

BEAVERHEAD COUNTY, MONTANA
WILDFIRE PROTECTION PLAN

September 2005

Prepared by


**Basic Biological Services LLC
Dillon, Montana**

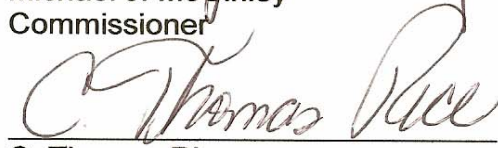
Approval Page

The Community Wildfire Protection Plan contained in this document has been reviewed and approved by the Beaverhead County Board of Commissioners and the Beaverhead County Fire Warden.

Dated this 19 day of September, 2005 by:


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Chairman


Michael J. McGinley
Commissioner


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EXECUTIVE SUMMARY

The citizens and community leaders of Beaverhead County have recognized the severe threat that uncontrolled wildfire presents to private and public property, the environment, the local economy, and to the quality of life. As a result, a Beaverhead County Wildfire Protection Plan has been completed. The Beaverhead County Wildfire Protection Plan (BCWPP) identifies conditions and characteristics of the environment and human activities within Beaverhead County that affect the potential of severe wildfire occurrence.

Initially, existing guidance documents (*Preparing a Community Wildfire Protection Plan*, 2004), fire plans (*Grasshopper Creek-Wise River Drainage Fire Plan*, 2003), and the *Healthy Forest Restoration Act of 2003* were used to outline the planning process for development of a community wildfire protection plan. The process involved the public at eight public Community Wildfire Protection Plan Workshops, and through numerous newspaper advertisements and articles, and radio announcements. Also, meetings between wildfire specialist, firefighting professionals, County, State and Federal representatives, and the public occurred several times per month. The assessments of wildfire hazards and risks, and property and resource values to be protected, has been completed at the workshops and meetings by individuals, community leaders, and representatives of Beaverhead County, the Montana Department of Natural Resources and Conservation (MDNRC), the Bureau of Land Management (BLM), and the United States Forest Service (USFS).

Within this document, wildfire hazards refer to the inherent characteristics of climate and weather, vegetation, landscape, and other naturally occurring phenomena. The term risk is used herein to describe the interaction of humans and their activities within the environment that affect or are affected by wildfire. The primary hazards identified during the Community Workshops and in consultation with wildfire and land management specialists include but are not limited to drought, fuel models, fire regime condition classes, and insects and disease infestations. The primary risks include population density and distribution, travel corridors and destinations, wildfire patterns, structure ignitability, and fire protection infrastructure. Wildfire hazards and risks were assessed with Geographic Information Systems (GIS) technology.

The results of hazard and risk assessments are identification of values to be protected. These values have been described in a general context. The locations and extents of the values to be protected have been identified on a map. The mapped display of these values allowed for the preparation of a Wildland Urban Interface (WUI) and High Wildfire Risk Areas (HWRA) map. The

private properties adjacent to federal lands that are considered by the community to be at risk of damage or destruction from uncontrolled wildfire are considered “at-risk communities” within a “wildland urban interface”. Other public and private values also are delineated on the WUI/HWRA map.

Three categories of high risk and high priority areas have been incorporated into the WUI/HWRA maps. A fourth high risk and priority category was defined but not mapped. The first category of high risk and priority is defined by a 1.5-mile radius boundary around the communities of Argenta, Bannack, Dell, Dewey, Grant, Jackson, Lakeview, Lima, Polaris, Wisdom, and Wise River. A 5.0-mile radius boundary was placed around Dillon. Additionally, high risk and priority is delineated by a 1.5-mile buffer around areas in the County that have a population density of ten or greater people per square mile. These boundaries and buffers all define high priority areas in need of protection against uncontrolled wildfire.

The second category of high risk and priority was assigned to all primary travel corridors within the County. The travel corridors were selected because they are at high risk of initiating wildfire ignition, and because they function as emergency response and escape routes. A 0.5-mile boundary on each side of each road delineates the areas where specific goals should be developed and wildfire mitigation treatments should be implemented.

The third category of high risk and priority are the specific properties and areas identified during the community workshops that lie adjacent to federal lands. The fourth category of high risk and priority was not mapped, but includes all properties that qualify as “at-risk” under the Healthy Forests Restoration Act of 2003 (HFRA), but were too isolated, too small, or too numerous to be included at the map scale used for the Beaverhead Community Wildfire Protection Plan. The fourth category includes sites or areas not specifically identified during the planning process that qualify as “at-risk” under the HFRA.

Finally, the entire County was divided into eight planning zones. Each zone was evaluated based on five general categories of risk. The individual zones were then rated by their risk score, and ranked in order as having High or Moderate risk. The order of the risk ranking by planning zone is: Red Rock-Beaverhead River Corridor (highest risk), East and West Pioneer Mountains, South Centennial Valley, Big Hole Valley Bottom, West Big Hole-Forested, Bannack-Grant Foothills, Tendoy Area, and Blacktail-Gravelly (lowest risk).

An action plan, goals and recommended mitigation activities have been determined for all categories of high risk and priority. The goals and treatment types are neither specific to an individual site, nor specific to the precise manner in which they may be implemented. This will allow for flexibility and options to be incorporated as specific projects are designed for unique sites and areas.

The responsibilities for management of the high risk and high priority areas lie with landowners and County, State, and Federal personnel. Coordinating and

partnering wildfire mitigation treatments between private and public lands will result in the greatest net effect to reduce wildfire impacts. The Beaverhead County Wildfire Protection Plan will be revised annually by the Beaverhead County Wildfire Protection Task Force.

DEVELOPMENT OF THE BEAVERHEAD COUNTY WILDFIRE PROTECTION PLAN

Development of the Beaverhead County Wildfire Protection Plan (BCWPP) requires substantial involvement from members of the small communities located throughout Beaverhead County. Basic Biological Services LLC (BBS) arranged and conducted eight community workshops to address local concerns and interests about wildfire issues. The workshops were held in the towns of Wisdom, Jackson, Melrose, Wise River, Grant, Polaris, Lima, and Dillon between January 11 and 19 of 2005. The workshops were scheduled at either 4:00 p.m. or 7:00 p.m. In addition to two printings of newspaper "Public Notices" within both the Dillon Tribune and the Montana Standard, all members signatory to the Wildfire Planning Task Force and all Beaverhead County Fire Chiefs were individually called and invited to the workshops. Public Notices also were posted at schools, stores, Post Offices, the ski lodge, restaurants, and other public buildings. Numerous unaffiliated individuals also were invited to the workshops. Appendix 1 is the list of all participants throughout the development of the plan.

The purpose of the Community Workshops was educational in nature. Each workshop was initiated with an introduction of the participants attending each meeting, and a brief discussion of current wildfire issues and wildfire history within Beaverhead County. The concept of a wildland/urban interface (WUI), and the opportunity to implement "FireWise" strategies in the WUI was an initial and primary topic. Cost-share opportunities to implement FireWise recommendations, alternative uses of wood by-products that may result during WUI projects, and future grant opportunities for fire-fuel reduction projects were discussed. Beaverhead County, State DNRC, and Federal Agency (USFS, BLM) representatives attended each meeting. Federal and State agency personnel described how the Healthy Forests Initiative (HFI), the Healthy Forests Restoration Act of 2003 (HFRA), the National Environmental Policy Act of 1969 (NEPA), the Montana Environmental Protection Act (MEPA), and other State and Federal laws could influence the BCWPP and future fire-fuel reduction projects.

A FireWise CD-ROM was shown at each community workshops to emphasize specific concepts of structural and landscape design-elements that reduce the probability of private property damages incurred during uncontrolled fire events. Numerous large maps that portrayed wildfire-related topics were presented at each meeting. Finally, at each workshop there was significant discussion about areas within or around each community that posed an increased risk of wildfire initiation, and the location of specific properties and structures that warranted special consideration. Participants were encouraged to depict the location of modern and historic structures, private timber reserves, prime agricultural values, power and utility stations, emergency travel corridors, forest insect and disease outbreaks, etc. on the Inter-Agency Travel Plans Maps (1996). The delineations of structures, properties, and other values resulted in patterns later used to define Wildland Urban Interface and High Wildfire Risk Areas.

DESCRIPTION OF BEAVERHEAD COUNTY

Location, Ownership, and Topography

Beaverhead County is located in Southwestern Montana and has a land area of about 3.5 million acres or 5572 square miles (Map 1 North and South). It is the largest county in Montana and is one of the largest counties in the United States. Beaverhead County, in comparison, is larger than Rhode Island and Connecticut combined. It is bordered by the state of Idaho on the south and west, Ravalli County, Montana, on the west; Madison County, Montana to the east and Silverbow and Deerlodge Counties, Montana, to the north. There are three major rivers that flow through Beaverhead County; the Red Rock River, the Beaverhead River, and the Big Hole River. Each river runs through a very large mountainous valley.

Beaverhead County has a landmass of 3,549,870 acres. Of this acreage, ownership is divided into 7 areas. According to a 1997 land inventory, land in Beaverhead County owned by the Fish, Wildlife and Parks accounts for approximately 13,000 acres, State land accounts for 332,000 acres and Federal lands makes up 2,033,394 acres. Under the Department of Agriculture, there are 1,370,000 acres of Forest Service land. The Department of Interior lands are composed of 640 acres at the Big Hole National Battlefield; 613,915 acres of BLM; 45,000 acres at the Red Rock Lakes National Wildlife Refuge; and approximately 3,839 acres are designated as Bureau of Reclamation. The remaining 1,171,476 acres are private land.

Elevation in Beaverhead County ranges from 4,770 feet above mean sea level along the Big Hole River near the northeast border of the county, to 11,154 feet at Tweedy Mountain in the East Pioneer Mountains, 21 miles northeast of Dillon. The Beaverhead County landscape is diverse and consists of glaciated peaks, desert-like foothills, and gently rolling to flat and extensive agricultural lands. Likewise, vegetation patterns also vary greatly, such as: barren rock and ice summits; open alpine meadows; whitebark, limber and lodgepole pine, aspen, and Douglas fir forests; mountain mahogany, alder, and sagebrush communities; perennial short grasses and wildflower rangelands; and irrigated hay, alfalfa, potato, and grain fields. Soils types are diverse, and the county boasts exceptionally complex geology.

Climate and Weather

Beaverhead County, Montana is located within the region generally classified as dry continental or Steppe with four distinct seasons. The weather in Beaverhead County is as diverse as the topography of the county. There are often large daily temperature variations, particularly from the fall through the spring.

Average high temperatures in January range from 31.6° F in Dillon to 22.5° F in Lake View. The average lows are from 9.8° F in Dillon to -0.1° F in Lake View.

Temperatures often drop well below 0° F for several days. In winter in particular, temperatures often vary significantly from the averages. Temperatures near –50° F have been recorded, while typical extreme winter minimum temperatures are between –25° and –35° F. Extreme wind chill situations occur every winter when windy conditions coincide with very low temperatures. Extreme cold during the winter can cause ice jams and freezing of streams and rivers from the bottom up. This can cause severe flooding conditions. Rapid warm-ups during the winter and early spring can lead to significant snow melt and flooding of small streams and rivers and/or ice jam flood problems.

Average high temperatures in July range from 82.8° F in Dillon to 76.5° F in Lake View. The low averages are from 48.8° F in Dillon to 37.5° F in Wisdom. Brief spells with temperatures above 100° F can occur but are often short lived. Temperatures above 101° F have been reported on occasion. Extended periods with temperatures above 90° F occur every few years. Freezing temperatures can occur, but are rare in June and August, particularly at sheltered valley locations. Annual average precipitation ranges from 9.7 inches in Dillon to 19.6 inches in Lake View. In Dillon, 67% of the precipitation falls from May through September. In other reporting areas of the county the precipitation is fairly evenly distributed throughout the year. November through March, are on average quite dry with average monthly precipitation of 0.50 inches or less. The most intense precipitation often occurs with localized downpours associated with thunderstorms in June through August. Significant flash flooding can result from these downpours with over 3 inches of precipitation reported in a few events. Widespread heavy precipitation events of 1 to 2 inches can occur every few years, commonly from April through June and September through November.

Social and Economic

In recent history, Beaverhead County sustained a rich and diverse socio-economic character. Ranching, farming, logging, mining, recreation, and commerce supported a standard of living and income that exceeded the national average. Currently, agriculture is still a large sector of the Beaverhead County economy, and consists primarily of cattle and sheep production, and hay, alfalfa, potato, and other crops. Outdoor recreation consists mainly of fishing, hunting, hiking, camping, wildlife viewing, snowmobiling, and skiing.

According to the U.S. Census Bureau, Census 2000, the population of Beaverhead County is 9,202. This represents a 9.3 percent increase in population in the 10 years since the last census. The median age in Beaverhead County is 37.6 years old. The County has 26.0 percent of its working population in occupations related to education, health, and social services. The next highest occupations are related to some form of agriculture and constitute for 19.3 percent, while the third largest group of occupations in the county is related to recreation, entertainment, accommodations, and services. These make up 10.3 percent of the working population. The unemployment rate for the county is 2.4

percent. In 1999 Beaverhead County had 3,679 households, with a median income of 28,962 dollars. Of the 3,679 households, only 2,952 had earned income. The median income for these households was 34,149 dollars. The poverty status in Beaverhead County in 1999 was 302 families or 12.8 percent and 1,491 individuals, which represents 17.1 percent of the population (U.S. Census Bureau, Census 2000). Montana continues to rank among the very lowest of all states in the U.S. as indicated by average annual incomes and percent population below the national poverty level. Beaverhead County currently falls in the lower half of all Montana counties in terms of average annual income and numerous other economic indicators.

ASSESSMENT OF HAZARDS

Drought

A drought is an extended period of unusually dry weather and directly affects the ignition and combustion of flammable materials. Vegetation and structural materials are rendered more flammable during dry weather and drought. The probability of wildfire initiation, intensity, and rate of spread is greatly increased during drought for all vegetation types located within Beaverhead County.

In periods of severe drought, forest and range fires can destroy the economic potential of the livestock, timber, and recreation industries, and diminish or eliminate wildlife habitat in and adjacent to the fire areas. Under extreme drought conditions, lakes, reservoirs, and rivers can be subject to severe water shortages, which greatly restrict the use of their water supplies. An additional hazard resulting from drought conditions to vegetation can be the increased incidence and rate of spread of insect and disease infestations.

The recorded history of drought in Beaverhead County is quite extensive and dates back to the 1930's during the Dust Bowl. According to precipitation records maintained at the weather station on the University of Montana Western Campus in Dillon, 17 of the past 20 years have experienced below average precipitation. The southeast quarter of the county, the Beaverhead River Basin and Red Rock River Basin, has experienced drastically lower precipitation than most of the other three quarters of the county.

The U.S. Department of Agriculture (USDA) issued Natural Disaster Determinations for drought for the State of Montana for the years 2000, 2001, and 2002. Drought conditions through 2003 resulted in all of Montana being declared a drought disaster area by the USDA Secretary of Agriculture. In 2004, record low stream flows and inflows to reservoirs were observed in Beaverhead County. Throughout much of southwest Montana, including Beaverhead County, drought conditions remained "exceptional" as of May, 2005 (Figure 1).

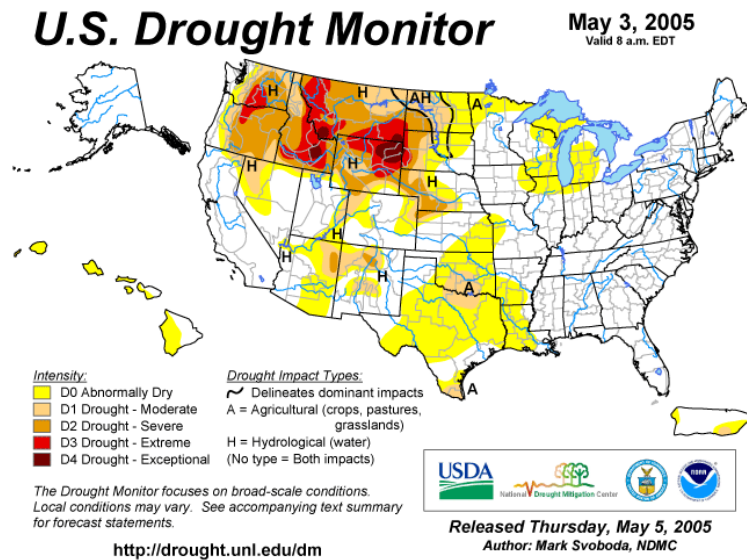
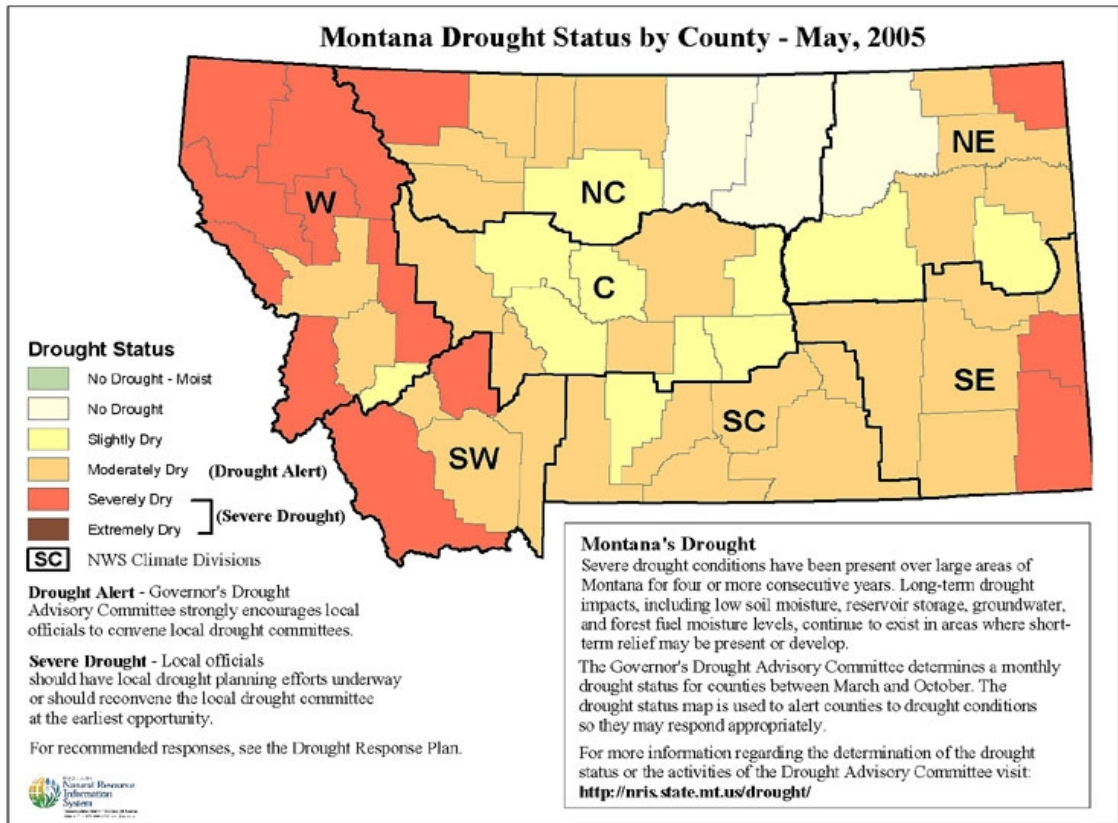


Figure 1. Drought Conditions in the United States and Montana, May, 2005.

The entire County has been affected by drought conditions that have lasted four or more years. This persistent climatic condition alone can be used to assist in the determination of wildfire hazards throughout much of Beaverhead County. Based on the aforementioned persistent drought, all of Beaverhead County could be considered as having at least a moderate to high wildfire hazard.

Fire Fuel Models

The existing vegetative communities within Beaverhead County have a significant influence on wildfire behavior. Fire fuel models developed by the USFS can be used as an aid for determining wildfire behavior (Anderson, 1982). A representation of the type and extent of fire fuel models within Beaverhead County is portrayed in Map 2 North and South. The unique fuel models can be used to interpret representative total fuel loads, dead fuel loads, live fuel loads, and fuel bed depths for specific mapped areas. Estimations of fuel loads have been derived from field sampling sites throughout USFS and BLM administered lands in the County. In addition, the individual fuel load models also allow for estimation of rate-of-spread and flame length that can be expected for each fuel model. In Beaverhead County, the fuel models that pose the greatest threat to life, property, and the environment are 2, 8, and 10.

Fire Regime Condition Classes

Another measure of wildfire hazard is the Fire Regime Condition Class (FRCC) (Schmidt and others, 2002). Fire regime condition class 1 represents any fire regime (vegetation type) where wildfire has occurred within an average and natural time period for that type of vegetation. This concept can be referred to as a wildfire frequency return interval. Fire regime condition classes 2 and 3 indicate that wildfire has not occurred within a given area and vegetation type for two or three consecutive frequency return intervals, and wildfire has been absent for a greater period than what is typical. The FRCC 2 and 3 represent increased risk of fire occurrence and the potential for fire intensity that is greater than would occur during more frequent fires. A discussion of historical fire regimes on the Beaverhead/Deerlodge National Forest best describes conditions found in Beaverhead County (Barrett, 1997). The distribution of FRCC 1, 2, and 3 in Beaverhead County is portrayed on Map 3 North and South.

Forest Insects and Diseases

Forest vegetation mortality, when concentrated in specific areas, does increase wildfire hazard. In Beaverhead County, a variety of causes have resulted in concentrated areas of tree mortality. A cause of extensive forest mortality is the infestation of insects and disease. The greatest impact on forest vegetation mortality in Beaverhead County is due to the effects of numerous types of bark beetles and their concentrated populations. Other common factors include wind throw, micro-burst blow-down, and avalanche events. The specific effects of

insects and diseases on wildfire hazards are complex, but in general the hazards are greatly increased where tree mortality is concentrated and extensive. The distribution of a wide range of intensities of insect and disease infestations, and the infrequent incidence of other factors of tree mortality, are depicted in Map 4 North and South.

ASSESSMENT OF RISKS

In this document, the assessment of risk will address several factors where humans and their activities may affect wildfire initiation, or be influenced by the occurrence of wildfire. These factors include population density and distribution, travel corridors and destinations, wildfire patterns, structure ignitability, and fire protection infrastructure. A risk assessment summary defines the relative ranking of wildfire risk for eight planning zones within Beaverhead County.

Population Density and Distribution

The population distribution and density within Beaverhead County is a large factor in the risk of wildfire occurrence. The population of Beaverhead County is 9,202 people, most of whom live in or near one of the small communities (Map 5 North and South). A relatively small percent of the total population lives beyond the extent of the major mountain valleys. The distribution and total number of people within the County is difficult to describe, in part due to the agricultural lifestyles, and the large influx of seasonal residents and outdoor recreational users. Because of the size of the County, its diverse topography, and the distance between communities, response time to emergency situations can be long and tedious at best. These limiting factors also can affect communications between fire fighters, rescue teams, and medical responders.

Travel Corridors and Destinations

Travel corridors have two primary affects on wildfire risk. First, they are often the source of wildfire ignition, either by the motorized vehicles or by the activities other than travel that occur along the corridors or at destinations. For example, highly concentrated use of specific locations in Beaverhead County occurs during hunting and fishing seasons. All destinations including campgrounds, boat ramps, and special interest areas are high risk areas. Second, the corridors function as access for fire protection services and as escape routes for residents and visitors. The road network within Beaverhead County is extensive and complex (Map 1 North and South). Interstate 15, numerous State Highways and County roads, and countless primary and secondary access routes exist. Also, railroad lines, small airports, mining and logging roads, off road motor vehicle routes, trails, and overland travel add to the risks of ignition of wildfire. In general, the use of travel corridors greatly increases the risk of wildfire ignition.

Wildfire Patterns

Wildfire is a naturally occurring phenomenon that exists with or without the presence of humans. The risk of wildfire is primarily perceived as it relates to threats to human life and health, valuable property, and the aesthetics qualities of the environment. Wildfire risk is directly related to the timing, extent, intensity, and duration of fire in proximity of the human environment.

According to the U.S. Forest Service (USFS), nationally, 25.7 percent of reported wildfires were caused by arson. Other ignition sources were debris burns (24 percent), lightning (13.3 percent), and other (16.7 percent). Statistics from the Montana office of the DNRC show that 60.6 percent of Montana fires are started by lightning. MDNRC statistics also indicate that human caused fires are represented as follows: debris burns (28 percent); miscellaneous starts (25 percent); camp fires (22 percent); equipment (7 percent); railroads (7 percent); power lines (4 percent); smoking (4 percent); and arson (3 percent). According to the National Interagency Fire Center, wildfires have burned, on average in the last 10 years, 3,955,472 acres annually. A 5-year average shows Montana has 326,186 acres burned per year. Fires in 2003 in Montana burned 736,809 acres, 126 percent more than the 5-year average. The location of documented wildfire starts in Beaverhead County is shown on Map 5 North and South.

Statistics from the Dillon office of the Beaverhead/Deerlodge National Forest, Dillon office of the Bureau of Land Management, and the Dillon office of the Department of Natural Resources and Conservation, show that Beaverhead County has had approximately 408 wildland fires in the past ten years (1993 to 2003). These fires burned approximately 75,000 acres. In comparison, the years of 2000, 2002, and 2003 experienced 110 fires that burned over 73,400 acres. This has been attributed primarily to the drought Beaverhead County has been experiencing for several years.

For the past three of four years, wildfires have impacted Beaverhead County quite heavily. The fires of 2000, 2002, and 2003 were declared State and/or Federal disasters. Table 1 represents a partial list of wildland fires in Beaverhead County from the Beaverhead/Deerlodge National Forest database. A number of these wildland fires have been in wildland urban interface areas. According to the Beaverhead/Deerlodge National Forest, there have been no structures lost in Beaverhead County due to wildland fires. However, every year the potential for structure loss increases because of the number of new constructions in the wildland urban interface and the continued drought.

Additional wildfire incident information has been compiled by the Dillon Volunteer Fire Department (Table 2). Each incident, by Type, occurred within the City of Dillon or the Dillon Rural Fire District. Table 2 does not include structure fires.

Date	Fire Name	Location	Size	Federal, State Land	Private Land
7-26-2000	Snowline	Sec22, T14S, R12W Lima Area	3500 Acres	Yes	Yes
7-31-2000	Mussigbrod	Sec23, T1N, R17W West Side Big Hole	50,000 Acres	Yes	Yes
8-19-2000	Circle S	Sec26, T5S, R13W Grasshopper Valley	200 Acres	No	Yes
8-17-2000	Junction Creek	Sec14, T14S, R8W Lima Area	400 Acres	Yes	Yes
8-26-2000	Jake Canyon	Sec16, T10S, R7W Blacktail Deer Creek	20 Acres	Yes	Yes
9-4-2001	Stone Lake	Sec6, T2S, R13W East Side Big Hole	5 Acres	Yes	No
11-2-2001	Garfield Mtn	Sec13, T15S, R9W Little Sheep Creek	6 Acres	Yes	No
7-12-2002	7 Medicine Lodge	Sec10, T11S, R12W Medicine Lodge Creek	56 Acres	Yes	Yes
7-13-2002	Goldstone	Sec16, T8S, R16W Bloody Dick Creek	200 Acres	Yes	No
8-15-2002	Sheep Creek	Sec12, T2S, R18W Chief Joseph Creek	2016 Acres	Yes	No
7-18-2003	Hidden Lake	Sec3, T5S, R12W Grasshopper Valley	3435 Acres	Yes	Yes
8-12-2003	Winslow	Sec36, T14S, R3W Centennial Valley	13,558 Acres	Yes	Yes

TABLE 2. Summary of Fire Incidents, 1/11/2000 and 6/20/2005.

* Type	Type #	Number of Incidents
Natural vegetation fire	140	8
Forest, woods or wildland fire	141	9
Brush, brush and grass mixture fire	142	15
Grass fire	143	38
Total		70
5 year Average/year		14

* Compiled by the Dillon Volunteer Fire Department.

Other large and recent local fire incidents include: 1) A major fire on 4-17-87, called the Elliott Fire, burned a large portion of the Beaverhead River corridor North of Dillon, threatening homes and structures, and burned over firefighters; 2) A major fire in Madison and Jefferson County in the Jefferson River corridor near Whitehall burned some structures in the path of the fire; 3) A recent fire on

the Red Rock River corridor above Clark Canyon Reservoir resulted from a test burn that escaped control and burned 2 miles of the river bottom.

Reports generated by the National Fire Information and Resource Service (NFIRS) show in 1998 Montana ranked second in the nation in structure fire deaths with 16.75 civilian deaths per 1,000 fires. Montana also ranked second in residential fire deaths with 24.55 civilians dying per 1,000 fires. Vehicle fires claimed 5.71 individuals per 1,000 fires ranking, Montana fourth in the nation. NFIRS statistics for 1998 show average property losses per fire in Montana are high. Losses related to structure fires place Montana sixteenth in the nation at \$14,109 per fire. Residential losses are \$13,512 per fire and place Montana eleventh nationally while vehicle fires put Montana in the twenty-fifth spot with losses of \$3,033 per fire.

Wildland fire danger has continued to increase in Montana over the past 10 years. According to the Montana DNRC, long-term drought and unhealthy forests are the primary causes. Negative impacts of wildfire include loss of life, property, and resource damage or destruction, severe emotional crisis, widespread economic impact, disrupted and fiscally impacted government services, and environmental degradation.

Structure Ignitability

Structural fuel hazards are characterized by the combustibility of the materials used in structures, and are highly variable across the County. For example buildings constructed from whole logs or wood-derived products are more combustible than brick, tile, steel, etc. Roof material composition is a critical factor when assessing structure vulnerability to wildfire. No comprehensive data exists that specifically characterizes the range variability across the County.

Dillon and other communities in Beaverhead County are like many other small towns around the state. Most of the downtown areas were built in the early to mid- 1900's. Buildings were constructed with common walls separating adjoining businesses and apartments. They were also constructed before many of the building safety codes were in place. Because of the close proximity of buildings to each other and lack of building codes during construction, many of the communities' business districts could be devastated if fire were to ever break out. Much of the residential area in the immediate proximity to downtown Dillon and in other communities is made up of beautiful historic homes that were once again built prior to significant safety codes. In general, most structures in the County were constructed without a thorough consideration of structure ignitability. It is very likely that most properties throughout the County do not incorporate FireWise concepts in either building construction or landscape design.

Fire Protection Infrastructure

The preparedness and capability of fire protection organizations has a significant affect on the risks associated with wildfire. The responsibility for fire protection and suppression in Beaverhead County is divided between agencies and organizations within three separate levels of governments. The federal agencies are the United States Forest Service (USFS), Dillon, Wise River, and Wisdom Ranger Districts, and the Bureau of Land Management (BLM) Butte District and Dillon Field Offices. The state agency is the Montana Department of Natural Resources and Conservation (MDNRC) Dillon Unit. The county fire protection entities include Volunteer Fire Departments (VFD) and Volunteer Fire Companies (VFC) within Rural Fire Districts (RFD).

Under terms of an agreement entered into by the BLM Montana State Director and USFS Regional Forester, Northern Region on February 18, 1982, wildfire suppression agencies agreed to aid/cooperate in the suppression of wildfires. This agreement is referred to as the BLM/USFS Master Agreement. On December 1, 1986, the State Director and Regional Forester also agreed to implement Phase II of the BLM/USFS Protection Adjustment. At that time, the BLM Butte District Office was directed by Instruction Memorandum No. MT-87-68 to proceed with developing operating plans with adjoining National Forests to implement Phase II.

On February 3, 1987, an operating plan for fire protection exchange adjustments was agreed to by BLM District Managers for Butte and Lewistown. Also concurring with the fire protection exchange adjustments were the Forest Supervisors of the Beaverhead, Deerlodge, Gallatin, Helena, and Lolo National Forests. Effective that date, the BLM Butte Districts' public lands of approximately 1.4 million acres became the wildfire protection responsibility of the Forest Service. The Forest Service entered into an agreement with the Montana Department of Natural Resources and Conservation (MDNRC), to have the MDNRC assume protection responsibility on a portion of public lands. All parties to this agreement currently work under the Cooperative Fire Management Agreement (Six Party Agreement), dated March 1998.

The Bureau of Land Management (BLM), Butte District Office and Dillon Field Office, are the BLM management units within Beaverhead County. The Butte District Office manages BLM lands along the upper and middle reaches of the Big Hole River. The Dillon Field Office manages the remainder of BLM lands in Beaverhead County.

The purpose of the Dillon Field Office Fire Management Plan of 2004 (FMP) is to identify and integrate all wildland fire management guidance, direction, and activities required to implement national fire policy and fire management direction

from the following: Federal Wildland Fire Management Policy and Program Review-1995 and 2001; The Interagency Fire Management Plan Template; and A Collaborative Approach for Reducing Wildfire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

In the event of a wildfire emergency, the agency having jurisdiction over the area affected may, through its delegated line of authority, request mutual aid assistance of any other agency of entity. Assistance provided by the cooperating agencies during the initial attack phase of a fire is non-reimbursable. Assisting resources may be recalled at any time, at the sole discretion of the entity furnishing the assistance.

The State/County Cooperative Fire Program is authorized under Montana State statutes 7-33-2210, 76-13-106, and 76-13-102, MCA. Specifically, the State of Montana and Beaverhead County have entered into a cooperative agreement which spells out certain responsibilities for each party, and allows for State support on County fires that are beyond the County's capability to control. Through this agreement, the State (along with its cooperators) and the County are enabled to work together to achieve comprehensive wildland fire protection in the County. One of the primary goals of the State/County Cooperative Fire Program is to establish a basic level of wildfire protection to all lands in the County that are not covered by a higher level of protection.

As set forth in Montana Statutes, Beaverhead County is responsible for protection of the county's resources from wildfire (7-33-2202 MCA). This applies to privately owned lands (or local government owned) whether forested or not. Lands within city limits of a county's incorporated cities are excluded from this mandate, since cities are required by other statutes to have their own municipal fire departments.

The County is allowed a number of methods it may adopt to provide this protection. In the mentioned areas of the County where there is no fire district and no other designated protection agency, the County governing body has the legal responsibility for wildfire suppression.

The Board of County Commissioners is the executive body of the County. In Beaverhead County, this Board is composed of 3 commissioners, one from each of 3 geographic districts in the County. The Commissioners have authority to:

- (A) Establish Rural Fire Districts (RFDs) after the commissioners are presented with a petition for formation of a district, signed by a majority of the landowners owning 50 percent or more of the private land in the area. After holding a public hearing, the Commissioners can then create a new district, and either run the district themselves or appoint a board of trustees to run the district (7-33-2104 MCA).

- (B) Establish Fire Service Areas (FSAs)
- (C) Set mill levy sufficient to fund the RFD and FSA budgets.
- (D) Provide for the formation of county volunteer fire companies.
- (E) Provide fire protection services.
- (F) Appoint a County Rural Fire Chief (Firewarden).
- (G) Establish or extend burning seasons.
- (H) Request State fire suppression services.

The Rural Fire Chief (Firewarden) and Deputy Firewarden are appointed by the Board of County Commissioners. These persons have the responsibilities to:

- (A) Represent the Board of Commissioners in matters pertaining to wildland fire management in the county.
- (B) Coordinate wildland fire protection for all lands on which the county is required to provide fire protection.
- (C) Monitor the county fire situation, and assures that adequate county resources are mobilized to suppress its fires.
- (D) Keep the Board of Commissioners apprised of the wildfire situation in the county, and brings wildfire related matters before the board for consideration.
- (E) Serve as the primary contact between the county and the State (DNRC) with regards to wildland fire.
- (F) Ensure that wildland fire equipment on loan to the county is maintained, fire-ready, and accounted for.
- (G) Represent the county and its fire organization in the Northern Rockies Coordinating Group (NRCG), a regional/state-wide organization of wildland firefighting agencies.
- (H) At the request of the County Commissioners, ensure that wildland fire concerns are addressed by land developers during the subdivision review process on major residential projects.

A Rural Fire District (RFD) is a political subdivision having geographical boundaries established by vote of the residents of an area. In accordance with State law, Rural Fire Districts are responsible for protection of all property within the district from fire. 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”.

Beaverhead County is made up of four Rural Fire Districts. There are four Volunteer Fire Departments (VFD) and three Volunteer Fire Companies (VFC) in the four RFD in Beaverhead County. Each of the following communities has its own VFD or VFC: Dillon, Lima, Polaris (Grasshopper), Wisdom, Grant, Jackson, and Wise River.

Fire District #1 includes the Lima VFD. Fire District #2 includes the Dillon VFD and the Grant VFC. Fire District #3 consists of the Wisdom VFD and the Jackson VFC. Fire District #4 is comprised of the Grasshopper VFD and the Wise River VFC, who serves the unprotected lands in northern Beaverhead County. The following section gives a brief description of each of the Rural Fire Districts, the Volunteer Fire Departments, and the Volunteer Fire Companies in the county. The extent of jurisdiction for each RFD is portrayed in Map 5 North and South. The preparedness and capability of each Volunteer Fire Department and Company is represented in Appendix 3.

The Lima Rural Fire District #1 covers the southern most portion of the county, having a common border with the Dillon and Wisdom-Jackson Rural Fire Districts. The entire fire district also is jointly protected from wildland fire by the Dillon, Wise River, and Wisdom Districts of the Beaverhead/Deerlodge National Forest (NF), and by an initial Attack Agreement with the Dillon Unit of the Montana Department of Natural Resources and Conservation.

The Dillon Rural Fire District #2 covers the eastern most portion of the county, having a common border with the Lima and Wisdom-Jackson Rural Fire Districts, the Wise River Rural Fire Company, and Madison County. The entire fire district is jointly protected from wildland fire by the Dillon, Wise River, and Wisdom Districts of the Beaverhead/Deerlodge NF, and by an initial Attack Agreement with the Dillon Unit of the Montana Department of Natural Resources and Conservation.

The Wisdom-Jackson Rural Fire District #3 covers the western most portion of the County having a common border with the Lima and Dillon Rural Fire Districts and the Wise River Rural Fire Company. The entire fire district is also protected from wildland fire by the Dillon, Wise River, and Wisdom Districts of the Beaverhead/Deerlodge NF, and by an initial Attack Agreement with the Dillon Unit of the Montana Department of Natural Resources and Conservation. The Wisdom-Jackson RFD also protects the southern portion of Deerlodge County directly adjacent to the Big Hole River.

The Grasshopper Valley Rural Fire District #4 includes the Grasshopper Volunteer Fire Department. The Grasshopper VFD has its own area of protection within the and the Wise River VFC within the Wisdom-Jackson RFD. In addition, the Wise River VFC serves other unprotected lands within RFD #4.

The Wise River Rural Volunteer Fire Company is unlike the Rural Fire Districts. Under 7-33 part 23 MCA, Fire Companies are not created by petition, but instead a Certificate of Organization listing the Company Officers and a roster of members is filed with the Clerk of the County. These organizations have no real fire responsibilities, except when attached to the County under the County COOP Fire Program as a County Rural Fire Department under the authority of the

County Fire Warden under 7-33 part 22 MCA. The Wise River Rural Volunteer Fire Company covers the northern most portion of the county having a common border with the Dillon and Wisdom-Jackson Rural Fire Districts. The entire fire company area is also jointly protected from wildland fire by a Mutual Aid Agreement with the Dillon and Wisdom-Jackson Districts of the Beaverhead/Deerlodge NF and the Melrose Rural Fire District of Butte-Silverbow County.

The Beaverhead County Sheriff's Office also has responsibilities in wildfire emergencies. The Sheriff and Deputies have the following responsibilities during wildfire suppression operations in the County: 1) Traffic Control; 2) Evacuation; 3) Enforcement of Fire Laws; and 4) Fire Investigation.

VALUES TO BE PROTECTED

A significant portion of the input received during the proceedings of each Community Workshop, was the emphasis of values to be protected. The values to be protected represents of broad range of private and public properties, roads and destinations, utilities, and most aspects of the natural environment. The participants of each meeting, and other interested publics, all contributed to the identification of values that fall into one of four separate categories.

Communities and Their Surroundings

The first concern is to provide protection for private properties within and immediately outside of the communities. Communities can be defined as a group of homes and structure that share utilities and access. This includes but is not limited to the communities themselves, homes, utilities, structures, equipment, fences, animals, livestock, crops, and timber. The basic concept is to provide a defensible space around any large group of inhabited structures or densely populated areas.

Roads, Utilities, and Historic Sites

The second concern focuses on private and publicly owned and managed properties including but not limited to power and communication utilities, roads and access, destinations, and historical sites and structures. This all-inclusive description is intended to provide a defensible space around roads and utilities that sustain communities, and to protect areas where people frequently visit.

Aesthetics and the Environment

The third concern is the value of aesthetic and natural amenities. The views, wildlife habitat, air and water quality, affects to property value, noxious weeds, recreation opportunities, and changes of lifestyle are all concerns. Finally, the negative affect of wildfire on local economies is emphasized. The challenge is to

protect these countless and widely distributed amenities, even though some of them are not well defined or mappable. The values to be protected that lie within areas of high wildfire risk have been identified. Areas where the high values are associated with high wildfire risk and are located adjacent to public lands are referred to as “at-risk communities” within a “wildland urban interface”.

GOALS FOR MITIGATION OF WILDFIRE IN WILDLAND URBAN INTERFACE AND HIGH WILDFIRE RISK AREAS

The concept of a wildland urban interface (WUI) has widespread applicability in Beaverhead County. Given the low total population density and highly dispersed nature of human occupancy, Beaverhead County has identified four specific categories to describe their WUI boundary and extent of the High Wildfire Risk Areas (HWRA). These individual categories have all been rated as all having High Risk based on the inherent and existing conditions of drought, vegetation, and terrain, the nature of wildfire itself, and the frequency and concentration of human activities. All areas, travel corridors, and sites identified in Categories I, II, III, and IV were identified and emphasized by the participants of the Beaverhead County Wildfire Protection Plan Community Workshops. Categories I, II, and III are delineated on the Beaverhead County Wildland Urban Interface and High Wildfire Risk Areas Map. Category IV is not portrayed on any map.

In southwest Montana, the wildland urban interface is widespread. Private land is readily dispersed throughout Beaverhead County adjacent to Federal and State Lands, including many tracts developed within Federal and State Land boundaries. Several sub-divisions have been developed next to Federal and State Lands that have vast amounts of timber. There are also resorts, dude ranches, private timbered lands, and other businesses developed within the wildland urban interface. Because of the location of private lands and rural developments in relationship to Federal and State lands, wildfires could prove to be disastrous for many Beaverhead County residents.

In general, goals of Beaverhead County for hazard mitigation as described herein will: 1) Address management opportunities to reduce wildfire fuel characteristics inherent to large areas; 2) Introduce fire as a natural ecosystem component and management tool; and 3) Describe means to prepare structures, landscapes, facilities, and roadways in such a manner as to enable them to withstand wildfire occurrence. These goals are intended to address typical conditions found in Category I, II, III, and IV High Risk areas.

Additionally, goals of the County are to: 1) Identify and prioritize the treatment of those specific locations where wood products with economic value exist within the Wildland Urban Interface and High Wildfire Risk Areas; for example woody materials used to sustain the Fuels for Schools Grant Program at the University

of Montana, Western; 2) Improve the County's ability to compete for funding that enables the acquisition of firefighting equipment and water storage facilities; 3) Emphasize treatments in non-forested high wildfire risk areas where human uses are concentrated; for example riparian habitats such as Poindexter Slough, and sagebrush habitats near Lemhi Pass. The goals set fourth herein are intended to describe the overall needs and desired future conditions for typical scenarios, and are not intended to be applied literally to any one area or site.

Category I

For small communities in Beaverhead County, hazard mitigation goals will address three issues. First, homeowners, community leaders, and local contractors must be informed and educated about methods that render both structures and surrounding landscapes most resistant to fire occurrence. A perimeter that delineates a sufficient extent of defensible space for each community must be defined. Actions that create a genuine defensible space should be implemented. FireWise strategies will continue to be encouraged for landscapes, fire retardant materials will be advocated for new and remodel constructions, and interior and exterior sprinkler and water storage systems will be promoted. Secondly, homeowners, community leaders, and local contractors must be informed about insurance incentives, County, State, and Federal programs, and cost-share opportunities that encourage safer, more fire-resistant communities. Third, response to fire occurrences will be met with greater preparedness. Improved communication and clearly defined roles and responsibilities must be defined. Individuals, neighborhoods, and communities will have a better understanding of how to respond in the event of a wildfire in their immediate area.

Category II

Goals for primary access and emergency escape routes will address two issues. First, hazards associated with access and escape routes will be reduced through increased diligence in management of roadside vegetation. This will involve both removal of excess roadside fire fuels, and revegetation strategies that promote the establishment of less hazardous vegetation types. Secondly, communication between residents and community leaders will be improved. This will be accomplished with the use of more roadside information and direction signs, establishment of pre-determined escape routes, and more clearly defined roles and responsibilities for fire response authorities.

Category III

Specific Wildland Urban Interface (WUI) and High Wildfire Risk Areas (HWRA) have been defined, and hazard mitigation goals for each area will be unique. Goals include but are not limited to: 1) Measurable reduction of standing and fallen fire fuels within each WUI and HWRA; 2) Restore fire in a controlled

manner to fire-prone WUI and HWRA areas where appropriate; 3) Promote active forms of forest and range management that allow for sustainable and suitable timber harvest and forage utilization within and around WUIs and HWRA; 4) Maintain secondary access routes to allow for active management of timber and forage resources, and provide emergency access for fire suppression response; 5) Increase communication with the general public to inform them of prevailing wildfire hazards and the most current fire conditions; 6) Employ active forest management strategies that will reduce the rate of spread of disease- and insects-caused mortality of forest resources; 7) Reduce high wildfire risks through timber removal from areas where high concentrations of dead and dying timber exists near communities, travel corridors, utilities, and destinations.

Category IV

The individual sites and natural amenities will require site specific goals. In general, where Category IV risks are localized, FireWise practices will be employed, improved housekeeping and grounds maintenance will be promoted, emergency fire suppression systems will be installed, and specific Category IV sites will be incorporation of into fuel reduction management practices of a surrounding WUI and/or HWRA. For large areas where values of veiwsheds, wildlife habitat, watershed health, etc. are identified as having high risk, long term management strategies will be developed through cooperation between private landowners, citizens, and agency personnel.

DELINEATION OF WILDLAND URBAN INTERFACE AND HIGH WILDFIRE RISK AREAS

Category I

All of the communities and their immediate surrounding areas within Beaverhead County have been classified as being at High Risk to wildland wildfire and subsequent urban fire potential. The communities within the County previously listed on the Federal Register as being recognized as “At-Risk” are Dell, Dillon, Jackson, Lima, Polaris, Wisdom, and Wise River. Additional communities designated as “At-Risk” in this document are Argenta, Bannack, Dewey, Grant, Lakeview, Monida. For each community, except Dillon, the recommended WUI exists at the perimeter of a 1.5-mile radius extending outward from each community center. The WUI around Dillon exists at a 5.0-mile perimeter extending from the community center (Map 6 North and South). These perimeters represent the extent of a defensible space where actions and treatments should be employed to reduce the potential for wildfire initiation and spread. Map 7 North and South also defines WUIs around areas where population density is equal to or greater than ten people per square mile.

Category II

All potential emergency evacuation routes and concentrated travel routes have been identified as High Risk, and WUI boundaries have been assigned. For all primary access roads to public lands, County Roads, State Highways, and Interstate 15, a WUI shall extend 0.5 miles to each side of the roadway (Map 6 North and South).

Category III

Specific extensive areas have been identified as having High Wildfire Risk that may contain elements of Category I and II. Each said area has a HWRA that is uniquely defined. The specific HWRA include but are not limited to: 1) Elk Lake Lodge; 2) The Red Rock, Beaverhead, and Big Hole River riparian corridors; 3) Lemhi Pass to Bar TT Ranch; 4) Lower Grasshopper Creek; 5) Upper Rattlesnake, Trout, and Birch Creeks; 6) East Pioneer Mountains, eastern portion; 7) The Polaris to Wise River Scenic Byway and State Highway 43; 8) Steele Creek; 9) The southwest Big Hole Valley; 10) The Big Hole Battlefield National Monument; and 11) Poindexter Slough. These areas are depicted with a 1.5-mile radius of defensible space on Map 8 North and South.

Category IV

Individual sites of importance were specifically identified during the Community Workshops that were too numerous to account for or map. They include but are not limited to individual cabins, homes, groups of outbuildings, historic structures and sites, cemeteries, communication facilities, utility substations, power transmission lines, Snotel sites, patented land inholdings, and designated campgrounds. Many of these sites are portrayed on Map 8 North and South with a 1.5-mile radius of defensible space.

RISK ASSESSMENT OF PLANNING ZONES IN BEAVERHEAD COUNTY

Public input received during the Community Workshops formed the initial basis of the identification of values to be protected that lie in or near a Wildland Urban Interface or High Wildfire Risk Area. These values at risk are described in the discussion of Category I, II, III, and IV areas and specific sites. Category I, II, III, and IV values exist throughout Beaverhead County, but these values and the risks to uncontrolled wildfire are not evenly distributed across the County.

The Beaverhead County Wildfire Task Force, comprised of those citizens who consistently participated in the development of the Beaverhead County Wildfire Protection Plan, incorporated a strategy to evaluate and compare the hazards, risks, and values found within the County. This risk assessment process is advocated in *Preparing a Community Wildfire Protection Plan, A Handbook for*

Wildland-Urban Interface Communities (2004). The process was adapted specifically to the geographic character of Beaverhead County.

Beaverhead County was divided into eight geographic planning zones. Each zone represents areas of similar landscape type and location. The planning zones are: 1) the West Big Hole Valley – Forested; 2) the Big Hole Valley Bottom; 3) the East and West Pioneer Mountains; 4) the Bannack-Grant Foothills; 5) the Tendoy Area; 6) the Red Rock-Beaverhead River Corridor; 7) the South Centennial Area; and 8) the Blacktail-Gravelly Area (Map 9).

A risk-rating checklist, incorporating eighteen rating criteria, was used to rank the planning zones in Beaverhead County. The eighteen rating criteria were grouped into five general rating categories. The five rating categories are: 1) Fuel Hazards; 2) Risk of Occurrence; 3) Homes, Businesses, and Essential Infrastructure; 4) Community Values; and 5) Protection Capability.

Each of the eighteen rating criteria received a rating score of High (3 points), Medium (2 points), or Low (1 point). The rating score for each of the eighteen criteria was agreed upon through consensus by the Task Force members, for each of the eight planning zones. The results, as portrayed in Table 3, rank the relative hazards, risks, and values as they are distributed across Beaverhead County. The results are: the Red Rock-Beaverhead River Corridor (47 points); the East and West Pioneer Mountains (46 points); the South Centennial Area (42 points); the Big Hole Valley Bottom (41 points); the West Big Hole-Forested (38 points); the Bannack-Grant Foothills (37 points); the Tendoy Area (33 points); the Blacktail-Gravelly Area (32 points). Planning zones with rating scores greater than 40 are considered as having a high concentration of hazards, risks, and values. Those planning zones with rating scores of 40 or less are considered as having a moderate concentration of hazards, risks, and values. **All of the aforementioned Category I, II, III, and IV values have a high priority for mitigation regardless of where they are located within Beaverhead County.**

TABLE 3. BEAVERHEAD COUNTY WUI RISK ASSESSMENT SUMMARY

Risks and Planning Zones	1 West Big Hole Forested	2 BH Valley Bottom	3 East- West Pioneers	4 Bannack Grant- Foothills	5 Tendoy Area	6 RRBVHD River Corridor	7 South Centen- nial Area	8 Blacktail Gravelly Area
A. Fuel Hazard	3	2	3	2	2	3	3	2
B. Risk of Occurrence	7	5	10	6	7	12	8	7
C. Home, Business, Infrastructure	3	6	5	4	4	6	4	2
D. Community Values	10	13	11	13	7	15	10	8
E. Fire Protection	15	15	17	12	13	11	17	13
Total	38	41	46	37	33	47	42	32

TREATMENT ACTIVITIES FOR MITIGATION OF WILDFIRE IN WILDLAND URBAN INTERFACE AND HIGH WILDFIRE RISK AREAS

Prioritization of future treatment activities is based on four criteria. The first criterion is Immediate Risk to Human Health and Safety. The second criterion is Public Involvement and Support. The third criterion is Long-Term Fire Fuels Management for Forest Health and Public Safety. The fourth criterion is Value or Significance of the Resources at Risk.

The USFS Beaverhead/Deerlodge NF has already developed a strategy for treatment of wildfire fuels in Beaverhead County. The Wisdom and Wise River Districts have outlined a series of projects in response to the Northern Region's 5-year Fuels Strategy. This Northern Region 5-year Fuels Strategy has a goal of managing high priority fire-adapted watersheds and landscapes in an integrated fashion to promote sustainability of natural and social resources.

All Category I, II, III, and IV areas are High Priorities

Mitigation treatments include but are not limited to:

- * A checklist has been prepared as an example of how to document prioritization of mitigation treatments by planning zone (see Appendix 4).
- * FireWise implementation for structures and landscapes (See Appendix 5).
- * Cutting and/or removal of live or dead grass, brush, and tree species outside of FireWise implementation areas, and along primary access and evacuation routes and destination areas. Place an emphasis on priority treatments where valuable wood products exist.
- * Prescribed fire and understory burning where appropriate.
- * Livestock grazing of fine fuels.
- * Use of herbicides, sterilants, and land clearing practices to eliminate fire fuels or change vegetation types.
- * Removal of excessive fallen woody debris.
- * Thinning of brush and tree species. An emphasis on priority treatments where valuable wood products exist.
- * All appropriate logging practices. An emphasis on priority treatments where valuable wood products exist.
- * Use of pesticides, micronutrients, attractants, aggregants, anti-aggregants, and pheromones to manage forest insects and diseases.
- * Increased use of postings and signage to communicate allowed travel routes, escape routes, and fire conditions.
- * Establish community wood slash/waste disposal sites where slash/waste products can be conveniently retrieved economic uses.

TREATMENT RESPONSIBILITIES AND STANDARDS

The roles and responsibilities for management of the high risk and high priority areas lie with private landowners and County, State, and Federal personnel. Each entity will address hazards and risks, goals and treatments, as determined by the ownership or management authority for each specific site or area. Coordinating wildfire mitigation treatments between private and public lands will result in the greatest net effect to reduce wildfire impacts. In some cases, cooperative agreements may assign roles and responsibilities where projects involve both private and public lands.

Wildfire mitigation treatments on private lands should incorporate State of Montana Best Management Practices (BMP) for forestry practices. Also, FireWise prescriptions must meet the appropriate treatment standards. All treatments on State lands will be subject to consideration for application of Montana Environmental Policy Act (MEPA) review. Any actions that occur on Federal lands will require National Environmental Policy Act review, as described in the Healthy Forests Restoration Act. All actions that occur on either private, State, or Federal lands will comply with existing laws, regulations, and requirements. Beaverhead County may adopt standards for treatments in order to provide more consistent project administration and results.

ACTION PLAN

Upon approval this will be used as a guide for mitigating wildland fire in Beaverhead County. It will provide a framework for interagency and private planning efforts to mitigate wildfire in various areas within the County. Areas identified as high risk and moderate risk will be studied for possible mitigation efforts and priorities set for mitigation projects in these areas.

This plan identifies the need to use multiple mitigation strategies to effectively lessen the threat and losses to wildfire. Although specific projects will aid in the lessening the threat, it is essential that all feasible mitigation strategies be used in an area to effectively mitigate wildfire. Interagency coordination and cooperation with all private landowners, the county, other state and federal agencies is essential to a successful fire mitigation program.

An assessment and plan review will be made annually and convening the members of the Wildfire Urban-Interface task force and cooperators. This process will be initiated by the County Fire Warden to review and assess the plan and set new priorities and goals for the mitigation process.

APPENDIX 1 - List of participants
Beaverhead County Wildfire Protection Plan Participants

Citizens

Jim Becker
Shelley Boyd
Tom Boyd
George Bradley
Marilyn Bradley
Fred and Ester Bridger
Rex Caraker
John Clinton
Josh Clinton
Alan Conover
Roger Cox
Barry Emge
Tim Fay
Dustin Fitzpatrick
George Goody
Jim Gross
Steve Hirschy
Lowell Inboden
Dale Johnson
Russ Kluesner
Shane Kluesner
Rich Larsen
Curly Lattin
Mark Marchesseault
Archie Matthews
Donna Matthews
Dick McCracken
Beverly McDougal
Graeme McDougal
Dan Mulkey
Alan Nygren
Lee Richardson
Paul Rust
Parke Scott
Elaine Spicer
Todd Tash
Peterson
Kirk Rector

Citizens

Rob Van Deren
Mike Wilkerson
Rob Worrel

City of Dillon

J.S. Turner

Beaverhead County

Rick Hartz
Garth Haugland
Larry Laknar
Scott Marsh
Frank Mastandrea
Mike McGinley
Donna Sevalstad
Tom Wagenknecht

Lewis and Clark County

Mike McFerrin
Pat McKelvey

Mineral County

Roger Hurst

Montana Department of Natural Resources and Conservation

Lee Hahnkamp
John Huston
Amy Kearney
Paula Rosenthal

Montana Fish Wildlife and Parks

John Hoerning

Bureau of Land Management

Lori Blinn
Kipper Blotkamp

Joe Casey
Paul Lenmark
Terina Mullen
Aly Piwowar

United States Forest Service

Erin Brown
Tammy Clark
Kirby Cook
Dennis Dennitto
Chip Fischer
Ken Gibson
Dennis Havig
Lee Harry
Charlie Hester
Diane Hutton
Brad Gillespie
George Johnson
Jim McNamara
Tom Osen

Basic Biological Services LLC

Linda Walent
John Whittingham
Josh Clinton

Northwest Management, Inc.

Jim Cancroft
Gary Ellingson

Ranch Maps and Aerials LLC

Curtis Kruer

APPENDIX 2 - List of Meetings Beaverhead County Wildfire Protection Plan

- July 16, 2004** – Requests for Proposals from contractors for Beaverhead County Wildfire Protection Plan received by Beaverhead County.
- September 27, 2004** – Beaverhead County personnel and Wildfire Task Force members interview Basic Biological Services LLC (BBS) for writing Wildfire Plan.
- November 15, 2004** – BBS awarded Wildfire Plan contract.
- December 6, 2004** - BBS first meeting w/ Beaverhead Co. personnel and public.
- December 17, 2004** – BBS meets Co., arrange community workshops.
- January 11, 2005** – BBS conducts Jackson and Wisdom community workshops.
- January 12, 2005** – BBS conducts Melrose, Wise River community workshops.
- January 13, 2005** – BBS conducts Grant and Polaris community workshops.
- January 18, 2005** – BBS conducts Lima community workshop.
- January 19, 2005** – BBS conducts Dillon community workshop.
- February 15, 2005** – Public meeting to address Wildfire Plan information needs.
- February 22, 2005** – BBS and Co. attend MDNRC sponsored planning meeting.
- March 10, 2005** – BBS and USFS meeting to prepare information.
- March 16, 2005** – BBS, Co., and USFS meet to prepare GIS information.
- March 21, 2005** – Public meeting, BBS and Northwest Mngmt. present info.
- March 24, 2005** – BBS receives GIS information from all agencies.
- March 31, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- April 5, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- April 19, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- April 26, 2005** – BBS meets USFS, GIS information.
- May 6, 2005** – BBS meets USFS, GIS information.
- May 6, 2005** – Public meeting, BBS presents BCWPP and information.
- May 11, 2005** – BBS attends USFS/MDA forest pests mngmt. meeting.
- May 17, 2005** – BBS meets agency personnel, discuss WUI/HWRA maps.
- May 18, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- May 25, 2005** – BBS meets Co. personnel to prepare WUI/HWRA maps.
- June 1, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- June 3, 2005** – BBS meets with Ranch Maps and Aerials, GIS information.
- June 6, 2005** – Public meeting, BBS presents BCWPP.
- June 13, 2005** – Public meeting, BBS presents BCWPP.
- June 22, 2005** – BBS meeting with County personnel.
- July 25, 2005** – Public meeting, review public comments.
- July 29, 2005** – Public meeting, Task Force performs Risk Assessment.
- August 15, 2005** – Task Force meeting, finalize Plan amendments.
- September 19, 2005** – Public meeting, BBS submits Final Fire Plan.

APPENDIX 3 - Beaverhead County Wildfire Fire Resource List

TRUCK NUMBER	TYPE	NUMBER OF PERSONNEL	GALLONS & GPM	<u>Location</u>
<i><u>DILLON FIRE</u></i>				
<i><u>DEPARTMENT</u></i>				
18-32	STRUCTURE	5	1000 gal. TANK / 1500 GPM	Dillon Fire Hall
18-37	STRUCTURE/CRASH	4	500 gal. Tank	Dillon Fire Hall
18-36	Type 6 WILDLAND	3	300 gal. Tank	Dillon Fire Hall
18-35	Type 6 WILDLAND	3	200 gal. Tank	Dillon Fire Hall
18-34	WATER TENDER	2	3000 gal. Tank	Dillon Fire Hall
18-33	WATER TENDER	2	1500 gal. Tank	Dillon Fire Hall
VAN 1	HAZ-MAT VAN	2		Dillon Fire Hall
18-38	ADMINISTRATIVE TRUCK (4X4)			
Dillon Fire Chief	Dillon Assistant Chief			
Scott Marsh 18-30	Chris Kraft 18-31			
406-683-5326(h)	406-683-4977(h)			
406-660-5051 (cell)	406-660-4977 (cell)			
32 Fire Personnel				
<i><u>LIMA FIRE</u></i>				
<i><u>DEPARTMENT</u></i>				
2004 Ford 4x4 18-444	mini pumper / Crash Truck / Extracation	4	300 Tank / 500gpm	Lima
1975 Ford 4x4 18-445	Type 6 Wildland / Foam	3	250 Tank / 125 gpm	Lima
1981 Ford 18-446	1 Structure	3	1000 Tank / 1000 gpm	Lima
1991 Ford 18-447	2 Water Tender / Honda Pump	2	3000 Tank	Lima
1986 GMC 4x4 18-448	Wildland/Heavy / Foam	3	500 Tank / 200 gpm	Lima

1985 Dodge 4x4 18-449	Type 6 Wildland	3	250 Tank / 125 gpm	Big Sheep
1983 Chevy 4x4 DSL 961	Type 6 Wildland / Foam	3	250 Tank / 125 gpm	Centennial
1994 Ford 4x4 DSL 499	Type 6 Wildland / Foam	3	300 Tank / 125 gpm	Lima
1991 Chevy 18-280	Ambulance			Lima
1982 Ford Van 18-281	Ambulance			Lima
ALL LIMA TRUCKS HAVE THESE FREQUENCIES				
1	KLV-872	DILLON SHERIFF LOCAL		
2	WCC-966	DILLON SHERIFF REPEATER		
3	RED	FIRE MUTUAL AID		
Lima Fire Chief	Lima Assistant Chief			
Shane Kluesner 18-440	Roy Roden 18-441			
406-276-3293 (h)	406-276-3276 (h)			
24 active fire personnel				
6 active ambulance personal				
<i>Grasshopper Valley</i>				
<i>Fire Department</i>				
18-484	TYPE 2 / EXTRICATION	3	1000 gal.Tank, 1250 G.P.M.	GVFD HALL
18-485	TYPE 2	3	1000 gal.Tank, 1000 G.P.M.	CIRCLE S RANCH
1976 18-483	TYPE 6	3	250 gal. Tank	GVFD HALL
1976 4X4	TYPE 6	2	200 gal.Tank	GVFD HALL
1984 FORD AMBULANCE	BLS	3		GVFD HALL
1989 DODGE AMBULANCE	BLS	3		CIRCLE S RANCH

GVFD Fire Chief	GVFD Assistant Chief			
Shelly Boyd 18-480	Buddy Inboden 18-481			
406-834-3497 (h)	406-834-3517 (h)			
24 fire personnel				
(of those)				
3 EMT B				
1 EMT FRA				
5 EMT FR				
<u>GRANT FIRE</u>				
<u>DEPARTMENT</u>				
FREIGHTLINER 18-464	WATER TENDER	2	2500 gal. Tank	GRANT FIRE HALL
18-463	WILDLAND Type 6	3	250 gal. Tank	GRANT FIRE HALL
CHEVROLET VAN	QUICK RESPONSE UNIT			GRANT FIRE HALL
Grant Fire Chief	Grant Assistant Chief			
Rob Worrell 18-460	Graeme McDougal 18-461			
406-681-3228 (h)	406-681-3131 (h)			
10 fire personnel				
(of those)				
3 EMT's				
also 1 W.E.C.				

<u>JACKSON FIRE</u>				
<u>DEPARTMENT</u>				
Portable slip-in unit 18-470	Wildland		150 gal. Tank	JACKSON FIRE HALL
1985 Ford 18-473	STRUCTURE TRUCK	3	750 gal. Tank	JACKSON FIRE HALL
1972 White 18-474	Water Tender	2	3000 gal. Tank	JACKSON FIRE HALL
1994 Chev. 1 ton 18-475	Wildland Type 6	3	210 gal/ Tank / 220 gpm	JACKSON FIRE HALL
Jackson Fire Chief	Jackson Assistant Chief			
Bob Nelson 18-470	M.D. Peterson 18-471			
406-834-3166 (h)	406-834-3104 (h)			
16 fire personnel				
<u>WISDOM FIRE</u>				
<u>DEPARTMENT</u>				
18-403	PUMPER	3		WISDOM FIRE HALL
18-404	PUMPER	3		WISDOM FIRE HALL
18-405 INTERNATIONAL	DNRC TYPE 6	3	200 gal. Tank	WISDOM FIRE HALL
18-406	DNRC TYPE 6	3		WISDOM FIRE HALL
	AMBULANCE			
Wisdom Fire Chief				
Rex Caraker 18-401				
406-689-3108 (h)				

<u>WISE RIVER FIRE</u>				
<u>DEPARTMENT</u>				
18-412	PUMPER	3	750 gal. Tank, 500 G.P.M.	WISE RIVER FIRE HALL
18-413	WATER TENDER	2	1250 gal. Tank , 300 G.P.M.	WISE RIVER FIRE HALL
DNRC 18-414	TYPE 6	3	350 gal. Tank, 300G.P.M.	WISE RIVER FIRE HALL
	AMBULANCE	3		WISE RIVER FIRE HALL
Wise River Fire Chief				
Will Pauley 18-410				
406-832-3210 (h)				
14 Fire personnel				
8 E.M.T's				
1 first responder				
<u>BEAVERHEAD EMERGENCY</u>				
<u>MEDICAL SERVICES</u>				
18-251	2 WD AMBULANCE	3	MAXIMUM TRANSPORT - 4	BEMS BARN
18-252	2 WD AMBULANCE	3	MAXIMUM TRANSPOR - 2	BEMS BARN
18-253	4WD EXTRICATION TRUCK	2	0	BEMS BARN
18-254	4WD FORD EXCURSION	3	MAXIMUM TRANSPORT - 1	BEMS BARN
18-255	4WD AMBULANCE	3	MAXIMUM TRANSPORT - 3	BEMS BARN
BEMS President		BEMS Vice President		BEMS MEDICAL DIRECTOR
Jim Snow		Tom Wagenknecht		Dawna Lynn Wells 18-142
406-683-3709 (w)	406-683-1251 (w)	406-683-3051 (w)		
406-683-5849 (h)	406-683-5897 (h)	406-683-9481 (h)		

406-925-0557 (cell)	406-596-1251 (cell)	406-660-0234 (cell)		
35 EMS Personnel				
31 EMT-Basics				
4 EMT-Intermediates				
<u>Beaverhead County</u>			<u>Lewis & Clark</u>	
<u>Search & Rescue</u>			<u>Radio Cache</u>	
60 personnel			includes	
Command Post			20 Portables	
2 Mobile Command Posts			4 Satellite Telephones	
Mobile Cook Trailer			2 Aircraft / Ham portables	
Equipment Trailers				
Rescue Equipment				
				Deputy DES Coordinator
				also Search & Rescue
County Sheriff	County Fire Warden	County DES Coordinator	Deputy DES Coordinator	Commander
Bill Briggs 18-1	Scott Marsh 18-30	Larry Laknar DES 18	Bob McWilliams 18-230	Brian Vinson 18-101
406-683-3707 (w)	406-683-3757 (w)	406-683-3771 (w)	406-683-3754 (w)	
406-276-3361(h)	406-683-5326 (h)	406-683-6394 (h)	406-683-4709 (h)	406-683-4948 (h)
406-925-1441 (cell)	406-925-1660 (cell)	406-660-1510 (cell)	406-660-0191 (cell)	406-660-4948 (cell)
County Commission	County Commissioner	County Commissioner		Search & Rescue
Chairman				Vice - Commander
Mike McGinley 18-202	Garth Haugland 18-201	Vacant		Bill Knox 18-R2
406-683-3751 (w)	406-683-3762 (w)			406-683-2536 (w)
406-683-4632 (h)	406-683-3657 (h)			406-683-4784
406-660-0391 (cell)	406-925-1353 (cell)			

APPENDIX 4 - Recommended Wildfire Mitigation Checklist

Beaverhead County Recommended Wildfire Mitigation Checklist

Planning Zone	Recommendations
6- Red Rock-Beaverhead River Corridor	<input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire
3- East-West Pioneers Mountains	<input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire
7- South Centennial Area	<input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation,

	<ul style="list-style-type: none"> Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire 	
2- Big Hole Valley Bottom	<ul style="list-style-type: none"> <input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire 	
1- West Big Hole- Forested	<ul style="list-style-type: none"> <input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire 	
4- Bannack-Grant Foothills	<ul style="list-style-type: none"> <input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions 	

	<input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire	
5- Tendoy Area	<input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire	
8- Blacktail-Gravelly Area	<input type="checkbox"/> Education-Fire Wise <input type="checkbox"/> Fuel Treatments <input type="checkbox"/> Reducing structural ignitability <input type="checkbox"/> Water sources and Supply <input type="checkbox"/> Improving Fire response capability <input type="checkbox"/> Improving Access <input type="checkbox"/> Subdivision Review and Regulation <input type="checkbox"/> Public Information <input type="checkbox"/> Agency Coordination- Response- Mitigation, Planning, Recovery <input type="checkbox"/> Open Burning Regulations- Restrictions <input type="checkbox"/> Livestock Grazing <input type="checkbox"/> Herbicide-Biological <input type="checkbox"/> Prescribed fire	

Appendix 5 – Fire Wise Concepts



LIVING WITH FIRE

NORTHERN ROCKIES FIRE PREVENTION TEAM • NORTHERN ROCKIES WILDFIRE COOPERATORS

LIVING IN A NATURAL FIRE ENVIRONMENT

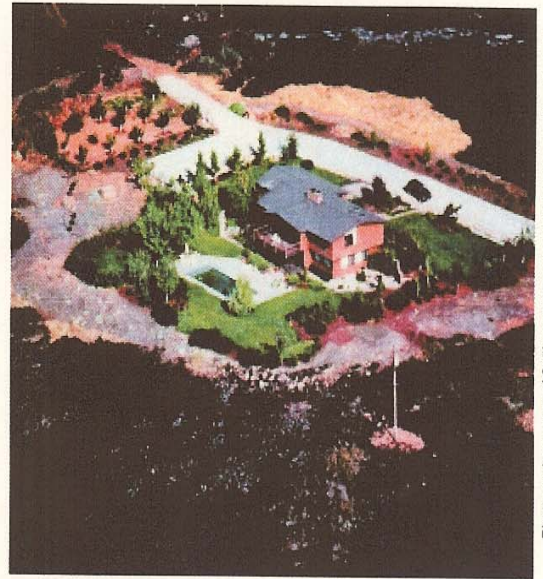
The Northern Rockies region is an area where fire has always played a prominent role in the natural environment. Long before towns and subdivisions were established across the landscape, fires were a natural result of the frequent summer thunderstorms that travelled across the mountains and plains. However, decades of fire suppression have resulted in fuel conditions that have the potential to create intense wildfires.

Within this natural fire environment, there are individual houses, subdivisions, and entire communities. Many homes, however, would be unable to survive an intense wildfire. Since it is not a question of "if" wildfires

will occur but "when," they will occur, the likelihood of human life and property loss is great and growing.

Our ability to live more safely in this fire environment greatly depends upon our use of "pre-fire activities." Pre-fire activities are actions taken before a wildfire occurs which improve the survivability of people and homes. They include proper vegetation management around the home (known as defensible space), use of fire resistant building materials, appropriate subdivision design, and other measures. Research clearly demonstrates that pre-fire activities save lives and property.

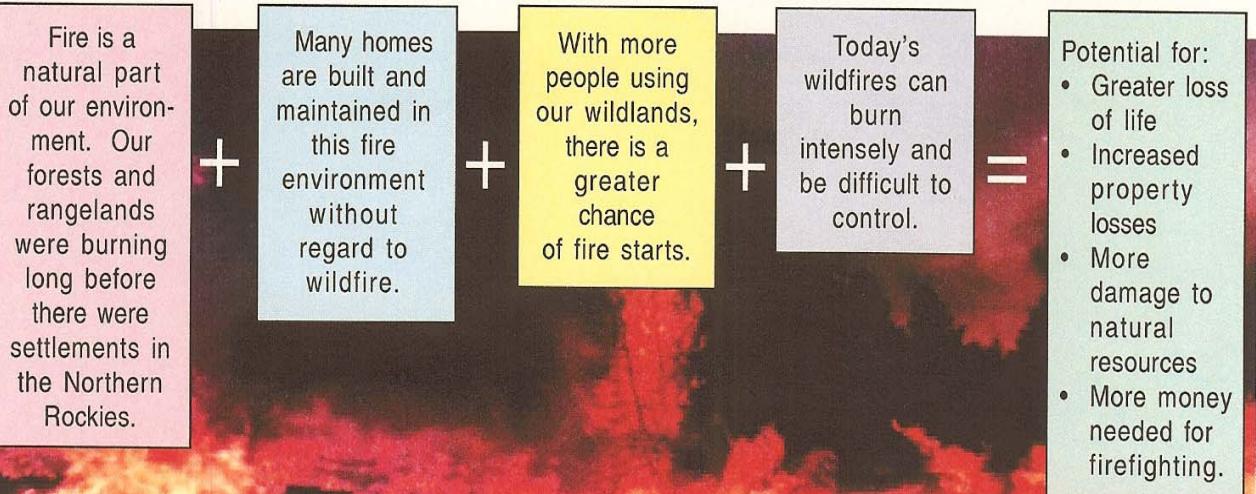
THE "LIVING WITH FIRE" PROJECT



Photograph courtesy of California Department of Forestry and Fire Protection.

The pre-fire activities implemented by this homeowner included a green and well maintained landscape, reduction of wildland vegetation around the perimeter of the property, a fire resistant roof, and a good access road with a turnaround area. The charred surroundings of the home show that these pre-fire activities effectively protected it when wildfire hit.

THE "WHY WE'RE WORRIED ABOUT WILDFIRE" EQUATION



Cover photograph courtesy of California Department of Forestry and Fire Protection.

THE FIRE ENVIRONMENT

The "fire environment" is defined as the "surrounding conditions, influences, and modifying forces that determine wildfire behavior." Firefighters recognize three components of the fire environment: weather, topography, and fuel. These three components affect the likelihood of a fire start, speed and direction at which a wildfire will travel, intensity at which a wildfire burns, and the ability to control and extinguish a wildfire. Although weather and topography cannot be changed, the fuels (or vegetation) can be modified. Consequently, many of our opportunities to reduce the wildfire threat lie in proper management and manipulation of wildland vegetation.

WEATHER: Dry, hot and windy weather increases the likelihood of a major wildfire. These conditions make ignition easier, allow fuels to burn more rapidly, and increase fire intensity. High wind speeds, in particular, can transform a small, easily controllable fire into a catastrophic event in a matter of minutes.

TOPOGRAPHY: Of topographic features, steepness of slope most influences fire behavior. As the steepness of slope increases, the fire spreads more quickly. Other important topographic features include aspect (south and southwest slopes usually have more fires) and steep, narrow drainages (chimneys) which can significantly increase the rate of firespread.

FUEL: Fuel is required for any fire to burn. With regards to wildfire, fuels almost always consist of living vegetation (trees, shrubs, grass, and wildflowers) and dead plant material (dead trees, dried grass, fallen branches, pine needles, etc.). Houses, when involved in a wildfire, become a source of fuel. The amount, size, moisture content, arrangement, and other fuel characteristics influence ease of ignition, rate of fire spread, length of flames produced, and other fire behaviors.

THE HUMAN ENVIRONMENT: When people are living in high hazard fire environments, the human built environment becomes an important factor in predicting the loss of life and property. Untreated wood shake and shingle roofs, narrow roads, limited access, lack of fire-wise landscaping, inadequate water supplies, and poorly planned subdivisions are examples of increased risk to people living with the threat of wildfire.

EXAMPLES OF LOCAL FIRE BEHAVIOR*

Presented below are five types of vegetation common to our region with computer generated estimates of how they would burn under certain conditions. These predictions assume a wind speed of 20 mph, flat terrain, typical moisture contents of living and dead vegetation for summertime, and normal August weather for our area. It is important to note that fire size and rate of spread is largely determined by spotting (embers/firebrands that are thrown ahead and to the sides of actively burning fires). Spotting results in smaller fires that may contribute to the main fire's size and rate of spread.

Flame Length 8 feet

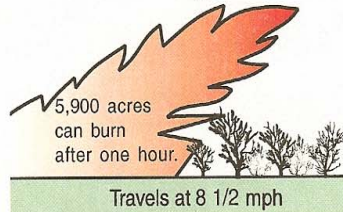
3,000 acres can burn after one hour.



CHEATGRASS: Cheatgrass is an invasive annual grass that usually occupies areas formerly vegetated with big sagebrush. It can dominate old burned areas, abandoned pastures, and other disturbed areas.

Flame Length 55 feet

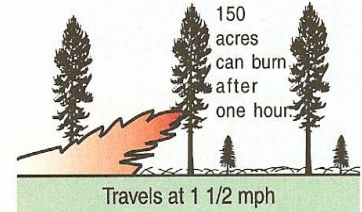
5,900 acres can burn after one hour.



BIG SAGEBRUSH/BITTERBRUSH: This is a heavy brush type consisting of large big sagebrush, bitterbrush, and sometimes mountain mahogany. Usually large amounts of dead woody material are present. It is common in the Bitterroot and Pintler Ranges and in southwestern and south central Montana.

Flame Length 10 feet

150 acres can burn after one hour.

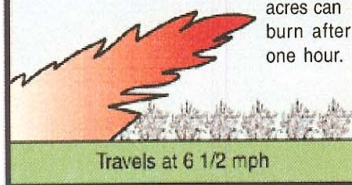


OPEN PINE FOREST: This type consists of open, park-like lodgepole and/or ponderosa pine, often interspersed with fir and other coniferous trees. The understory consists of pine needles, a variety of grasses, and often dense saplings.

*Fire behavior estimates were prepared by Risa Lange-Navarro, USDA Forest Service.

Flame Length 22 feet

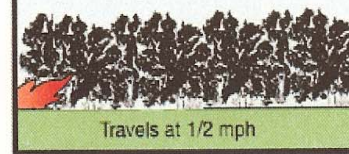
3,400 acres can burn after one hour.



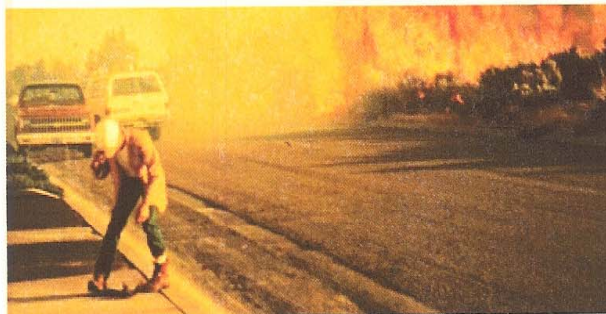
BIG SAGEBRUSH: Big sagebrush is the dominant shrub in this type and there is an understory of cheatgrass, bunch grass, and wildflowers. This type is very common in the foothills surrounding the valleys.

Flame Length 9 feet

15 acres can burn after one hour.



DENSE CONIFER FOREST: Thick stand of mature pine, fir and other conifers. There are mixed layers of vegetation among young trees, seedlings and shrubs. There is a large amount of dead or down woody material, needles and organic matter on the forest floor.



Photograph courtesy of Ben Hammack.

When wildfire flame lengths exceed 11 feet, direct firefighting efforts are ineffective. Under these conditions firefighters use roads, streams, and other barriers to control the wildfire.

THE LIMITATIONS OF WILDLAND FIREFIGHTING

A lot of people assume that when a wildfire starts, it will be quickly controlled and extinguished. This is an accurate assumption 97% of the time, if firefighters can reach the fire quickly. Firefighters have the ability, equipment, and technology to effectively suppress most wildfires. But 3% of the time wildfires burn so intensely that there is little firefighters can do. Presented at right are firefighter tactics as they relate to wildfire flame length. Compare this to the flame lengths shown in "Examples of Local Fire Behavior."

FLAME LENGTH	EFFECTIVE FIRE SUPPRESSION TACTICS*
Less than 4 feet	Fireline constructed with hand tools, such as shovels and axes, can be effective at the front of the fire.
4 to 8 feet	Bulldozers and other heavy equipment will be needed to construct an effective fireline. Where bulldozers are not available, fire engines with hoses and water will be required to "knock down" the flames before the fire crews with hand tools can be effective. Or fire crews must construct a fireline at a considerable distance from the fire.
8 to 11 feet	Airtankers with fire suppressing retardant or helicopters with water are required to reduce the fire's rate of spread before fireline construction by crews or bulldozers can be effective.
More than 11 feet	Direct fire suppression efforts will be ineffective. Retreat to existing roads, streams and other barriers. Burn out vegetation between the fireline and the advancing fire front to eliminate wildfire fuels.

*Adapted from information provided by Risa Lange-Navarro, USDA Forest Service.

FREQUENTLY ASKED QUESTIONS ABOUT DEFENSIBLE SPACE



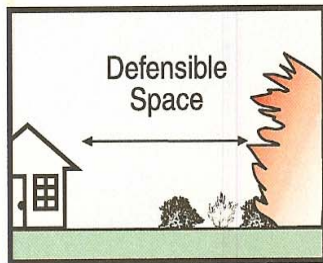
Photograph courtesy of Ben Hammack.

More and more homes are being built in high fire hazard environments.

In the 1980's, the term "defensible space" was coined to describe vegetation management practices aimed at reducing the wildfire threat to homes. This article responds to some of the commonly asked questions about defensible space.

WHAT IS DEFENSIBLE SPACE?

Defensible space is the area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and to provide an opportunity for firefighters to effectively defend the house. Sometimes, a defensible space is simply a homeowner's properly maintained backyard.



WHAT IS THE RELATIONSHIP BETWEEN VEGETATION AND WILDFIRE THREAT?

Many people do not view the plants growing on their property as a threat. But in terms of wildfire, the vegetation adjacent to their homes can have considerable influence upon the survivability of their houses. All vegetation, including plants native to the area as well as ornamental plants, is potential wildfire fuel. If vegetation is properly modified and maintained, a wildfire can be slowed, the length of flames shortened, and the amount of heat reduced, all of which assist firefighters to defend the home against an oncoming wildfire.

THE FIRE DEPARTMENT IS SUPPOSED TO PROTECT MY HOUSE, SO WHY BOTHER WITH DEFENSIBLE SPACE?

Some individuals incorrectly assume that a fire engine will be parked in their driveway and firefighters will be actively defending their homes if a wildfire approaches. During a major wildfire, it is unlikely there will be enough firefighting resources available to defend every home. In these instances, firefighters will likely select homes they can most safely and effectively protect. Even with adequate resources, some wildfires may be so intense that there may be little firefighters can do to prevent a house from burning. The key is to reduce fire intensity as wildfire nears the house. This can be accomplished by reducing the amount of flammable vegetation surrounding a home. Consequently, the most important person in protecting a house from wildfire is not a firefighter, but the property owner. And it's the action taken by the owner **before** the wildfire occurs (such as proper landscaping) that is most critical.

DOES DEFENSIBLE SPACE REQUIRE A LOT OF BARE GROUND IN MY LANDSCAPE?

No. Unfortunately, many people have this misconception. While bare ground is certainly effective in reducing the wildfire threat, it is unnecessary and unacceptable due to appearance, soil erosion, and other reasons. Many homes have attractive, well vegetated landscapes that also serve as effective defensible space.

DOES CREATING A DEFENSIBLE SPACE REQUIRE ANY SPECIAL SKILLS OR EQUIPMENT?

No. For the most part, creating a defensible space employs routine gardening and landscape maintenance practices such as pruning, mowing, weeding, plant removal, appropriate plant selection, and irrigation. Equipment needed includes of common tools like a chain saw, pruning saw, pruning shears, loppers, weed-eater, shovel, and a rake. A chipper, compost bin, or a large rented trash dumpster may be useful in disposing of unwanted plant material.

HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?

Defensible space size is not the same for everyone, but varies by slope and type of wildland vegetation growing near the house. See the article entitled "Creating An Effective Defensible Space" for specific information.



Photo courtesy of Dave Hill

DOES DEFENSIBLE SPACE MAKE A DIFFERENCE?

Yes. Investigations of homes threatened by wildfire indicate that houses with an effective defensible space are much more likely to survive a wildfire. Furthermore, homes with both an effective defensible space and a nonflammable roof (composition shingles, tile, metal, etc.) are many times more likely to survive a wildfire than those without defensible space and flammable roofs (wood shakes or shingles). These conditions give firefighters the opportunity to effectively and safely defend the home.

DOES HAVING A DEFENSIBLE SPACE GUARANTEE MY HOUSE WILL SURVIVE A WILDFIRE?

No. Under extreme conditions, almost any house can burn. But having a defensible space will significantly improve the odds of your home surviving a wildfire.

WHY DOESN'T EVERYONE LIVING IN A HIGH WILDFIRE HAZARD AREA CREATE A DEFENSIBLE SPACE?

The specific reasons for not creating a defensible space are varied. Some individuals believe "it won't happen to me". Others think the costs (time, money, effort, loss of privacy, etc.) outweigh the benefits. Some fail to implement defensible space practices simply because of lack of knowledge or misconceptions.

HOW DO I CHANGE THE VEGETATION ON MY PROPERTY TO REDUCE THE WILDFIRE THREAT?

The objective of defensible space is to reduce the wildfire threat to a home by changing the characteristics of the adjacent vegetation. Defensible space practices include:

- increasing the moisture content of vegetation.
- decreasing the amount of flammable vegetation.
- shortening plant height.
- altering the arrangement of plants.

This is accomplished through the "Three R's of Defensible Space." The article "Creating An Effective Defensible Space" provides detailed information about changing vegetation characteristics for defensible space.

THE THREE R's OF DEFENSIBLE SPACE

Removal

This technique involves the elimination of entire plants, particularly trees and shrubs, from the site. Examples of removal are cutting down a dead tree or cutting out a flammable shrub.

Reduction

The removal of plant parts, such as branches or leaves, constitute reduction. Examples of reduction are pruning dead wood from a shrub, removing low tree branches, and mowing dried grass.

Replacement

Replacement is substituting less flammable plants for more hazardous vegetation. Removal of a dense stand of flammable shrubs and planting an irrigated, well maintained flower bed is an example of replacement.

CREATING AN EFFECTIVE DEFENSIBLE SPACE*

...A Step-by-Step Guide

Are you worried about the wildfire threat to your home, but aren't sure how to get started in making your home defensible? Follow these six steps to an effective defensible space...

STEP ONE: HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?

The size of the defensible space area is usually expressed as a distance extending outward from the sides of the house. This distance varies by the type of wildland vegetation growing near the house and the steepness of the terrain.

On the "Recommended Defensible Space Distance" chart presented below, find the vegetation type and percent slope (see "Homeowners Guide to Calculating Percent Slope") which best describes the area where your house is located. Then find the recommended defensible space distance for your situation.

For example, if your property is surrounded by wildland grasses such as cheatgrass, and is located on flat land, your recommended defensible space distance

would extend 30 feet from the sides of the house. If your house is on a 25% slope and the adjacent wildland vegetation is dense tall brush, your recommended defensible space distance would be 200 feet.

If the recommended distance goes beyond your property boundaries, contact the adjacent property owner and work cooperatively on creating a defensible space. The effectiveness of defensible space increases when multiple property owners work together. The local assessor's office can provide assistance if the owners of adjacent properties are unknown. Do not work on someone else's property without their permission.

Temporarily mark the recommended distance with flagging or strips of cloth tied to shrubs, trees, or stakes around your home. This will be your defensible space area.

STEP TWO: IS THERE ANY DEAD VEGETATION WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?

Dead vegetation includes dead trees and shrubs, dead branches lying on the ground or still attached to living plants, dried grass, flowers and weeds, dropped leaves and needles, and firewood stacks. In most instances, dead vegetation should be removed from the recommended defensible space area. A description of the types of dead vegetation you're likely to encounter and the recommended actions are presented below on the next page.

DEFENSIBLE SPACE				
RECOMMENDED DISTANCES—STEEPNESS OF SLOPE				
	Flat to Gently Sloping 0 to 20%	Moderately Steep 21% to 40%	Very Steep +40%	
VEGETATION TYPE	Grass Wildland grasses (such as cheatgrass), weeds, and widely scattered shrubs with grass understory.	30 feet	100 feet	100 feet
	Shrubs Includes shrub dominant areas (such as sagebrush and bitterbrush) and juniper.	100 feet	200 feet	200 feet
	Trees Includes forested areas. If substantial grass or shrub understory is present, use those values shown above.	30 feet	100 feet	200 feet

- 1) Find the percent slope which best describes your property.
- 2) Find the type of vegetation which best describes the wildland plants growing on or near your property.
- 3) Locate the number in feet corresponding to your slope and vegetation. This is your recommended defensible space distance.

*Please note the recommendations presented in this article are suggestions made by local firefighters experienced in protecting homes from wildfire. They are not requirements nor do they take precedence over local ordinances.

STEP THREE: IS THERE A CONTINUOUS DENSE COVER OF SHRUBS OR TREES PRESENT WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?

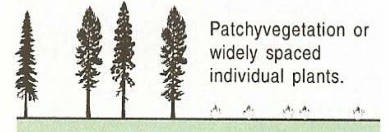
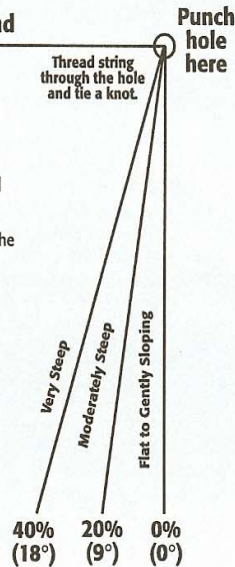
Sometimes wildland plants can occur as an uninterrupted layer of vegetation as opposed to being patchy or widely spaced individual plants. The more continuous and dense the vegetation, the greater the wildfire threat. If this situation is present within your defensible space area, you should "break-it-up" by providing a separation between plants or small groups of plants.

Homeowner's Guide to Calculating Percent Slope

Hold this line parallel to the ground

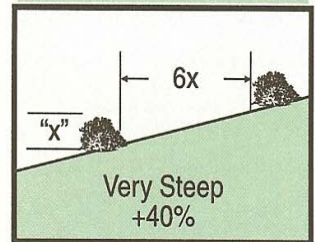
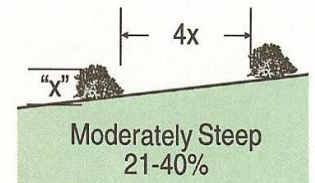
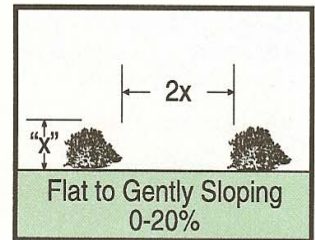
INSTRUCTIONS:

1. Enlarge this diagram using a photocopying machine.
2. Mount photocopy on a piece of cardboard.
3. Punch a hole through photocopy and cardboard at the designated spot.
4. Thread a 12 inch piece of string through the hole and tie a knot in the end of the string on the backside of the cardboard.
5. Tie a one inch or larger washer to weight the other end of the string.
6. Hold the designated line parallel to the ground, sighting up slope along the edge of the cardboard.
7. The weighted string will indicate the percent of slope steepness. For convenience, steepness of slope in degrees is presented in parenthesis.



Recommended Separation Distances for Shrubs and Juniper

For areas with dense brush or juniper trees, the recommended separation distance is dependant upon shrub height and steepness of slope. Specific recommendations are presented below.

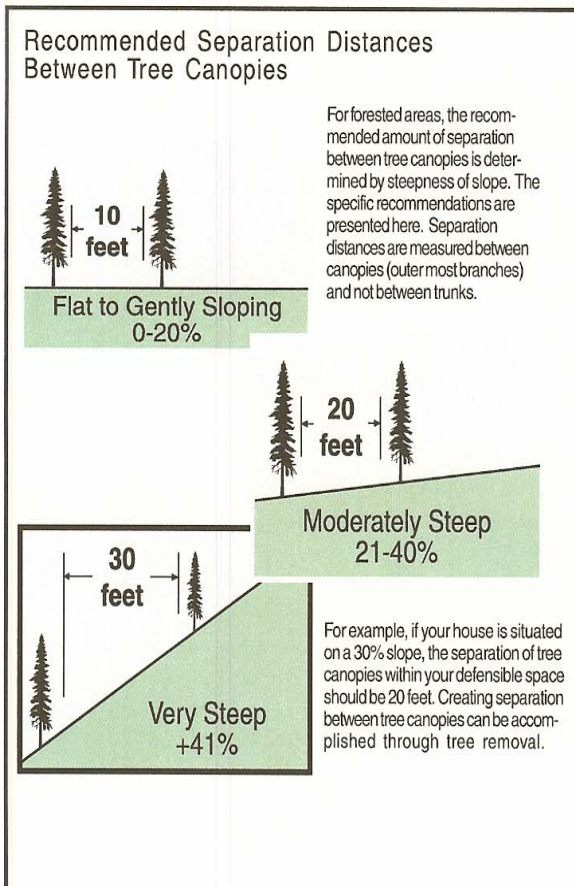
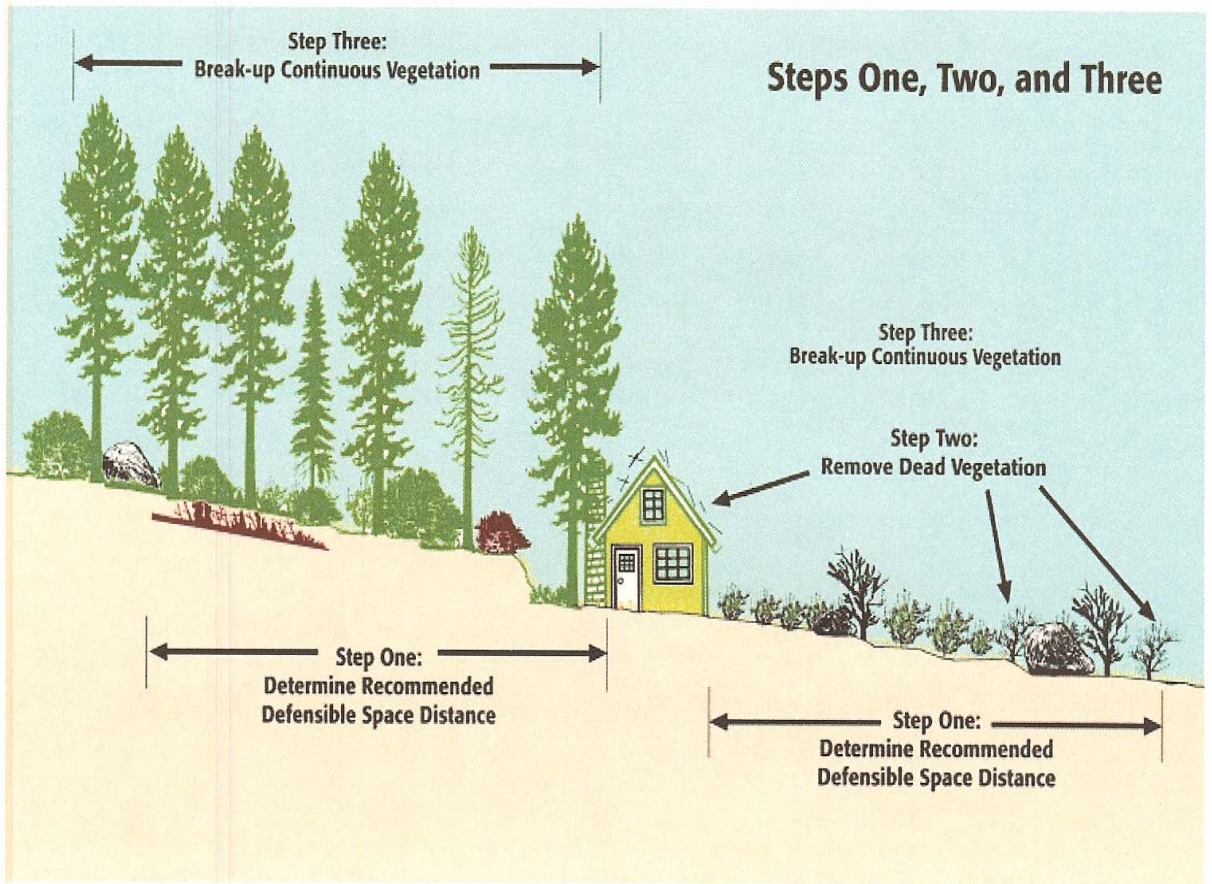


Note: Separation distances are measured between canopies (outermost branches) and not between trunks.

For example, if your home is located on a 10% slope and the brush is four feet tall, the separation distance would be two times the shrub height or eight feet. The recommended separation distance can be accomplished by removing plants or through pruning that reduces the diameter or height of shrubs (shorter height means less separation is needed). Removal works best for sagebrush. For shrubs which readily sprout, such as bitterbrush, pruning to reduce height may be the best approach.

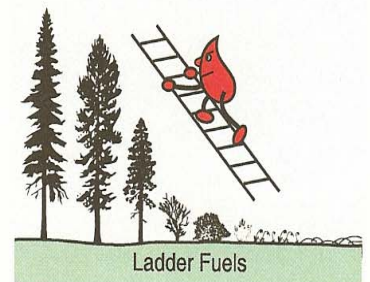
TYPES OF DEAD VEGETATION AND RECOMMENDED PRACTICE

DEAD FUEL TYPE	RECOMMENDED PRACTICE
STANDING DEAD TREE	Remove all standing dead trees from within the defensible space area.
DOWN DEAD TREE	Remove all down dead trees within the defensible space area if they have recently fallen and are not yet embedded into the ground. Downed trees that are embedded into soil and which cannot be removed without soil disturbance should be left in place. Remove all exposed branches from an embedded downed dead tree.
DEAD SHRUBS	Remove all dead shrubs from within the defensible space area.
DRIED GRASSES AND WILDFLOWERS	Once grasses and wildflowers have dried out or "cured," cut down and remove from the defensible space area.
DEAD NEEDLES, LEAVES, BRANCHES, CONES (ON THE GROUND)	Reduce thick layers of pine needles to a depth of two inches. Do not remove all needles. Take care not to disturb the "duff" layer (dark area at the ground surface where needles are decomposing) if present. Remove dead leaves, twigs, cones, and branches.
DEAD NEEDLES, LEAVES, BRANCHES, AND TWIGS (OTHER THAN ON THE GROUND)	Remove all dead leaves, branches, twigs, and needles still attached to living trees and shrubs to height of 15 feet above ground. Remove all debris that accumulates on the roof and in rain gutters on a routine basis (at least once annually).
FIREWOOD, HAY STORAGE AND OTHER COMBUSTIBLE DEBRIS	Locate firewood and other combustible debris (wood scraps, grass clippings, leaf piles, etc.) at least 100 feet uphill from the house.



STEP FOUR: ARE THERE LADDER FUELS PRESENT WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?

Vegetation is often present at varying heights, similar to the rungs of a ladder. Under these conditions, flames from fuels burning at ground level, such as a thick layer of pine needles, can be carried to shrubs which can ignite still higher fuels like tree branches. Vegetation that allows a fire to move from lower growing plants to taller ones is referred to as "ladder fuel." The ladder fuel problem can be corrected by providing a separation between the vegetation layers.



Within the defensible space area, a vertical separation of three times the height of the lower fuel layer is recommended.

For example, if a shrub growing adjacent to a large pine tree is three feet tall, the recommended separation distance would be nine feet. This could be accomplished by removing the lower tree branches, reducing the height of the shrub, or both. The shrub could also be removed.

STEP FIVE: IS THERE AN AREA AT LEAST 30 FEET WIDE SURROUNDING YOUR HOUSE THAT IS "LEAN, CLEAN, AND GREEN"?

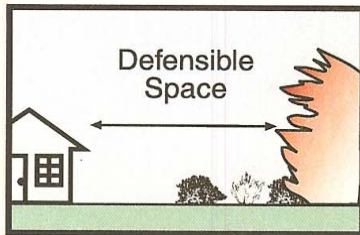
The area immediately adjacent to your house is particularly important in terms of an effective defensible space. It is also the area that is usually landscaped. Within an area extending at least 30 feet from the house, the vegetation should be kept...

- Lean—small amounts of flammable vegetation,
- Clean—no accumulation of dead vegetation or other flammable debris, and
- Green—plants are healthy and green during the fire season.

The "Lean, Clean, and Green Zone Checklist" will help you evaluate the area immediately adjacent to your house.

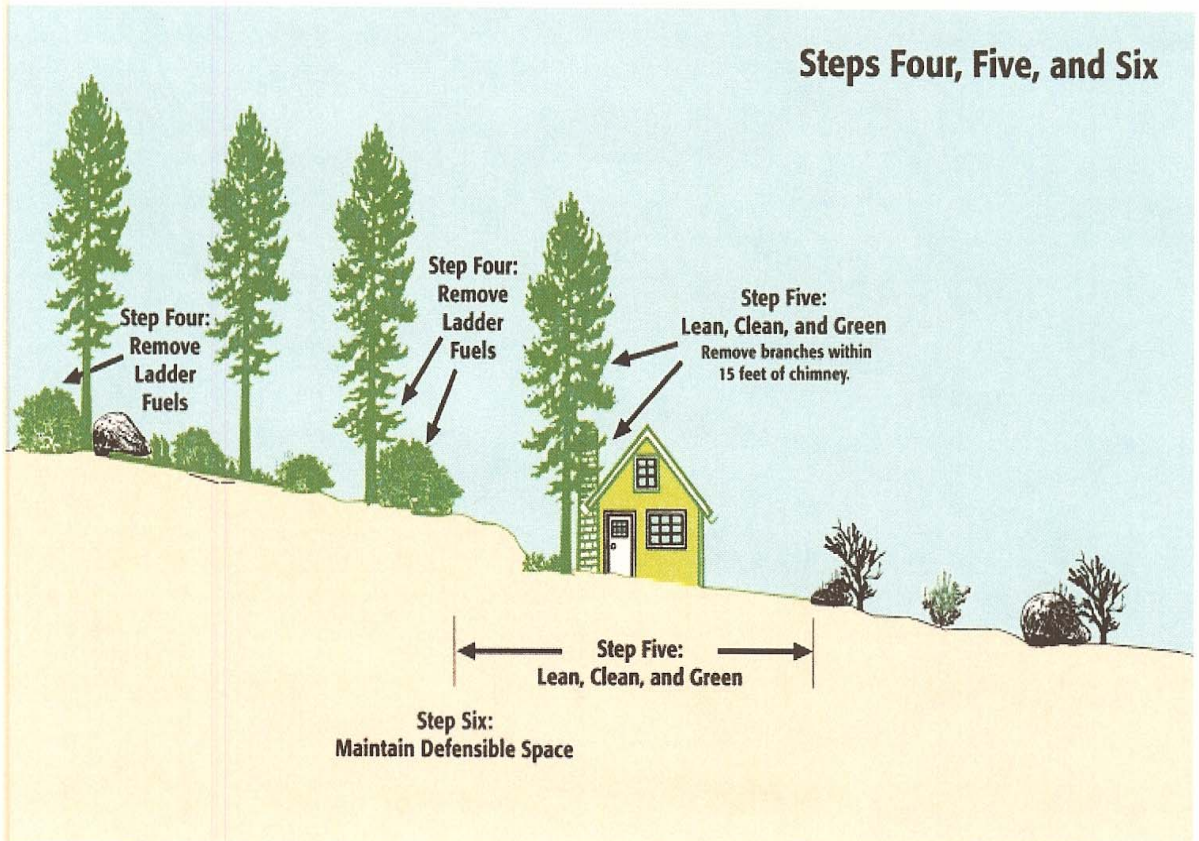
STEP SIX: IS THE VEGETATION WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA MAINTAINED ON A REGULAR BASIS?

Keeping your defensible space effective is a continual process. At least annually, review these defensible space steps and take action accordingly. An effective defensible space can be quickly diminished through neglect.



THE LEAN, CLEAN, AND GREEN CHECKLIST

- Emphasize the use of low growing herbaceous (non-woody) plants that are kept green during the fire season through irrigation if necessary. Herbaceous plants include lawn, clover, a variety of groundcovers, bedding plants, bulbs, perennial flowers, and conservation grasses.
- Emphasize use of mulches, rock, and non-combustible hard surfaces (concrete sidewalks, brick patios, and asphalt driveways).
- Deciduous ornamental trees and shrubs are acceptable if they are kept green and free of dead plant material, ladder fuels are removed, and individual plants or groups of plants are arranged so that adjacent wildland vegetation cannot convey a fire through them to the structure. Shorter deciduous shrubs are preferred.
- Minimize the use of ornamental coniferous shrubs and trees (such as juniper, arborvitae, and mugo pine) and tall exotic grasses (such as pampas grass).
- Where permitted, most wildland shrubs and trees should be removed from this zone and replaced with more desirable alternatives (see next page). Individual specimens or small groups of wildland shrubs and trees can be retained so long as they are kept healthy and free of dead wood, are pruned to reduce the amount of fuel and height, and ladder fuels are removed.
- For some areas substantial removal of wildland vegetation may not be allowed. In these instances, wildland vegetation should conform to the recommendations presented in steps 2 through 4. Please become familiar with local requirements and restrictions before removal of wildland vegetation.
- Tree limbs within 15 feet of a chimney, encroaching on powerlines, or touching the house should be removed.



COMMON WILDLAND PLANTS THAT FUEL WILDFIRES*



CHEATGRASS

Short annual grass; may dominate disturbed areas; extremely flammable when dried.



BIG SAGEBRUSH

Very common gray-green shrub; does not resprout; considered a flammable plant.



BITTERBRUSH

Often growing with big sagebrush; dark green three-tipped leaves, growth form and size variable; tall and dense stands burn very intensely.



NINEBARK

White saucer-shaped flowers; alternate, strongly veined leaves.



SNOWBRUSH

Shiny, three veined, green leaves; re-sprouts; common in the Sierras above 6,000 feet elevation.



PONDEROSA PINE

Bark is orange-brown to cinnamon with deep fissures.



ROCKY MTN. JUNIPER

Shrub to small tree; dry, rocky, open sites; cedar-like.



DOUGLAS-FIR

Irregular, spreading or drooping branches tipped with pointy reddish-brown buds.



LODGEPOLE PINE

Largely bare of branches in closed stands; branches usually curved upwards.

FIRESCAPE - FIRE SAFE LANDSCAPE DESIGN

Firescaping is a type of landscape design that reduces a home's vulnerability to wildfire. The goal is to develop and design a landscape with plants that offer fire protection and enhance the property. The idea is to surround the home with things that are less likely to burn.

Proper plant selection, placement and maintenance can diminish the possibility of ignition, lower fire intensity, and reduce how quickly a fire spreads. Because junipers, other conifers and broadleaf evergreens contain oils, resins and waxes that make those plants burn with great intensity, use of these plants should be minimized within 30 feet of a structure. These more flammable plants

should be replaced with "fire wise" plants that generally have a higher moisture content. A list of fire wise plants available in the Northern Rockies region is found below.

When designing a landscape for fire safety remember less is better. Simplify visual lines and groupings. A firesafe landscape lets plants and garden elements reveal their natural beauty by leaving space between plants and groups of plants. Although fire-wise plants are preferred, regular landscape maintenance is far more important to fire prevention than the selection of plant material.

Fire-Wise Plant Material for the Northern Rocky Mountains

Although there are no fire resistant plant materials, the following is a list of some fire-resistive plants that can be used in landscaping for fire prevention. Landscape maintenance is far more important to fire prevention than the selection of plant materials. When planning your landscape, use the characteristics of fire-resistive plants along with site characteristics such as slope, aspect, hardiness zone and amount of precipitation to choose plant material suitable for your site.

TREES	common name	PERENNIALS	common name
Conifers:			
Calocedrus decurrens	Incense cedar	Achillea spp.	Yarrow
Thuja plicata	Western red cedar	Allium schoenoprasum	Chives
Betula	Birch	Bergenia spp.	Bergenia
Deciduous:			
Acer spp.	Maple	Brodiaea spp.	Lilies
Alnus spp.	Alder	Coreopsis spp.	Coreopsis
Catalpa speciosa	Northern catalpa	Erysimum linifolium	Wall flower
Cornus florida	Flowering dogwood	Eschscholzia spp.	California poppy
Fagus spp.	Beech	Fragaria spp.	Wild strawberries
Fraxinus spp.	Ash	Geranium spp.	Geranium
Gleditsia tricanthos	Honeylocust	Hemerocallis hybrids	Daylilies
Malus spp.	Apple	Heuchera spp.	Coral bells
Populus spp.	Aspen, cottonwood, poplar	Iris spp.	Iris
Prunus spp.	Cherry	Kniphofia uvaria	Red hot poker
Quercus spp.	Oak (white, burr or red)	Lupinus spp.	Lupine
Robinia pseudoacacia	Black locust	Oenothera spp.	Evening primrose
Salix spp.	Willow	Penstemon spp.	Beard tongue
		Solidago spp.	Goldenrod
		Strachys byzantina	Lamb's ear
SHRUBS	common name	GROUNDCOVERS	common name
Amelanchier spp.	Serviceberry	Succulents:	
Atriplex canescens	Four wing saltbrush	Delosperma nubigenum	Hardest ice plant
Buddelia davidi	Butterfly bush	Echeveria spp.	Hens & chicks
Caryopteris x clandonensis	Blue-mist spirea	Sedum spp.	Stone crops
Cornus sericea	Red osier dogwood	Non-succulents:	
Cotoneaster spp.	Cotoneaster	Achillea tomentosa	Wolly yarrow
Liquidambar spp.	Privet	Ajuga reptans	Carpet bugle
Mahonia spp.	Creeping grape holly	Arctostaphylos uva-ursi	Kinnikinnick
Pachistima canbyi	Dwarf mountain lover	Armeria maritima	Sea pink; thrift
Philadelphus spp.	Mock orange; syringa	Cerastium tomentosa	Snow in summer
Rhamnus fragula	Buckthorn	Cotoneaster dammeri	Bearberry cotoneaster
Rhododendron spp.	Azaleas, rhododendrons	Euonymus fortunei	Winter creeper
Ribes spp.	Currant	Potentilla tabernaemontanii	Spring cinquefoil
Shepherdia argentea	Silver buffaloberry	Senecio cineraria	Dusty miller
Symphoricarpos albus	Snowberry	Thymus praecox arcticus	Mother of thyme
Viburnum trilobum	Cranberry bush	Verbenia bipinnatifida	Verbenia
Yucca spp.	Yucca		

OTHER CONSIDERATIONS IN MAKING YOUR HOME DEFENSIBLE

How a house is designed, where it is built, materials used in its construction and landscape, and access to the home all influence survivability during wildfire. Presented below are recommendations and an illustration modified from the publication "How to Make Your Home Fire Safe." These recommendations will make a home much easier to defend and will improve its chances of surviving a wildfire.

1. ROOF

- Remove dead branches hanging over your roof.
- Remove any branches within 15 feet of your chimney.
- Clean all dead leaves and needles from your roof and gutters. Install a roof that meets the fire resistance classification of "Class C" or better. Local jurisdictions may require a higher fire resistance rating. Check with your fire marshal.
- Cover your chimney outlet and stovepipe with a nonflammable screen of one-half inch or smaller mesh.

2. CONSTRUCTION

- Build your home away from ridge tops, canyons and areas between high points on a ridge.
- Build your home at least 30 feet from your property line.
- Use fire resistant building materials.
- Enclose the underside of balconies and above-ground decks with fire resistant materials.
- Limit the size and number of windows in your home that face large areas of vegetation.
- Install only dual-paned or triple-paned windows.
- Consider sprinkler systems within the house. They may protect your home while you're away or prevent a house fire from spreading into the wildlands.

3. LANDSCAPE

- See "Creating An Effective Defensible Space" and "Firescape - Fire Safe Landscape Design."

4. YARD

- Stack woodpiles at least 30 feet from all structures and clear away flammable vegetation within 10 feet of woodpiles.
- Locate LPG tanks (butane and propane) at least 30 feet from any structure and surround them with 10 feet of clearance.
- Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.
- Contact your local fire department to see if open burning is allowed in your area; if so, obtain a permit before burning debris.
- Where burn barrels are allowed, clear flammable materials at least 10 feet around the barrel; cover the open top with a non-flammable screen with mesh no larger than one-quarter inch.

5. EMERGENCY WATER SUPPLY

- Maintain an emergency water supply that meets fire department standards through one of the following:
 - a community water/hydrant system
 - a cooperative emergency storage tank with

neighbors

— a minimum storage supply of 2,500 gallons on your property

- Clearly mark all emergency water sources and notify your local fire department of their existence.
- Create easy firefighter access to your closest emergency water source.
- If your water comes from a well, consider an emergency generator to operate the pump during a power failure.

6. ACCESS

- Identify at least two exit routes from your neighborhood.
- Construct roads that allow two way traffic.
- Design road width, grade and curves to allow access for large emergency vehicles.
- Construct driveways to allow large emergency equipment to reach your house.
- Design bridges to carry heavy emergency vehicles, including bulldozers carried on large trucks.
- Post clear road signs to show traffic restrictions such as dead-end roads, and weight and height limitations.
- Make sure dead-end roads and long driveways have turnaround areas wide enough for emergency vehicles. Construct turnouts along one-way roads.
- Clear flammable vegetation at least 10 feet from roads and five feet from driveways.
- Cut back overhanging tree branches above roads.
- Construct fire barriers, such as greenbelts, parks, golf courses and athletic fields.
- Make sure that your street is named or numbered, and a sign is visibly posted at each street intersection.
- Make sure that your street name and house number are not duplicated elsewhere in the county.
- Post your house address at the beginning of your driveway, or on your house if it is easily visible from the road.

FIRE BRANDS AND THE WOOD SHAKE ROOF HAZARD

Firebrands are burning embers produced by wildfire which are lifted high into the air and carried beyond the fire front. Firebrands are one of the major causes of homes burned due to wildfire.

Typical firebrand materials include pine cones, bark, and if houses are involved, wood shakes and shingles. Depending on wind speed and size of materials, firebrands can be carried more than one-half mile ahead of the fire front.

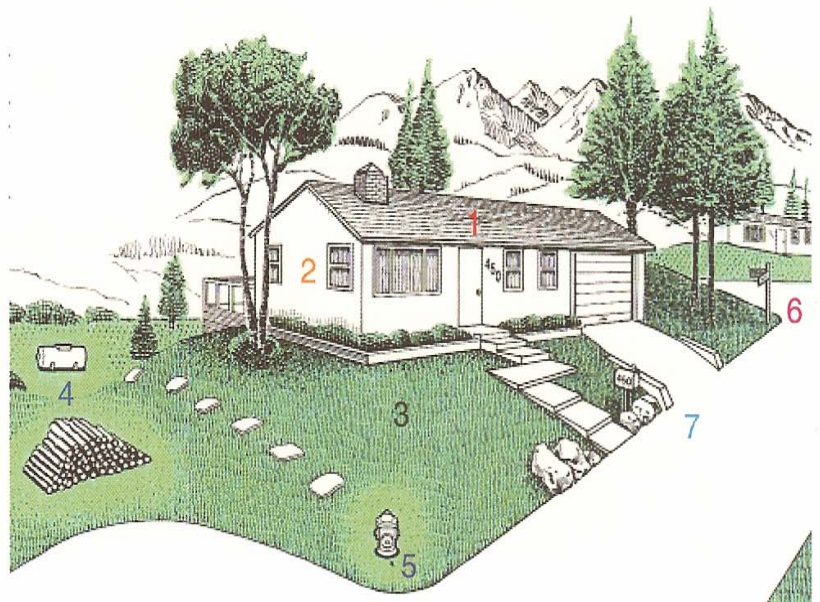
A shower of thousands of firebrands can be produced during a major wildfire event. If these firebrands land in areas with easily ignited fuels, numerous spot fires can start. Homes located blocks away from the main fire front can be threatened.

A house can be threatened by a wildfire in three ways: direct exposure from flames, radiated heat, and airborne firebrands. Of these, firebrands account for the majority of homes burned by wildfire. The roof of the house is the most vulnerable to firebrands.

Because of its angle, the roof can catch and trap firebrands. If the roof is constructed of combustible materials such as untreated wood shakes and shingles, the house is in jeopardy of igniting and burning.

Not only are combustible roofing materials a hazard to the structure on which they are installed, but they also pose a threat to other houses in the vicinity. Burning wood shakes can become firebrands, be lifted from the burning roof, and carried blocks away, and land in receptive fuel beds such as other combustible roofs.

Unfortunately for homeowners with existing combustible roofs, there are no long-term reliable measures available to reduce roof vulnerability to wildfire other than re-roofing with fire resistant materials.



WHEN WILDFIRE APPROACHES

Should homes be threatened by wildfire, occupants may be advised to evacuate to protect them from life-threatening situations. Homeowners, however, do have the right to stay on their properties if they so desire and so long as their activities do not hinder fire fighting efforts. If occupants are not contacted in time to evacuate or if owners decide to stay with their homes, these suggestions will help them protect their properties and families.

- Evacuate, if possible, all family members not essential to protecting the house. Evacuate pets as well.
- Contact a friend or relative and relay your plans.
- Make sure family members are aware of a prearranged meeting place.
- Tune into a local radio station and listen for instructions.
- Place vehicles in the garage, have them pointing out, and roll up windows.
- Place valuable papers and mementos in the car.
- Close the garage door, but leave it unlocked. If applicable, disconnect the electric garage door opener so that the door can be opened manually.
- Place combustible patio furniture in the house or garage.
- Shut off propane at the tank or natural gas at the meter.
- Wear only cotton or wool clothes. Proper attire includes long pants, long sleeved shirt or jacket, and boots. Carry gloves, a handkerchief to cover face, water to drink, and goggles.
- Close all exterior vents.
- Prop a ladder against the house so firefighters have easy access to the roof.
- Make sure that all garden hoses are connected to faucets and attach a nozzle set on "spray"
- Soak rags, towels, or small rugs with water to use in beating out embers or small fires.
- Inside, fill bathtubs, sinks, and other containers with water. Outside, do the same with garbage cans and buckets. Remember that the water heater and toilet tank are available sources of water.
- Close all exterior doors and windows.
- Close all interior doors.



Photo courtesy of Jim Linardos

- Open the fireplace damper, but place the screen over the hearth to prevent sparks and embers from entering the house.
- Leave a light on in each room.
- Remove lightweight and/or non-fire resistant curtains and other combustible materials from around windows.
- If available, close fire resistant drapes, shutters, or venetian blinds. Attach pre-cut plywood panels to the exterior of windows and glass doors.
- Turn off all pilot lights.
- Move overstuffed furniture (e.g. couches, easy chairs, etc.) to the center of the room.
- Keep wood shake or shingle roofs moist by spraying water. Do not waste water. Consider placing a lawn sprinkler on the roof if water pressure is adequate. Do not turn on until burning embers begin to fall on the roof.
- Continually check the roof and attic for embers, smoke, or fire.

If a fire should occur within the house, contact the fire department immediately. Continue to inspect your house and property for embers and smoke.

Most importantly, **STAY CALM!**

In May of 1999, the University of Nevada, Reno (Cooperative Extension and Agricultural Experiment Station) and the Sierra Front Wildfire Cooperators initiated a program entitled Living With Fire. Its purpose is to facilitate widespread implementation of pre-fire activities throughout western Nevada and eastern California.

One of the products of the Living with Fire program was a publication for homeowners. The Northern Rockies Fire Prevention Team reviewed and modified this publication for use throughout the Northern Rockies.

The Living With Fire program will help us coexist more safely with the threat of wildfire. For more information on this publication contact D. C. Haas at (406) 542-4251.

THANK YOU! The printing of this publication was made possible by funding from: the Rocky Mountain Elk Foundation, Plum Creek Timber Company, and Smurfit-Stone Container Corporation.



www.fs.fed.us/r1/nrcg

- Montana Firewardens Association
- Montana Disaster and Emergency Services Division
- Montana Department of Natural Resources and Conservation
- Idaho Department of Lands
- North Dakota Forest Service
- Fish and Wildlife Service
- National Park Service
- Bureau of Indian Affairs
- Bureau of Land Management
- USDA Forest Service



PlumCreek

FOR MORE INFORMATION:
www.firewise.org
www.firesafecouncil.org
www.fema.gov
www.nifc.gov

APPENDIX 6 - Implementation

This plan is an appendix to and part of the Beaverhead County Growth Policy. It is intended to provide guidance and direction in the review and design of subdivisions and other developments. It is also intended to provide guidance in planning for water supplies, transportation, and other infrastructure in Beaverhead County, in planning efforts with local or state government, and with federal agencies in making and implementing land use plans.

APPENDIX 7 - Distribution List of the Beaverhead County Wildfire Protection Plan

Distribution in 2005:

- 6 US Forest Service, 2 to each Ranger District
- 1 US Forest Service Dillon Interagency Dispatch
- 4 Bureau of Land Management, (2 to Dillon Field Office)
(2 to Butte District Office)
- 3 Montana Department of Natural Resources and Conservation,
(2 to Dillon Field Unit) (1 to State Office)
- 2 Fire District #1 Lima
- 4 Fire District #2 Dillon, Grant
- 2 Fire District #3 Wisdom, Jackson
- 2 Fire District #4 Grasshopper Valley
- 2 Wise River Fire Co.

- 2 County Fire Warden
- 1 Grants Writer
- 1 Disaster and Emergency Services
- 10 Wildfire Planning Projects
- 1 County Commission
- 2 County Planner

- 2 Basic Biological Services LLC
- 1 Ranch Maps and Aerials
- 1 Ecosystem Research Group LLC
- 1 Northwest Management, Inc.

APPENDIX 8 - Revision and Update Summary Sheet

Beaverhead County Wildfire Protection Plan

Date Of Revision	Revision (Page #'s, etc.)	Signature

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- Bitter Root Resource Conservation and Development Area, Inc. (2004), *Bitterroot Community Wildfire Protection Plan (April 2004 Update)*. 62 pg. Bitter Root Resource Conservation and Development Area, Inc. need address.
- Bureau of Land Management, Dillon Field Office, 2004 Fire Management Plan, 64 pp.
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(WUI) Community Assessments, Mitigation Plans, and Community Workshops (2/27/03). 11 pg.

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FireWise Communities (2002), *FIREWISE Around Your Home*, 1 Batterymarch Park, Quincy, MA 02169. 5 pg. Pamphlet.

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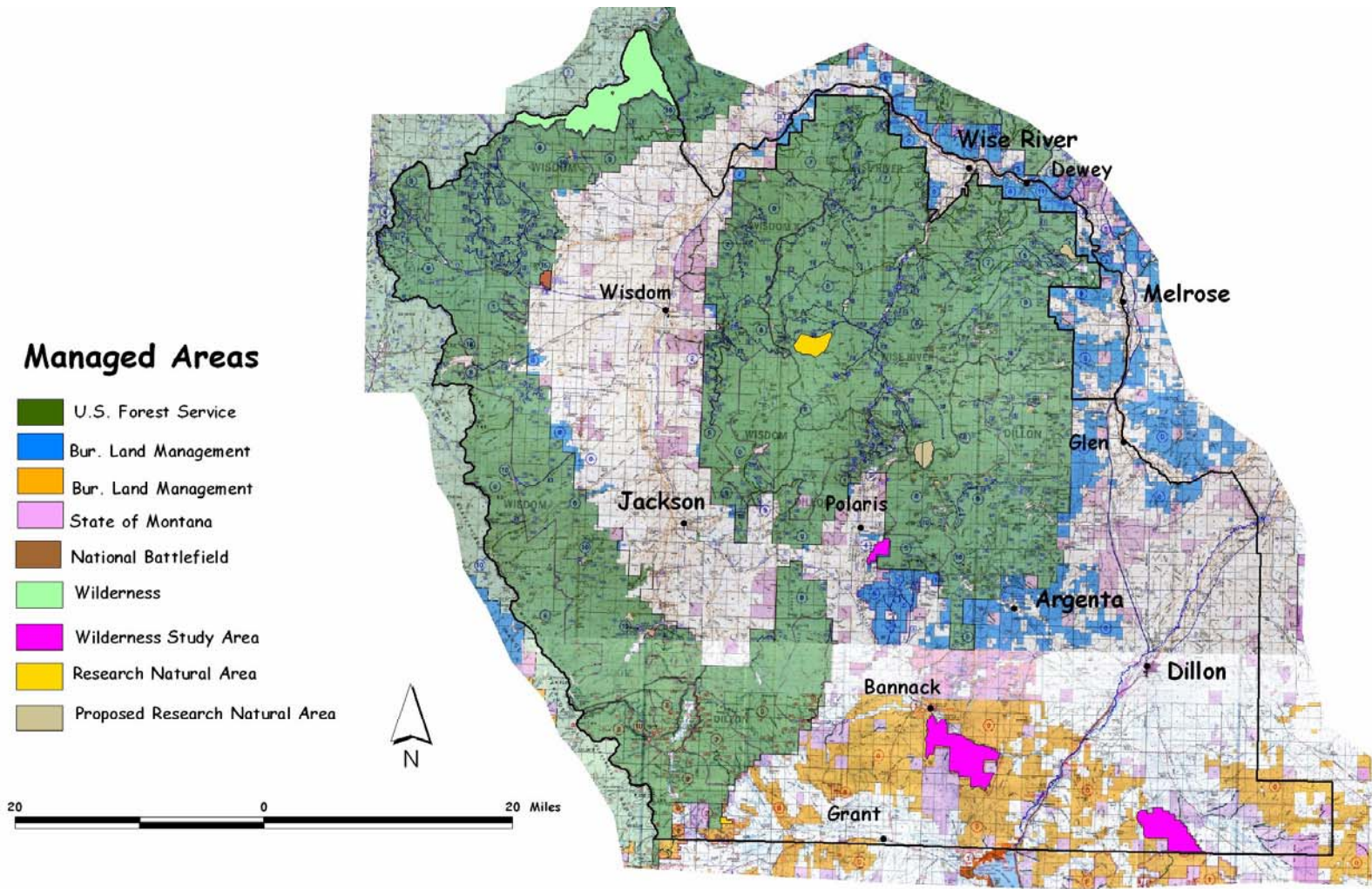
Schmidt, M.K., and others (2002). Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management. USDA, USFS, General Technical Report RMRS-87. 41 pg.

LIST OF ACRONYMS

BBS – Basic Biological Services LLC
BCWPP – Beaverhead County Wildfire Protection Plan
BLM – Bureau of Land Management
BMP – Best Management Practices
DNRC – Department of Natural Resources and Conservation
FMP – Fire Management Plan
FRCC – Fire Regime Condition Class
FSA – Fire Service Areas
GIS – Geographic Information Systems
HFI – Healthy Forest Initiative
HFRA – Healthy Forest Restoration Act of 2003
HWRA – High Wildfire Risk Areas
MCA – Montana Codes Annotated
MDNRC – Montana Department of Natural Resources and Conservation
MEPA – Montana Environmental Policy Act
NEPA – National Environmental Policy Act of 1969
NF – National Forest
NFIRS – National Fire Information and Resources Service
NRCG – Northern Rockies Coordinating Group
RFD – Rural Fire Districts
USDA – United States Department of Agriculture
USFS – United States Forest Service
VFD – Volunteer Fire Department
WUI – Wildland Urban Interface

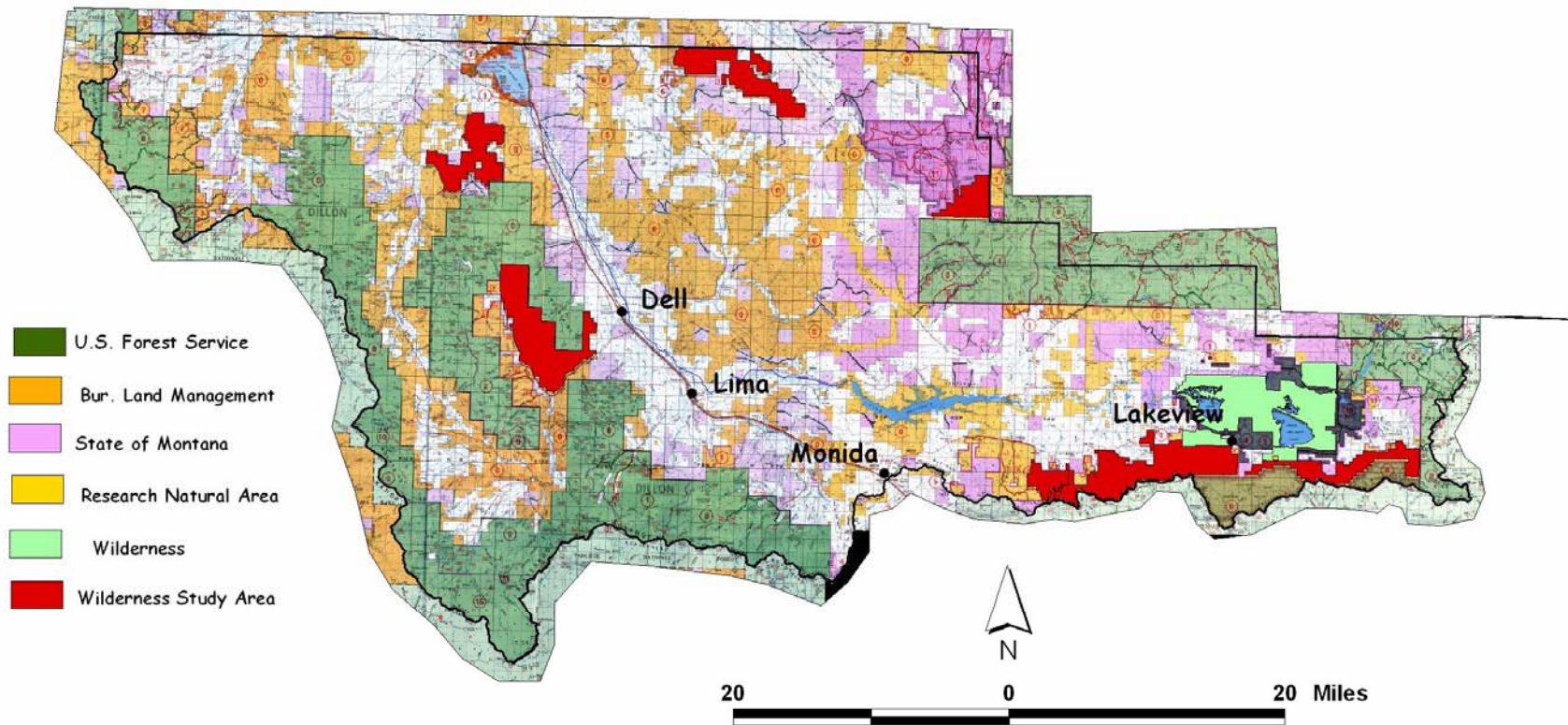
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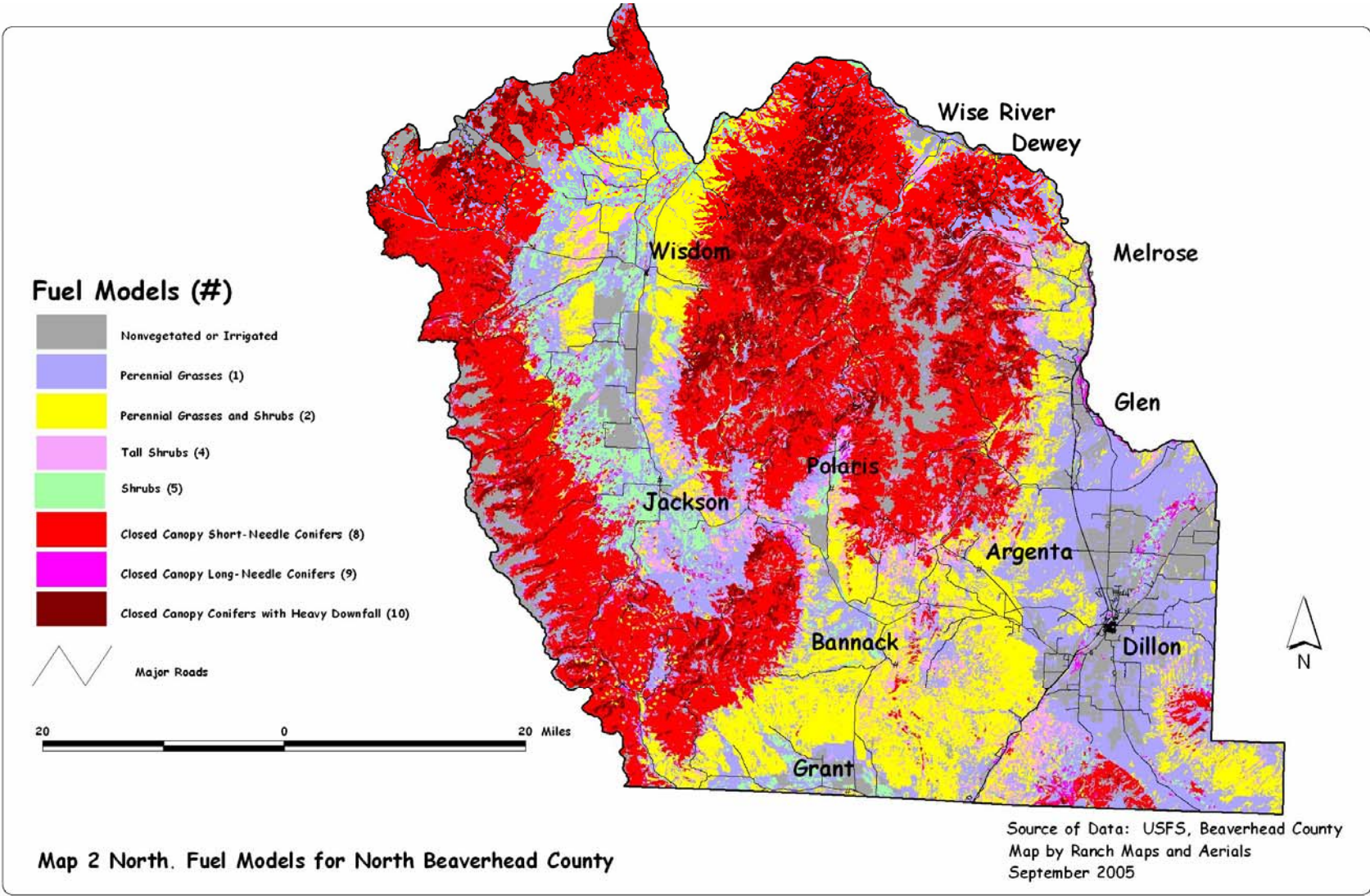
Map 1 North. Land Ownership and Special Management Areas in North Beaverhead County

Data Source: USFS and Beaverhead County
 Map by Ranch Maps and Aerials
 September 2005

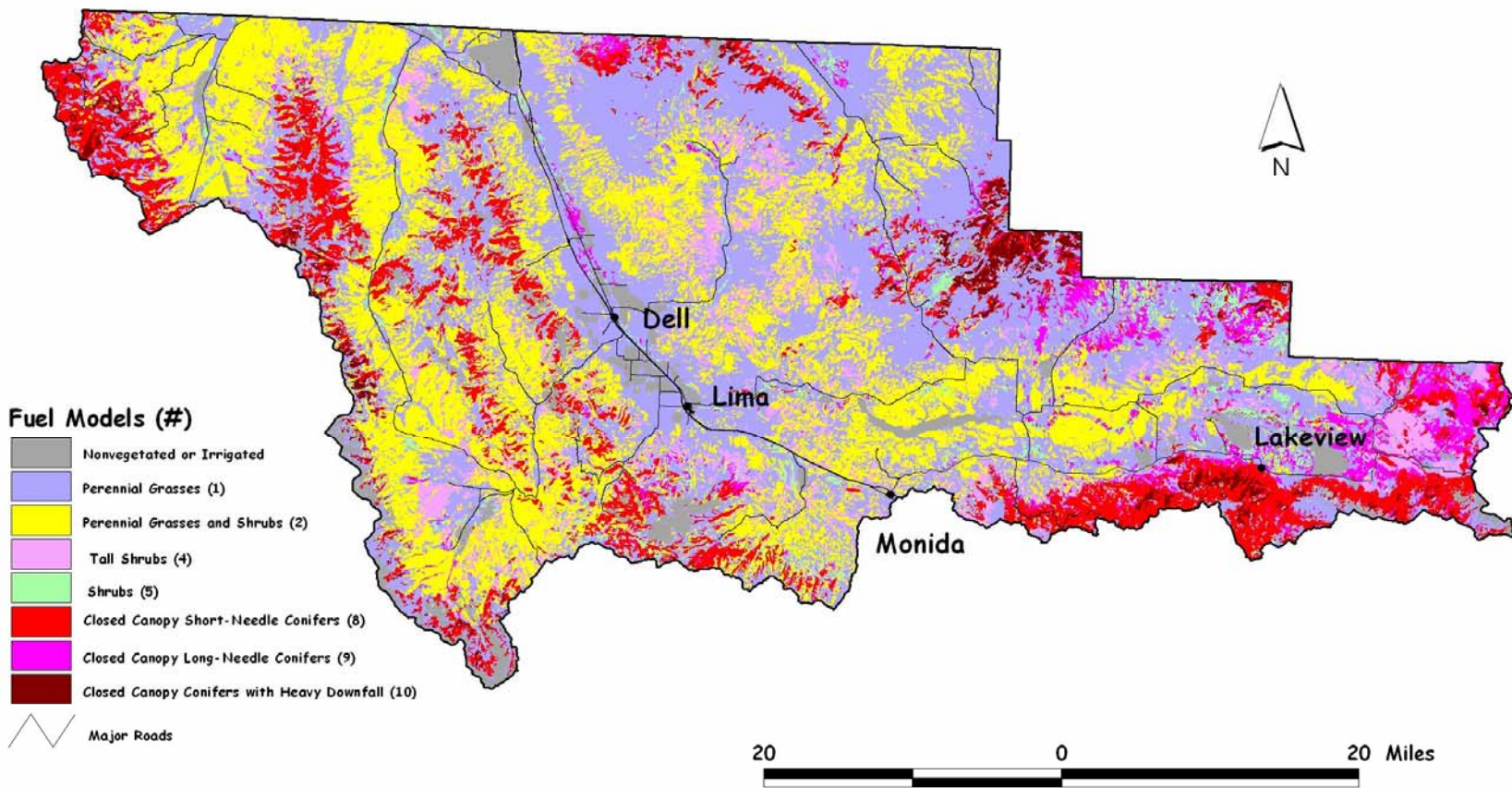


Map 1 South. Land Ownership and Special Management Areas in South Beaverhead County

Data Source: USFS and Beaverhead County
 Map by Ranch Maps and Aerials
 September 2005

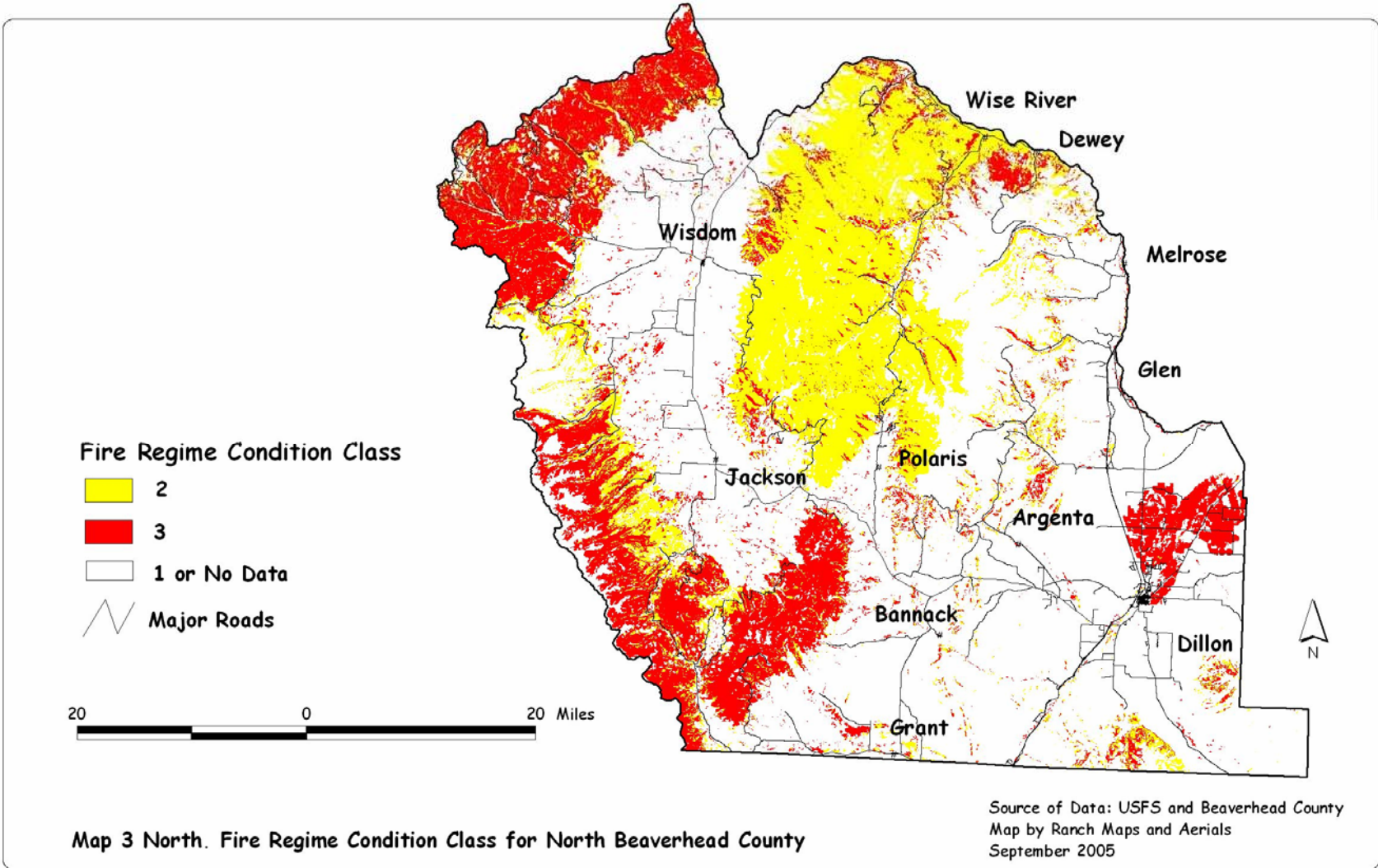


Map 2 North. Fuel Models for North Beaverhead County

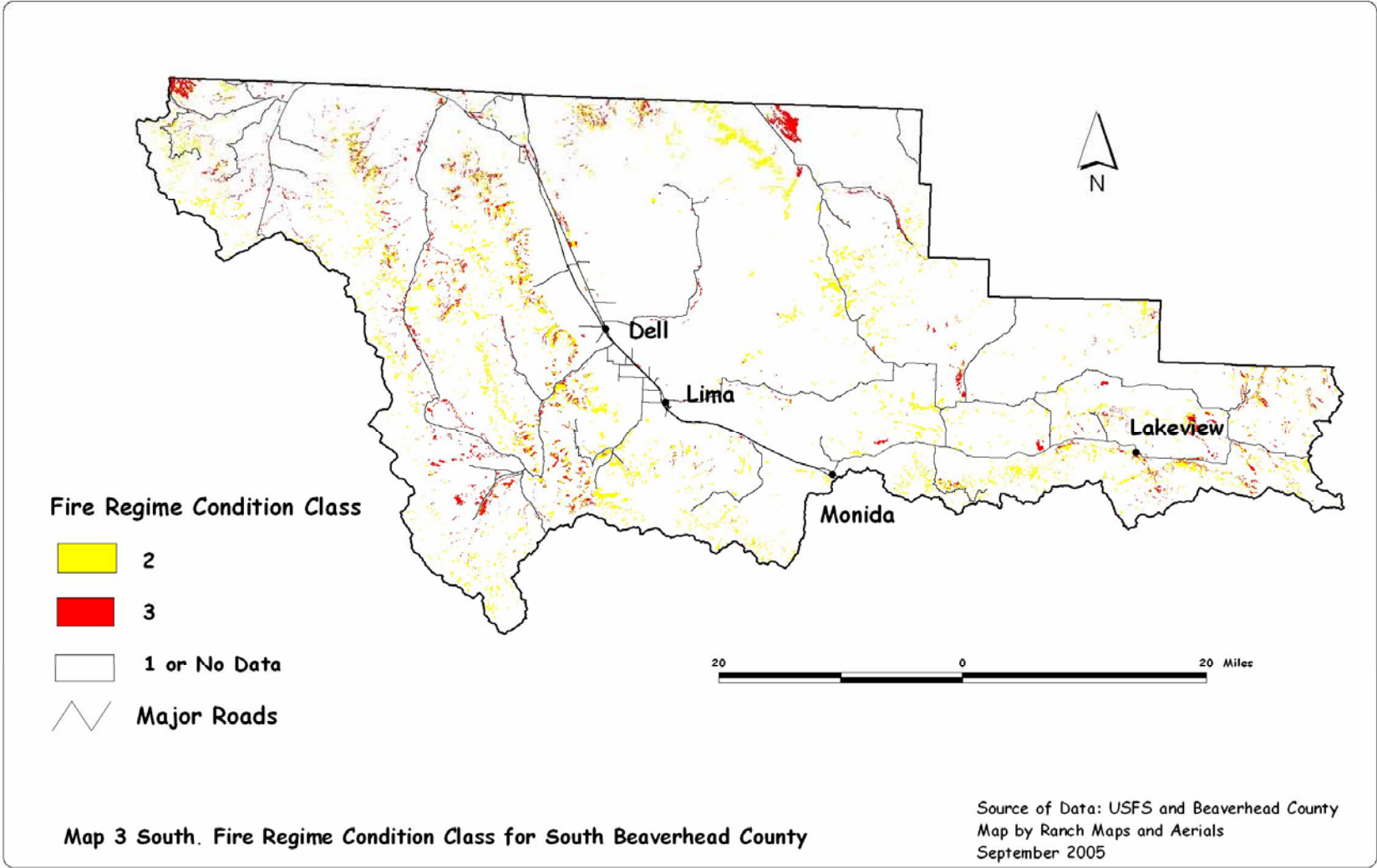


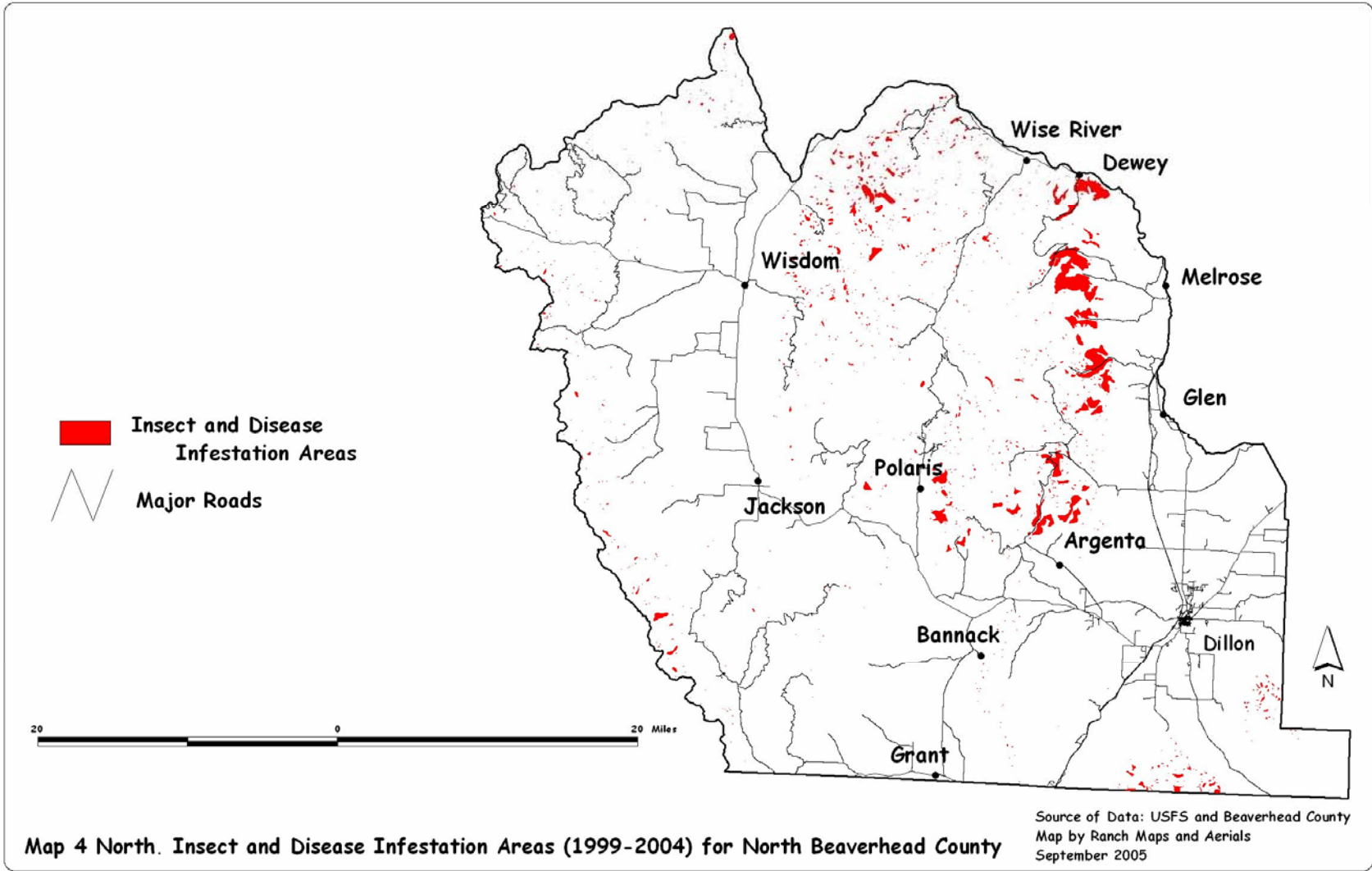
Map 2 South. Fuel Models for South Beaverhead County

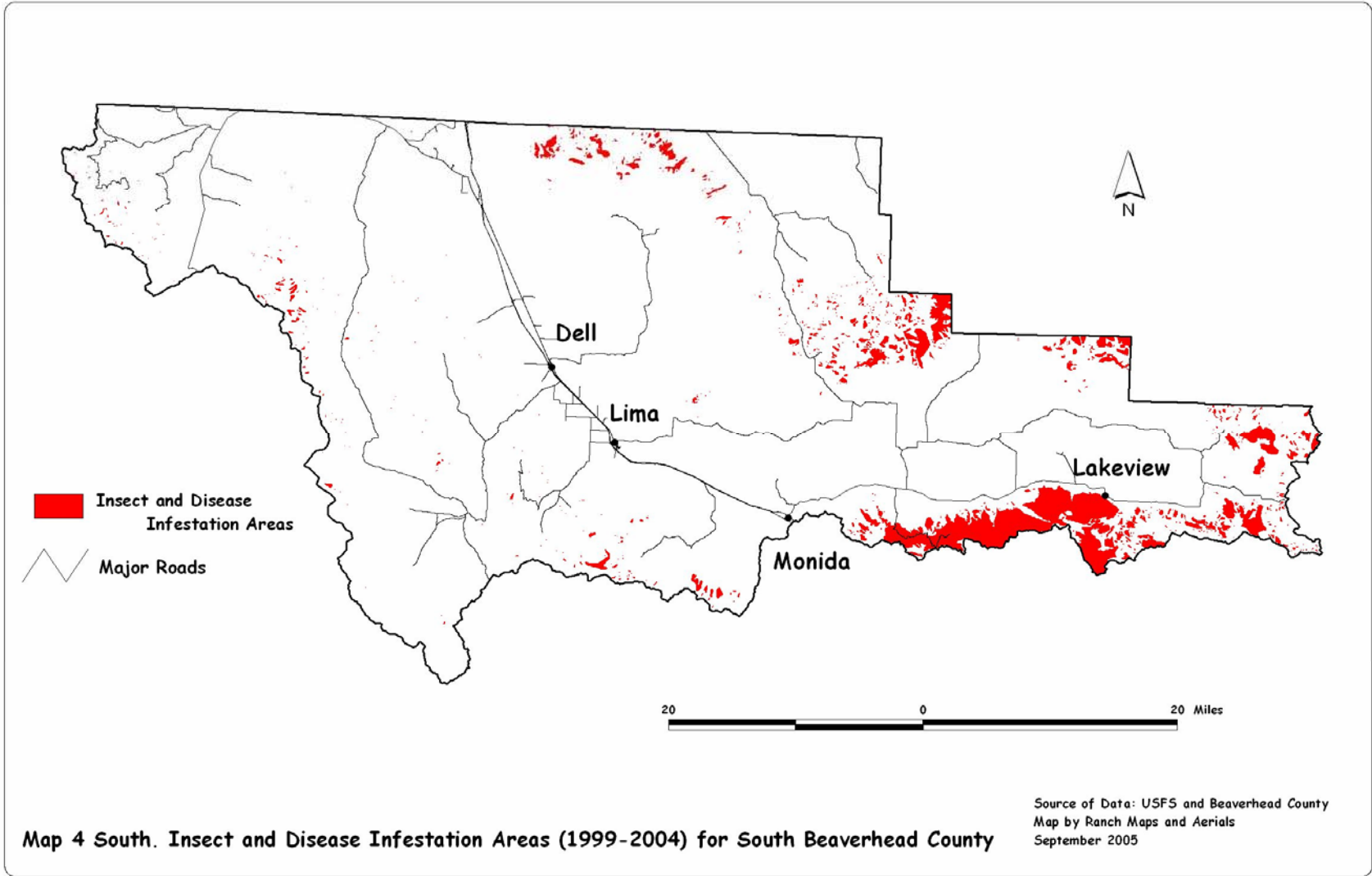
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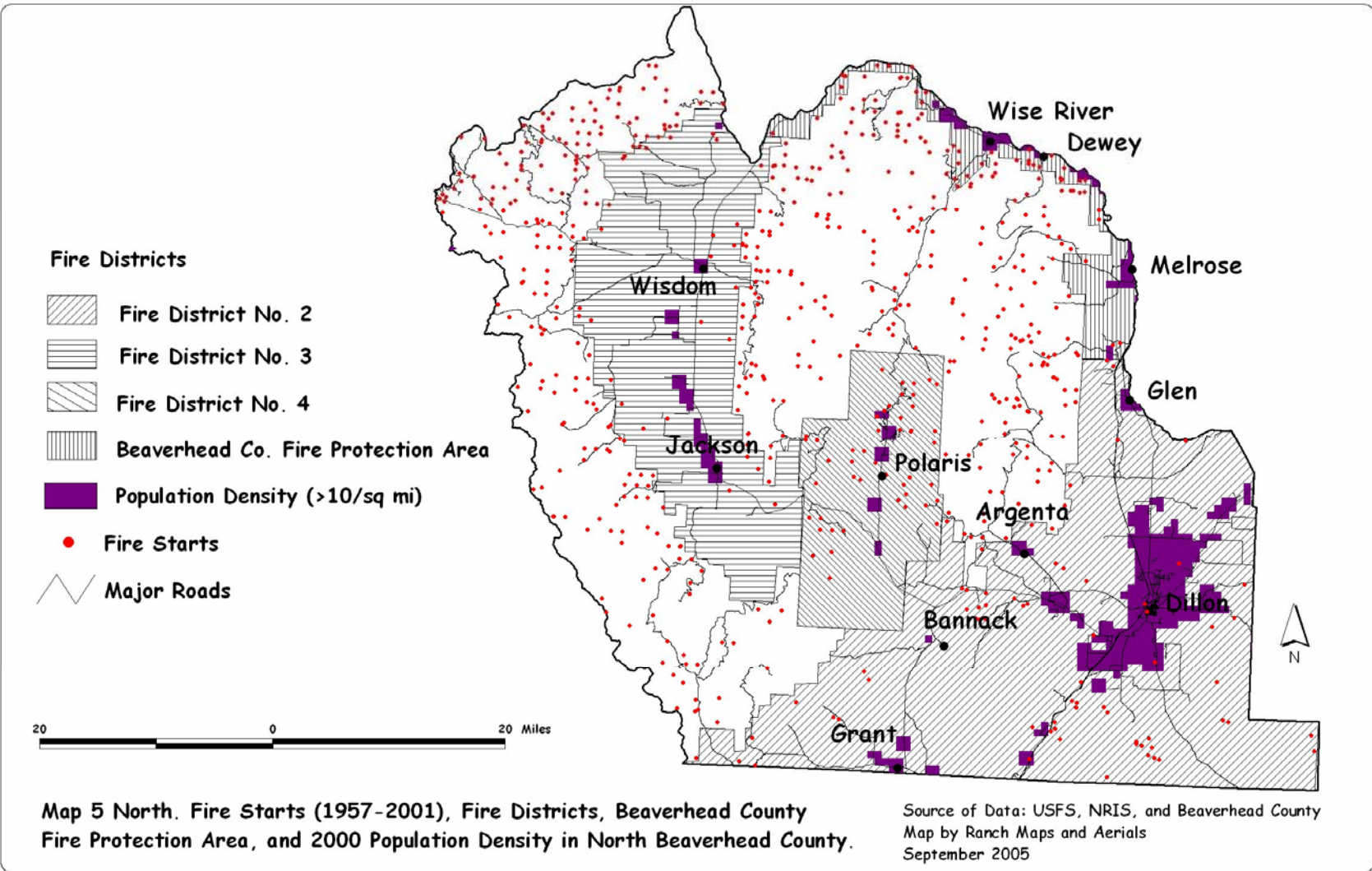


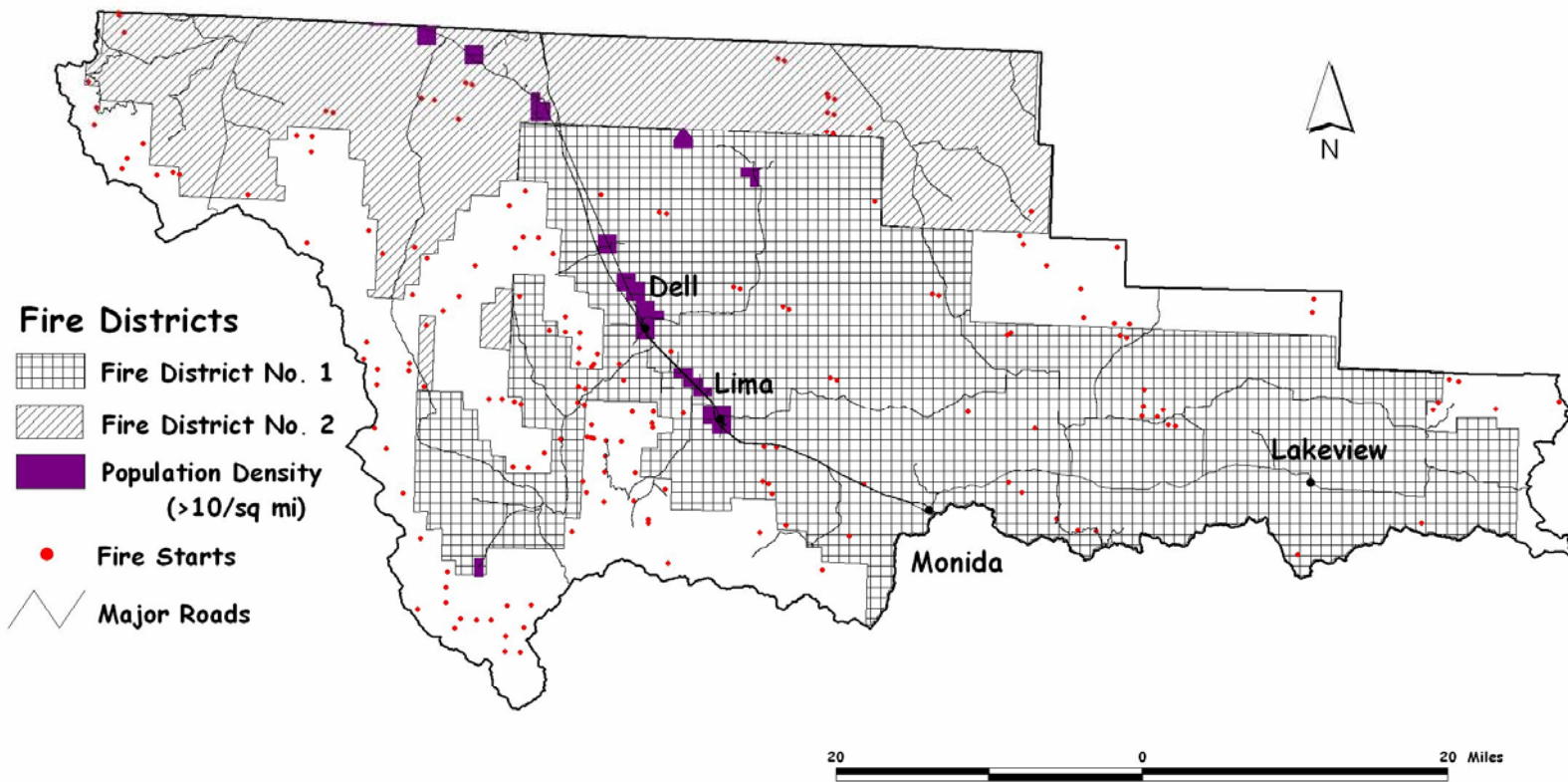
Map 3 North. Fire Regime Condition Class for North Beaverhead County





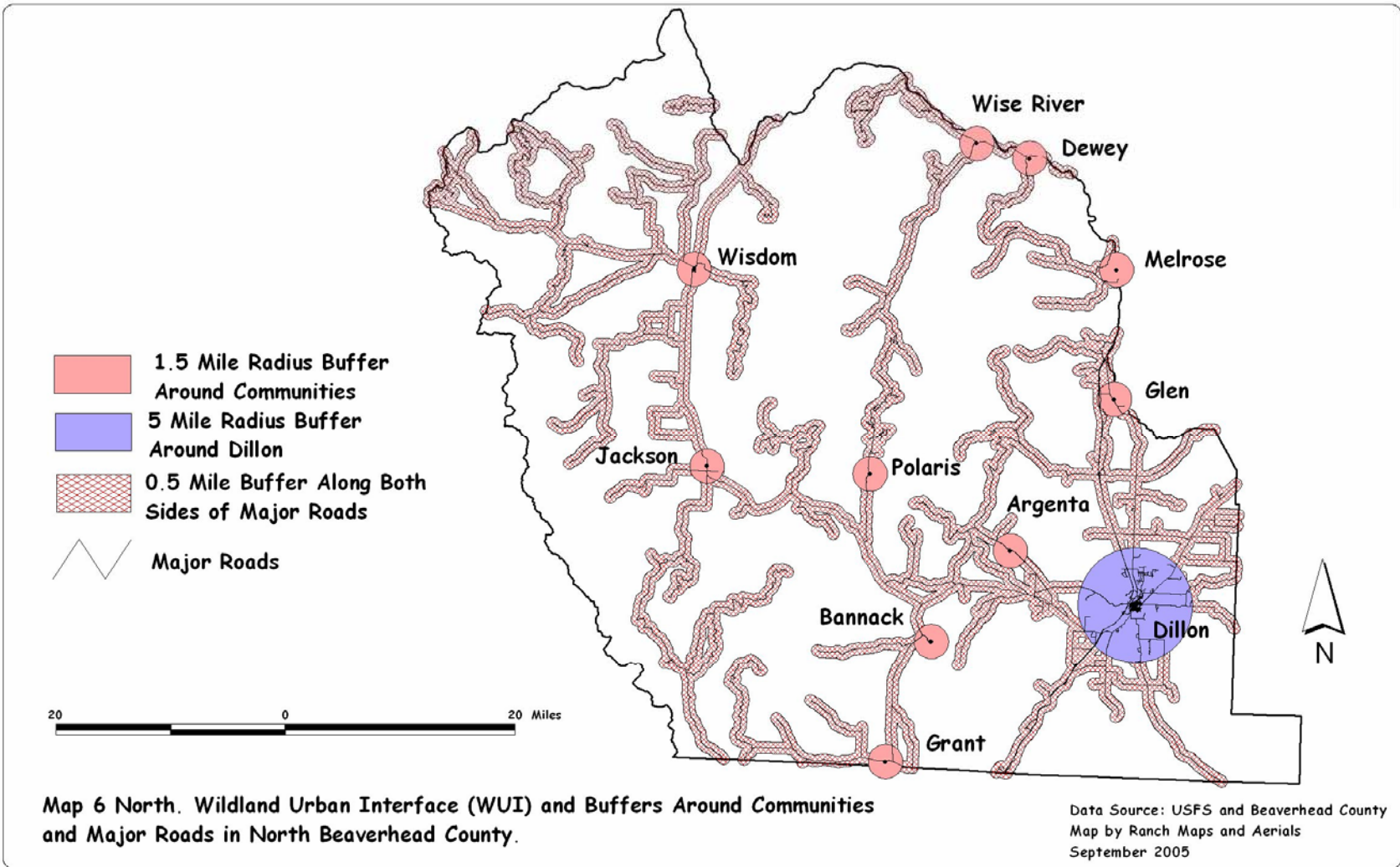


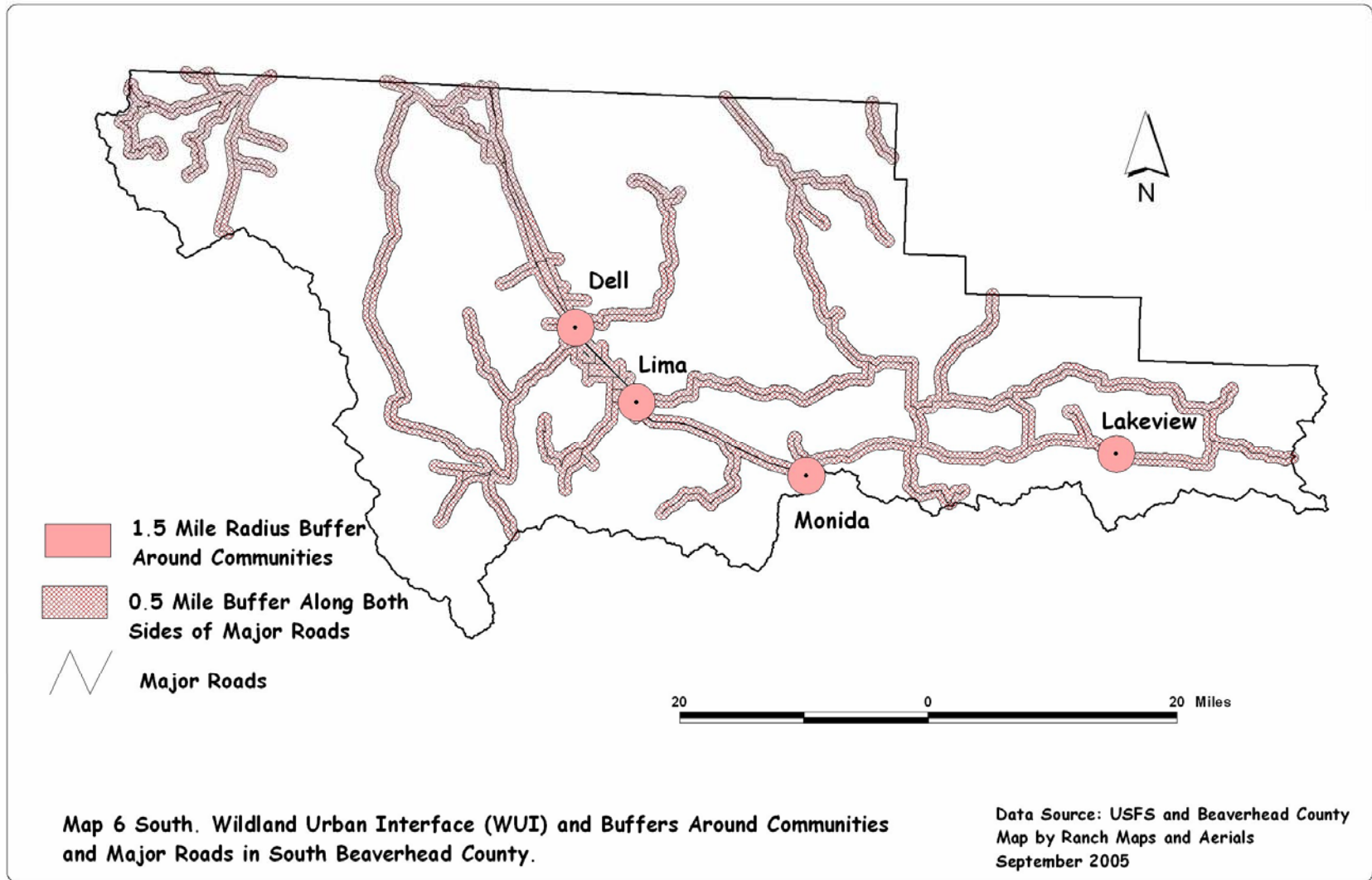


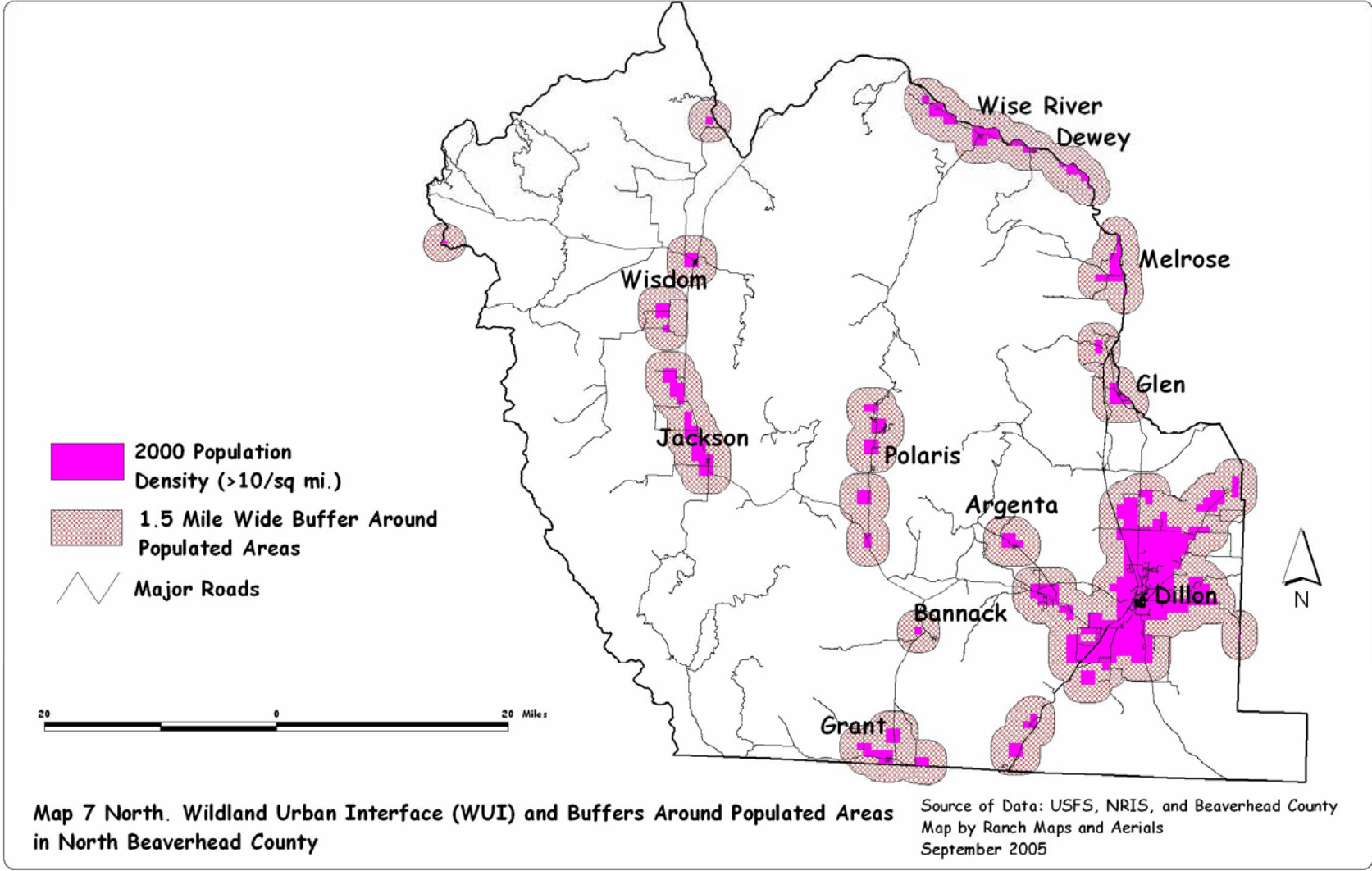


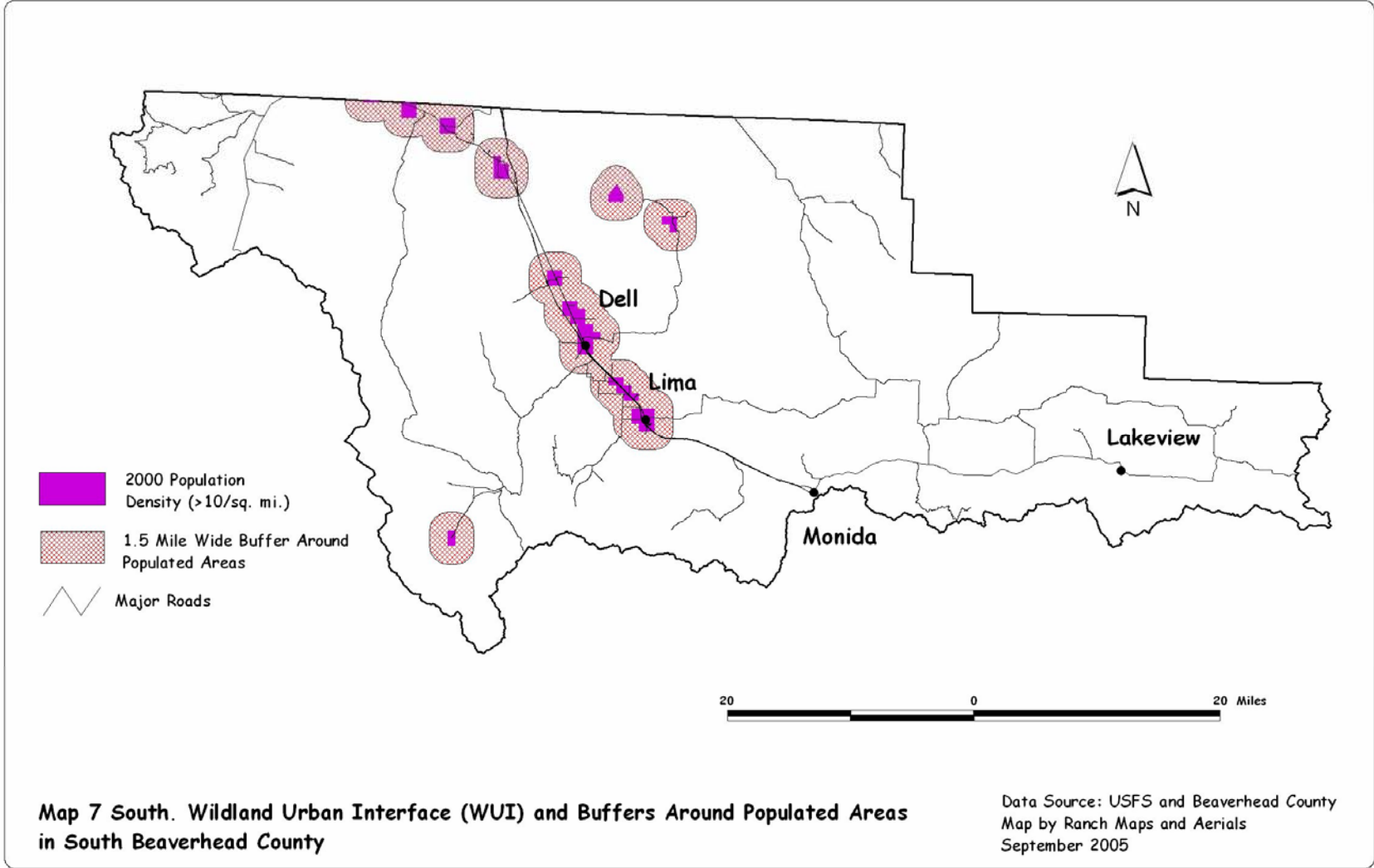
Map 5 South. Fire Starts (1957-2001), Fire Districts and 2000 Population Density in South Beaverhead County.

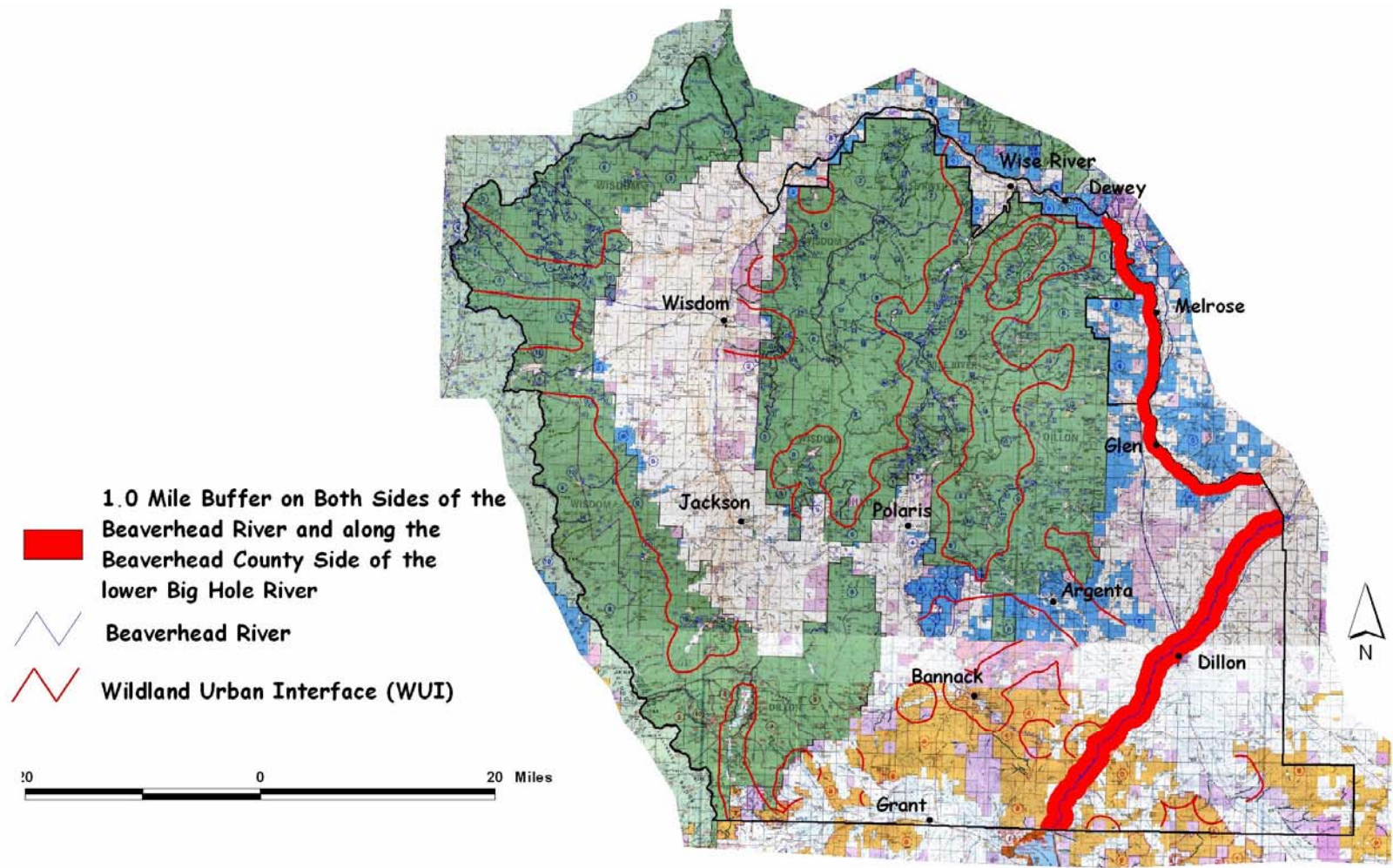
Source of Data: USFS, NRIS, and Beaverhead County
 Map by Ranch Maps and Aerials
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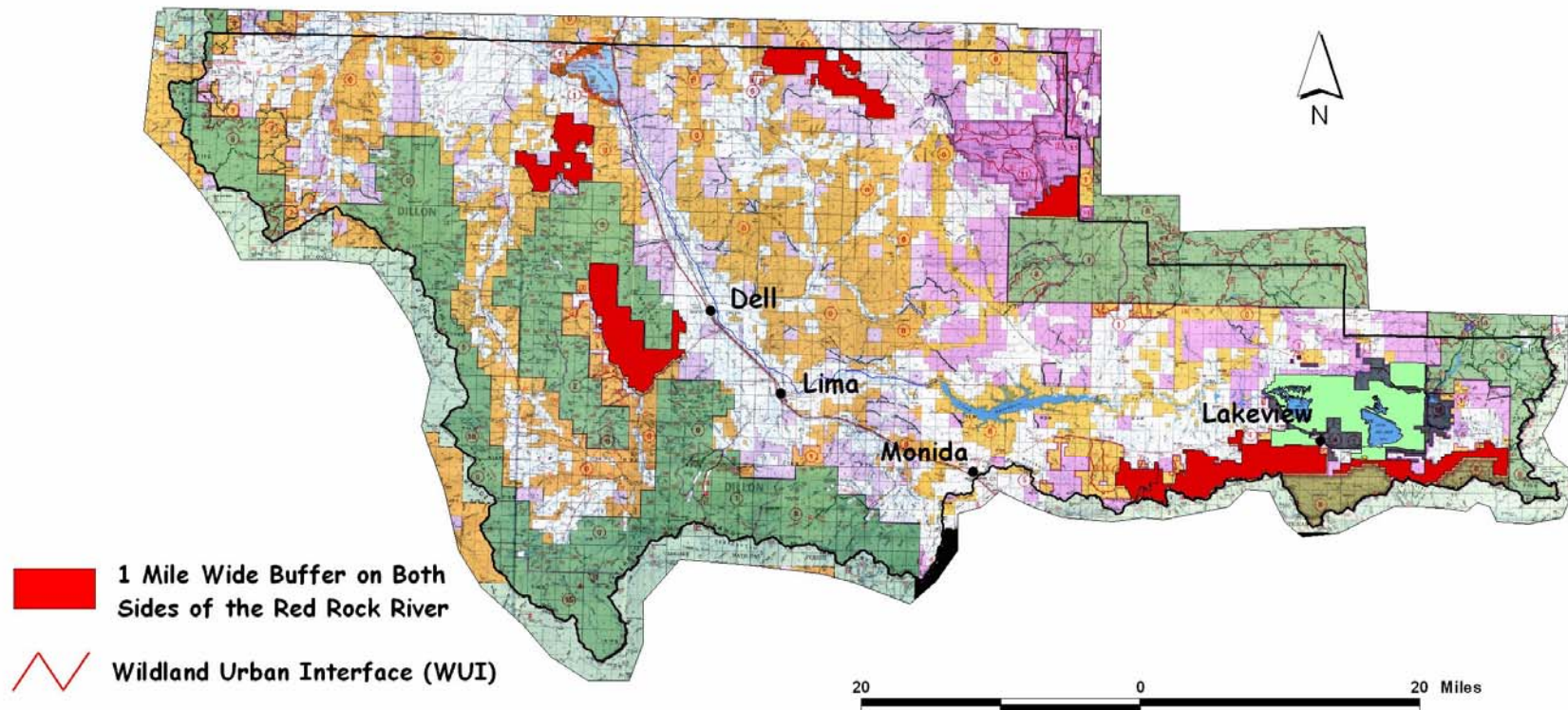






Map 8 North. Wildland Urban Interface (WUI) and High Wildfire Risk Areas in North Beaverhead County.

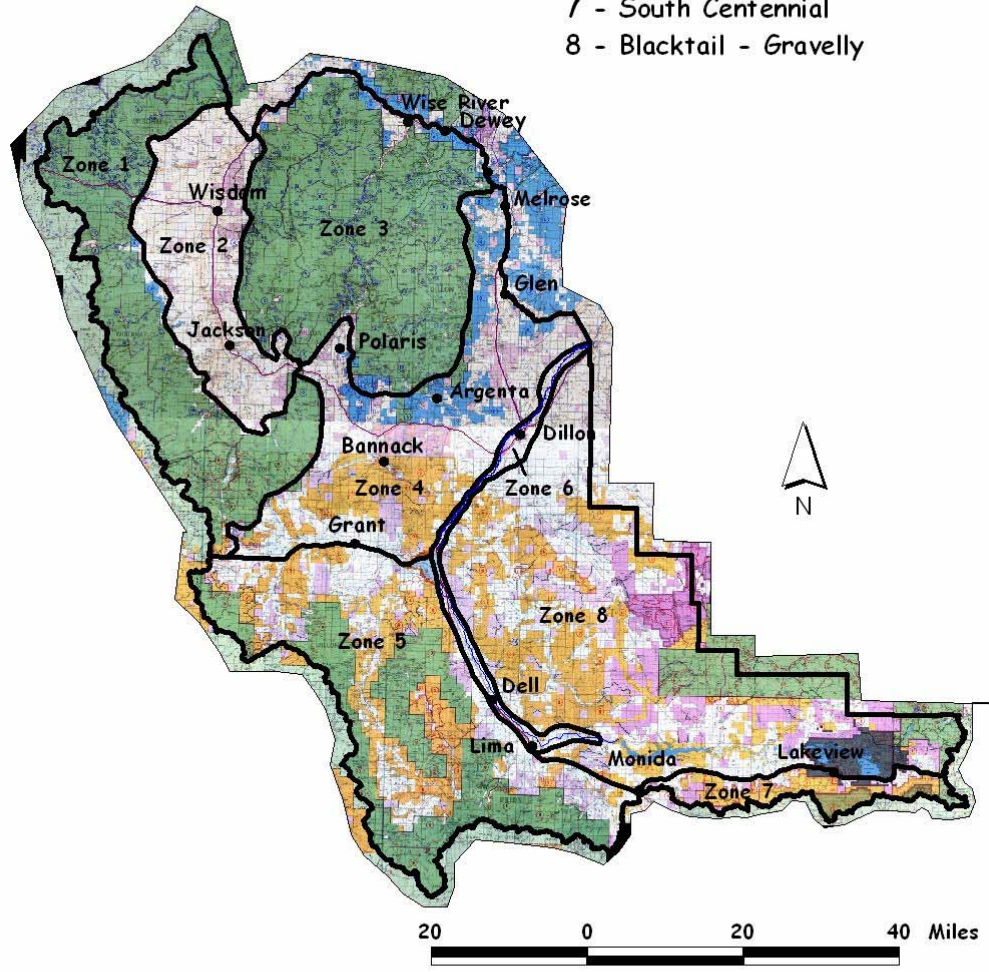
Data Source: USFS and Beaverhead County
 Map by Ranch Maps and Aerials
 September 2005



Map 8 South. Wildland Urban Interface (WUI) and High Wildfire Risk Areas in South Beaverhead County.

Data Source: USFS and Beaverhead County
 Map by Ranch Maps and Aerials
 September 2005

- Zones:
- 1 - West Big Hole - Forested
 - 2 - Big Hole Valley Bottom
 - 3 - East-West Pioneers
 - 4 - Bannack - Grant Foothills
 - 5 - Tendoy Area
 - 6 - River Corridors
 - 7 - South Centennial
 - 8 - Blacktail - Gravelly



Map 9. Beaverhead County Wildland-Urban Interface Risk Zones

Source of Data: USFS, Beaverhead County Map by Ranch Maps and Aerials September 2005