine meadows to timbered forests at mid-elevations to prairie pothole topography on the valley floor. Glacial deposits, including glacial till, outwash and glacial lake sediments, are common throughout the valley floor of the project area. Elevations within the project area range from 3250 feet in the valley bottom to 9400 feet on the surrounding peaks. Slopes within the project area range from 0 to 72 degrees, with 37% of the area represented by slopes of 0 to 10 degrees, 32% by slopes of 10 to 20 degrees, 23% by slopes of 20 to 30 degrees, 7% by slopes of 30 to 40 degrees, and less than 1% by slopes of greater than 40 degrees. The project area is nearly evenly distributed among north (23%), east (25%), south (26%) and west (26%) aspects.

Climate

The climate of the project area is characterized as cool and temperate with minor maritime influences. However, large day-to-day temperature variations are not uncommon. Summers are dry with temperatures averaging between 42^{o} F and 78^{o} F. Winter temperatures average from 12^{o} F to 33^{o} F. Arctic air intrusions can also occur in winter. Precipitation ranges from 12 to 31 inches with most of the precipitation in fall, winter, and spring occurring as snow. Average rainfall in July and August is < 2 inches. A snow pack of greater than 3 feet is typical for the area in winter during non-drought precipitation cycles. There is also a slight climatic gradient in the project area with the northern and western parts of the project area being slightly moister than the central, eastern and southern parts, due in general to elevations and the position of prevailing storm tracks.

Local Forest Conditions and Fire Ecology

Historical Disturbance Regimes

An important factor in identifying the potential range of forest conditions that can occur on a landscape is an understanding of the influence of historical disturbance regimes on vegetation structure, species composition and spatial distribution. Some of the more common disturbance regimes within North America include fire, insects, disease, hurricanes, blowdowns, and flooding. Within any given landscape, several different historical disturbance regimes may have operated to influence vegetation in this manner. For the project area, the three primary historical disturbance regimes influencing species composition and structure were the short-interval fire regime (avg. <25 years), the long-interval fire regime (avg. >100 years), and the mixed severity fire regime with intermediate fire return intervals creating forest patches displaying either short or long-term fire effects. Fire was the primary disturbance agent in this landscape directly influencing large-scale changes in forest species composition, structure and spatial distribution. While insects and disease were and continue to be important disturbance agents as well, their activities often contribute to the occurrence and severity of fire as the end result. Consequently, the ultimate driving force of large-scale disturbance in the plan region was predominately fire.

Human-induced changes and/or impacts have functionally suppressed, eliminated or changed many of the historical disturbance regimes throughout North America. The result has been the loss of many native ecosystems and their corresponding biodiversity. In the project region, the primary influence in this regard has been the suppression of fire for nearly 100 years as well as past logging that has

changed the historical structure of many forest stands. Fire suppression programs have had profound effects on many ecological communities and ecosystem processes.

Short-interval Fire Regime - The short-interval fire regime is predominantly characterized by relatively frequent, non-lethal, low to moderate intensity fires that burn along the ground and remain within the understory. The frequency of these fires, generally averaging between 5 and 25 year intervals, influences both the species composition and vegetation structure within these forests. Fire tolerant species such as ponderosa pine and western larch become dominant in the overstory and bunch grasses become dominant in the understory. This becomes what is referred to as a "fire maintained seral disclimax"; due to the frequency of the fires, the stand is unable to succeed toward climax vegetation. Stand history studies have demonstrated that stands occurring within the short-interval fire regime had relatively predictable species composition and vegetative structure. They were also less likely to move through a typical successional progression of age classes. Instead, fire maintained a multi-age structure, characterized by saplings to old growth trees.

Long-interval fire regime - The long-interval fire regime is characterized by an infrequent, lethal, high intensity fire that consumes both the understory and overstory as it moves across the landscape. Stand replacing fire regimes result in a short term, catastrophic effect on stand conditions, in contrast to the persistent, yet less obvious effects of the short-interval fire regime. The result of this impact is to set the stand back to an early successional stage and release plant species stimulated by severe fire events. Then the stand proceeds along an undisturbed successional trajectory for many years, depending on the ecological site.

Mixed-severity fire regime - Within the project region, a "mixed severity" fire regime also occurred. That is, depending on site conditions or position on the landscape, both non-lethal and lethal fires could occur within a mosaic of diverse stand conditions. This is typically common through the transitional portion of the environmental gradient where the lower elevation, drier sites are dominated by non-lethal fire regimes and the high elevation, moister sites are dominated by the lethal fire regime. Consequently, where a transitional site occurs primarily adjacent to the low elevation types, it is predominantly influenced by a short-interval fire regime. Where it occurs primarily adjacent to the high elevation types, it is predominantly influenced by a long-interval fire regime. Topographic features can also influence the occurrence of a "mixed" fire regime as well. For example, dry south aspect slopes and ridges within an ecological site such as warm, moist subalpine fir can be predominantly influenced by a short-interval fire regime. Whereas under average site conditions, this ecological site would more typically be influenced by a long-interval fire regime.

Historical Forest Conditions

Habitat typing is a classification system that maps similar ecological sites in terms of the plant community that would naturally occur on each site if no disturbances occurred to that site (Pfister, Kovalchik, and Arno. 1977. Forest habitat types of Montana. USDA Forest Service General Technical Report INT-34). This classification has been widely applied to forest ecosystems in the western U.S. While the classification is determined based on floristics of a stand, it is not a description of the existing vegetation, but rather on the potential late-successional conditions that a specific location would support in the absence of disturbance. For fuel assessments and identification of historical fire regimes, groupings of individual habitat types that had similar historical fire regimes and similar successional trajectories in response to these disturbances were used.

Warm, Dry Ponderosa Pine, Xeric Douglas-fir Habitat Types

Distribution - This group of habitat types, representing only a small percentage of the project area, is at the warm, dry extreme of forest environments wherever ponderosa pine is found. Typically, they represent lower timberline conditions and in northwest Montana may occur as low as 2,000 feet in elevation. Upper limits may extend to about 5,400 feet on steep, dry, southerly aspects. Associated geology is quite variable and includes steep, rocky sites to glacially scoured ridge tops and ridge noses to moderately deep glacial till, with drumlins and moraines, to shallow and moderately deep residual

soils. Geology and terrain appear to be limiting factors only to the extent of retaining sufficient soil moisture, which is the controlling influence.

Potential Dominant Species - Open stands of ponderosa pine are the characteristic tree cover. At the upper elevations of this habitat type, scattered Douglas-fir may be associated with the pine. The undergrowth vegetation is characterized by grasses (bluebunch wheatgrass, elk sedge and pinegrass) and occasional shrubs (bitterbrush and snowberry). In contrast to other habitat types, all members of the shrub and herb layers occur as components of the even drier shrub steppe or mountain shrub zones of vegetation. Consequently, this group of habitat types marks the lower transition between forest and non-forest.

These sites are severely limited in their tree-stocking capability and maintain a savannah appearance when fully stocked. Before Euro-American settlement interrupted the normal fire cycle, nearly all stands were likely in a savannah condition with grass-dominated understories. Historically, these sites burned at least every 5 to 25 years. Average densities ranged from 5 to 20 trees per acre. Historical patch sizes were characterized by small openings of less than 5 acres, within 20 to 200 acre stands of low-density trees. Low-intensity short-interval fires would result in few fire-sensitive shrubs, low fuel accumulations, and few tree seedlings and small saplings. Since the early 1900s, attempts to exclude fire have lengthened fire return intervals. Tree seedlings, small saplings, and fire-sensitive shrubs such as bitterbrush, and snowberry, have become more common and thereby have increased understory fuel loadings. When fires do occur, they are often of higher severity and result in conditions that rarely occurred historically.

Warm, Dry Douglas-fir Habitat Types

Distribution - This group of habitat types represents the warm and dry Douglas-fir/ponderosa pine forests of northwestern Montana and is a relatively small component of the project area. It characterizes the warm, mild environments of low- to mid-elevation forests but may extend upward to about 5,800 feet on dry, southerly aspects. These sites are typically well drained and vary from fairly deep glacial till associated with drumlins and moraines, to shallow and moderately deep residual soils.

Potential Dominant Species - The Douglas-fir habitat types are characterized by mixed stands of Douglas-fir and ponderosa pine but at lower elevations, Douglas-fir may be absent. On moderate elevation sites, ponderosa pine, Douglas-fir and western larch are major seral species with small amounts of lodgepole pine, Engelmann spruce, or subalpine fir present as well. In unlogged stands, ponderosa pine, at low elevations, and western large, at moderate elevations, are usually the larger, older component with Douglas-fir ranging from sapling to mature trees. The undergrowth, if undisturbed, supports mainly rhizomatous shrub and grasses such as common snowberry, mallow, ninebark, pinegrass, or elk sedge. Following a disturbance such as fire or logging, a wide variety of other shrubs, herbs, and grasses may be present.

Historically, these sites experienced frequent low-intensity underburns that excluded most Douglas-fir and killed many small ponderosa pines and western larch. Estimates of fire return intervals range from 15 to 45 years. These fires burned extensively throughout the low- to mid-elevation forests, being extinguished only by fall rains or lack of fuel due to previous fires. Under this burning regime, the stands remained open and park-like, consisting of mostly ponderosa pine, western larch and to a lesser degree, Douglas-fir in a variety of age classes. Stand density ranged from about 15 to 30 large overstory trees per acre. Trees often occurred in clumps, with irregular shaped openings between the relatively low density of trees. The potential for destructive wildfire, insect, or disease events was low. Due to their different responses to low-intensity burning, it is likely that shrub cover was less and grass cover was greater than under present conditions.

Since Euro-American settlement, fires have become less frequent and stand conditions have changed dramatically, particularly in unmanaged stands. Here, the historical stand of widely spaced ponderosa pine or western larch is often still evident in the overstory as an older stand component. Between the pines, many smaller Douglas-firs and lodgepole pine have become established since the last underburn,

which likely occurred in the late 1800s to early 1900s. Stand densities now range from 250 to 600, and sometimes 900, trees per acre, creating stressful conditions throughout the tree layer. Now the potential for destructive wildfire, bark beetle, spruce budworm, Douglas-fir tussock moth, dwarf mistletoe, and root rot events is quite high.

Cool, Moist and Cool, Dry Douglas-fir Habitat Types

Distribution - Cool moist and dry Douglas-fir sites are common in the project area and represent the cooler extremes of the Douglas-fir zone. Subalpine fir is usually present on adjacent cooler sites. Cool, moist Douglas-fir sites may extend upwards to about 6,800 feet in elevation but are also common down to about 4,800+ feet in cold air drainages and frost pocket areas. At the lower elevation, nightly cold air patterns may be compensating for soil moisture.

Potential Dominant Species - Ponderosa pine is present as a major seral species only at the warmer extremes of these habitat types and is usually absent at the colder extremes. Lodgepole pine may be common on the cooler and more frost-prone sites. Western larch, trembling aspen, and lodgepole pine, may dominate early to mid seral stands. In some cases, Douglas-fir is the only tree species capable of growing on the site. The undergrowth is characterized by shade-tolerant species such as mountain maple, mountain ash, and/or huckleberries. Many other disturbance-related species may be present, such as serviceberry, Scouler willow, thimbleberry, and chokeberry. On drier sites, undergrowth vegetation may be sparse with pinegrass and elk sedge the most common species.

Historically, these sites likely experienced a mixed regime of both short-interval and long-interval fire regimes. Average short-interval fire regimes may have ranged from 17-102 years while long-interval fire regimes ranged from 150-400 years. Consequently, stand composition can vary from nearly pure stands of single-age lodgepole pine to mixtures of multi-age lodgepole, ponderosa pine, or western larch with Douglas-fir or pure multi-age stands of Douglas-fir. The extended fire return intervals on some sites increase the opportunities for dwarf mistletoe and bark beetle infestations.

As a result of organized fire suppression, a shift to continuous, multi-story stands of Douglas-fir has greatly increased. The result of this fire suppression is less opportunity for the diverse mosaic of vegetative conditions that result from a mixed fire regime. The probability of widespread stand-destroying fire has increased. Lack of fire has also increased the proportion of dense multistoried stands, making them more vulnerable to bark beetle attack and stand-destroying fire. Severity of dwarf mistletoe infection among these stands has also increased. In some areas, the increase has been dramatic, creating stands composed primarily of large witches brooms.

Warm, Moist Subalpine Fir Habitat Types

Distribution - This group ranges in elevation from about 5,000 to 7,200 feet but may follow cold air drainages as low as 4,500 feet. This habitat type group is common in the project area. These sites are found in moist, protected areas such as stream terraces, toeslopes, and steep, northerly aspects. Soils are variable and range from loess overlaying glacial tills and lacustrine sediments, to alluvial and outwash deposits on terraces.

Potential Dominant Species - Various mixtures of lodgepole pine, western larch, Douglas-fir, and Engelmann spruce comprise the seral tree layers. Any one of these tree species may be dominant, depending on stand history and local site conditions.

Seral shrub layers may be tall and dense, consisting largely of Sitka alder. Lesser amounts of mountain maple, mountain ash, and serviceberry may be present. In late seral and climax stages, menziesia dominates some sites, but usually lower-growing shrubs, such as blue huckleberry and Utah honeysuckle, are more common.

Historically, these sites experienced both short-interval and long-interval severity fires. Estimates of fire frequency range from 38 to 120 years on predominantly short-interval sites and 120-300 on predominantly long-interval sites. Generally, ignitions occurred on adjacent drier sites, and the fire

was wind-driven onto these sites. Fire patterns could be small and patchy (100 acres or less) or uniform and extensive (5,000 to 100,000 acres), depending on the burning conditions. Sites influenced by predominantly short-interval (mixed severity) fires resulted in large gaps in the canopy and a mosaic of structures within the stand. The presence of western larch in the canopy is a good indicator of short-interval fires on these sites. Long-interval fires create a mosaic of even-aged structures across stands and are characterized by the presence of both seral and climax species.

Warm, Dry Subalpine Fir Habitat Types

Distribution **-** Warm, dry subalpine fir sites are less common than warm, moist subalpine fir in the project area. They are found at elevations between 4,800 and 7,500 feet and represent the warm, dry extremes of the subalpine fir zone. At their lower limits, these sites occur mainly on steep, northerly or easterly aspects but shift to southerly and westerly aspects at their upper limits. Sites at the lower limits are often controlled by cold air drainage and are strongly interfingered with Douglas-fir sites.

Potential Dominant Species - Western larch and Douglas-fir are the predominant seral trees, and small amounts of ponderosa pine may occur on the warmer sites. At the cool, moist extremes, lodgepole pine and Engelmann spruce may appear in varying amounts but seldom dominate.

Tall, dense shrub layers are common, reflecting the relatively warm nature of these sites. Mountain maple and mountain ash are common in near climax stands, while beargrass, serviceberry and Scouler willow are common components of mid-seral grass and shrub layers. Ceanothus and pinegrass can develop high coverages on severely burned sites in early seral stages. The pinegrass can persist indefinitely on many of these sites, often dominating the herb layer.

The historical fire regime consisted of sites influenced by predominantly short-interval fires ranging from 38 to 71 years and long-interval fires ranging from 100 to 500 years. A mixture of short-interval and long-interval fire patterns can create a mosaic of seral stages at the landscape level. Cyclic bark beetle attacks on dense patches of Douglas-fir, lodgepole pine, and Engelmann spruce can contribute further to this mosaic. The influence of fire regime on the species composition and structure are similar to those exhibited in Warm, Moist Subalpine fir. Historic patch size ranged from 50 to 300 acres on short-interval sites and 5,000 to 100,000 on long-interval sites. However, with a recent history of fire suppression, these sites are losing their mosaic patterns and are becoming more uniform. Unless managed to maintain landscape diversity, these sites will increase their risk of extensive, stand-destroying fire and bark beetle epidemics, providing less opportunities for a mosaic of conditions at the landscape level.

Cool, Dry Subalpine Fir Habitat Types

Distribution - These sites primarily occur at mid to upper elevations of the subalpine fir zone and are relatively uncommon in the project area. They represent cold, dry subalpine sites and range upwards to 7,800 feet in elevation but are also common down to about 4,500 feet in cold frost-pocket areas. At the lower elevations, these sites usually occur in the dry gentle terrain formed by glacial outwash in broad valleys.

Potential Dominant Species - At upper elevations, whitebark pine may be present in minor amounts, however in recent years its distribution has decreased as a result of mountain pine beetle and whitepine blister rust. In the moister areas, minor amounts of Engelmann spruce are common. At the cold, dry extremes, which are transitional to non-forested systems, lodgepole pine is the only tree present and is considered to be the climax species. Elsewhere, subalpine fir usually appears in varying amounts as the climax indicator species. Alpine larch occurs on rockslides and talus. Douglas-fir, western larch, and western white pine rarely occur on these ecological sites.

Shrub layers are usually sparse and consist mainly of low-growing huckleberries, such as dwarf huckleberry and whortleberry. The sparse low shrub layer reflects the cool temperatures and short growing seasons inherent to these sites.

Stand conditions predominantly influenced by long-interval fire regimes and mountain pine beetle attacks were the normal historical recycling process. Long-interval fires occurred about every 100 to 300 years. Short-interval fires occurred less often and on a frequency of every 35 to 300 years. Minor fire scars in these stands attest to the nature of these low-intensity, short-interval fires. Fires crept through these stands wherever fine fuels would carry a flame and then flared up wherever fuel concentrated in the denser patches of larger trees, usually those greater than eight inches in diameter. When these trees were killed, the beetle population subsided until another group of trees grew into the vulnerable size class. After each beetle event, the dead trees soon fell and provided an opening for more regeneration. In this manner, a mosaic of tree sizes and densities were maintained, which helped reduce stand uniformity and the widespread destruction of crown fires and bark beetle epidemics.

Ecosystems and Biological Diversity

The planning area supports a rich biodiversity of both plants and animals. This area has been identified as bioregionally outstanding, supporting some 2,203 terrestrial species including an estimated 48 endemics. It is particularly noted for its rich diversity of coniferous forest ecosystems. It also contains some of the most intact watersheds and aquatic ecosystems in the lower 48 states. The area is noteworthy for its populations of large carnivores including wolves, grizzly bears, wolverines, mountain lion, marten, and lynx, and is one of the few remaining strongholds for the threatened bull trout.

Much of the biological distinctiveness of this region is due to the presence of protected lands and lands managed for natural resources. This region maintains populations of a number of species extirpated in most of their former ranges including the above-mentioned carnivores. This landscape also maintains healthy populations of a long list of additional plant and animal species. These species are supported by an array of terrestrial and aquatic ecosystems that still maintain most of their historical ecological processes. This region provides a unique opportunity to maintain the full range of ecosystems and biodiversity that historically occurred in the area.

The region has a conservation status that is among the highest in the U.S. Presently, the forests and watersheds are relatively intact. Some forest ecosystems have undergone changes due to logging, fire exclusion practices, exotic diseases, and exotic species. These changes have produced some habitat loss. Substantial blocks of forest ecosystems still occur but some ecosystems exhibit different structures and species compositions relative to their historical conditions. In addition, this region has maintained relatively high landscape connectivity, which is a primary reason the populations of large carnivores still occur. Developing strategies to reduce the threat and impacts of wildfire on local communities while maintaining ecosystem integrity and biological diversity in this landscape will be critical to the persistence of grizzly bears, lynx, wolverines, and bull trout, as well as the functional ecosystems on which they depend.

While the watershed has a high percentage of public land, the major valley bottoms within the area have a significant percentage of private lands and also serve as transportation routes. These valleys include the Blackfoot River Valley through the bulk of the project area and the Clearwater River Valley on the north end of the project area. Private land ownership consists of three general types: agricultural ranches, forested non-industrial private lands, and Plum Creek Timber Company lands (PCT). The ranches are dominated by grassland systems with smaller amounts of forested systems, while the non-industrial private lands display a wide range of tree sizes, conditions, and purposes. PCT has recently sold a percentage of their land holdings in the planning region to The Nature Conservancy. TNC is currently in the process of transferring ownership of these lands to federal, state and private interests, while maintaining conservation objectives as the primary future use of these lands. The remaining PCT lands will either be sold through the recently negotiated Montana Legacy Project land purchase, higher and better use program discussed above, or continue to be managed for commercial timber production, a use that will maintain a forested condition.

Some ecosystems within the planning region have lost much of their ecological integrity through either direct or indirect human activities. Low elevation forests in particular, primarily sites that historically supported ponderosa pine and western larch dominated ecosystems, have been altered by a combination of logging and fire exclusion practices. Aspen ecosystems have declined in many areas due to fire exclusion practices. In

order to maintain the full complement of biological diversity and ecosystem integrity, restoration of functional processes and conditions for all of these ecosystems should be addressed. In addition, low elevation forests are at risk from catastrophic fires of an intensity and scale that never occurred historically. Concerns over such fires have prompted major Federal spending to protect human lives and property. The integrity of many low elevation forest ecosystems is at risk from both the threat of fire as well as the potential for inappropriate management associated with fuel reduction programs. The incorporation of ecosystem restoration objectives into fire protection plans is needed to assure that ecological objectives are also considered in fire planning efforts.

Water quality and Watersheds

The project area represents two primary watersheds: the Blackfoot Watershed and the Clearwater Watershed (Figure 4). The Blackfoot River is drainage system for the entire assessment area. The Clearwater River drains from north to south and is a tributary of the Blackfoot River system. The effects of wildfire on water quality and the sub-watersheds within the assessment area will depend on several factors including the severity/intensity of the fire, post-fire precipitation, actions taken to control or suppress the fire, and the condition of the watershed pre-fire. Wildfire usually results in the loss of vegetation as well as the reduced capacity for soils to soak up rainwater and snow melt. The result is increased runoff and a greater volume of water reaching streams and lakes in a shorter period of time. Flash flooding is often a major concern following a significant wildfire event within a watershed. In addition, the loss of vegetation can result in increased sediment transport to streams and lakes due to soil erosion, reduced soil infiltration, and increased water volumes and overland flow rates. Water quality impacts frequently observed post-wildfire include increased transport of organic materials, nutrients and chemicals (i.e., fertilizers, herbicides) to surface waters, as well as increased turbidity (i.e., suspended particles) and water temperatures.

Air Quality

Air quality in the project area would be considered good on average, relative to national standards. Wood burning during the heating season can sometimes contribute to localized air quality problems when inversions or other weather conditions prevent smoke from dispersing. Some of the watershed is at risk from non-attainment of particulate matter of 2.5 microns or less (PM 2.5) standards. This is primarily a concern during winter inversions, when various sources of smoke, but primarily wood-burning stoves, may result in levels exceeding standards. Because of air quality concerns, outdoor burning between December and February is restricted in much of the watershed.

Wildfires are also considered a natural source of air pollution and can sometimes cause severe short-term smoke impacts. These smoke impacts can pose a major health risk for some individuals. Symptoms from short-term smoke exposure range from burning-stinging eyes, scratchy throat, cough, irritated sinuses, headaches, and runny nose. Individuals with pre-existing health conditions such as asthma, emphysema, congestive heart disease and other conditions can have more serious reactions. The elderly and young children are considered high-risk groups for health complications due to smoke. The Montana Department of Environmental Quality has produced a document entitled - “Wildfire Smoke: A guide for public health officials” to help public officials recognize and address the potential health problems associated with wildfire smoke.

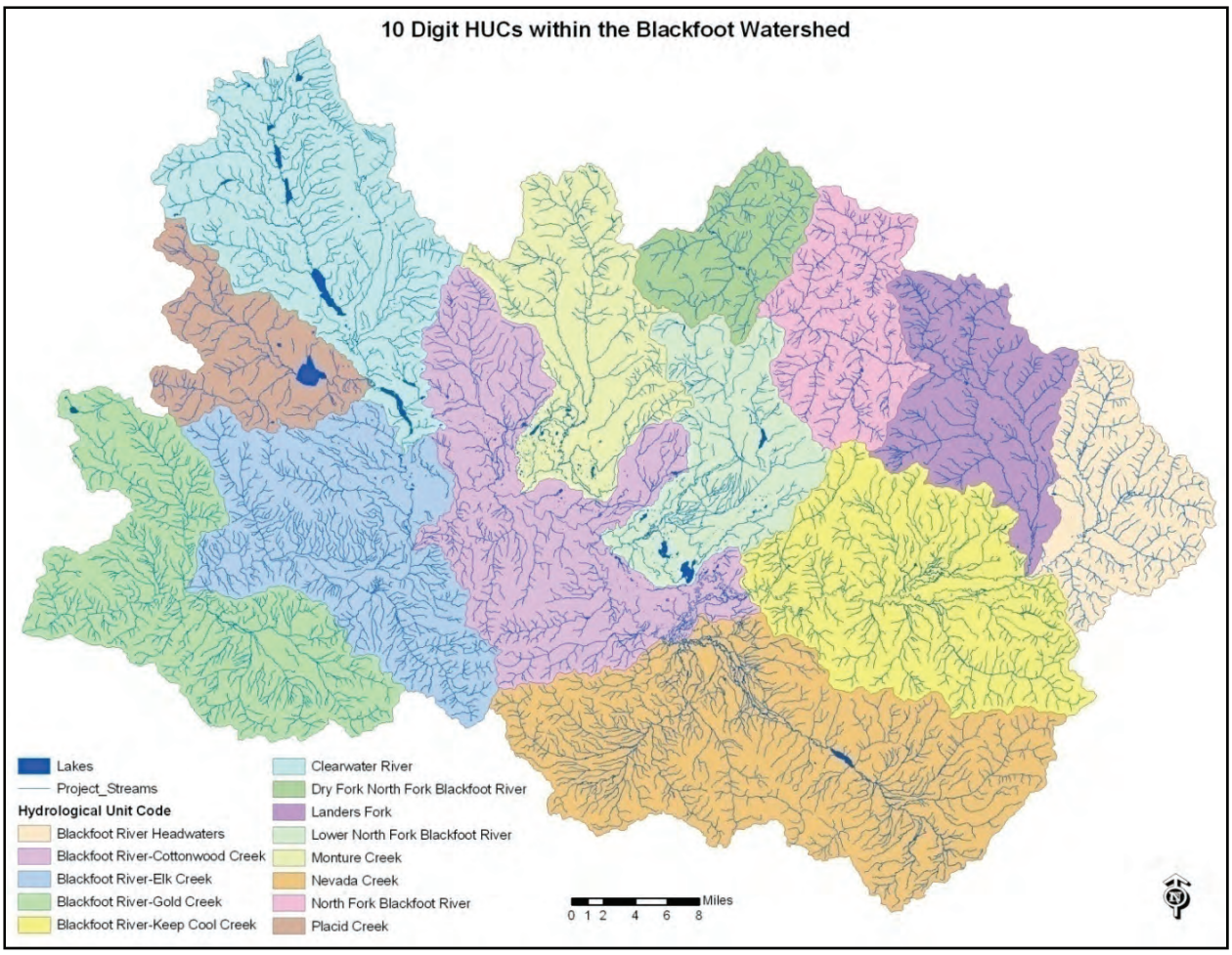

Figure 4. 10 digit hydrological units in the Blackfoot project area.

Recreation

Recreational activities are a valued part of the rural lifestyle for residents of the project area. In addition, many of the communities are economically benefited by tourists seeking to recreate in the project area. In several years in the past decade, closure of forest lands due to extreme wildfire weather conditions and existing wildfires, severely limited recreational activities in the project area. In 2003 and 2007, closure of Plum Creek lands limited some recreational activities, while smoke and the threat of fire turned hundreds of campers and hikers away. In general, severe fire seasons and fire risks have a negative impact on recreational activities.

Natural Resource Management

The project area is predominantly managed as wildlands and working lands by the four public agencies (U.S. Forest Service, Bureau of Land Management, Montana Fish, Wildlife and Parks, and Montana DNRC), The University of Montana (Lubrecht Experimental Forest), Plum Creek Timber Company, and The Nature Conservancy. The remaining lands in the plan are residential or maintained as ranchlands. The U.S. Forest Service lands in the western half of the project area are administered by the Seeley Lake Ranger District of the Lolo National Forest and the Lincoln Ranger District of the Helena National Forest administers the lands in the eastern half of the project area. These lands include areas of designated wilderness, where management activities are very limited and primarily involve trail

maintenance. Other areas of the National Forests are managed for multiple uses, although only a small percentage of timber or fuels management has occurred in the last 10 years. The Bureau of Land Management lands primarily occur in the southeastern corner of the project area. The Federal Land Policy and Management Act of 1976 guides management of BLM lands based on the principles of multiple use and sustained yield of natural resources within a framework of environmental responsibility and scientific technology.

State lands within the project area are primarily managed by the Clearwater Unit of the Montana DNRC. Lands within the Blackfoot-Clearwater Wildlife Management Area are managed by Montana Fish, Wildlife, and Parks. Montana DNRC manages its lands for timber production to produce income under its school trust responsibilities. The Blackfoot-Clearwater Wildlife Management Area is primarily managed to maintain its value as big game winter range. The Lubrecht Experimental Forest is managed by the University of Montana primarily for research purposes.

Plum Creek Timber Company manages its lands to produce financial returns to the company. This has historically been through forestry operations, but a recent shift has increased emphasis on management for real estate values. As Plum Creek Timber Company increases its sale of lands for "highest and best use" within the project area, expansion of residential properties could increase the overall size of the wildland/urban interface (WUI), and increase areas at risk from wildfires. However, recent large purchases by The Nature Conservancy (TNC) (88,000 acres in the Blackfoot Community Project) and planned purchase of 160,000 acres through the Montana Legacy Project by TNC and The Trust For Public Lands) will remove much of this potential expansion of the WUI. TNC currently owns some of the lands included in the Blackfoot Community Project. TNC manages its land for habitat and wildlife conservation while generally holding these lands for a short period of time until they can be purchased by or transferred to a public agency.

The Blackfoot project area supports a number of forest products companies. These include Plum Creek Timber Company (land only), Pyramid Mountain Lumber, and Round Wood West, Bouma Post Yard, and Stimson Lumber Company (land only). In addition, other forest product mills in the surrounding area include Smurfit-Stone, Plum Creek Timber Company, and Alpine Forest Products. These companies provide a demand for timber or fiber that can help support fuel thinning programs in the plan region.

Cultural Resources

The Blackfoot project region supported considerable use by Native Americans prior to Euro-American settlement in the late 1800's-early 1900's. In fact, understanding historical fire regimes in the Valley is also a function of understanding how Native Americans used fire to "manage" their environment for travel and hunting. No map of cultural sites was produced as part of this fire plan.

CONDITIONS INFLUENCING WILDFIRE EVENTS

Fire Weather

Critical fire weather is defined as conditions whose effects on fire behavior make control difficult and threaten firefighter and community safety. Weather patterns common to the project area that contribute to critical fire weather include high afternoon temperatures (mid-80's to high-90's) coupled with low relative humidity (mid-teens to mid-40%). If high temperatures and low relative humidity are further combined with afternoon and evening winds of 10 miles per hour or greater and if this weather pattern persists for several days or more, most forests will rapidly transition from moist fuel conditions to drought-like fuel conditions. During periods of unusually high temperatures, it is also not uncommon to experience thunderstorms that roll through the area with associated lightning and high winds, but very little rain.

Hazardous Fuels

Forest Cover Types and Fuels

The map of forest cover types for the planning area was developed from satellite imagery landscape classification coverage obtained from LANDFIRE. This cover was based on Landsat imagery from 2001 and 2006. The coverage was classified by LANDFIRE using a fuel model classification system similar to the one developed for the Clearwater Unit of the DNRC - "Aids to determining fuel models on the Clearwater Unit" (D.M. Geyer, unpublished Report). Each fuel model was given the following rating: FM 1=1, FM 2=3, FM 5=7, FM 6=8, FM 8=8, FM 9=7, FM 10=10. This information was used to develop a fuel hazard map for the Blackfoot project area (Figure 5).

An accuracy assessment of the fuel model classification was conducted using data points collected from 2005-2008 in the project area. Field accuracy assessments were conducted for habitat type, and the resulting fuel model classification. Sample points were randomly stratified across the 7 fuel model categories. Only publicly accessible lands were included in the stratification. A total of 178 points were used to calculate the accuracy of the LANDFIRE classification. Fuel model classes were lumped together into three fire risk categories: low, moderate, and high. Table 2 shows the resulting accuracy of the LANDFIRE classification based on those classes. It should be noted that the accuracy of the actual fuel model classification was considerably lower than the classification of low, moderate, and high fire risks. While this is not a concern for fuel mitigation prioritization, use of the LANDFIRE data and maps for projecting fire behavior particularly in a fire-response scenario, should consider the lower accuracy of these data sets.

Table 2. Accuracy assessment of field assessed fuel model classification versus the LANDFIRE fuel model classes.

	LANDFIRE Fuel Model				
Actual Fuel Model	Low	Moderate	High	Total	User's Accuracy
Low	44	18	1	63	69.84%
Moderate	6	66	13	85	77.65%
High	0	9	21	30	70.0%
Total	50	93	32	178	-
Producer's Accuracy	88.0%	70.97%	60.0%		
			Total UserAccuracy		73.60%

There are multiple limitations with using satellite imagery for fuel hazard ranking that must be discussed. Because satellite imagery classification is based primarily on the overstory vegetation, it is less dependable for identifying structure and understory conditions that heavily influence fuel hazard rankings. For this reason, classification of fuel model categories 8 and 10 were particularly difficult in the project area. In addition, logging history was not available therefore fuel model categories 11, 12 and 13 were not included in the fuel hazard ranking for the plan region. Future efforts to map fuel hazards should strive to overcome these limitations and deficiencies in existing data.

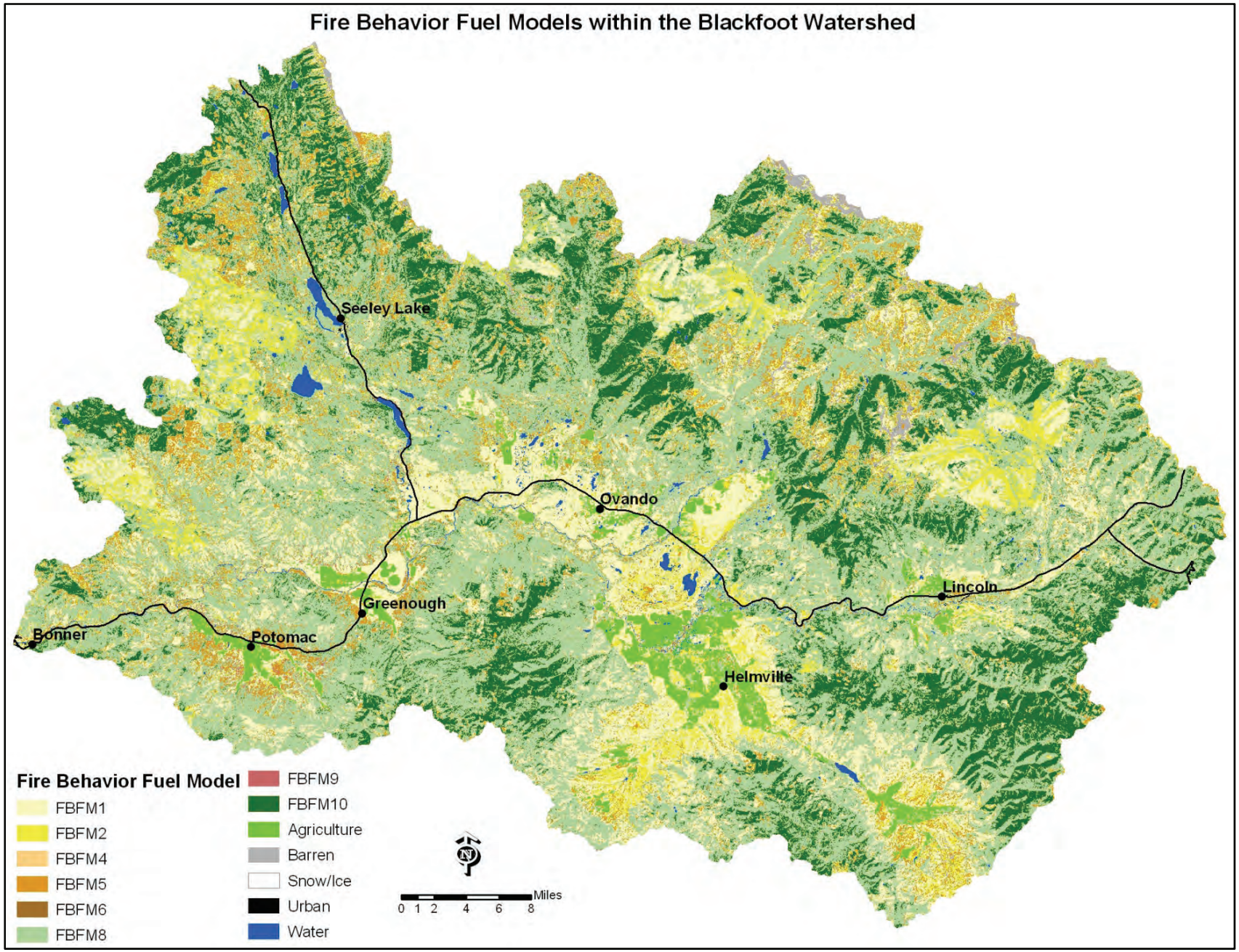

Figure 5. Hazardous fuels in the project area, as classified using the Geyer fuel models.

Fire Regime Condition Class

A fire regime condition class (FRCC) is a classification of the amount of departure from the historical fire regime. This departure results in changes to one or more of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern) and fuel composition, as well as fire frequency, severity, and pattern. They include three condition classes based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the historical fire regime. Low departure is considered to be within the historical range of variability, while moderate and high departures are outside.

The identification of FRCC is currently a high priority for determining forest restoration goals on state and federal ownership. FRCC GIS layers have been developed for the project area by the U.S. Forest Service but when reviewed relative to actual conditions were found to be too coarse for application at the stand level and for fuel reduction purposes in the project area. The development of stand level FRCC information has been identified by local forest managers as a high priority need for determining ecologically appropriate fuels reduction strategies in the Blackfoot project area.

It is also important to note that while FRCC is an important tool for state and federal forest managers, it has less relevance to fuel reduction programs in the wildland-urban interface. While FRCC provides important information on appropriate ecosystem restoration goals, inside the WUI ecosystem restoration is not as high a priority as it is outside the WUI. Typically, inside the WUI public safety is an overriding factor for fuels reduction programs that outweighs other ecosystem restoration goals. On some habitat types, fuels reduction can benefit both public safety and ecosystem restoration goals (i.e., warm, dry Douglas-fir) but on other habitat types, fuels reduction for public safety may not contribute toward ecosystem goals (i.e., cool, moist subalpine fir).

Natural Firebreaks

Natural firebreaks within the project area are not well distributed but where they occur, are primarily represented by open grasslands most common to the central and eastern portions of the project area. Several large lakes are also present in the northern part of the project area. The Blackfoot River and other larger rivers, as well as highways and some roads, can also act as firebreaks during mild to moderate weather conditions. However, it is important to note that under more extreme or critical weather conditions (i.e., high temperatures, low humidity, and moderate to high winds) burning embers can be carried long distances and ignite fires on the other side of a natural firebreak. Grassland openings can represent opportunities to slow or stop wildfires where reasonable weather conditions permit.

Fire History

Information on fire history for the project area was obtained from multiple sources: Lolo National Forest, and U.S. Forest Service Region 1. Figure 6 identifies the approximate boundaries and frequency of the historical fires in the region based on field surveys, local knowledge, and GIS mapping. The largest number of acres burned in a single year by wildfire occurred in 1988 with 96,418 total acres. It is also interesting to note the pattern of recurrence of fire in many of the previously burned areas.

Fire Ignition History

Approximately 2533 wildfires were recorded in the project area between 1889 and 2007 (Source: U.S. Forest Service Region 1 and MT DNRC). Of these 2533 fires, 73% were lightning caused fires and 27% were human-caused fires. Patterns of historical fire ignition densities indicate that most of the human-caused fires (Figure 7) originated near the most densely populated areas and near high-use recreational areas. Lightning strikes occurred throughout the plan region (Figure 8).

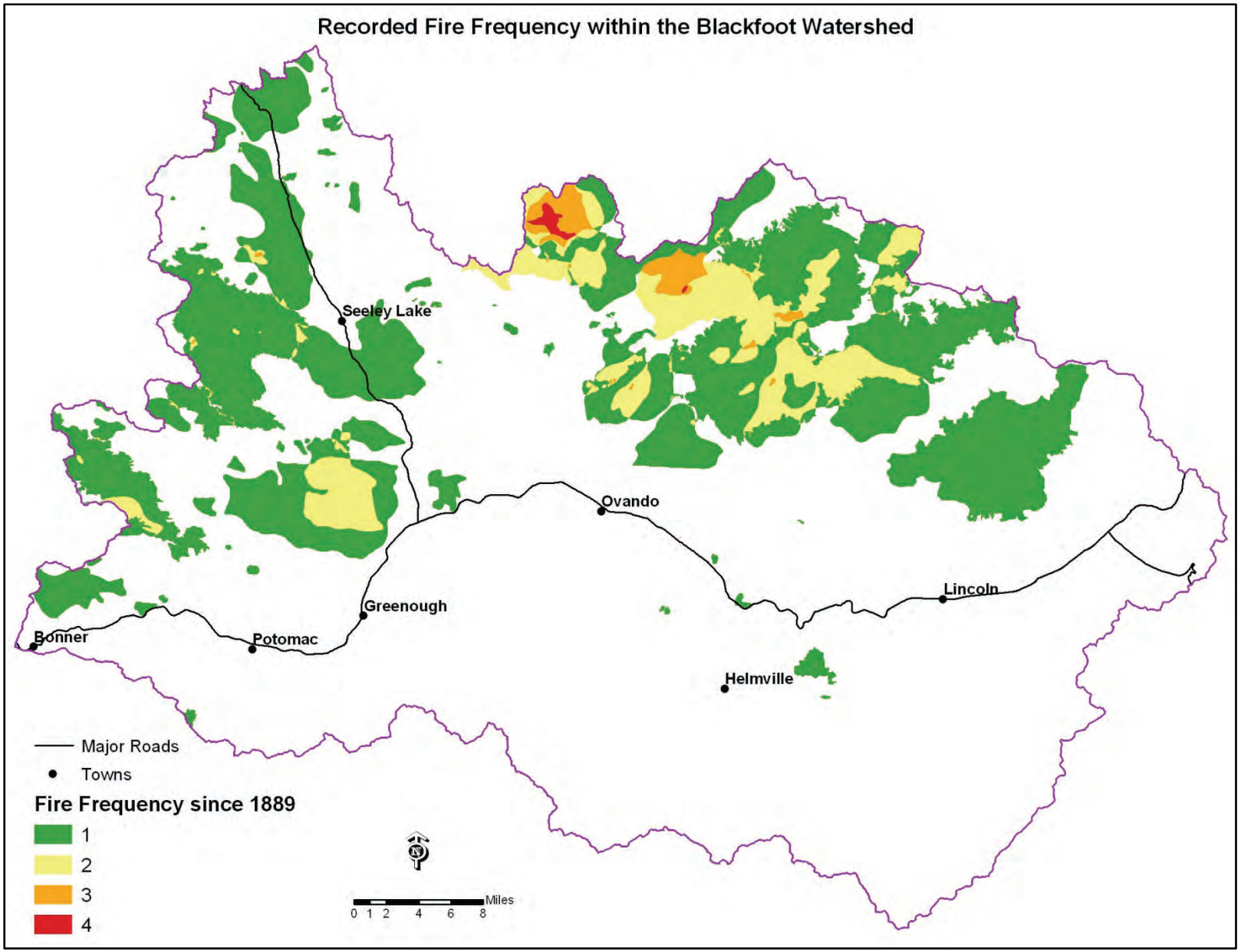

Figure 6. Frequency and extent of historical fires since 1889 in the Blackfoot watershed.

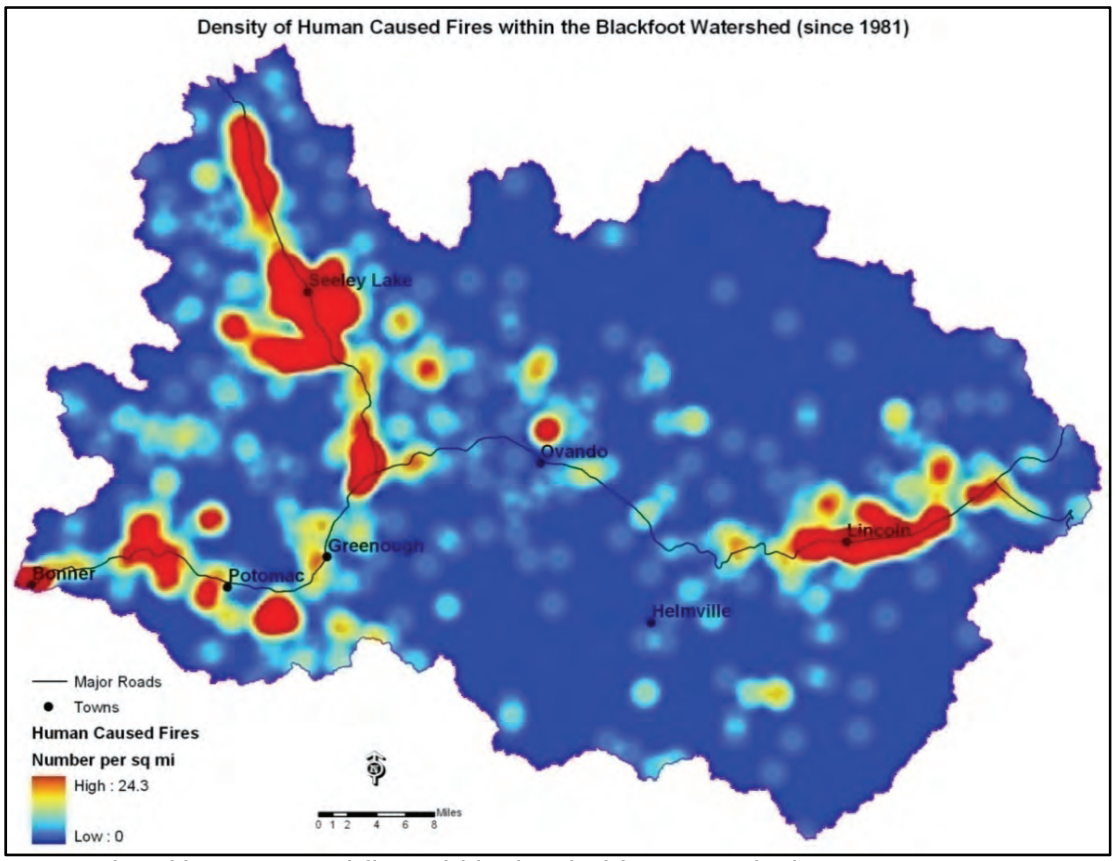

Figure 7. Density of human caused fires within the Blackfoot watershed.

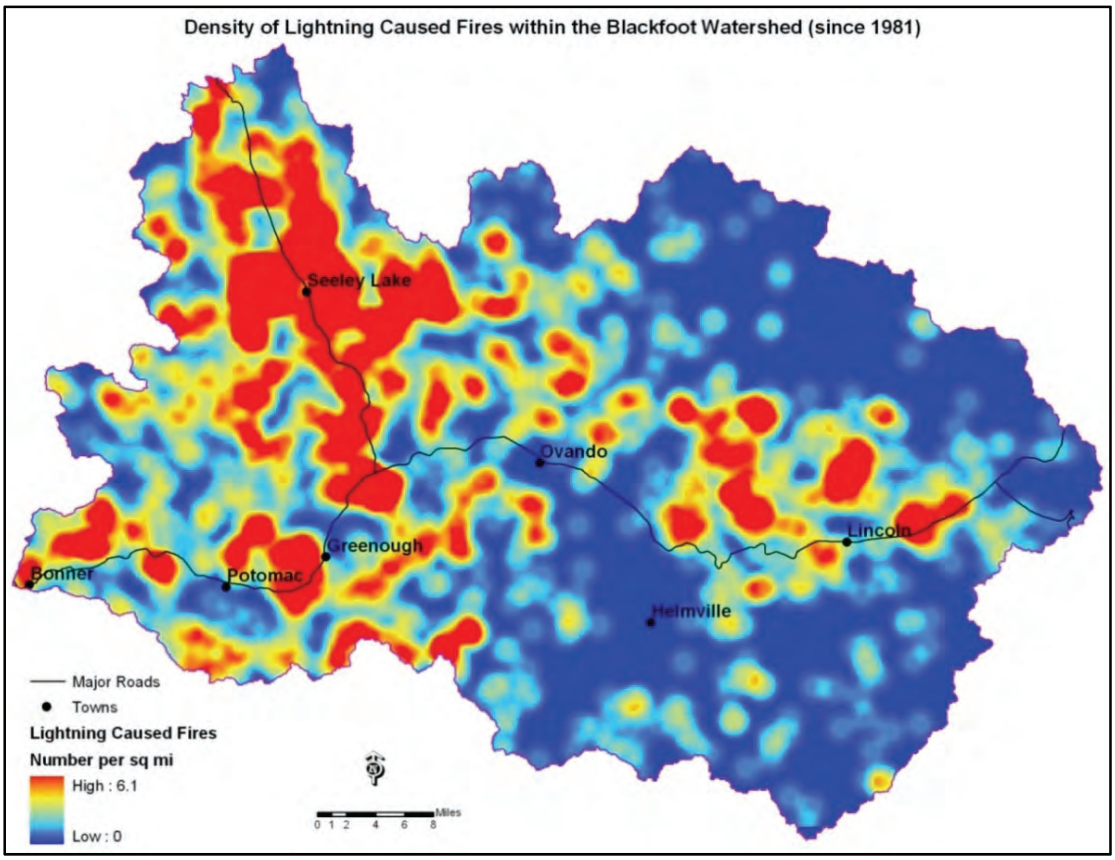

Figure 8. Density of lightning caused fires within the Blackfoot watershed.

Expected Fire Behavior

Fire behavior in the Blackfoot project area is expected to be variable depending on site-specific forest conditions and overall weather patterns. The following provide a general discussion of four levels of fire behavior and how they may relate to vegetative conditions occurring in the project area.

Low Fire Behavior

The fire may spread rapidly, but is easy to extinguish with average wind conditions.

Fine fuel moisture – above 15%, twigs and branches are readily bendable.

Vegetation - Low density vegetation that may include open conifer stands with less than 35 percent crown cover. Typical vegetation may include grasslands, weeds, brush under two feet tall, aspen, cottonwood or willow trees.

Moderate Fire Behavior

Moderate fire behavior may produce flare-ups many feet above treetops with sparks thrown ahead of the main fire. The fire spread is variable (slow to fast) depending on specific site conditions and can produce considerable heat with average wind conditions.

Fine fuel moisture – ranges between 8 to 15%, twigs and branches may snap when bent.

Vegetation - trees with a crown cover of 35-55 percent of the ground area. Usually tree crowns are not touching. Herbage and litter are present with patches of small trees and dead wood.

High Fire Behavior

Frequent flare-ups that go higher than tree tops with "crown" fires possible, sparks can be thrown far in front of main fire with average wind conditions.

Fine fuel moisture – below 8%, twigs and branches instantly snap when bent.

Vegetation influencing high fire behavior includes dense conifer stands with more than 55 percent crown cover, brushy understory or ladder fuels to the canopy. Crowns are usually touching.

Extreme Fire Behavior

Fire conditions exhibiting a high rate of spread, prolific crowning and/or spotting, presence of fire whirls, and/or a strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment. Fire under these conditions is often described as erratic and very dangerous. This usually implies a level of fire behavior that often precludes actions or methods that would establish direct control.

Vegetation contributing to extreme fire behavior is frequently similar to that described for high fire behavior but with critical weather conditions (high temperatures, low humidity and wind) exacerbating the fire behavior and negatively impacting efforts to control the fire.

4.0 HAZARDOUS FUELS RISK ASSESSMENT

A risk assessment was conducted to evaluate the risk of wildand fire to the communities of the Blackfoot Watershed. The goal of the risk assessment process is to determine what areas are cumulatively the most vulnerable to wildfire hazards. The risk assessment approach applied in this strategy used a Geographic Information System (GIS) and the relevant landscape data to evaluate the vulnerability of people, structures and community assets to potential wildfire. This type of analysis is dependent on the accuracy of the data used. To expedite completion of the strategy and reduce overall costs, existing data were used to conduct the risk assessment. Except for the fuel hazard classification, accuracy assessments were not conducted on the existing data.

FUELS AND SLOPE

The fuel hazard ratings results discussed in Section 3.2.1 were further combined with 5 weighted categories of slope (0 to 10^{o}=1, 10 to 20^{o}=2, 20 to 30^{o}=3, 30 to 40^{o}=5, and greater than 40^{o}=10) to assess the overall fuel hazard within the fire plan region. The overall fuel hazard rating was calculated by adding fuel hazard rating to one half the slope rating (Figure 9). Increasing slope can have a chimney effect that increases the overall fire intensity and spread rate within a forest stand.

STRUCTURE DENSITIES AND EVACUATION ROUTES

Information on structure densities (structures per square mile) for the project area was combined with information on evacuation routes to produce a map (Figure 10) prioritizing the vulnerability of the communities to wildfire risk. Evacuation routes were based on a 1.5 mile buffer delineated on either side of the primary evacuation routes, a 0.5 mile buffer on either side of secondary evacuation routes, and a 0.25 mile buffer on either side of tertiary evacuation routes as identified in section 2.9.1. The primary road buffer was given a weighting of 5 within 0.5 miles, 4 within 1 mile, and 3 within 1.5 miles. The secondary and tertiary buffers were given a weighting of 3. The structure density (structures/square mile) was broken into 10 weighted categories (>0-1=1, >1-2=2, >2-5=3, >5-10=4, >10-25=5, >25-50=6, >50-100=7, >100-150=8, >150-200=9, >200=10) and combined with the weighted evacuation routes to create a structure density/route layer. This layer was also used as the primary input to delineate the boundary of the Wildland-Urban Interface (WUI) in the project area. The WUI includes the portions of the project area that fall within one of the evacuation route buffers or within 1.5 miles of where the structure density is greater than or equal to 16 structures/square mile.

CUMULATIVE EFFECTS – FINAL RISK ASSESSMENT

The fuel hazards/slope information was combined with the structure densities/evacuation route information to produce a map of each stand's cumulative risk to human life or property. This map used the fuel hazard rating for each location that ranged from 1-15 based on the amount and type of fuels present as well as the slope. It then combined the fuel hazard with a structure density/evacuation route rating that ranged from 1-15, with 15 being the highest priority areas for human safety and evacuation areas. The fuel hazard rating and structure/evacuation rating were combined using an 80%/20% split. This means 80% of the final score came from the fuels hazard/slope information and 20% of the final score came from the structure densities/evacuation route information. The resulting map (Figure 11) identifies the combined ratings and identifies forest stands that present the greatest risk to human life or property under their existing conditions. The stands with high ratings can be listed by ownership and prioritized for preventive actions, either by agency management, for use in prioritizing possible funding support for fuel thinning on private lands, and for prioritizing other private land fuel mitigation activities.

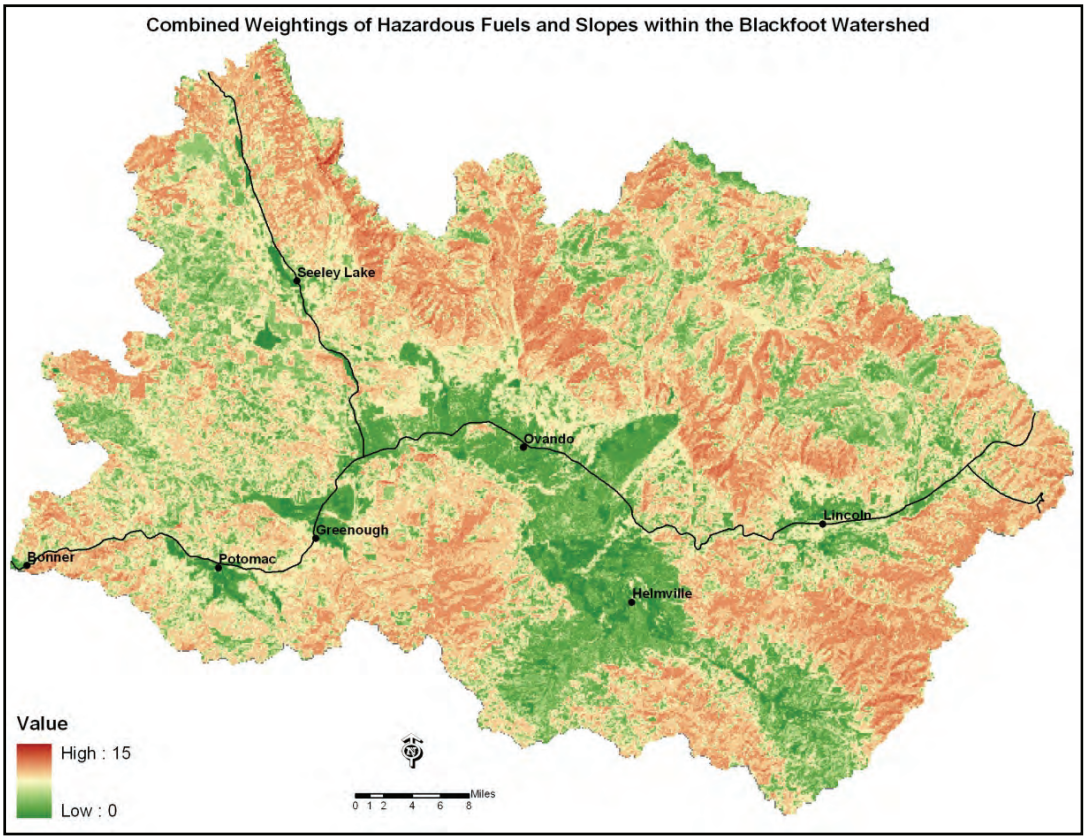

Figure 9. Combined weighting of hazardous fuels and slopes for the project area.

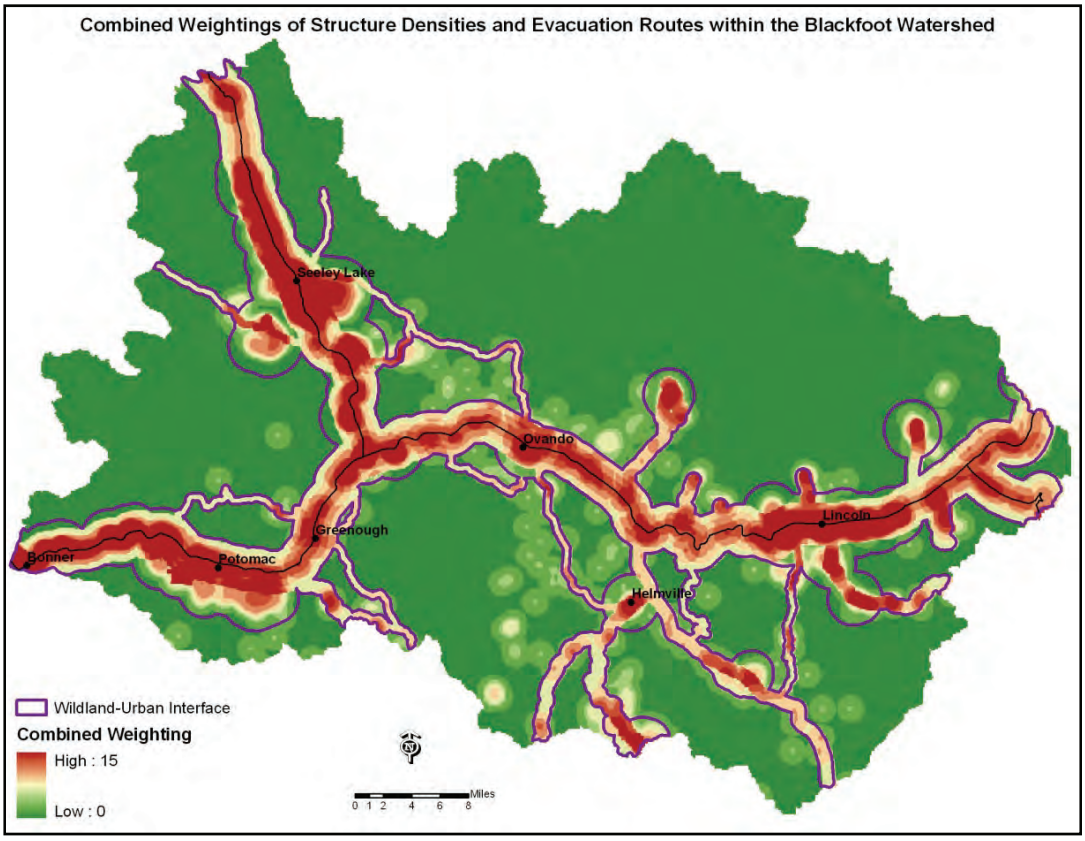

Figure 10. Combined weighting of population densities and evacuation routes for the project area

Risk Assessment within the Blackfoot Watershed

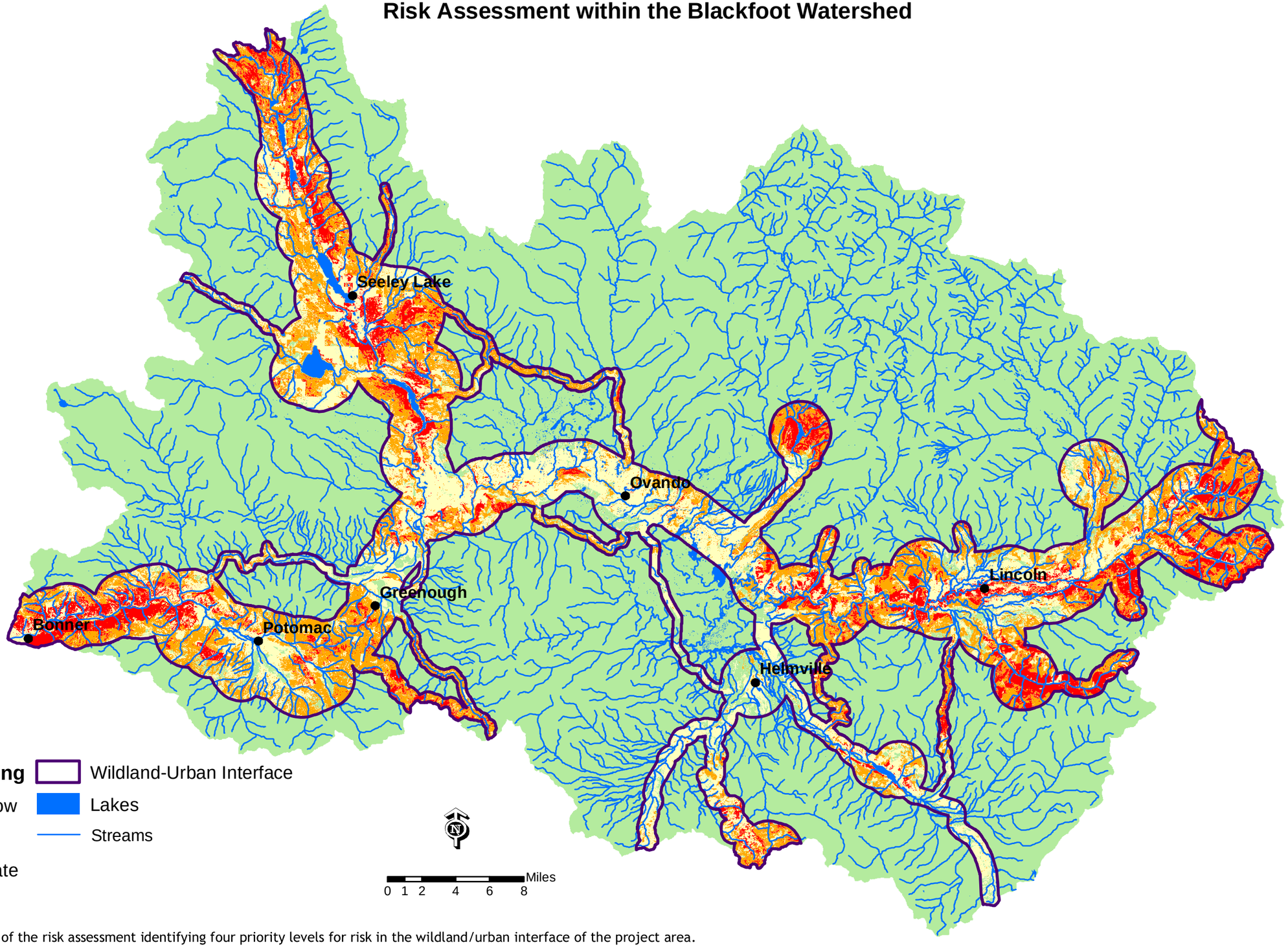

Figure 11. Results of the risk assessment identifying four priority levels for risk in the wildland/urban interface of the project area.

5.0 WILDFIRE MITIGATION

THE COMMUNITIES: PRE-FIRE PREPARATION

Interagency Collaboration

The Rural Fire Districts, Lolo and Helena National Forests, Bureau of Land Management, and DNRC Blackfoot-Clearwater Units have worked together over the past 20 years to ensure interagency coordination and collaboration relative to wildfire prevention and suppression in the project area. To aide in this regard, these agencies have developed mutual agreements and a six-party federal and state agreement. They also revise operating plans with dispatch centers and county cooperative agreements on an annual basis.

The ability to plan and implement mitigation treatments across jurisdictional boundaries will require close cooperation among all agencies administering grant programs and all affected landowners. Addressing areas of multi-ownership will be handled initially through public education efforts to identify and make known those priority areas identified by the risk assessment. Consequent efforts between the USFS, BLM and DNRC will require close interagency cooperation and coordination to implement mitigation project areas with joint boundaries. All agencies are committed to work together to implement mitigation efforts identified by the community as priority areas.

An example of coordination and collaboration is the Seeley Lake Fuels Mitigation Task Force. This Task Force is comprised of the Rural Fire Districts in the Seeley/Swan Valley along with the Seeley Lake and Big Fork Ranger Districts of the Lolo and Flathead National Forests, the Clearwater Unit and Swan Valley Unit of MT DNRC, the Clearwater Resource Council, and the Swan Ecosystem Center. This Task Force was formed to expand on the existing cooperation of fire response agencies for coordinated fire readiness and response, and to coordinate fuel mitigation work. The Task Force has applied for and received funding for fuel mitigation on private lands, coordinated fuel mitigation work among agencies, delineated primary lines of defense for fuel mitigation priorities, and hired a fuels mitigation coordinator to assist private landowners with obtaining fuel mitigation funding and completing fuel thinning.

Coordinated Resource Management Plans

The Clearwater Resource Council (CRC) is a community-based organization that provides input and support to natural resource issues in the Clearwater watershed. The CRC developed a Landscape Assessment that crosses all land ownerships for a watershed view of the landscape. The assessment's maps and information were developed to help federal and state land managers, timber industry, and private landowners incorporate the needs of the community in natural resource management decisions for the Clearwater watershed. The CRC Landscape Assessment can be viewed at www.crcmt.org. The Blackfoot Challenge is a landowner-based group that coordinates management among agencies, landowners, and others within the Blackfoot River Watershed. Multiple resource-based documents have been produced for this effort and are available on their website at www.blackfootchallenge.org.

County Land Use Planning and Zoning

County land use planning and zoning has been implemented within the Blackfoot Watershed. Powell County has implemented a zoning plan for the northern part of the County that identifies local communities and then has placed zoning of 1 dwelling per 160 acres in areas outside of these local community boundaries. The Seeley Lake Community Council approved a proposed land use plan that recognized the wildland/urban interface within the Seeley Lake Planning Region, and encouraged

future development to occur within the existing interface. It has recommended adoption of zoning to further encourage future development to occur within the interface and to maintain wild and working forestlands. The proposed land use plan is being considered by the County.

Fire Protection

Ignition Workload Analysis

The following table represents the number of wildfires within the northern portion of the project area that were responded to by MT DNRC and the U.S. Forest Service over five fire seasons.

Fire Season	Suppressed	Escaped Initial Attack	Total Fires
2008	68	0	68
2007	88	6	94
2006	61	3	64
2005	29	0	29
2004	51	1	52

The ratio of successful fire suppression in the project area to the total fire workload during this five-year period is 98%. The average number of fire responses in this five-year period decreased 59% over the previous five-year period.

Strategic Fuel Breaks

State and federal agencies should work with local communities within the project area to identify strategic fuel breaks to maximize the benefits of fuel reduction programs to public safety. The Seeley/Swan Fire Plan updated in May 2008 included various primary lines of defense (PLOD) situated around high density areas. The PLOD identifies those areas that are the most critical from a fuel mitigation standpoint.

Safety Zones

Safety zones should be developed in cooperation with local communities and firefighting agencies. The locations of these safety zones will be geographically referenced and added to the GIS system with future data acquisition efforts. These zones should be displayed on maps and provided to the public so that they are knowledgeable of where to go during a severe fire emergency. Maintaining safety zones as functional areas should be a high priority for fuel mitigation work.

Community Fire Plans

The National Fire Plan (2000) and the Healthy Forests Restoration Act of 2003, along with several other national fire-planning documents, mandate the development of community-level fire plans to help coordinate firefighting resources, develop collaboration among firefighting agencies, and develop a course of action for reducing the threat of wildfire to residents and their property, as well as wildland firefighters. In many instances, federal funding is tied to the existence of a community fire plan. Several community fire plans have been developed that overlap the Blackfoot project area: the Missoula County Community Wildfire Protection Plan, the Powell County Community Wildfire Protection Plan, the Tri-County Regional Community Wildfire Protection Plan, the Seeley-Swan Fire Plan, and the Lincoln Rural Fire District Community Wildfire Protection Plan.

Fuel reduction priorities were also identified in County plans. The Missoula County Community Wildfire Plan identified areas within the county with high fuel loads within a defined wildland-urban interface. This information was developed from satellite imagery as well as from input obtained from local fire chiefs. The Blackfoot Fuels Assessment has been developed as a fine-scale plan with additional fuel mitigation information that will benefit the Blackfoot Challenge and others in fuel mitigation planning. Similarly, the Powell County Community Wildfire Plan and Tri-County Regional Community Wildfire Protection Plan overlap with some of the Blackfoot Fuels Assessment Plan, but are designed for broader planning at the county level.

REGULATORY COMPLIANCE

Potential legal barriers to implementing various aspects of wildfire mitigation plans on National Forest lands include National Environmental Protection Act (NEPA) and Endangered Species Act (ESA) regulations and compliance issues, as well as potential citizen or organizational intervention (legal challenges) to proposed mitigation actions. Also, agency priorities for ongoing projects and potential agency funding restrictions for new projects have the potential to act as barriers to implementing mitigation actions identified and deemed necessary by the community.

At the federal level, NEPA concerns address threatened and endangered species and potential impacts that mitigation efforts will have on these. In the Blackfoot River Watershed, existing threatened and endangered species include the grizzly bear, Canada lynx, bull trout, and wolf. All four species are listed as threatened under the ESA. Both state and federal land management is influenced by ESA.

Potential citizen intervention in the form of legal challenges to mitigation efforts, while always a potential, are unlikely to come from the communities affected by this fire plan. Recent large wildfire events in the valley have resulted in heightened wildfire hazard awareness among community members. As a result of this, there is overwhelming consensus among community members, that mitigation action to reduce the threat of catastrophic losses due to wildfires is an urgent priority.

The Healthy Forest Restoration Act (HFRA) alleviates some potential barriers in the short term. Specifically, the HFRA established an abbreviated appeal process that allows agencies to propose one alternative action treatment, as opposed to multiple alternatives. In the event of legal challenges to proposed actions, the HFRA also gives the courts direction as far as considering the effects and potential catastrophic outcomes of no action being taken.

In addition to the ESA, potential legal barriers to implementing various aspects of wildfire mitigation plans on state lands include the Federal Enabling Act of 1889 and the Montana Environmental Policy Act. The Enabling Act granted sections 16 and 36 to the State of Montana and provided that proceeds from the sale and permanent disposition of any of the trust lands, or part thereof, shall constitute permanent funds for the support and maintenance of the public schools and the various state institutions for which the lands had been granted. The Montana Constitution provides that these permanent funds shall forever remain inviolate, guaranteed by the State of Montana against loss or diversion. The department's obligation is to obtain the greatest benefit for the school trusts. The greatest monetary return must be weighed against the long-term productivity of the land to ensure continued future returns to the trusts. The State Forest Land Management Plan (SFLMP), approved by the State Land Board in June 1996, guides the management of the forested trust lands. This guidance is provided in the form of general management philosophy and specific resource management standards. In February 2003, the State Land Board approved new Forest Management Administrative Rules that provide programmatic direction for the Forest Management Program. These rules are written in support of the resource management standards contained within the State Forest Management Plan. These new rules apply to all timber management activities initiated as of the date of acceptance of these rules by the State Land Board.

The second legal mandate influencing fuels mitigation on state lands consists of the Montana Environmental Policy Act (MEPA). MEPA was enacted by the 1971 Legislature and provides a public process that assures Montana's citizens that before state government makes a decision that could have significant impacts on the human environment a deliberate effort is made to identify those impacts. The concept is that the decision maker and the public should be well informed of the environmental impacts of the decision before the decision is made. In order to learn the most about what the environmental impacts of a significant state action might be, agencies are directed to obtain the input of others. This is important because state government often makes decisions that can impact the environment or affect personal property rights or quality of life, and no one decision maker has all the answers.

There are two basic types of state government activities that most commonly require a MEPA review of possible impacts on the human environment. The first type of activity is an agency-sponsored proposal to implement a program or project or to undertake an activity on its own or in concert with other agencies. This may include local projects if they are funded by the state. Examples include timber sales on state lands or the construction of a road or a state recreation area. The second type of activity includes a decision by the state to grant to an applicant a license, permit, lease, or other state authorization to act. Examples of this type of action include permits for mines, air or water quality discharges, surface or ground water use, mineral leasing, and many others.

MEPA requires agencies to prepare a written environmental review that is available to the public. This review may be a simple checklist environmental assessment (EA), a more comprehensive EA, or a more detailed environmental impact statement (EIS). MEPA requires that the level of analysis and the degree of public involvement increase, depending on the significance of the potential or identified environmental impacts.

HAZARDOUS FUELS REDUCTION

Priorities

The risk assessment analysis conducted for the project area identified high, medium, low, and very low priority levels within the wildland/urban interface. Areas with high fuel loadings, particularly on steep slopes occurring within this interface represent significant risk to human life and property. A first priority for fuel reduction programs would be to reduce these fuel loadings to safer levels. This will be an on-going process, as the favorable forest productivity of the project area means that additional fuels are added each year, and will accumulate to undesirable levels without continued fuel reduction programs.

Mitigation Goals by Landowner

The results of the Blackfoot Watershed risk assessment identified 76,609 acres in the category of high risk from wildfire. An additional 163,628 and 145,569 acres were identified for the moderate and low risk categories, respectively. Table 3 identifies the number of high and moderate risk acres occurring in the WUI by landowner.

Mitigation goals for the plan region should be set by the cooperating agencies. For example, a goal may be to reduce the number of acres in the high priority category by at least 10% of the total each year. If this goal were set, this would require treatment of approximately 7,660 acres of high priority fuel hazard conditions each year for the next ten years. Additional acres within the moderate risk category would be treated if additional resources were available.

Table 3. Number of high and moderate priority hazardous fuel reduction acres by landowner for the Blackfoot project area.

	Priority Level	
Landowner	**High**	**Moderate**
Lolo National Forest (Missoula RD)	706	1,042
Lolo National Forest (Seeley Lake RD)	12,989	25,168
Helena National Forest (Lincoln RD)	17,532	23,205
U.S. Bureau of Land Management	3,806	6,386
U.S. Fish and Wildlife Service	154	243
State of Montana (DNRC/U of M/DOT)	7,261	21,850
MT FWP	1,253	3,125
Plum Creek Timber Co.	7,941	18,044
Stimson Lumber Co.	1,625	1,858
The Nature Conservancy	665	4,700
Private	22,451	57,824
Local Government	48	65
Minor Miscellaneous	178	118
Total	**76,609**	**163,628**

Information was also available for the areas covered by the Seeley-Swan CWPP and the Powell County CWPP. The CWPP process for these areas produced different Wildland-Urban Interfaces (Figure 12).

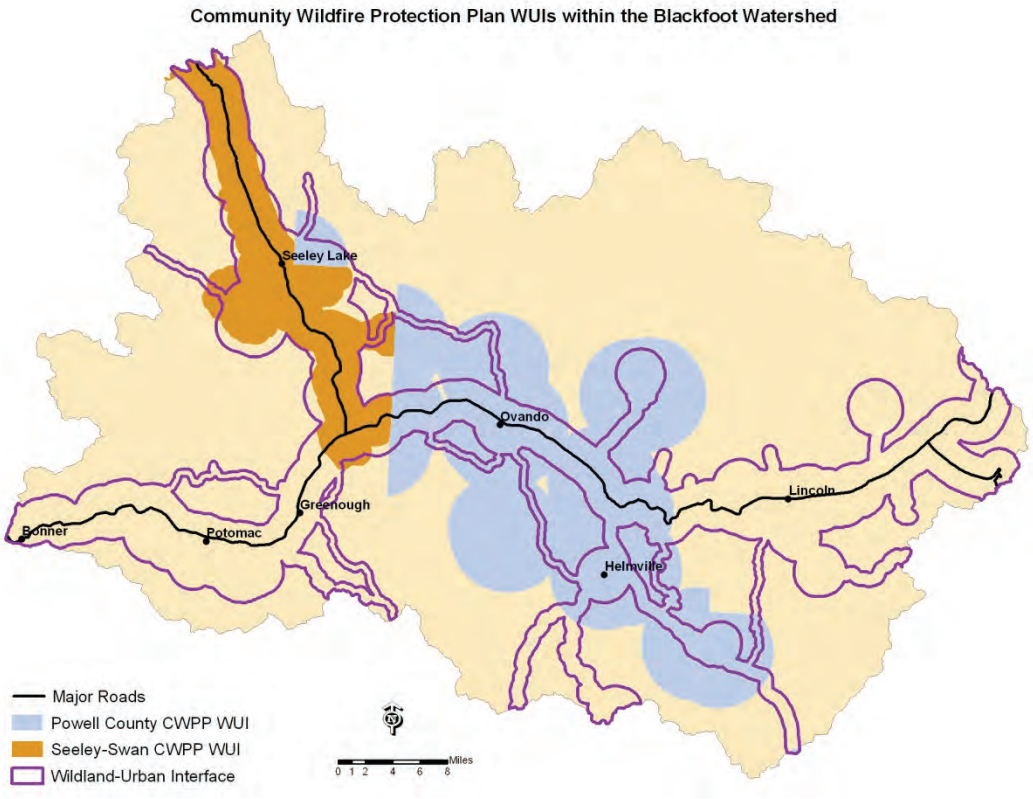

Figure 12. Wildland-Urban interfaces developed for Powell County and Seeley-Swan CWPPs compared to the Wildland-Urban Interface developed for the Blackfoot Watershed Fuels Assessment.

Table 4 and Table 5 show additional priority acres identified in the Seeley-Swan and Powell County plans, respectively. At the time of this writing GIS data were not publicly available for the Missoula County CWPP and Tri-County CWPP.

Table 4. Additional high and moderate priority hazardous fuel reductions acres by landowner within the Seeley-Swan CWPP WUI.

	Priority Level	
Landowner	**High**	**Moderate**
Lolo National Forest (Seeley Lake RD)	36	795
U.S. Bureau of Land Management	56	90
State of Montana (DNRC/U of M/DOT)	72	970
MT FWP	3	53
Plum Creek Timber Co.	41	637
Private	26	598
Total	**234**	**3,143**

Table 5. Additional high and moderate priority hazardous fuel reductions acres by landowner within the Powell County CWPP WUI.

	Priority Level	
Landowner	**High**	**Moderate**
Lolo National Forest (Seeley Lake RD)	4,667	11,178
Helena National Forest (Lincoln RD)	4,816	8,284
U.S. Bureau of Land Management	4,743	12,230
U.S. Fish and Wildlife Service	0	74
State of Montana (DNRC/U of M/DOT)	609	5,189
MT FWP	408	1,470
Plum Creek Timber Co.	15	148
Stimson Lumber Co.	2	0
The Nature Conservancy	442	10,171
Private	659	19,407
Minor Miscellaneous	2	9
Total	**16,363**	**68,160**

Prioritization Process for Fuels Reduction

State and federal agencies can use the results of the risk assessment to give highest priority to projects within the high and moderate risk categories. State and federal grant programs to assist fuel reduction actions on private lands might also give highest priority to projects within the high and moderate risk categories of the risk assessment.

MITIGATION/GRANT PROGRAMS

Funding sources for fuel hazard reduction and firefighting equipment and training have been evolving over the last 7 years with the implementation of the National Fire Plan. The following list of possible funding sources has been identified:

Program: Western Wildland Urban Interface Grant Program
Source: National Fire Plan; administered by MT DNRC
Description: Provides financial assistance towards hazardous fuels and educational projects within the following four goals: 1) improving prevention and suppression, 2) reducing hazardous fuels, 3) restoring fire-adapted ecosystems, and 4) promoting community assistance.
More info: dnrc.mt.gov/forestry/fire/grants/wuigrants.asp

Program: Rural Fire Assistance
Source: Department of Interior Agencies; administered by MT DNRC
Description: Provides funds to rural fire departments for wildfire fighting; also provides wildland fire equipment, training and/or prevention materials.
More info: dnrc.mt.gov/forestry/fire/grants/rfa.asp

Program: Community Protection Grant Program/Stevens Money
Source: U.S. Forest; administered by MT DNRC
Description: Provides funds to minimize losses on private lands adjacent to federal lands where fire-related activities are planned.
More info: dnrc.mt.gov/forestry/fire/grants

Program: Forest Land Enhancement Program
Source: US Forest Service; administered by DNRC
Description: State Forestry Agencies in coordination with their State Forest Stewardship Coordinating Committees will develop a State Priority Plan for FLEP. This Plan will provide the details for how the FLEP funds will be utilized, including minimum acres, maximum acres, aggregate payment, use for technical, educational and cost-share assistance, and all other factors for the program. Landowners will have to have a forest management plan to be eligible for cost-share. The practices to be cost-shared and the cost-share rate will be described in the State Priority Plan. For information about how FLEP will operate in your state, contact MT DNRC.
More info: www.fs.fed.us/spf/coop/programs/loa/flep.shtml

Program: Rural Community Assistance
Source: US Forest Service; administered by Missoula and Powell Counties
Description: USFS provides funds to counties for the development of community strategic fuel reduction actions and fire risk management plans to increase community resiliency and capacity.
More info: Dave Atkins, Regional RCA Coordinator at 406-329-3132

Program: National Fire Plan Community Assistance Program
Source: U. S. Bureau of Land Management
Description: Provides financial and technical assistance for risk assessment and mitigation planning, defensible space/fuel reduction projects and prevention and education programs, with a priority on activities that complement efforts on nearby BLM lands. BLM currently requires that an approved wildfire protection plan be in place before funds are awarded for defensible space or prevention and education projects.
More info: www.blm.gov/nhp/index.htm; www.mt.blm.gov; www.fire.blm.gov

Program: Community Facilities Loans and Grants
Source: Rural Housing Service (RHS) U. S. Dept. of Agriculture
Description: Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; funds have been provided to purchase fire-fighting equipment for rural areas. No match is required.
More info: www.rurdev.usda.gov/rhs/cf/cp.htm; or local county Rural Development office.

Program: Sale of Federal Surplus Personal Property
Source: General Services Administration
Description: This program sells property no longer needed by the federal government. The program provides individuals, businesses and organizations the opportunity to enter competitive bids for purchase of a wide variety of personal property and equipment. Normally, there is no use restrictions on the property purchased.
More info: www.gsa.gov

Program: Hazard Mitigation Grant Program
Source: Federal Insurance and Mitigation Administration, FEMA
Description: Provides states and local governments with financial assistance to implement measures to reduce or eliminate damage and losses from natural hazards. Funded projects have included vegetation management projects. Hazard mitigation projects have been identified by state and county level pre-disaster mitigation plans.
More info: www.fema.gov/fima/hmgp/

More funding information available at: www.firewise.org

Other Possible Wildfire Mitigation Actions

Educational Programs

Public education regarding wildfire risk is a high priority for all fire fighting agencies within the project area. Agency personnel provide presentations to local organizations and audiences when possible and additional educational material and programs will be developed as resources become available.

Defensible Space

Helping communities and landowners understand the need for and specific conditions that represent defensible space around residences will be an important role for local, state, and federal agencies to play in the future. Tools and information to help in this regard include FIREWISE (www.firewise.org) as well as various state and federal brochures and publications that provide guidelines for landowners to follow to achieve defensible space. Existing brochures and publications should be evaluated to ensure the information is up to date and appropriate for fuel hazards and site conditions present in the Blackfoot-Clearwater project area.

Absentee Landowners

The Seeley Lake RFD has produced a video using funds provided by a grant from Montana Department of Commerce that discusses the importance of reducing wildfire threats on property owned by absentee landowners. Additional opportunities for reaching and educating absentee landowners regarding mitigating wildfire risk on private land are recommended.

Fire Safe Inspection Program

Fire inspection audits are offered on a voluntary basis to all homeowners by the rural fire districts within the project area. It is the goal of most RFD's to expand the resources available to conduct these inspections to ensure that all homes are visited within the next five years.

6.0 PLAN UPDATES

This document has several components that should be reviewed and monitored on an annual basis. Considerable data and mapping information was compiled to facilitate firefighting capabilities as well as to identify and prioritize fire hazard areas for treatments. These data and information should be examined and updated on an annual basis. New residences and structures need to be added to the database and maps. Roads, water sources, helipads, and hazard areas need to be reviewed and updated annually. New information on fuel loadings should be incorporated as it becomes available. Sites treated for fuels reduction should be mapped and digitized to document progress toward mitigation goals in the GIS system. Thus, this should be updated in a systematic manner to maintain its currency and utility for fuel mitigation planning.

7.0 APPENDICES (PROVIDED SEPARATELY ON COMPACT DISC)

- Data: GIS layers, tabular data, etc.
- Maps in PDF