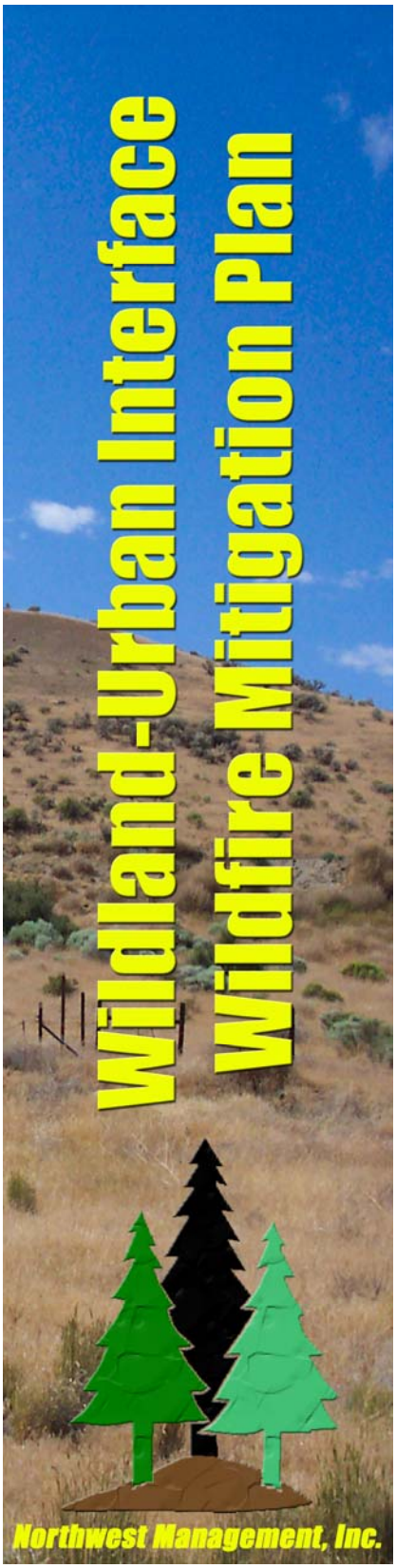


Judith Basin County, Montana, Wildland-Urban Interface Wildfire Mitigation Plan

Main Document

September 14, 2004

Vision: *Institutionalize and promote a countywide wildfire hazard mitigation ethic through leadership, professionalism, and excellence, leading the way to a safe, sustainable Judith Basin County.*

This plan was developed by the Judith Basin County Wildland-Urban Interface Wildfire Mitigation Plan Committee in cooperation with Northwest Management, Inc., P.O. Box 565, Helena, MT 59624, Phone: (406) 442-7555, Fax: (406) 495-9605, www.Consulting-Foresters.com

Acknowledgments

This Wildland-Urban Interface Wildfire Mitigation Plan represents the efforts and cooperation of a number of organizations and agencies, through the commitment of people working together to improve the preparedness for wildfire events while reducing factors of risk.

Judith Basin County Commissioners,
the employees of Judith Basin County,
Judith Basin Rural Fire District,
Hobson Rural Fire District,
Local Businesses and
Citizens of Judith Basin County

Snowy Mountain Development Corporation

USDI Bureau of Land Management

USDA Forest Service

Montana Disaster and Emergency Services

Federal Emergency Management Agency

Montana Department of Natural Resources and Conservation

Northwest Management, Inc.

To obtain copies of this plan contact:

Judith Basin County Commissioners Office

PO Box 427
31 1st Avenue
County Courthouse
Stanford, MT 59479-0427
Phone: (406) 566-2277
Fax: (406) 566-2211

Table of Contents

Chapter I: Overview of this Plan and its Development

1 Introduction

This Wildland-Urban Interface Wildland Fire Mitigation Plan for Judith Basin County, Montana, is the result of analyses, professional cooperation and collaboration, assessments of wildfire risks and other factors considered with the intent to reduce the potential for wildfires to threaten people, structures, infrastructure, and unique ecosystems in Judith Basin County, Montana. The planning team responsible for implementing this project was led by the Judith Basin County Commissioners. Agencies and organizations that participated in the planning process included:

- USDI Bureau of Land Management
- USDA Forest Service
- Montana Department of Natural Resources and Conservation
- Snowy Mountain Development Corporation
- Geyser Volunteer Fire Department
- Hobson Volunteer Fire Department
- Raynesford Volunteer Fire Department
- Stanford Volunteer Fire Department
- Windham Volunteer Fire Department
- Northwest Management, Inc.

The Judith Basin County Commissioners, working cooperatively with the Snowy Mountain Development Corporation, solicited competitive bids from companies to provide the service of leading the assessment and the writing of the **Judith Basin County Wildland-Urban Interface Wildland Fire Mitigation Plan**. The Commissioners selected Northwest Management, Inc., to provide this service. Northwest Management, Inc., is a professional natural resources consulting firm located in Helena, Montana. Established in 1984, in Moscow, Idaho, NMI provides natural resource management services across the USA. The Project Manager from Northwest Management, Inc. was Dr. William E. Schlosser, a professional forester and regional planner.

1.1 Goals and Guiding Principles

1.1.1 Federal Emergency Management Agency Philosophy

Effective November 1, 2004, a Local Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA) is required for Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) eligibility. The HMGP and PDM program provide funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The new local hazard mitigation plan requirements for HMGP and PDM eligibility is based on the Disaster Mitigation Act of 2000, which amended the Stafford Disaster Relief Act to promote an integrated, cost effective approach to mitigation. Local hazard mitigation plans must meet the minimum requirements of the Stafford Act-Section 322, as outlined in the criteria contained in 44 CFR Part 201. The plan criteria covers the planning process, risk assessment, mitigation strategy, plan maintenance, and adoption requirements.

FEMA will only review a local hazard mitigation plan submitted through the appropriate State Hazard Mitigation Officer (SHMO). Draft versions of local hazard mitigation plans will not be reviewed by FEMA. FEMA will review the final version of a plan prior to local adoption to determine if the plan meets the criteria, but FEMA will be unable to approve it prior to adoption. In Montana the SHMO is:

Montana Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Helena, Montana 59604-4789
Dan McGowen, 841-3911 - FAX: 841-3965

A FEMA designed plan will be evaluated on its adherence to a variety of criteria.

- Adoption by the Local Governing Body
- Multi-jurisdictional Plan Adoption
- Multi-jurisdictional Planning Participation
- Documentation of Planning Process
- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-Jurisdictional Risk Assessment
- Local Hazard Mitigation Goals
- Identification and Analysis of Mitigation Measures
- Implementation of Mitigation Measures
- Multi-Jurisdictional Mitigation Strategy
- Monitoring, Evaluating, and Updating the Plan
- Implementation Through Existing Programs
- Continued Public Involvement

1.1.2 Additional State and Federal Guidelines Adopted

The Wildland-Urban Interface Wildfire Mitigation Plan component of this All Hazards Mitigation Plan will include compatibility with FEMA requirements while also adhering to the guidelines proposed in the National Fire Plan and the Healthy Forests Restoration Act (2004). This Wildland-Urban Interface Wildland Fire Mitigation Plan has been prepared in compliance with:

- The National Fire Plan; A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan–May 2002.
- Northern Rockies Coordinating Group
- Healthy Forests Restoration Act (2004)
- The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Natural Hazards Mitigation Plan.

"When implemented, the 10-Year Comprehensive Strategy will contribute to reducing the risks of wildfire to communities and the environment by building collaboration at all levels of government."
- The NFP 10-Year Comprehensive Strategy August 2001

The objective of combining these four complimentary guidelines is to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in Judith Basin County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

1.1.2.1 National Fire Plan

The goals of this Wildland-Urban Interface Fire Mitigation Plan include:

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

Its three guiding principles are:

1. Priority setting that emphasizes the protection of communities and other high-priority watersheds at-risk.
2. Collaboration among governments and broadly representative stakeholders
3. Accountability through performance measures and monitoring for results.

This Wildland-Urban Interface Fire Mitigation Plan fulfills the National Fire Plan's 10-Year Comprehensive Strategy. The projects and activities recommended under this plan are in addition to other Federal, state, and private / corporate forest and rangeland management activities. The implementation plan does not alter, diminish, or expand the existing jurisdiction, statutory and regulatory responsibilities and authorities or budget processes of participating Federal, State, and tribal agencies.

By endorsing this implementation plan, all signed parties agree that reducing the threat of wildland fire to people, communities, and ecosystems will require:

- Firefighter and public safety continuing as the highest priority.
- A sustained, long-term and cost-effective investment of resources by all public and private parties, recognizing overall budget parameters affecting Federal, State, Tribal, and local governments.
- A unified effort to implement the collaborative framework called for in the Strategy in a manner that ensures timely decisions at each level.
- Accountability for measuring and monitoring performance and outcomes, and a commitment to factoring findings into future decision making activities.
- The achievement of national goals through action at the local level with particular attention on the unique needs of cross-boundary efforts and the importance of funding on-the-ground activities.
- Communities and individuals in the wildland-urban interface to initiate personal stewardship and volunteer actions that will reduce wildland fire risks.
- Management activities, both in the wildland-urban interface and in at-risk areas across the broader landscape.

- Active forestland and rangeland management, including thinning that produces commercial or pre-commercial products, biomass removal and utilization, prescribed fire and other fuels reduction tools to simultaneously meet long-term ecological, economic, and community objectives.

The National Fire Plan identifies a three-tiered organization structure including 1) the local level, 2) state/regional and tribal level, and 3) the national level. This plan adheres to the collaboration and outcomes consistent with a local level plan. Local level collaboration involves participants with direct responsibility for management decisions affecting public and/or private land and resources, fire protection responsibilities, or good working knowledge and interest in local resources. Participants in this planning process include Tribal representatives, local representatives from Federal and State agencies, local governments, landowners and other stakeholders, and community-based groups with a demonstrated commitment to achieving the strategy's four goals. Existing resource advisory committees, watershed councils, or other collaborative entities may serve to achieve coordination at this level. Local involvement, expected to be broadly representative, is a primary source of planning, project prioritization, and resource allocation and coordination at the local level. The role of the private citizen is not to be underestimated, as their input and contribution to all phases of risk assessments, mitigation activities, and project implementation is greatly facilitated by their involvement.

1.1.2.1.1 Montana's Endorsement of the National Fire Plan

In May 2002, Montana Governor Martz, as a member of the Western Governors' Association, helped developed the *10-Year Comprehensive Strategy* and an implementation plan, titled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment*. With the Western Governors' Association endorsement of the Implementation plan, Montana adopted the national implementation plan as its own.

NFP funding to the states occurs under the community assistance point and is made available through the USFS state and private forestry programs. DNRC has responsibility for delivery of these programs on state-owned and private lands in Montana.

The DNRC NFP Program is implemented primarily within the Forestry Division's Fire and Aviation Management Bureau (FAMB) and Service Forestry Bureau (SFB). The National Fire Plan is delivered, wherever appropriate, through existing state and private forestry programs. These programs are:

- County Cooperative Fire Program (FAMB)
- State Fire Assistance Program (FAMB)
- Private Forestry Assistance Program (SFB)
- Stewardship Program (SFB)

The Volunteer and Rural Fire Assistance (VFA/RFA) Program provides assistance to county fire agencies for equipment, training, and fire prevention materials. Adding National Fire Plan funding resulted in a grant program with more money than ever before. Again in 2003, the Department of the Interior agencies (FWS & BLM) contributed their budgeted Rural Fire Assistance Program dollars to be combined with the Volunteer Fire Assistance funds granted by the USDA Forest Service. The total assistance available in Montana exceeded $1.1 million in 2003. DNRC and its partners were recognized with the Ben Franklin Award, given by the Forest Service annually to one state for excellence in delivering these programs.

1.1.2.2 Northern Rockies Coordinating Group

The Northern Rockies Coordination Group (NRCG) was established to provide an interagency approach to wildland fire management and all-risk support on all land ownerships within the States of Montana, North Dakota, northern Idaho, and a small portion of South Dakota and Wyoming. NRCG is made up of representatives from the Montana Firewarden's Association, Montana Disaster and Emergency Services Division, Montana Department of Natural Resources and Conservation, Idaho Department of Lands, North Dakota Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, Fish and Wildlife Service, Forest Service, Montana Fire Chief's Association, and Montana Sheriff's and Peace Officer's Association. The purpose of NRCG is to further interagency cooperation, communications, coordination, and to provide interagency fire management direction and all-risk support for the Northern Rockies Geographic Area.

1.1.2.2.1 County Wildland Fire Interagency Group

Each County within the state has been requested to write a Wildland Fire Mitigation Plan. These plans should contain at least the following five elements:

1) Documentation of the process used to develop the mitigation plan. How the plan was developed, who was involved and how the public was involved.
2) A risk assessment to identify vulnerabilities to wildfire in the wildland-urban interface (WUI).
3) A prioritized mitigation strategy that addresses each of the risks. Examples of these strategies could be: training for fire departments, public education, hazardous fuel treatments, equipment, communications, additional planning, new facilities, infrastructure improvements, code and/or ordinance revision, volunteer efforts, evacuation plans, etc.
4) A process for maintenance of the plan which will include monitoring and evaluation of mitigation activities
5) Documentation that the plan has been formally adopted by the involved agencies. Basically a signature page of all involved officials.

This five-element plan is an abbreviated version of the FEMA mitigation plan and will begin to meet the requirements for that plan. To develop these plans each county should bring together the following individuals, as appropriate for each county, to make up the County Wildland Fire Interagency Group. It is important that this group has representation from agencies with wildland fire suppression responsibilities:

- County Commissioners (Lead)
- Local Fire Chiefs
- Montana Department of Natural Resources and Conservation representative
- USDA Forest Service representative
- USDI Bureau of Land Management representative
- Bureau of Indian Affairs
- Local Tribal leaders
- Bureau of Disaster and Emergency Services
- LEPC Chairperson
- Resource Conservation and Development representative
- State Fish and Game representative
- Interested citizens and community leaders as appropriate

- Other officials as appropriate

If requested by the County Commissioners, the local Resource Conservation and Development Councils may be available to assist the County Commissioners in evaluating each County within their council area to determine if there is a wildland fire mitigation plan in place, or if a plan is currently in the development phase. If no plan is in place, the RC&D's, if requested, could be available to assist the Commissioners with the formation of the County Wildland Fire Interagency Group and/or to facilitate the development of a wildland fire mitigation plan.

If a plan has been previously completed, the Commissioners will determine if the recommended five elements have been addressed. The Counties will provide a copy of the completed mitigation plan to the Montana Department of Natural Resources and Conservation Fire Plan Coordinator, which will include a contact list of individuals that developed the plan.

1.1.2.3 National Association of State Foresters

1.1.2.3.1 Identifying and Prioritizing Communities at Risk

This plan is written with the intent to provide the information necessary for decision makers (elected officials) to make informed decisions in order to prioritize projects across the entire county. These decisions may be made from within the council of Commissioners, or through the recommendations of ad hoc groups tasked with making prioritized lists of projects. It is not necessary to rank projects numerically, although that is one approach, rather it may be possible to rank them categorically (high priority set, medium priority set, and so forth) and still accomplish the goals and objectives set forth in this planning document.

The following was prepared by the National Association of State Foresters (NASF), June 27, 2003, and is included here as a reference for the identification of prioritizing treatments between communities.

Purpose: To provide national, uniform guidance for implementing the provisions of the "Collaborative Fuels Treatment" MOU, and to satisfy the requirements of Task e, Goal 4 of the Implementation Plan for the 10-Year Comprehensive Strategy.

Intent: The intent is to establish broad, nationally compatible standards for identifying and prioritizing communities at risk, while allowing for maximum flexibility at the state and regional level. Three basic premises are:

- Include all lands and all ownerships.
- Use a collaborative process that is consistent with the complexity of land ownership patterns, resource management issues, and the number of interested stakeholders.
- Set priorities by evaluating projects, not by ranking communities.

The National Association of State Foresters (NASF) set forth the following guidelines in the Final Draft Concept Paper; Communities at Risk, December 2, 2002.

Task: Develop a definition for "communities at risk" and a process for prioritizing them, per the Implementation Plan for the 10-Year Comprehensive Strategy (Goal 4.e.). In addition, this definition will form the foundation for the NASF commitment to annually identify priority fuels reduction and ecosystem restoration projects in the proposed MOU with the federal agencies (section C.2 (b)).

1.1.2.3.2 Conceptual Approach

1. NASF fully supports the definition of the Wildland Urban Interface (WUI) previously published in the Federal Register. Further, proximity to federal lands should not be a consideration. The WUI is a set of conditions that exists on, or near, areas of wildland fuels nation-wide, regardless of land ownership.
2. Communities at risk (or, alternately, landscapes of similar risk) should be identified on a state-by-state basis with the involvement of all agencies with wildland fire protection responsibilities: state, local, tribal, and federal.
3. It is neither reasonable nor feasible to attempt to prioritize communities on a rank order basis. Rather, communities (or landscapes) should be sorted into three, broad categories or zones of risk: high, medium, and low. Each state, in collaboration with its local partners, will develop the specific criteria it will use to sort communities or landscapes into the three categories. NASF recommends using the publication "Wildland/Urban Interface Fire Hazard Assessment Methodology" developed by the National Wildland/Urban Interface Fire Protection Program (circa 1998) as a reference guide. (This program, which has since evolved into the Firewise Program, is under the oversight of the National Wildfire Coordinating Group (NWCG)). At minimum, states should consider the following factors when assessing the relative degree of exposure each community (landscape) faces.
    - **Risk:** Using historic fire occurrence records and other factors, assess the anticipated probability of a wildfire ignition.
    - **Hazard:** Assess the fuel conditions surrounding the community using a methodology such as fire condition class, or [other] process.
    - **Values Protected:** Evaluate the human values associated with the community or landscape, such as homes, businesses, and community infrastructure (e.g. water systems, utilities, transportation systems, critical care facilities, schools, manufacturing and industrial sites, and high value commercial timber lands).
    - **Protection Capabilities:** Assess the wildland fire protection capabilities of the agencies and local fire departments with jurisdiction.
4. Prioritize by project not by community. Annually prioritize projects within each state using the collaborative process defined in the national, interagency MOU "For the Development of a Collaborative Fuels Treatment Program". Assign the highest priorities to projects that will provide the greatest benefits either on the landscape or to communities. Attempt to properly sequence treatments on the landscape by working first around and within communities, and then moving further out into the surrounding landscape. This will require:
    - First, focus on the zone of highest overall risk but consider projects in all zones. Identify a set of projects that will effectively reduce the level of risk to communities within the zone.
    - Second, determining the community's willingness and readiness to actively participate in an identified project.
    - Third, determining the willingness and ability of the owner of the surrounding land to undertake, and maintain, a complementary project.

- Last, set priorities by looking for projects that best meet the three criteria above. It is important to note that projects with the greatest potential to reduce risk to communities and the landscape may not be those in the highest risk zone, particularly if either the community or the surrounding landowner is not willing or able to actively participate.

5. It is important, and necessary, that we be able to demonstrate a level of accomplishment that justifies to Congress the value of continuing the current level of appropriations for the National Fire Plan. Although appealing to appropriators and others, it is not likely that many communities (if any) will ever be removed from the list of communities at risk. Even after treatment, all communities will remain at some, albeit reduced, level of risk. However, by using a science-based system for measuring relative risk, we can likely show that, after treatment (or a series of treatments), communities are at "*reduced risk*".

Similarly, scattered, individual homes that complete projects to create defensible space could be "counted" as "households at reduced risk". This would be a way to report progress in reducing risk to scattered homes in areas of low priority for large-scale fuels treatment projects.

Using the concept described above, the NASF believes it is possible to accurately assess the relative risk that communities face from wildland fire. Recognizing that the condition of the vegetation (fuel) on the landscape is dynamic, assessments and re-assessments must be done on a state-by-state basis, using a process that allows for the integration of local knowledge, conditions, and circumstances, with science-based national guidelines. We must remember that it is not only important to lower the risk to communities, but once the risk has been reduced, to maintain those communities at a reduced risk.

Further, it is essential that both the assessment process and the prioritization of projects be done collaboratively, with all local agencies with fire protection jurisdiction – federal, state, local, and tribal – taking an active role.

1.1.2.4 Healthy Forests Restoration Act

On December 3, 2003, President Bush signed into law the Healthy Forests Restoration Act of 2003 to reduce the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes. The legislation is based on sound science and helps further the President's Healthy Forests Initiative pledge to care for America's forests and rangelands, reduce the risk of catastrophic fire to communities, help save the lives of firefighters and citizens, and protect threatened and endangered species.

Among other things the Healthy Forests Restoration Act (HFRA):

- Strengthens public participation in developing high priority projects;
- Reduces the complexity of environmental analysis allowing federal land agencies to use the best science available to actively manage land under their protection;
- Creates a pre-decisional objections process encouraging early public participation in project planning; and
- Issues clear guidance for court action challenging HFRA projects.

The Judith Basin County Wildland-Urban Interface Wildfire Mitigation Plan is developed to adhere to the principles of the HFRA while providing recommendations consistent with the policy document which should assist the federal land management agencies (US Forest Service and Bureau of Land Management) with implementing wildfire mitigation projects in Judith Basin

County that incorporate public involvement and the input from a wide spectrum of fire and emergency services providers in the region.

1.1.3 Local Guidelines and Integration with Other Efforts

1.1.3.1 Judith Basin County Fire Mitigation Planning Effort and Philosophy

The goals of this planning process include the integration of the National Fire Plan, the Western Governors Association Implementation Strategy, the Healthy Forests Restoration Act, and the requirements of FEMA for a county-wide Fire Mitigation Plan; a component of the County's All Hazards Mitigation Plan. This effort will utilize the best and most appropriate science from all partners, the integration of local and regional knowledge about wildfire risks and fire behavior, while meeting the needs of local citizens, the regional economy, the significance of this region to the rest of Montana and the Inland West.

1.1.3.1.1 Mission Statement

To make Judith Basin County residents, communities, state agencies, local governments, and businesses less vulnerable to the negative effects of wildland fires through the effective administration of wildfire hazard mitigation grant programs, hazard risk assessments, wise and efficient fuels treatments, and a coordinated approach to mitigation policy through federal, state, regional, and local planning efforts. Our combined prioritization will be the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

1.1.3.1.2 Vision Statement

Institutionalize and promote a countywide wildfire hazard mitigation ethic through leadership, professionalism, and excellence, leading the way to a safe, sustainable Judith Basin County.

1.1.3.1.3 Goals

- To reduce the area of WUI land burned and losses experienced because of wildfires where these fires threaten communities in the wildland-urban interface
- Prioritize the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy
- Educate communities about the unique challenges of wildfire in the wildland-urban interface (WUI)
- Establish mitigation priorities and develop mitigation strategies in Judith Basin County
- Strategically locate and plan fuel reduction projects
- Provide recommendations for alternative treatment methods, such as modifying forest stand density, herbicide treatments, fuel reduction techniques, and disposal or removal of treated slash
- Meet or exceed the requirements of the National Fire Plan and FEMA for a County level Fire Mitigation Plan

Chapter 2: Planning Process

2 Documenting the Planning Process

Documentation of the planning process, including public involvement, is required to meet FEMA's DMA 2000 (44CFR§201.4(c)(1) and §201.6(c)(1)). This section includes a description of the planning process used to develop this plan, including how it was prepared, who was involved in the process, and how all of the involved agencies participated.

2.1.1 Description of the Planning Process

The Judith Basin County Wildland-Urban Interface Wildfire Mitigation Plan was developed through a collaborative process involving all of the organizations and agencies detailed in Section 1.0 of this document. The County's local coordinator contacted these organizations directly to invite their participation and schedule meetings of the planning committee. The planning process included 5 distinct phases which were in some cases sequential (step 1 then step 2) and in some cases intermixed (step 4 completed though out the process):

1. **Collection of Data** about the extent and periodicity of wildfires in and around Judith Basin County. This included an area encompassing Fergus, Petroleum, and Judith Basin Counties to insure a robust dataset for making inferences about fires in Judith Basin County specifically; this included a wildfire extent and ignition profile.
2. **Field Observations and Estimations** about wildfire risks including fuels assessments, juxtaposition of structures and infrastructure to wildland fuels, access, and potential treatments by trained wildfire specialists.
3. **Mapping** of data relevant to wildfire control and treatments, structures, resource values, infrastructure, fire prone landscapes, and related data.
4. **Facilitation of Public Involvement** from the formation of the planning committee, to a public mail survey, news releases, public meetings, public review of draft documents, and acceptance of the final plan by the signatory representatives.
5. **Analysis and Drafting of the Report** to integrate the results of the planning process, providing ample review and integration of committee and public input, followed by acceptance of the final document.

Planning efforts were led by the Project Director, Dr. William E. Schlosser, of Northwest Management, Inc. Dr. Schlosser holds 4 degrees in natural resource management (A.S. geology; B.S. forest and range management; M.S. natural resource economic & finance; Ph.D. environmental science and regional planning). Mr. Gary Ellingson, holds a degree in forest resource management, and manages the Montana Office of Northwest Management, Inc. Together, they led a team of resource professionals that included fire mitigation specialists, wildfire control specialists, resource management professionals, and hazard mitigation experts.

They were the point-people for team members to share data and information with during the plan's development. They and the planning team met with many residents of the county during the inspections of communities, infrastructure, and hazard abatement assessments. This methodology, when coupled with the other approaches in this process, worked effectively to integrate a wide spectrum of observations and interpretations about the project.

The planning philosophy employed in this project included the open and free sharing of information with interested parties. Information from federal and state agencies was integrated

into the database of knowledge used in this project. Meetings with the committee were held throughout the planning process to facilitate a sharing of information between cooperators.

When the public meetings were held, many of the committee members were in attendance and shared their support and experiences with the planning process and their interpretations of the results.

2.2 Public Involvement

Public involvement in this plan was made a priority from the inception of the project. There were a number of ways that public involvement was sought and facilitated. In some cases this led to members of the public providing information and seeking an active role in protecting their own homes and businesses, while in other cases it led to the public becoming more aware of the process without becoming directly involved in the planning process.

2.2.1 News Releases

Under the auspices of the Judith Basin County Wildland-Urban Interface Wildfire Mitigation Planning Committee, news releases were submitted to area newspapers and radio.

2.2.1.1 Radio Messages

A short news release was aired over the KXLO and KLCM radio station the week prior to the public meetings announcing the goals of the planning committee, the purpose of the mitigation plan, the date and times of public meetings, and contact information.

2.2.1.2 Newspaper Articles

Committee meeting announcements were published in the local newspaper ahead of each meeting. The following is an announcement that ran in the local newspaper.

Hot Topic: Judith Basin County Plans to Mitigate Wildfire Risk

Stanford, MT --- The Judith Basin County Commissioners, working with Snowy Mountain Development Corporation, have created a Wildfire Mitigation Plan Committee to complete a Wildfire Mitigation Plan for Judith Basin County as part of the National Fire Plan authorized by Congress and the Whitehouse. The Judith Basin County Wildfire Mitigation Plan will include risk analysis at the community level with predictive models for where fires are likely to ignite and where they are likely to spread rapidly once ignited. Northwest Management, Inc. has been retained by Judith Basin County to provide wildfire risk assessments, mapping, field inspections, and interviews, and to collaborate with the committee to prepare the plan. The coordination for this effort is being provided by Kathie Bailey of Snowy Mountain Development Corp. The committee includes rural and wildland fire districts, land managers, elected officials, agency representatives, and others. Northwest Management specialists are conducting analyses of fire prone landscapes and making recommendations for potential treatments. Specific activities for homes, structures, infrastructure, and resource capabilities will be proposed as part of the analysis.

One of the most important steps in gathering information about fire risk in Judith Basin County is to conduct a homeowner's survey. Northwest Management, Inc., in cooperation with local fire officials, have mailed a brief survey to randomly selected homeowners in the county seeking details about home construction materials, proximity to water sources, and other risk factors surrounding homes. This survey is very important to the success of the plan. Those homes that

receive a survey are asked to please take the time to complete it, thereby benefiting the community overall.

The planning team will be conducting Public Meetings to discuss preliminary findings and to seek public involvement in the planning process in June. For more information on the Fire Mitigation Plan project in Judith Basin County contact your County Commissioner, Northwest Management, Inc. project director Dr. William Schlosser (208) 883-4488, Gary Ellingson of Northwest Management, Inc. (406) 442-7555 or Kathie Bailey at 406-350-0198.

Public Information Meeting: June 15th at the Hobson Senior Center at 12 noon. Free Lunch!

Public Information Meeting: June 16th at the Geyser Senior Center at 12 noon. Free Lunch!

Public Information Meeting: June 16th at the Stanford City Hall at 7pm

2.2.2 Public Mail Survey

In order to collect a broad base of perceptions about wildland fire and individual risk factors of homeowners in Judith Basin County, a mail survey was conducted. Using a state and county database of landowners in Judith Basin County, homeowners from the Wildland-Urban Interface surrounding each community were identified. In order to be included in the database, individuals were selected that own property and have a dwelling in Judith Basin County, as well as a mailing address in Judith Basin County. This database created a list of 829 unique names to which was affixed a random number that contributed to the probability of being selected for the public mail survey. A total of 231 landowners meeting the above criteria were selected.

The public mail survey developed for this project has been used in the past by Northwest Management, Inc., during the execution of other WUI Wildfire Mitigation Plans. The survey used The Total Design Method (Dillman 1978) as a model to schedule the timing and content of letters sent to the selected recipients. Copies of each cover letter, mail survey, and communication are included in Appendix III.

The first in the series of mailing was sent May 27, 2004, and included a cover letter, a survey, and an offer of receiving a custom GIS map of the area of their selection in Judith Basin County if they would complete and return the survey. The free map incentive was tied into assisting their community and helping their interests by participating in this process. Each letter also informed residents about the planning process. A return self-addressed enveloped was included in each packet. A postcard reminder was sent to the non-respondents on June 4, 2004, encouraging their response. A final mailing, with a revised cover letter pleading with them to participate, was sent to non-respondents on June 17, 2004.

Surveys were returned during the months of June and July. A total of 95 residents responded to the survey. No surveys were returned as undeliverable. The effective response rate for this survey was 41%. Statistically, this response rate allows the interpretation of all of the response variables significantly at the 99% confidence level.

2.2.2.1 Survey Results

A summary of the survey's results will be presented here and then referred back to during the ensuing discussions on the need for various treatments, education, and other information.

Almost all of the respondents (96%) have a home in Judith Basin County, and 96% consider this their primary residence. Table 2.1 summarizes where respondents consider their community of residence.

Table 2.1. Response rate to public mail survey, summarized by community of residence.

Community	Percent of Total Responses
Stanford	24%
Raynesford	20%
Hobson	20%
Geyser	14%
Windham	5%
Buffalo	4%
Utica	4%
Judith Gap	4%
Moore	1%
Judith Basin	1%
Kolin	1%
Moccasin	1%

Almost all of the respondents (93%) correctly identified that they have emergency telephone 911 services in their area. Respondents were asked to identify if their home is protected by a rural or city fire district. Of the respondents, 83% correctly identified they live in an area protected by a rural or city fire district. Approximately 8% responded they do not have a fire district covering their home, when in fact they do.

Respondents were asked to indicate the type of roofing material covering the main structure of their home. Approximately 60% of respondents indicated their homes were covered with a composite material (asphalt shingles). About 26% indicated their home were covered with a metal (eg., aluminum, tin) roofing material. Roughly 11% of the respondents indicated they have a wooden roofing material such as shakes or shingles.

Residents were asked to evaluate the proximity of trees within certain distances of their homes. Often, the density of trees around a home is an indicator of increased fire risk. The results are presented in Table 2.2

Table 2.2 Survey responses indicating the proximity of trees to homes.

Number of Trees	Within 250 feet of your home	Within 75 feet of your home
None	11%	17%
Less than 10	39%	44%
Between 10 and 25	23%	23%
More than 25	28%	16%

Approximately 98% of those returning the survey indicated they have a lawn surrounding their home. Of these individual home sites, 92% indicated they keep this lawn green through the fire season.

The average driveway length of the respondents was approximately 930 feet long, from their main road to their parking area. Roughly 25% of the respondents had a driveway over ¼ mile long. Of these homes with lengthy driveways, roughly 61% have turnouts allowing two vehicles to pass each other in the case of an emergency. Approximately 86% of all homeowners indicated they have an alternative escape route, with the remaining 14% indicating only one-way-in and one-way-out.

Nearly all respondents (96%) indicated they have some type of tools to use against a wildfire that threatens their home. Table 2.3 summarizes these responses.

Table 2.3. Percent of homes with indicated fire fighting tools in Judith Basin County.

96% – Hand tools (shovel, Pulaski, etc.)
47% – Portable water tank
21% – Stationery water tank
40% – Pond, lake, or stream water supply close
35% – Water pump and fire hose
28% – Equipment suitable for creating fire breaks (bulldozer, cat, skidder, etc.)

Roughly 34% of the respondents in Judith Basin County indicated they have someone in their household trained in wildland fire fighting. Approximately 23% indicated someone in the household had been trained in structural fire fighting. However, it is important to note that these questions did not specify a standard nor did it refer to how long ago the training was received.

A couple of questions in the survey related to on-going fire mitigation efforts households may be implementing. Respondents were asked if they conduct a periodic fuels reduction program near their home sites, such as grass or brush burning. Approximately 45% answered affirmative to this question, while 59% responded that livestock (cattle, horses, sheep) graze the grasses and forbs around their home sites.

Respondents were asked to complete a fuel hazard rating worksheet to assess their home's fire risk rating. An additional column titled "results" has been added to the table, showing the percent of respondents circling each rating (Table 2.4).

Circle the ratings in each category that best describes your home.

Table 2.4. Fuel Hazard Rating Worksheet		Rating	Results
Fuel Hazard	Small, light fuels (grasses, forbs, weeds, shrubs)	1	59%
	Medium size fuels (brush, large shrubs, small trees)	2	35%
	Heavy, large fuels (woodlands, timber, heavy brush)	3	6%
Slope Hazard	Mild slopes (0-5%)	1	87%
	Moderate slope (6-20%)	2	11%
	Steep Slopes (21-40%)	3	2%
	Extreme slopes (41% and greater)	4	0%
Structure Hazard	Noncombustible roof and noncombustible siding materials	1	30%
	Noncombustible roof and combustible siding material	3	27%
	Combustible roof and noncombustible siding material	7	13%
	Combustible roof and combustible siding materials	10	30%
Additional Factors	Rough topography that contains several steep canyons or ridges	+2	Average -1.79 pts
	Areas having history of higher than average fire occurrence	+3	
	Areas exposed to severe fire weather and strong winds	+4	
	Areas with existing fuel modifications or usable fire breaks	-3	
	Areas with local facilities (water systems, rural fire districts, dozers)	-3	

Calculating your risk

Values below are the average response value to each question.

Fuel hazard	1.5	x Slope Hazard 1.1	= 1.67
Structural hazard	+	5.0	
Additional factors	(+ or -)	-1.8	
Total Hazard Points	=	4.9 .	

Table 2.5. Percent of respondents in each risk category as determined by the survey respondents.
00% – Extreme Risk = 26 + points
03% – High Risk = 16–25 points
34% – Moderate Risk = 6–15 points
63% – Low Risk = 6 or less points

Maximum household rating form score was 18 points, as assessed by the homeowners. These numbers were compared to observations made by field crews trained in wildland fire fighting. These results indicate that for the most part, these indications are only slightly lower than the risk rating assigned by the “professionals”. Anecdotal evidence would indicate that Judith Basin

County landowners involved in this survey have a more realistic view of wildfire risk than the landowners in other Montana counties where these questions have been asked.

Finally, respondents were asked "if offered in your area, would members of your household attend a free, or low cost, one-day training seminar designed to teach homeowners in the wildland–urban interface how to improve the defensible space surrounding your home and adjacent outbuildings?" A majority of the respondents, 51% indicated a desire to participate in this type of training.

2.2.2.2 Committee Meetings

The following list of people who participated in the planning committee meetings, volunteered time, or responded to elements of the Judith Basin County Wildland-Urban Interface Wildfire Mitigation Plan's preparation.

- Gary Kirpach .....USDA Forest Service
- Joe Alexander .....USDA Forest Service
- Steve Hedstrom .....Judith Basin County Fire Warden
- Kathie Bailey .....Snowy Mountain Development Corporation
- Charlie Kolar .....Fire Board, Judith Basin
- Hal Jorgensen .....Deputy Fire Warden
- Bonnie Ostertag .....Disaster and Emergency Services
- Lee Clark.....USDA Forest Service
- Ron Hecker .....USDA Forest Service
- Tim Crosmer .....Windham Volunteer Fire Department & DNRC
- Edward F. Arnott .....County Commissioner
- Jerome Kolar.....County Commissioner
- Jerry Buhre.....DNRC
- Vincent Corrao .....Northwest Management, Inc.
- John Erixson .....Northwest Management, Inc.
- Toby Brown .....Northwest Management, Inc.
- Gary Ellingson.....Northwest Management, Inc.
- William E. Schlosser .....Northwest Management, Inc.
- Ron Wiseman.....USDA, Stanford Ranger District

Committee Meetings were scheduled and held on the following dates:

2.2.2.2.1 April 15, 2004

Attendance list was signed by all present and collected by Bill Schlosser

Bill Schlosser, of Northwest Management Inc., made introductions and stated that the purpose for the initial meeting is to describe the fuel mitigation planning process and explain the role

committee members will have in developing the plan for their county. Committee members can anticipate 3-4 meetings over the next several months. Future meetings will be focused on completing portions of the plan document and involve hands on planning and input from committee members. Bill emphasized that the plan will be submitted to county commissioners for their signature and that their sustained involvement in the process is especially important. All committee members and their respective organizations will be asked to sign off on the completed plan.

Bill reviewed standards that will apply to the planning document. Pertinent standards are contained within FEMA All Hazards Mitigation Plan, National Fire Plan, Healthy Forests Restoration Act, and DNRC's Statewide Implementation Strategies.

Bill outlined possible funding opportunities that may be come available if the mitigation plan meets requirements of various funding sources. The fuels mitigation plan will be designed and written to enable the community to seek assistance from USFS, BLM, FEMA, DNRC and other sources that may become available in the future.

Bill spoke about the strategy for planning and described what data will be collected and used in development of the plan utilizing GIS. He also provided definitions of Wildland Urban Interface and reviewed the public comment process.

Questions and comments from committee members:

What is NMI experience with environmental groups who comment on draft plans?

Bill responded that there has been little controversy associated with the development of the plan in other western counties.

There are two fire districts – Hobson and Stanford

Bill distributed the draft Judith Basin County Community Assessment and requested that all committee members review it and provide written response prior to the next meeting. Bill will try to summarize all comments and bring a 2nd draft to the next meeting.

Bill also distributed an example public mail survey and requested comments. A survey of Resource and Capabilities for fire districts was for completion by local fire chiefs, BLM and DNRC.

Questions and comments from committee members:

BLM and USFS will be asked to complete Resource and Capabilites forms. Bill will email forms to them.

Mail survey question 1 should be modified to ask if home is a primary residence, 2nd home, hunting cabin or other.

USFS has completed a Judith fuels assessment and can make data available; also have ignition profile with large scale fire data and fire history. A GIS layer is available for past fuel treatments and silvicultural treatments. Data is available on FTP site. Contact is Vel Demer with L&C Supervisors office.

Fire chiefs may have hand drawn maps for Limestone Canyon area.

Four fire chiefs are located in Windham, Standford, Hobson and Geyser.

No growth development plan for county.

The next meeting date was set for May 13th. Kathy will mail meeting notices.

2.2.2.2.2 May 13, 2004

Attendance list was signed by all present and collected by Bill Schlosser

Bill Schlosser, of Northwest Management Inc. (NMI), made introductions and reviewed where the group is in the planning process.

Written comments on the community assessments were collected. These comments will be incorporated into the draft document.

There was a brief discussion about developing a mutual aid agreement between Windham and Hobson. The two districts in the county are Judith Basin Rural Fire District and Hobson Rural Fire District.

Bonnie agreed to write a paragraph on where repeaters are needed within the county.

The county is in the process of developing a communications plan.

It was stated that Sapphire Village has 2 Type 6 engines in a heated garage.

Bill was provided with pipeline data and informed that there are 9 power substations in the county.

There is an airstrip in Stanford, other locations will need to be evaluated.

The committee worked as a group to: review road labels, identify missing roads, identify approximate locations of powerlines and radio towers.

The committee also identified primary and secondary roads on the map. A USFS roads layer is available from Val.

Bill asked for comments on the mail survey. The committee approved mailing out of the survey as it is.

Public meetings were scheduled for Geyser, Standford and Hobson .

Tentative locations and dates are:

June 15 @ noon in Hobson at the senior citizen center.

June 16 @ noon in Geyser at the senior citizen center.

June 16 @ 7pm in Stanford at City Hall.

The next committee is scheduled for June 15 @ 3 pm in Stanford at the courthouse.

NMI will advertise the public meetings in local newspapers.

2.2.2.2.3 June 15, 2004

Attendance list was signed by all present and collected by Toby Brown, attendees were Gary Kirpach, Steve Hedstrom, Joe Alexander, Gary Ellingson, Toby Brown, Jerome Kolar and Edward F. Arnot.

The meeting began with a discussion on how to advertise the public meetings happening this week. The advertisements never made it into the local paper. The Hobson meeting has been rescheduled for June 17th at noon. Flyers will be made up and posted in all the communities. Members of the committee will contact the local fire districts and others they feel should know about the public meetings.

Reviewed the map updates made since the last meeting. It was noted that there are only 2 fire districts in the county. What is shown on the maps are the different school districts. The map was updated. Both districts and all the cities have mutual aid agreements; when contacted all districts respond to a fire.

A review of the WUI map showed two missing structures south of Geyser, one on Jackson Coulee Rd another on the east boundary, near the Judith River. There may be some additional structures near Limestone Canyon in the northwest part of the county, but it's a gated community with no access through their locked gate.

The county is planning on two new repeater sites. Barbara was to write a paragraph about the new sites, but was not at the meeting.

No other comments or changes of the fire to the maps were made.

No additional resource and capabilities forms were returned. Toby emphasized that the rest of these forms need to be returned.

The remainder of the meeting was spent in discussing various mitigation activities. Among the mitigation measures discussed for Judith County were:

Improving roads for both ingress and egress and for better access when wet. Many of the back country roads can be made quickly impassible by a passing summer thunderstorm. Among the needs are surfacing, widening and drainage.

Water sources in rural areas is also a concern. Where water is available access is often difficult. More sources need to established, and made known to all the fire districts in the county (annual map).

Communications. The county is switching over to narrow band radios, but many fire trucks, districts and handheld radios are not narrow band. New radios need to be purchased so everyone is on the same band. The county is doing an audit to find where the dead areas are in the county and where repeaters could be located to fill these dead zones.

2.2.2.2.4 July 15, 2004

Attendance list was signed and collected by Vincent Corrao. In attendance were: Joe Alexander, Bonnie Ostertag, Jerry Buhre, Kathie Bailey, Steve Hedstrom, Edward Arnott, Vincent Corrao and John Erixson.

The purpose of the meeting was to discuss and provide comments to the Draft WUI Wildfire Mitigation Plan. Comments were taken and added to the Draft document for public review.

2.2.2.2.5 August 12, 2004

Attendance included: Ron B. Wiseman, Gary Kirpach, Kathie A. Bailey, Jerome Kolar, Steve Hedstrom, Edward Arnott, Bernard Taylor, John Erixson, Gary Ellingson.

Discussion as follows:

Possible signing meeting, Sept 14, 2004—10:30-4 (when commissioners are in).

John Erixson distributed drafts and explained comments incorporated into draft.

Sent out public announcement concerning where plans are available for public review. August 27th is the last day for comments. Have not received info on fire starts in county—should have them in a week or two from rural fire districts.

Gary had sent USFS data 1980-85 that does not show in plan—was provided to Bill in GIS data.

BLM projects in back 90% not in Judith Basin (talk to Shannon Iverson). Reviewed FEMA rating on p.15. John explained why WUI boundary was not expanded.

Question about white area in SE corner on WUI map (green does not match legend). Change legend on bottom of all pages in appendix to say Judith Basin.

Corrections: have not adopted road list/post signs. See table 3.14 for codes. Adjacent to Petroleum (not itself). BLM resources do not reside in Judith Basin. More information to come on rural fire resources from Steve. USFS may provide additional data also (Gary Kirpach). Add Mark Schlepp, MT FW&P to signature page. Hobson rural fire district has jurisdiction on game range (state land); Equipment: 2-200 gal engines in Sapphire, 1500 gal underground storage tank, plus 300 gal type 6 (not on list). No fire hydrants in Hobson;

1 original signed copy for commissioners and agencies—6 should be good.

2.2.2.3 Public Meetings

Public meetings were held as an integral component to the planning process. It was the desire of the planning committee, and the Judith Basin County Commissioners to integrate the public's input to the development of the fire mitigation plan.

The formal public meetings were scheduled on June 15, 2004, at Hobson, Montana and June 16, 2004 at Geyser and Stanford. The purpose of the meetings was to share information on the planning process with a broadly representative cross section of Judith Basin County landowners. Wall maps were posted in the meeting room with many of the analysis results summarized specifically for the risk assessments, location of structures, fire protection, and related information. The formal portion of the presentation included a PowerPoint presentation made by Project Specialist, Toby Brown. During his presentation, comments from committee members, fire chiefs, and others were encouraged in an effort to engage the audience in a discussion.

It was made clear to all in attendance that their input was welcome and encouraged, as specific treatments had not yet been decided, nor had the risk assessment been completed. Attendees were told that they could provide oral comment during the meeting, they could provide written comment to the meeting, or they could request more information in person to discuss the plan. In addition, attendees were told they would have an opportunity to review the draft plan prior to its completion to further facilitate their comments and input.

The formal presentations lasted approximately 1 hour and included many questions and comments from the audience. Following the meetings, many discussions continued with the committee members and the general public discussing specific areas, potential treatments, the risk analysis, and other topics.

Attendance at the public meeting included 26 individuals in Hobson, 3 in Stanford, and 20 in Geyser. The following are comments, questions or suggestions from the meetings:

2.2.2.3.1 Hobson Public Meeting

June 17, 2004 – Hobson Senior Center – 12 noon

Attendance list was signed by all present and collected by Toby Brown. There were 26 attendees. Lunch was paid for by NMI and was prepared by the Hobson Senior Citizen center.

Toby Brown, of Northwest Management Inc. (NMI), began the meeting with a slide show of what Fire Mitigation Plans are, how they were authorized and funded, who had been involved and what work had been done to date.

During the presentation there were several questions asked regarding the details of how the plan was funded and how it would work once implemented. These questions were answered as they came up and showed a high interest in the execution of the plan when it is finalized

After the presentation there was a general discussion about what mitigation needs existed in the county. Many ideas were discussed.

Utilization of the biomass generated from various fuel reduction treatments was of great interest to several members of the audience. A biomass plant to produce heat and electricity for local schools and city offices has been explored for the area in the recent past. Senior citizens in the group remarked on the desirability of utilizing this material instead of burning piles in the fall which creates smoke that negatively impacts their health. If the fuel generated from fire mitigation work cannot be used in a co-gen type plant, could it be mulched/chipped instead of burned.

In the early 1990's Hobson was threatened by the Turkey fire, which burned within 5 miles of town. Considering the fuel types in the area this is only one to two hours burn time away from town. Many people were interested in seeing fuel breaks constructed around most communities in the county.

Better information about why, how and what groups (funding) are available to help create defensible space around homes and structures in the county. Many people were willing have there homes inspected and would be willing to match funding with labor. If a grant/funding source could be secured so that homes in the county could be treated all at once, possibly by local crews with labor match coming from homeowners. Many seniors are unable to provide hard physical labor, but are willing to provide meals, or help with any nonphysical labor tasks.

Location and use of water sites in the rural areas of the county were discussed. Some ranchers in the audience would not mind there stock watering ponds being used to fight fires, but the water needs to be replaced. For many to lose their water would put a severe strain on their herds and on the ranchers economic future.

2.2.2.3.2 Geyser Public Meeting

June 16, 2004 – Geyser Senior Center – 12 noon

Attendance list was signed by all present and collected by Toby Brown. There were 18 attendees. Lunch was paid for by NMI and was prepared by the Geyser Senior Citizen center.

Toby Brown, of Northwest Management Inc. (NMI), began the meeting with a slide show of what Fire Mitigation Plans are, how they were authorized and funded, who had been involved and what work had been done to date.

After the presentation there was a general discussion about what mitigation needs existed in the county. Many ideas were discussed.

Members of the local fire departments would like to see compressed air foam systems, so they can spray a structure and leave the area, instead of having to stay at individual structures. This would help them to protect more structures at once.

Some people would like to see an improvement in the building codes, so new structures would be more fire resistant.

There was a discussion on helping the USFS fight fires in the wildlands. The USFS has jurisdictions, with mutual aid agreements, training and proper communications city and rural fire districts can help the Forest Service. All of this must be set up and organized long before a fire starts. The USFS will turn away engines that have not been inspected and known to have the proper equipment training and communications.

At the county level often the first responders are farmers/ranchers with their spray trucks. Often they are fighting the fire when the rural districts show up. A program to get these public first responders to be trained and equipped with personal protective equipment and in communication with the fire managers (radios).

Improving the 911 system in the county and identifying roads. Often locals refer to places and roads by who lives there, and people from the other side of the county or from other areas will not know where to go.

2.2.2.4 Meeting Notices

Public meeting notices were not printed in the local newspapers prior to the meetings. However, flyers were printed and posted throughout the county. Additionally, a phone tree was established by the committee in order to contact residents. The following is an example of the flyer.

Judith Basin County

Wildfire Mitigation Plan

Public Meeting Announcement

Geyser Senior Center Wednesday, June 16th @ noon FREE LUNCH!

Stanford City Hall Wednesday, June 16th @ 7pm

Hobson Senior Center Thursday, June 17th @ noon FREE LUNCH!

You'll learn:

"What is a wildfire mitigation plan?"

"How might I be affected?"

Tell us:

What are your concerns regarding wildfires in Judith Basin County.

What could be done to further protect people, homes, businesses, and natural resources in your community?

2.3 Review of the WUI Wildfire Mitigation Plan

Review of sections of this document were conducted by the planning committee during the planning process as maps, summaries, and written assessments were completed. These individuals included fire mitigation specialists, fire fighters, planners, elected officials, and others involved in the coordination process. Preliminary findings were discussed at the public meetings, where comments were collected and facilitated.

The results of these formal and informal reviews were integrated into a DRAFT Wildland-Urban Interface Wildfire Mitigation Plan. This plan was given to members of the planning committee (including the Judith Basin County Commissioners and the Snowy Mountain Development Corporation) on July 15, 2004.

Committee review of the DRAFT plan was completed on August 12, 2004. Comments, suggestions, and clarifications were integrated into a revised DRAFT plan which was released for public review on August 12, 2004. This DRAFT document was distributed at local libraries, the Snowy Mountain Development Corporation, and the County Commissioners Office. Comments were collected and integrated into the final plan which was accepted by the Judith Basin County Commissioners and other signatories on September 14, 2004.

Chapter 3: County Characteristics & Risk Assessment

3 Background and Area Description

3.1 Demographics

Judith Basin County reported a increase in total population from 2,282 in 1990 to 2,329 in 2000. Judith Basin County has three incorporated communities, Hobson (pop. 865), Stanford (pop. 831), and Geyser (pop. 633).

Table 3.1 summarizes some relevant demographic statistics for Judith Basin County.

Table 3.1 Selected demographic statistics for Judith Basin County, Montana, from Census 2000.

Subject	Number	Percent
Total population	2,329	100.0
SEX AND AGE		
Male	1,215	52.2
Female	1,114	47.8
Under 5 years	122	5.2
5 to 9 years	183	7.9
10 to 14 years	180	7.7
15 to 19 years	184	7.9
20 to 24 years	65	2.8
25 to 34 years	180	7.7
35 to 44 years	354	15.2
45 to 54 years	375	16.1
55 to 59 years	173	7.4
60 to 64 years	113	4.9
65 to 74 years	212	9.1
75 to 84 years	143	6.1
85 years and over	45	1.9
Median age (years)	42.3	(X)
18 years and over	1,700	73.0
Male	868	37.3
Female	832	35.7
21 years and over	1,640	70.4
62 years and over	446	19.1
65 years and over	400	17.2
Male	186	8.0
Female	214	9.2

Table 3.1 Selected demographic statistics for Judith Basin County, Montana, from Census 2000.

Subject	Number	Percent
RELATIONSHIP		
Population	**2,329**	**100.0**
In households	2,329	100.0
Householder	951	40.8
Spouse	582	25.0
Child	711	30.5
Own child under 18 years	603	25.9
Other relatives	36	1.5
Under 18 years	14	0.6
Nonrelatives	49	2.1
Unmarried partner	25	1.1
In group quarters	0	0.0
Institutionalized population	0	0.0
Noninstitutionalized population	0	0.0
HOUSEHOLDS BY TYPE		
Households	**951**	**100.0**
Family households (families)	661	69.5
With own children under 18 years	283	29.8
Married-couple family	599	63.0
With own children under 18 years	250	26.3
Female householder, no husband present	35	3.7
With own children under 18 years	18	1.9
Nonfamily households	290	30.5
Householder living alone	262	27.5
Householder 65 years and over	123	12.9
Households with individuals under 18 years	291	30.6
Households with individuals 65 years and over	400	42.1
Average household size	2.45	(X)
Average family size	3.01	(X)
HOUSING TENURE		
Occupied housing units	**951**	**100.0**
Owner-occupied housing units	734	77.2
Renter-occupied housing units	217	22.8
Average household size of owner-occupied unit	2.45	(X)
Average household size of renter-occupied unit	2.46	(X)

(X) Not applicable
[1] Other Asian alone, or two or more Asian categories.
[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.
[3] In combination with one or more other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, P3, P4, P8, P9, P12, P13, P,17, P18, P19, P20, P23, P27, P28, P33, PCT5, PCT8, PCT11, PCT15, H1, H3, H4, H5, H11, and H12.

3.2 Socioeconomics

Judith Basin County had a total of 951 occupied housing units and a population density of 1.2 persons per square mile reported in the 2000 Census. Ethnicity in Judith Basin County is distributed: white 98.6%, American Indian or Alaskan Native 0.1%, Asian 0.1%, Hispanic or Latino 0.6%, and two or more races 0.9%.

Specific economic data for individual communities is collected by the US Census; in Judith Basin County this includes Hobson, Stanford, and Geyser. Hobson households earn a median income of $30,750 annually, Stanford households earn $27,083, and Geyser households average $30,096 annually, which compares to the Judith Basin County median income during the same period of $29,241. Table 3.2 shows the dispersal of households in various income categories in Judith Basin County.

Table 3.2 Income in 1999.	**Judith Basin County**	
	Number	**Percent**
Households	**951**	**100.0**
Less than $10,000	139	14.6
$10,000 to $14,999	102	10.7
$15,000 to $24,999	187	19.7
$25,000 to $34,999	148	15.6
$35,000 to $49,999	201	21.1
$50,000 to $74,999	99	10.4
$75,000 to $99,999	27	2.8
$100,000 to $149,999	31	3.3
$150,000 to $199,999	8	0.8
$200,000 or more	9	0.9
Median household income (dollars)	29,241	(X)

(Census 2000)

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, directs federal agencies to identify and address any disproportionately high adverse human health or environmental effects of its projects on minority or low-income populations. In Judith Basin County, a significant number, 21.0%, of families are at or below the poverty level (Table 3.3).

Table 3.3 Poverty Status in 1999 (below poverty level)	**Judith Basin County**	
	Number	**Percent**
Families	**108**	**(X)**
Percent below poverty level	(X)	16.3
With related children under 18 years	71	(X)
Percent below poverty level	(X)	24.7
With related children under 5 years	24	(X)
Percent below poverty level	(X)	31.6

Table 3.3 Poverty Status in 1999 (below poverty level)	Judith Basin County	
	Number	Percent
Families with female householder, no husband present	16	(X)
Percent below poverty level	(X)	45.7
With related children under 18 years	8	(X)
Percent below poverty level	(X)	40.0
With related children under 5 years	0	(X)
Percent below poverty level	(X)	(X)
Individuals	490	(X)
Percent below poverty level	(X)	21.1
18 years and over	301	(X)
Percent below poverty level	(X)	17.7
65 years and over	53	(X)
Percent below poverty level	(X)	13.3
Related children under 18 years	189	(X)
Percent below poverty level	(X)	30.6
Related children 5 to 17 years	144	(X)
Percent below poverty level	(X)	29.0
Unrelated individuals 15 years and over	58	(X)
Percent below poverty level	(X)	17.7

(Census 2000)

The unemployment rate was 1.5% in Judith Basin County in 1999, compared to 4.4% nationally during the same period. Approximately 42% of the Judith Basin County employed population worked in natural resources, with much of the indirect employment relying on the employment created through these natural resource occupations; Table 3.4 (Census 2000).

Table 3.4 Employment and Industry	Judith Basin County	
	Number	Percent
Employed civilian population 16 years and over	1,068	100.0
OCCUPATION		
Management, professional, and related occupations	534	50.0
Service occupations	152	14.2
Sales and office occupations	152	14.2
Farming, fishing, and forestry occupations	97	9.1
Construction, extraction, and maintenance occupations	53	5.0
Production, transportation, and material moving occupations	80	7.5
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	449	42.0
Construction	52	4.9
Manufacturing	27	2.5
Wholesale trade	14	1.3
Retail trade	55	5.1
Transportation and warehousing, and utilities	38	3.6
Information	11	1.0

Table 3.4 Employment and Industry	Judith Basin County	
	Number	Percent
Finance, insurance, real estate, and rental and leasing	42	3.9
Professional, scientific, management, administrative, and waste management services	38	3.6
Educational, health and social services	164	15.4
Arts, entertainment, recreation, accommodation and food services	98	9.2
Other services (except public administration)	30	2.8
Public administration	50	4.7

Approximately 47% of Judith Basin County's employed persons are private wage and salary workers, while around 17% are government workers (Table 3.5).

Table 3.5 Class of Worker	Judith Basin County	
	Number	Percent
Private wage and salary workers	505	47.3
Government workers	179	16.8
Self-employed workers in own not incorporated business	321	30.1
Unpaid family workers	63	5.9

(Census 2000)

3.3 Description of Judith Basin County

Judith Basin County lies in central Montana, between Great Falls and Lewistown. The county is characterized by isolated mountain ranges that surround a sea of grass and wheat cultivated in the fertile lands of the Judith River Basin. In the southern portion of the county are The Little Belt Mountains within the Lewis and Clark National Forest. The Little Belts are the headwaters for the Judith River, which flows to the northeast past Sapphire Village, Utica and Hobson on its way to the Missouri, north of Winifred in neighboring Fergus County.

The lands within Judith Basin are recognized as some of the better non-irrigated agricultural land in the state. As such, Judith Basin County is home to hundreds of large farms that drive the agriculturally-based economy of the county. The county is sparsely populated, with county residents spread across the rural landscape or clustered in small communities that provide services in support of the agricultural economy. The vast majority of communities have been built along rail lines that serve as transportation links to distant markets.

The beauty and grandeur of the area accurately fits Montana's character of rugged, open spaces. The famous cowboy painter Charlie Russell has captured the landscape and scenes from the unfolding drama associated with the settlement of the area. His name is now entwined with the County, featured in museums and historic markers throughout the county.

Land ownership throughout the County is a mix of private, state, BLM, and US Forest Service. Much of the land in Judith Basin County is managed in support of the ranching and agricultural economy of the area. Domestic livestock and wildlife graze many of the areas that are not actively cultivated for hay or other crops.

3.3.1 Highways

The main highways weaving through the county are U.S. Highways 87/State Highway 200. U.S. 87/MT 200 is the primary east-west transportation route through central Montana. U.S. 191 is

actually located mostly in neighboring Fergus County; however, residents use this paved route to access commercial centers to the south. There are also numerous paved State Routes that connect rural communities to the main arterials and the more populace towns. All of these two-lane highways are typically bordered by rangelands. Recreational and large truck traffic is particularly intense during the summer and fall months.

3.3.2 Rivers

The Judith River drainage flows from the slopes of the Lewis and Clark National Forest near Sapphire Village traveling through the community of Utica before exiting the County east of Hobson. During the historic times and still today, this waterway served as a large financial entity in Judith Basin County providing many recreational and economic resources. Other important bodies of water in the county are Ackley Lake, Hidden Lake, Twin Lakes, Sage Creek, Arrow Creek, and a plethora of streams and coulees that make ranching and agricultural production possible.

3.3.3 Recreation

Judith Basin County has many outstanding tourism and recreational facilities. The county offers a full panorama of recreational opportunities ranging from boating on Ackley Lake to cross-country skiing and hiking in the Lewis and Clark National Forest.

The economic impacts of these activities to the local economy and the economy of Montana have not been enumerated. However, they are substantial given the many months of the year that activities take place and the large numbers of visitors that travel to this location.

3.3.3.1 Lewis and Clark National Forest

Historically, the Lewis and Clark National Forest has been separated into two major divisions-the Rocky Mountain Division, west of Great Falls, contains the Rocky Mountain Ranger District; and the Jefferson Division, scattered mountain ranges to the east of Great Falls, contains the Judith, Belt Creek, Musselshell, and White Sulphur Springs Ranger Districts.

The Jefferson Division is comprised of six distinct mountain ranges east and south east of Great Falls. Private or other agency lands surround each mountain range. The mountain ranges include the Crazy Mountains (south half administered by Gallatin National Forest), Little Belt Mountains, Castle Mountains, Highwood Mountains, Big Snowy and Little Snowy Mountains.

The Lewis and Clark National Forest contains more than 1,500 miles of forest roads. Surfaced roads feature many scenic drives, including Kings Hill National Scenic Byway (US Highway 89), a major route between Glacier and Yellowstone National Parks, which passes through the Little Belt Mountains.

The Lewis and Clark National Forest contains 29 developed recreation sites. Many of these sites are handicap accessible. There are five cabins on the forest that may be rented by the public on a first come, first served basis. Trails provide the only routes of travel to much of the forest. Approximately 2,200 miles of trails are managed by the Lewis and Clark National Forest.

The Lewis and Clark National Forest is home for large game animals, small animals and protected species. Forest visitors can hunt elk, mule and white tail deer, mountain goat, bighorn sheep, black bear, mountain lion and blue grouse. Protected wildlife living on or near the forest includes bald eagles, grizzly bears, peregrine falcon, lynx and gray wolf. The forest contains many popular viewing sites for migrating waterfowl.

The forest has 1,600 miles of permanent streams and several small, natural and man-made lakes where forest visitors may fish for cutthroat, brook and rainbow trout, and mountain whitefish.

3.3.3.2 Ackley Lake State Park

Named after an early settler and frontiersman, this central Montana grassland park offers diverse water sports opportunities, good fishing and picnic and camping sites. Ackley Lake State Park has 23 developed camp areas, 2 boat ramps, and bathroom facilities. There is also a swimming and wildlife viewing area. This public area is easily accessible being approximately only 5 miles southwest of Hobson.

3.3.3.3 Judith River Wildlife Management Area

The Judith River WMA is located approximately 11 miles southwest of Utica at the east end of the Little Belt Mountains. This area is managed by to the Montana Fish, Wildlife, and Parks in order to provide high-quality and abundant vegetation for wintering elk and other wildlife species and to provide public recreational opportunities. Winter presents the best opportunities for viewing elk and deer; however, the WMA is closed to recreational activity between December 1 and May 15. White-tailed deer and antelope can be seen in spring, summer and fall as can a variety of raptors, small mammals, and songbirds. Archery and rifle hunting seasons for elk, mule deer, white-tailed deer, antelope and black bear are open to licensed hunters; however, rifle hunting for elk is by special permit only. Limited opportunities exist for upland game bird hunting in this area.

3.3.3.4 Judith Basin County Museum

The Judith Basin County Museum was opened in 1967 and displays many old time articles, old pictures and history books. There is a collection of over 2000 salt and paper shakers, more than 50,000 buttons, Indian artifacts and many more items. Charles M. Russell l, a famous Western artist, lived and painted many of his paintings in this area. A display of some of his work is included in the museum.

3.3.3.5 Camping

Camping is a popular activity enjoyed by residents of Judith Basin County. Other than those offered by the state park, there are also several campsites on the Lewis and Clark National Forest, most of which are easily accessed. The Dry Wolf Trailhead campground and the Indian Hill area offer exceptional access to scenic trails and creek fishing.

3.3.3.6 Winter Sports

For those people who enjoy winter sports, Judith Basin County has a variety of activities to interest them. Cross-country skiers will be exhilarated by the challenging mountain trails. Snowmobiling is also a popular winter sport that attracts many local and out of town thrill seekers.

3.3.3.7 Fishing and Hunting

Fishing and hunting is very important to Judith Basin County both from a recreational standpoint and as an economic resource. A wide variety of fish can be caught in Judith Basin County

including: trout, bass, catfish, crappie, perch, and pike. However, many local fisherman claim the best fishing "hole" is in one of the numerous small tributaries that feed the Judith River.

For those people who prefer a gun or bow to a fly rod, Judith Basin County offers a bounty of hunting experiences. Wild birds and game, like deer, elk, bear, pheasant, partridge, grouse, wild duck, geese, and doves are found in abundance.

3.3.4 Resource Dependency

Over the past century, employment through agricultural farming and livestock ranching has been significant in the region. Livestock ranching has been and continues to be an important component of the economy in Judith Basin County. Livestock grazing in Judith and surrounding Counties has provided stable employment while serving to keep rangelands and forestlands alike maintained at a lower wildfire risk than if they had not been present and managed.

The role of natural resources in the local economies of Montana can be summarized by looking at the share of each community's economic base. Basic industries, or export industries, consist of firms that sell their products outside the local area or that are otherwise affected by events outside the local area.

Basic industries are responsible for injecting new funds into a region's economy, which in turn create additional jobs and incomes as these dollars are spent and re-spent locally. The incomes earned by workers in basic industries are spent at local grocery stores, car dealerships, and healthcare facilities such as hospitals and doctors and dentist offices (sometimes denoted as derivative or secondary industries). The relationship between basic and derivative industries is often summarized in terms of a "multiplier," which reflects the amount of additional income (or jobs) created in derivative industries for each dollar (or job) increase in the basic industries (Polzin 1998).

Table 3.6. Gross state product in basic industries, 1994.

Industry	Millions of 2004$
Ag and Ag Service	$1,242
Mining	$1,128
Primary Manufacturing	$731
Subtotal of Natural Resources	$3,101
Natural resources / Basic	41.8%
Other Basic Industries	$4,317
Total Basic	$7,417

Source: (Polzin 1998)

Montana's economy is a natural resource dependent economy (Table 3.6), which in turn is affected by natural and man caused disasters, including wildland fire. Efforts to mitigate hazards will have a positive impact on both rural economies, but also on the state's economy.

3.4 Emergency Services & Planning and Zoning

Judith Basin County has not finalized its official Road Name List. Road name lists can serve emergency response efforts well.

Currently, the County does not have Enhanced 911. The Fergus County Sheriff's office operates the 911 Dispatch Center for Judith Basin County. In addition to handling law enforcement and emergency medical calls, the center also provides dispatch services to all of the rural fire districts and city fire departments in Fergus and Judith Basin Counties, and the fire

company in Judith Basin County. The dispatch center, operational 24 hours a day, is located in the Sheriff's office at 121 8th Avenue South in Lewistown, Montana.

With regard to wildfires, the 911 dispatch center is primarily responsible for receiving reports of fires and notifying the appropriate fire district and/or agency according to protocol sheets provided by the districts or agencies. The center will provide some support to incidents, but generally does not function as an expanded dispatch office. For large-scale incidents, the County Emergency Operations Center in the basement of the Sheriff Complex is activated. The county DES Coordinator will be involved in establishing and operating the EOC.

3.5 Cultural Resources

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during potential fire mitigation activities such as thinning and prescribed fire.

The United States has a unique legal relationship with Indian tribal governments defined in history, the U.S. Constitution, treaties, statutes, Executive Orders, and court decisions. Since the formation of the union, the United States has recognized Indian tribes as domestic dependant nations under its protection. The Federal Government has enacted numerous regulations that establish and define a trust relationship with Indian tribes.

The relationship between Federal agencies and sovereign tribes is defined by several laws and regulations addressing the requirement of Federal agencies to notify or consult with Native American groups or otherwise consider their interests when planning and implementing Federal undertakings, among these are:

- **EO 13175, November 6, 2000**, Consultation and Coordination with Indian Tribal Governments.
- **Presidential Memorandum, April, 1994**. Government-Government Relations with Tribal Governments (Supplements EO 13175). Agencies must consult with federally recognized tribes in the development of Federal Policies that have tribal implications.
- **EO 13007, Sacred sites, May 24, 1996**. Requires that in managing Federal lands, agencies must accommodate access and ceremonial use of sacred sites and must avoid adversely affecting the physical integrity of these sites.
- **EO 12875, Enhancing Intergovernmental Partnerships, October 26, 1993**. Mainly concerned with unfunded mandates caused by agency regulations. Also states the intention of establishing "regular and meaningful consultation and collaboration with state, local and tribal governments on matters that significantly or uniquely affect their communities."
- **Native American Graves Protection and Repatriation Act (NAGPRA) of 1989**. Specifies that an agency must take reasonable steps to determine whether a planned activity may result in the excavation of human remains, funerary objects, sacred objects and items of cultural patrimony from Federal lands. NAGPRA also has specified requirements for notifying and consulting tribes.
- **Archaeological Resources Protection Act (ARPA), 1979**. Requires that Federal permits be obtained before cultural resource investigations begin on Federal land. It also requires that investigators consult with the appropriate Native American tribe prior to initiating archaeological studies on sites of Native American origin.

- **American Indian Religious Freedom Act (AIRFA), 1978**. Sets the policy of the US to protect and preserve for Native Americans their inherent rights of freedom to believe, express, and exercise the traditional religions of the American Indian . . . including, but not limited to access to sacred sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites.
- **National Environmental Policy Act (NEPA), 1969**. Lead agency shall invite participation of affected Federal, State, and local agencies and any affected Indian Tribe(s).
- **National Historic Preservation Act (NHPA), 1966**. Requires agencies to consult with Native American tribes if a proposed Federal action may affect properties to which they attach religious and cultural significance. (Bulletin 38 of the act, identification of TCPs, this can only be done by tribes.)
- Treaties (supreme law of the land) in which tribes were reserved certain rights for hunting, fishing and gathering and other stipulations of the treaty.
- Unsettled aboriginal title to the land, un-extinguished rights of tribes.

3.5.1 National Register of Historic Places

The National Park Service maintains the National Register of Historical Places as a repository of information on significant cultural locale. These may be buildings, roads or trails, places where historical events took place, or other noteworthy sites. The NPS has recorded sites in its database. These sites are summarized in Table 3.7.

Table 3.7. National Register of Historic Places in Judith Basin County, Montana.

Item Number	Resource Name	Address	City	Listed	Multiple
1	Judith River Ranger Station	SW of Utica in Lewis & Clark NF	Utica	1992	Myers, Thomas Guy
2	Meadowbrook Stock Farm	US 87	Hobson	1992	Murray, Thomas R.
3	Wood Lawn Farm	5 mi. W of Hobson on Utica Rd. No. 239	Hobson	1993	Jellison, Richmond

(NRHP 2003)

Fire mitigation activities in and around historical sites have the potential to affect historic places. In all cases, the fire mitigation work will be intended to reduce the potential of damaging the site due to wildfire. Areas where ground disturbance will occur will need to be inventoried depending on the location. Such actions may include, but are not limited to, constructed firelines (handline, mechanical line, etc.), new roads to creeks to fill water tankers, mechanical treatments, etc. Only those burn acres that may impact cultural resources that are sensitive to burning (i.e., buildings, peeled bark trees, etc.) would be examined. Burns over lithic sites are not expected to have an impact on those sites, as long as the fire is of low intensity and short duration. Some areas with heavy vegetation may need to be examined after the burn to locate and record any cultural resources although this is expected to be minimal. Traditional Cultural Properties (TCPs) will also need to be identified. Potential impact to TCPs will depend on what values make the property important and will be assessed on an individual basis.

3.6 Transportation

Primary access to and from Judith Basin County is provided by U.S. Highway 87/State Highway 200, a two-lane highway traversing the County from east to west. This route enters near Hobson, travels through Moccasin, Benchland, Stanford, and Geyser, then exits approximately 3 miles west of the Raynesford. This access is the only paved route connecting the central regions of Judith Basin and neighboring Counties. U.S. Highway 191 is a paved, two lane route just east of the Judith Basin-Fergus County border that serves as a connection between Judith Basin County and the more urban centers of Harlowton and Big Timber to the south.

Secondary, gravel roads maintained by the County or private entities provide access to the adjoining areas within the county, including many of the more rural communities, oil rigs, recreation areas, and rural homes. A variety of trails and closed roads are to be found throughout the region. Many of these roads were originally built to facilitate agricultural or ranching activities. In most cases, these roads are adequate to facilitate firefighting equipment as they adhere to County Building Codes. County building codes for new developments should be adhered to closely to insure this tendency continues.

3.7 Vegetation & Climate

Vegetation in Judith Basin County is a mix of grasslands, rangelands, and forested ecosystems. An evaluation of satellite imagery of the region provides some insight to the composition of the forest vegetation of the area. The full extent of the county was evaluated for cover type as determined from Landsat 7 ETM+ imagery in tabular format, Table 3.8.

The most represented vegetated cover type is a Low/Moderate Cover Grasslands type at approximately 26% of the County's total area. The next most common vegetation cover type represented is Moderate/High Cover Grasslands at 13% of the total area. Dryland Agricultural represents only 11% of Judith Basin County, while irrigated farmlands represents 9% (Table 3.8).

Table 3.8. Cover Types in Judith Basin County

	Acres	Percent of County's Total Area
Low/Moderate Cover Grasslands	313,653	26.2%
Moderate/High Cover Grasslands	158,949	13.3%
Agricultural Lands: Dry	128,292	10.7%
Agricultural Lands: Irrigated	111,751	9.3%
Lodgepole Pine	62,274	5.2%
Mixed Subalpine Forest	58,523	4.9%
Douglas-fir	58,399	4.9%
Other Grasslands	53,478	4.5%
Graminoid and Forb Riparian	49,328	4.1%
Ponderosa Pine	33,320	2.8%
Shrub Riparian	17,810	1.5%
Douglas-fir/Lodgepole Pine	17,472	1.5%
Very Low Cover Grasslands	15,856	1.3%
Mixed Broadleaf Forest	14,475	1.2%
Altered Herbaceous	11,169	0.9%
Montane Parklands and Subalpine	11,067	0.9%

Table 3.8. Cover Types in Judith Basin County	Acres	Percent of County's Total Area
Rock	10,504	0.9%
Mixed Whitebark Pine Forest	10,420	0.9%
Low Density Xeric Forest	9,513	0.8%
Limber Pine	7,326	0.6%
Mixed Xeric Forest	7,164	0.6%
Standing Burnt Forest	5,857	0.5%
Mixed Broadleaf and Conifer Forest	5,430	0.5%
Mesic Shrub-Grassland Association	4,343	0.4%
Sagebrush	4,289	0.4%
Broadleaf Riparian	2,922	0.2%
Conifer Riparian	2,634	0.2%
Mixed Mesic Forest	2,600	0.2%
Badlands	1,950	0.2%
Mixed Riparian	1,195	0.1%
Xeric Shrub-Grassland Association	837	0.1%
Water	622	0.1%
Rocky Mountain Juniper	592	0.0%
Mixed Barren Sites	582	0.0%
Mixed Xeric Shrubs	528	0.0%
Mixed Broadleaf and Conifer Rip	512	0.0%
Missouri Breaks	284	0.0%
Urban or Developed Lands	168	0.0%
Mines, Quarries, Gravel Pits	40	0.0%

Vegetative communities within the county follow the strong moisture and temperature gradient related to the major river drainages. Scarce precipitation and soil conditions result in a relatively arid environment. As moisture availability increases, so does the abundance of hardwood and conifer species.

3.7.1 Monthly Climate Summaries In or Near Judith Basin County

3.7.1.1 Raynesford, Montana (246900)

Period of Record Monthly Climate Summary

Period of Record : 5/18/1954 to 4/30/1970

Table 3.9 Climate records for Raynesford, Montana (Judith Basin County).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	34.3	37.7	42.8	53.6	63.9	72.1	82.1	81.2	69.3	59.6	45.6	39.7	56.8
Average Min. Temperature (F)	8.8	14.0	18.4	27.7	35.7	42.1	46.0	43.6	36.0	31.0	20.9	15.8	28.3
Average Total Precipitation (in.)	0.69	0.51	0.52	1.31	2.87	3.60	1.52	1.38	1.59	1.09	0.68	0.67	16.42
Average Total Snow	10.1	10.2	5.0	8.2	0.5	0.3	0.0	0.0	0.8	2.2	6.9	8.0	52.1

Table 3.9 Climate records for Raynesford, Montana (Judith Basin County).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Fall (in.)													
Average Snow Depth (in.)	2	3	1	1	0	0	0	0	0	0	1	1	1

Percent of possible observations for period of record. Max. Temp.: 90.9% Min. Temp.: 91.7% Precipitation: 93.1% Snowfall: 74.3% Snow Depth: 69.2%

3.7.1.2 Stanford, Montana (247858)

Period of Record Monthly Climate Summary

Period of Record : 4/ 1/1927 to 12/31/1964

Table 3.10 Climate records for Stanford, Montana (Judith Basin County).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	34.0	36.7	41.7	54.4	64.2	70.6	82.0	80.4	69.8	59.9	46.1	39.1	56.6
Average Min. Temperature (F)	9.3	12.0	18.1	28.0	37.4	44.4	50.5	48.9	40.6	32.3	21.1	15.0	29.8
Average Total Precipitation (in.)	0.56	0.54	0.69	0.99	2.56	3.27	1.70	1.50	1.24	0.86	0.62	0.57	15.10
Average Total Snow Fall (in.)	7.0	8.0	8.1	7.8	2.3	0.6	0.3	0.0	1.1	2.8	6.4	7.5	52.1
Average Snow Depth (in.)	3	3	2	1	0	0	0	0	0	0	1	2	1

Percent of possible observations for period of record. Max. Temp.: 99% Min. Temp.: 98.7% Precipitation: 99.6% Snowfall: 47.9% Snow Depth: 51.8%

3.7.1.3 Hobson, Montana (244193)

Period of Record Monthly Climate Summary

Period of Record : 7/ 1/1950 to 7/31/1984

Table 3.11 Climate records for Hobson, Montana (Judith Basin County).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	Insufficient Data												
Average Min. Temperature (F)	Insufficient Data												
Average Total Precipitation (in.)	0.69	0.42	0.64	0.89	2.73	2.73	1.35	1.29	1.04	0.75	0.57	0.54	13.65
Average Total Snow Fall (in.)	9.9	5.6	6.9	5.1	1.1	0.1	0.0	0.0	0.6	2.8	5.3	6.6	44.0
Average Snow Depth (in.)	4	3	1	0	0	0	0	0	0	0	1	2	1

Percent of possible observations for period of record. Max. Temp.: 0% Min. Temp.: 0% Precipitation: 97.1% Snowfall: 86.2% Snow Depth: 79.5%

3.7.1.4 Utica, Montana (248495)

Period of Record Monthly Climate Summary

Period of Record : 2/ 1/1962 to 5/31/1987

Table 3.12 Climate records for Utica, Montana (Judith Basin County).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	33.6	39.0	42.6	52.5	61.4	69.7	78.9	78.4	67.2	58.2	43.0	35.9	55.0
Average Min. Temperature (F)	7.0	12.5	15.7	23.5	31.4	39.1	42.3	41.2	33.5	26.6	16.7	9.9	25.0
Average Total Precipitation (in.)	0.69	0.53	0.90	1.12	3.01	3.10	1.64	1.86	1.46	0.91	0.73	0.67	16.61
Average Total SnowFall (in.)	8.8	6.4	8.4	4.4	0.1	0.0	0.0	0.0	0.3	2.5	6.6	9.2	46.8
Average Snow Depth (in.)	5	5	3	1	0	0	0	0	0	0	1	3	2

Percent of possible observations for period of record. Max. Temp.: 99.9% Min. Temp.: 99.8% Precipitation: 100% Snowfall: 89.9% Snow Depth: 97.3%

3.8 Wildfire Hazard Profiles

3.8.1 Wildfire Ignition Profile

Fire was once an integral function of the majority of ecosystems in Montana. The seasonal cycling of fire across the landscape was as regular as the July, August and September lightning storms plying across the canyons and mountains. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition (Johnson 1998). The fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals (Barrett 1979). With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure, and age (Johnson *et al.* 1994). Native plant communities in this region developed under the influence of fire, and adaptations to fire are evident at the species, community, and ecosystem levels. Fire history data (from fire scars and charcoal deposits) suggest fire has played an important role in shaping the vegetation in the Columbia Basin for thousands of years (Steele *et al.* 1986, Agee 1993).

Detailed records of fire ignition and extent have been compiled by the USDA Forest Service, and the USDI Bureau of Land Management. Using this data on past fire extents and fire ignition data, the occurrence of wildland fires in the region of Judith Basin County has been evaluated.

Many fires have burned in the region of Judith Basin County (Table 3.13 & 3.14). Figure 3.1 summarizes fire ignitions and acres burned annually (1980-2003). There were approximately 82 fire ignitions during this 24 year period, with the highest number of total ignitions peaking in 1990, recent years have witnessed a decrease in the number of ignitions and the total acres burned (Figure 3.1).

The average number of acres burned each year since 1980 has been approximately 1,530 acres, however, this average was highly influenced by the fires in 1990 when 32,500 acres burned in Judith basin County. If this year is removed from the analysis, then only 183 acres

burn in the average year. Across all fires in this time period, the average fire burned just under 450 acres after ignition.

Table 3.13. B.L.M. record of past fire ignitions in Judith Basin County, Montana: 1980-2003.

Name	LATITUDE	LONGITUDE	Cause[1]	Acres	Year
	46.685	-110.417	1	0.1	1986
	47.000	-110.500	6	0.1	1986
	47.083	-110.625	1	0.1	1986
	47.000	-110.500	5	10.0	1987
	46.750	-110.500	1	0.1	1987
	46.750	-110.250	2	0.1	1987
	46.750	-110.000	1	1.0	1987
	46.750	-110.500	1	0.2	1987
	47.000	-110.500	2	0.1	1987
	47.000	-110.250	2	0.1	1987
	46.842	-110.358	1	0.3	1988
	46.852	-110.312	1	0.2	1988
	46.867	-110.033	1	2.0	1988
Iron Claim	47.000	-110.250	6	1431.0	1988
	46.717	-110.367	1	30.0	1988
	46.983	-110.350	1	0.2	1988
	46.712	-110.417	1	2.5	1988
	46.783	-110.592	1	1.5	1988
	46.950	-110.250	1	1.1	1988
	46.892	-110.500	1	0.2	1988
	46.767	-110.300	1	0.1	1989
	47.065	-110.632	1	0.1	1990
	46.785	-110.620	2	0.1	1990
	47.150	-110.700	1	1.0	1990
	46.978	-110.398	5	0.1	1990
Turkey	46.978	-110.398	5	32500.0	1990
	47.065	-110.573	1	0.1	1990
	47.333	-110.733	1	2.0	1990
	46.730	-110.448	9	30.0	1990
	46.785	-110.283	2	1.5	1990
	46.815	-110.642	1	0.1	1991
	47.077	-110.637	9	0.1	1991
	46.685	-110.410	6	60.0	1991
	46.888	-110.362	1	5.0	1991
	46.728	-110.537	1	1.5	1991
	47.160	-110.035	1	1.5	1991
	46.785	-110.620	1	550.0	1991
	46.785	-110.305	2	0.1	1992
	47.033	-110.488	2	0.1	1992
	46.785	-110.305	2	0.1	1992
	46.873	-110.362	2	0.1	1992

Table 3.13. B.L.M. record of past fire ignitions in Judith Basin County, Montana: 1980-2003.

Name	LATITUDE	LONGITUDE	Cause[1]	Acres	Year
	47.018	-110.552	5	7.0	1992
	46.785	-110.578	1	0.8	1992
	46.800	-110.305	2	0.1	1992
	46.728	-110.452	2	0.1	1992
	46.860	-110.297	2	0.1	1992
	46.873	-110.362	2	0.1	1992
	46.772	-110.578	1	0.5	1994
	46.757	-110.347	1	0.1	1994
Ant Park #9	46.785	-110.537	1	0.1	1995
Ant Park #10	46.772	-110.558	1	0.1	1995
Ant Park #13	46.772	-110.558	1	0.1	1995
Ant Park #11	46.772	-110.558	1	0.1	1995
Ant Park #12	46.772	-110.558	1	0.1	1995
DRYPOLE CR	46.800	-109.817	1	0.2	1996
SIEVE	47.178	-110.765	1	1.0	1996
OTI PARK	47.033	-110.595	1	0.1	1996
TEPEE BUTTE	46.932	-110.595	1	0.3	1996
BAKER	46.990	-110.530	4	0.1	1996
BURNT RIDGE	46.757	-110.495	1	0.1	1996
	46.975	-110.530	1	0.1	1998
Hunter #1	47.062	-110.488	2	0.3	1998
TOLLGATE	46.887	-110.338	4	136.0	1998
Hunter #2	47.062	-110.488	2	0.1	1998
SMOKER	46.903	-110.622	3	0.1	1999
SPRING CREEK	46.745	-110.513	1	564.0	1999
SMITH CREEK	46.743	-110.388	1	0.1	1999
BURNT RIDGE	46.744	-110.517	3	0.1	1999
CARELESS TREE	46.744	-110.446	1	0.1	2000
STUD HORSE	46.850	-110.350	1	13.0	2000
LOST FORK RIDGE	46.767	-110.522	1	1300.0	2000
KELLY MOUNTAIN	46.883	-110.483	1	0.3	2000
HEAD ACHE	46.767	-110.029	1	0.1	2000
ANTELOPE	46.814	-110.031	1	24.0	2000
STEINER CREEK	46.850	-110.533	1	0.1	2000
HIGH SPRINGS	46.767	-110.350	1	68.0	2000
DAISEY PEAK	46.675	-110.329	1	0.1	2000
BURNT RIDGE	46.742	-110.542	1	0.1	2000
Rock	47.204	-110.607	6	1.0	2001
DEER POINT 2	46.874	-110.531	1	0.1	2001
DEER POINT 1	46.874	-110.531	1	0.1	2001
GIBSON PEAK	47.019	-110.467	1	0.2	2001

[1] See table 3.14 for cause codes.

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.1	Anderson	1940
4	0.1	Willow Creek	1940
1	0.1	Jefferson	1940
1	0.1	Sandpoint # 1	1940
1	0.1	Sandpoint # 2	1940
1	0.3	Snow Creek	1940
1	0.5	Middle Peak	1940
1	0.5	West Lost Fork	1940
1	0.1	Thorson Mine	1941
1	0.1	Blacktail	1941
1	0.1	Monk Ridge	1941
1	0.2	Bower Canyon	1941
1	0.1	Taylors Ranch	1942
1	0.9	Smith Creek	1942
1	0.1	Green Mountain	1944
1	0.1	Middle Fork	1944
1	0.2	Yogo	1944
4	0.5	Dry Pole	1944
1	3.6	Boundary	1945
1	0.1	Beldon Flat	1946
1	2.4	Highwood Fire	1946
3	2,680.0	Toll Gate	1946
1	0.1	Baldy Ridge	1947
4	0.1	Barker	1948
1	0.1	Judith River Boundary Fire	1948
1	0.1	Oti Park	1949
1	0.1	Davis	1949
1	0.1	Bear Gulch	1949
1	0.5	Arch Coulee	1949
1	0.5	Clyde Park	1949
3	80.0	Braun Creek	1949
1	0.1	Running Wolf	1952
4	0.1	Old Mill	1952
4	0.1	Morris Creek	1952
4	0.1	Cross Creek	1952
1	0.1	Davis	1952
1	0.1	Otter Creek	1953
1	0.1	Villar Creek Fire	1953
1	0.1	Dry Wolf	1953
1	0.1	Yogo Peak	1953
1	0.1	Toll Mountain	1953
1	0.1	Cleveland Creek	1953
1	0.1	Coyote Peak	1953

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
9	0.1	Flume	1953
4	0.1	Corral Creek	1953
1	0.1	Cross Park	1953
1	0.2	High Springs	1953
1	0.2	McGee Gulch	1953
1	0.6	Cross Ridge	1953
1	0.7	Jefferson Creek	1953
1	1.1	South Fork Lamb Creek	1953
1	2.0	Blankenship	1953
1	0.1	Lyons Gulch	1954
1	0.1	Lead Gulch	1954
1	0.1	Sage Creek	1955
1	0.1	Dubois	1955
1	0.1	Ettien Ridge	1955
1	0.1	Lost Fork Ridge	1955
1	0.1	West Fork Lost Fork	1955
1	0.1	Deadhorse	1955
1	0.2	Burris Ridge	1955
3	1,680.0	Swimming Woman	1955
1	0.1	Warm Spring Creek	1956
1	0.1	Harrison Creek	1956
1	0.2	Hell Creek	1956
1	0.3	Bower Gulch	1956
1	0.1	Martin Creek	1957
1	0.1	Mount Baldy	1957
1	0.1	Ettien Ridge	1957
1	0.1	Mount High	1957
1	0.2	Yogo	1957
1	0.4	Middle Fork	1957
1	0.6	Anderson	1957
4	2.0	Blankenship	1957
4	0.1	Burnt Ridge	1958
1	0.1	Deadhorse	1958
1	0.1	Appraisal Creek	1959
3	0.1	Yogo Canyon	1959
4	0.1	Judith Station	1960
3	0.1	Dam	1960
1	0.1	Spur Park	1960
1	0.1	Little Antelope	1960
4	0.1	Coyote Peak	1960
1	0.3	East End	1960
1	1.0	Morrisy	1960
1	2.0	Antelope	1960

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.1	Geyser Creek	1961
1	0.1	Otter Creek	1961
1	0.1	Blankenship Gulch	1961
1	0.1	Iron Mines	1961
1	0.1	Rolfe Gulch	1961
1	0.1	Big Baldy	1961
1	0.1	Beldon Flat	1961
1	0.1	Spur Park	1961
1	0.1	Lucky Thirteen	1961
1	0.5	Yogo Crossing	1961
1	12.1	Hay Canyon	1961
1	0.1	Shannon Creek	1962
1	0.1	Old Baldy	1962
1	0.1	Coyote Peak	1962
1	0.1	Wolf Butte	1963
1	0.1	Tepee Butte	1963
1	0.1	Ettien Ridge	1963
1	0.1	Hill-McDonald	1964
3	0.1	Running Wolf	1964
4	0.1	Kelly Mountain	1964
1	0.3	Oka	1964
1	0.1	Bill Trask	1965
1	0.1	Lone Tree	1966
1	0.1	Blacktail	1966
1	0.1	Tollgate	1966
1	0.1	Pecks Dam	1966
3	0.1	Judith Station	1966
1	0.1	Weatherwax	1966
1	0.1	Indian Hill	1966
1	0.1	Harrison Creek	1966
1	0.1	Sawmill	1966
1	0.1	Big Hill	1966
1	0.3	Blacktail # 2	1966
1	0.1	Blankenship Gulch	1967
9	0.1	Villars R/W	1967
1	0.1	Middle Fork	1967
1	0.1	Collins Creek	1967
1	0.1	Bower Canyon	1967
1	0.1	No Comm	1967
1	0.1	Bear Gulch	1968
1	0.1	Middle Ridge	1969
1	0.1	Ettien Ridge	1969
1	0.1	Dry Gulch	1970

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.1	Middle Fork # 2	1970
1	0.1	Ettien Ridge	1970
1	0.1	Indian Hill	1970
4	0.1	Bower Canyon Water Gap	1970
1	0.1	Roughlock Hill	1970
1	0.1	Cabin Creek	1970
9	0.4	Middle Fork	1970
1	0.8	Taylor Ranch	1970
1	6.0	Burris Trail	1970
5	30.0	Anderson	1970
5	446.0	Anderson Peak	1970
1	0.1	Sandpoint	1971
1	0.1	Mount High	1971
1	0.1	Goat Rock	1972
4	0.1	Rickard Coulee	1972
1	0.1	Rocky Gulch	1972
1	0.1	Silver Creek	1973
1	0.1	Hell Creek	1973
1	0.1	Woodchopper	1973
1	0.1	Gorman Cabin	1973
1	0.1	Rocky Gulch	1973
1	0.1	Burley Peak	1973
1	0.1	Basin Creek	1973
1	1.0	Middle Fork	1973
1	25.0	Peterson Mountain	1973
1	1.0	Antelope Canyon	1974
5	9.0	Villars Creek	1974
5	1.0	Bluff Mountain # 2	1975
5	12.0	Bluff Mountain	1975
4	0.1	Yogo Peak	1976
1	0.1	Missouri Coulee	1976
1	0.1	Bower Canyon	1976
1	0.1	Russian Creek Sale	1976
1	0.4	Upper Russian	1976
3	2.0	Bear Gulch	1976
5	32.0	Upper Russian Sale # 2	1976
1	0.1	Conan Coulee	1977
1	0.2	Veldon Flats	1977
5	85.0	Blacktail Hills	1977
1	0.1	Russian Creek	1978
4	0.2	Hay Canyon	1978
4	0.5	Middle Fork Campground	1978
5	0.5	Lost Lake	1978

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.5	Weatherwax # 9	1978
3	0.1	San Miguel	1979
4	0.1	Stock Tank	1979
4	0.5	Mount High	1979
4	0.1	Tollgate	1981
1	0.1	Stud Horse	1981
4	0.1	Dry Pole	1981
2	0.1	Russian Flat	1981
1	0.2	Mount High	1981
1	1.0	Lost Creek	1981
4	0.1	Johnny's Fire	1983
4	0.1	Rickard Coulee	1984
4	0.1	Lost Fork	1984
1	5.0	Ettien Springs	1984
1	0.1	Peterson Mountain	1985
1	0.1	Willow Creek Fire	1985
1	0.1	Sawmill Gulch	1985
1	0.1	Tollgate	1985
4	0.1	Lower Russian Creek	1985
1	0.1	Oka Butte	1985
1	0.1	Clyde Park	1985
1	11,300.0	Sandpoint	1985
1	0.1	Mixes	1986
1	0.1	Whitetail	1986
1	2.0	Burnt Ridge	1986
4	0.1	Big Deer Point	1987
4	0.1	Woodchopper	1987
4	0.1	Beldon Flats	1987
4	0.1	Ettien	1987
1	0.1	Bluff Creek	1987
1	0.2	Tollgate	1987
1	1.0	Buffalo Canyon	1987
7	9.6	Bear Five	1987
1	0.2	Willow Creek	1988
1	0.2	Rhoda Lake	1988
1	0.2	Skunk Gulch	1988
1	0.2	Yogo	1988
1	0.3	Ettien Gulch	1988
1	1.5	Ettien Ridge	1988
1	2.5	Deadhorse	1988
1	30.0	Cross Creek 2	1988
2	1,431.0	Iron Claim	1988
1	0.1	Russell Point	1989

Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.1	Blakenship	1990
1	0.1	Oti Park	1990
7	0.1	Bear Three	1990
3	0.1	Sandpoint	1990
4	1.5	Indian Hill	1990
5	30.0	Deadhorse	1990
7	4,500.0	Turkey	1990
9	0.1	Hughesville	1991
1	0.1	Boundary	1991
1	1.5	Hoover Springs	1991
1	5.0	Tollgate	1991
2	60.0	Willow Park	1991
1	550.0	Harrison Creek	1991
4	0.1	Big Rock	1992
4	0.1	Yogo Creek # 2	1992
4	0.1	Yogo Creek # 1	1992
1	0.1	Suicide	1992
4	0.1	Hay Canyon	1992
4	0.1	Russell Hill	1992
4	0.1	Dude Fire	1992
4	0.1	Hidden Lake	1992
1	0.8	Little Harrison	1992
7	7.0	Big Baldy	1992
1	0.1	South Fork	1994
1	0.1	Ant Park # 11	1995
1	0.1	Ant Park # 13	1995
1	0.1	Ant Park # 10	1995
1	0.1	Ant Park # 12	1995
1	0.1	Oti Park	1996
5	0.1	Baker	1996
1	0.1	Burnt Ridge	1996
1	0.3	Tepee Butte	1996
4	0.1	Hunter #1	1998
4	0.1	Hunter #2	1998
1	0.1	Dry Wolf Campground	1998
5	136.0	Tollgate	1998
3	0.1	Smoker	1999
3	0.1	Holiday Camp	1999
3	0.1	Burnt Ridge	1999
1	0.1	Smith Creek	1999
1	564.0	Spring Creek East	1999
1	0.1	Steiner Creek	2000
1	0.1	Burnt Ridge	2000

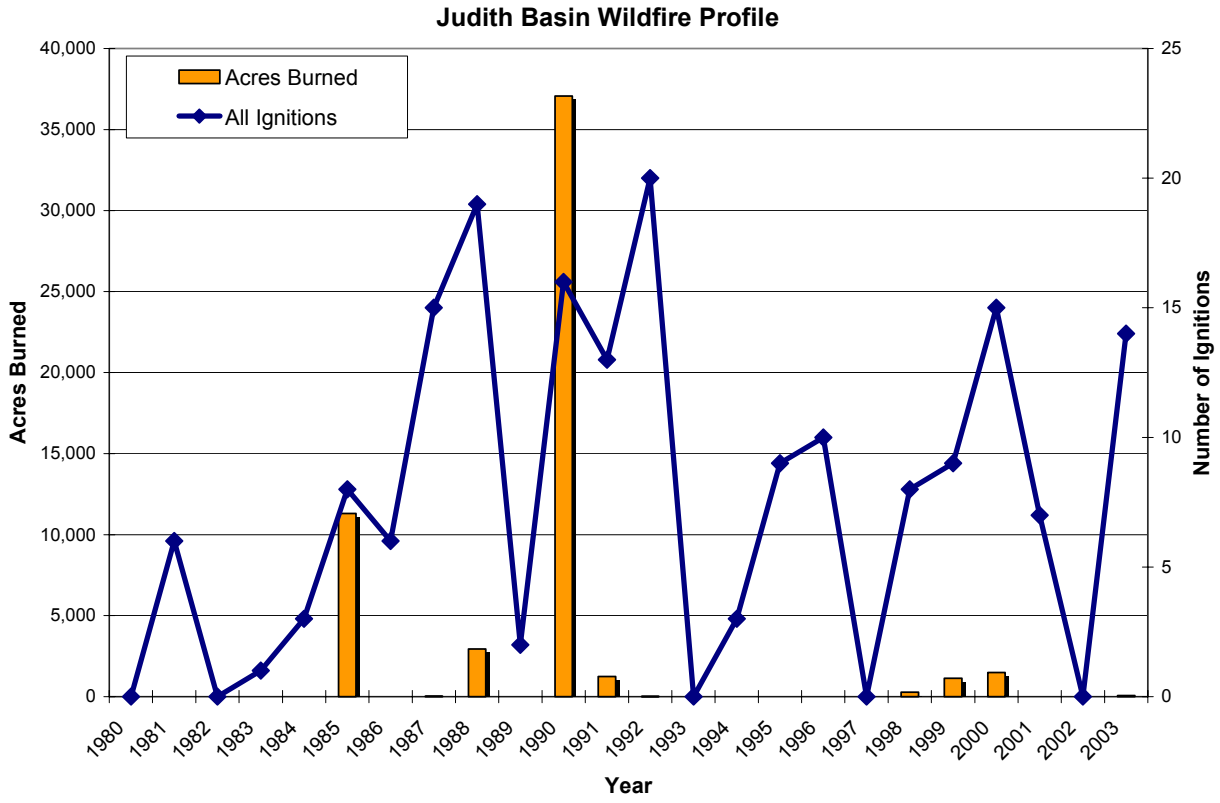
Table 3.14. US Forest Service record of past fire ignitions in Judith Basin County, Montana: 1940-2003

Cause[1]	Acres	Name[2]	Year
1	0.3	Kelly Mountain	2000
1	13.0	Stud Horse	2000
1	68.0	High Springs	2000
1	0.1	Deer PT #1	2001
1	0.1	Deer PT #2	2001
1	0.2	Gibson Peak	2001
1	0.1	Snag 1	2003
4	0.1	Bower	2003
1	0.1	Grendah Mountain	2003
1	0.1	Stiner Fire	2003
1	0.1	Yogo Peak	2003
1	0.1	Tucken	2003
1	0.2	Section 30	2003
1	0.2	Cabin Mountain	2003
1	0.3	Sink Hole	2003
1	0.3	South Game Range	2003
1	0.5	Bird Song	2003
1	0.5	Teepee Butte	2003
1	10.0	Rickard Coulee	2003
1	52.0	Burnt Ridge	2003

[1] See table 3.14 for cause codes.

[2] Some fires in this database may also be reported in Table 3.13.

Figure 3.1. Judith Basin County Wildfire Ignition and Extent Profile.



Since 1980, it would appear that roughly 64% of all fires in Judith Basin County have been ignited by nature, while the remaining 36%, on average have been human caused (including miscellaneous causes, Table 3.13, 3.14, 3.15). In comparison with the rest of Montana and the Western United States, this statistic would indicate that the rate of human caused ignitions is low in comparison with the average experienced in the rest of the region. There may be many factors contributing to this statistic, but the low population of the county, coupled with the agrarian economy and wildfire educated residents are all positive factors.

Table 3.15. Wildfire Ignitions by Cause in Judith Basin County by cause.

Cause	Cause Reference	1973-2003 Occurrence	1973-2003 Percent
Lightning	1	137	63.7%
Campfire	2	18	8.4%
Smoking	3	8	3.7%
Debris Burning	4	28	13.0%
Arson	5	13	6.0%
Equipment Use	6	4	1.9%
Railroad	7	4	1.9%
Children	8	0	0.0%
Miscellaneous	9	3	1.4%
Total		**215**	

Data provided by the Bureau of Land Management and the USDA Forest Service.

3.8.2 Regional Wildfire Profile

Across the North Central Montana Region, many fires have ignited and burned causing a loss of property and life. Data indicates that in this region, approximately 5,000 fires have burned an estimated 1.0 million acres (average 200 acres each, maximum 182,000 acres – Hill County Fire). Figure 3.2 demonstrates the periodicity of wildland fires in the region, while Table 3.15 documents the degree of nature caused versus human caused wildfires. It is important to understand that the percent of lightning caused fires is calculated based on the total number of fires in the region. Thus, if only a small number of human caused fires are totaled with a large number of nature caused fires, then the percent of lightning caused fires will be high. Conversely, if human caused wildfires are abundant, then the percent of wildfires caused by lightning will be low. Therefore, the observed 36% of total fires caused by lightning, and the 64% of human caused ignitions in the region demonstrates a very high number of human caused ignitions. In fact, the ratio between these two figures should be reversed, with human caused ignitions averaging only 30%, with lightning representing 70%.

Figure 3.2. Regional Wildfire Ignition and Extent Profile.

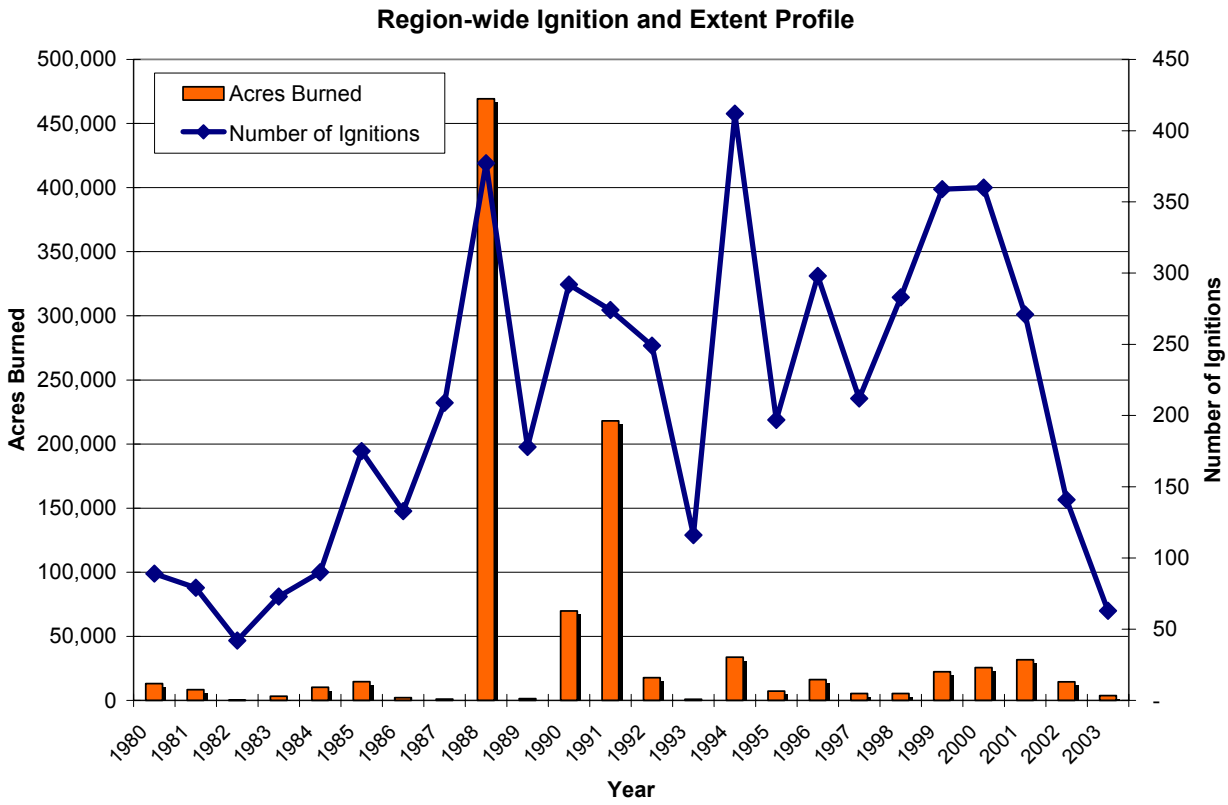


Table 3.16. Regional Summary of Wildfire Ignitions by Cause regionally.

Cause	Cause Reference	1980-2003 Occurrence	Percent
Lightning	1	1,814	36.3%
Campfire	2	271	5.4%
Smoking	3	241	4.8%
Debris Burning	4	742	14.9%
Arson	5	197	3.9%
Equipment Use	6	230	4.6%
Railroad	7	82	1.6%
Children	8	490	9.8%
Miscellaneous	9	929	18.6%
Total		**4,996**	

Across the west, wildfires have been increasing in extent and cost of control. The National Interagency Fire Center (2003) reports nearly 88,500 wildfires in 2002 burned a total of nearly 7 million acres and cost $1.6 billion (Table 3.17). By most informed accounts, the 2003 totals will be significantly higher in terms of acres burned and cost.

Table 3.17. National Fire Season 2002 Summary

Number of Fires (2002 final)	88,458
10-year Average (1992-2001)	103,112
Acres Burned (2002 final)	* **6,937,584**
10-year Average (1992-2001)	4,215,089
Structures Burned (835 primary residences, 46 Commercial buildings, 1500 outbuildings)	2,381
Estimated Cost of Fire Suppression (Federal agencies only)	$ 1.6 billion

- *This figure differs from the 7,184,712 acres burned estimate provided by the National Interagency Coordination Center (NICC). The NICC estimate is based on information contained in geographic area and incident situation reports prepared at the time fires occurred. The 6,937,584 estimate is based on agency end-of-year reports.*

The National Interagency Fire Center, located in Boise, Idaho, maintains records of fire costs, extent, and related data for the entire nation. Tables 3.18 and 3.19 summarize some of the relevant wildland fire data for the nation, and some trends that are likely to continue into the future unless targeted fire mitigation efforts are implemented and maintained in areas like Judith Basin County.

Table 3.18. Total Fires and Acres 1960 - 2002 Nationally

These figures are based on end-of-year reports compiled by all wildland fire agencies after each fire season, and are updated by March of each year. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, USDA Forest Service and all State Lands.

Year	Fires	Acres	Year	Fires	Acres
2002	88,458	* **6,937,584**	1980	234,892	5,260,825
2001	84,079	3,555,138	1979	163,196	2,986,826
2000	122,827	8,422,237	1978	218,842	3,910,913
1999	93,702	5,661,976	1977	173,998	3,152,644
1998	81,043	2,329,709	1976	241,699	5,109,926
1997	89,517	3,672,616	1975	134,872	1,791,327
1996	115,025	6,701,390	1974	145,868	2,879,095
1995	130,019	2,315,730	1973	117,957	1,915,273
1994	114,049	4,724,014	1972	124,554	2,641,166
1993	97,031	2,310,420	1971	108,398	4,278,472
1992	103,830	2,457,665	1970	121,736	3,278,565
1991	116,953	2,237,714	1969	113,351	6,689,081
1990	122,763	5,452,874	1968	125,371	4,231,996
1989	121,714	3,261,732	1967	125,025	4,658,586
1988	154,573	7,398,889	1966	122,500	4,574,389
1987	143,877	4,152,575	1965	113,684	2,652,112
1986	139,980	3,308,133	1964	116,358	4,197,309
1985	133,840	4,434,748	1963	164,183	7,120,768
1984	118,636	2,266,134	1962	115,345	4,078,894
1983	161,649	5,080,553	1961	98,517	3,036,219
1982	174,755	2,382,036	1960	103,387	4,478,188
1981	249,370	4,814,206			

(National Interagency Fire Center 2003)

Table 3.19. Suppression Costs for Federal Agencies Nationally

Year	Bureau of Land Management	Bureau of Indian Affairs	Fish and Wildlife Service	National Park Service	USDA Forest Service	Totals
1994	$98,417,000	$49,202,000	$3,281,000	$16,362,000	$678,000,000	**$845,262,000**
1995	$56,600,000	$36,219,000	$1,675,000	$21,256,000	$224,300,000	**$340,050,000**
1996	$96,854,000	$40,779,000	$2,600	$19,832,000	$521,700,000	**$679,167,600**
1997	$62,470,000	$30,916,000	$2,000	$6,844,000	$155,768,000	**$256,000,000**
1998	$63,177,000	$27,366,000	$3,800,000	$19,183,000	$215,000,000	**$328,526,000**
1999	$85,724,000	$42,183,000	$4,500,000	$30,061,000	$361,000,000	**$523,468,000**
2000	$180,567,000	$93,042,000	$9,417,000	$53,341,000	$1,026,000,000	**$1,362,367,000**
2001	$192,115,00	$63,200,000	$7,160,000	$48,092,000	$607,233,000	**$917,800,000**
2002	$204,666,000	$109,035,000	$15,245,000	$66,094,000	$1,266,274,000	**$1,661,314,000**

(National Interagency Fire Center 2003)

Although many very large fires, growing to over 250,000 acres have burned in Montana, actual fires in this county have usually been controlled at much smaller extents. This is not to imply that wildfires are not a concern in this county, but to point to the aggressive and professional manner to which the wildland and rural fire districts cooperate in controlling these blazes. The Rural Fire Districts of Judith Basin County provide primary wildfire protection in Judith Basin County in cooperation with the US Forest Service and with the Montana Department of Natural Resource Conservation assisting for wildfires that escape initial attack.

3.9 Analysis Tools and Techniques to Assess Fire Risk

Judith Basin County and the adjacent counties of Fergus and Petroleum Counties, were analyzed using a variety of techniques, managed on a GIS system (ArcGIS 8.2). Physical features of the region were represented by data layers including roads, streams, soils, elevation, and remotely sensed images from the Landsat 7 ETM+ satellite. Field visits were conducted by specialists from Northwest Management, Inc., and others. Discussions with area residents and fire control specialists augmented field visits and provided insights to forest health issues and treatment options.

This information was analyzed and combined to develop an assessment of wildland fire risk in the region.

3.9.1 Fire Prone Landscapes

Schlosser *et al.* 2002, developed a methodology to assess the location of fire prone landscapes on forested and non-forested ecosystems in the western US. Working under an agreement with the Clearwater Resource Conservation and Development Council, Inc., (RC&D), Northwest Management, Inc., a natural resources consulting firm, completed a similar assessment for five counties in the north central Idaho area including Clearwater County, Idaho County, Latah County, Lewis County, and Nez Perce County. In a separate project, also funded by the Bureau

of Land Management working in cooperation with Adams, Gem, Payette, Washington, and Valley Counties, through the West Central Highlands RC&D Area, Northwest Management, Inc., completed a Fire Prone Landscapes assessments on those listed areas. Additional assessments of Fire Prone Landscapes were completed simultaneously for Ada, Boise, Canyon, and Elmore Counties, working in cooperation with the Southwestern Idaho RC&D located in Meridian, Idaho.

The goal of developing the Fire Prone Landscapes analysis is to make inferences about the relative risk factors across large geographical regions (multiple counties) for wildfire spread. This analysis uses the extent and occurrence of past fires as an indicator of characteristics for a specific area and their propensity to burn in the future. Concisely, if a certain combination of vegetation cover type, canopy closure, aspect, slope, stream and road density have burned with a high occurrence and frequently in the past, then it is reasonable to extrapolate that they will have the same tendency in the future, unless mitigation activities are conducted to reduce this potential.

The analysis for determining those landscapes prone to wildfire utilized a variety of sources.

Digital Elevation: Digital elevation models (DEM) for the project used USGS 30 meter DEM data provided at quarter-quadrangle extents. These were merged together to create a continuous elevation model of the analysis area.

The merged DEM file was used to create two derivative data layers; aspect and slope. Both were created using the spatial analyst extension in ArcGIS 8.2. Aspect data values retained one decimal point accuracy representing the cardinal direction of direct solar radiation, represented in degrees. Slope was recorded in percent and also retained one decimal point accuracy.

Remotely Sensed Images: Landsat 7 Enhanced Thematic Mapper (ETM+) images were used to assess plant cover information and percent of canopy cover. The Landsat ETM+ instrument is an eight-band multi-spectral scanning radiometer capable of providing high-resolution image information of the Earth's surface. It detects spectrally-filtered radiation at visible, near-infrared, short-wave, and thermal infrared frequency bands from the sun-lit Earth. Nominal ground sample distances or "pixel" sizes are 15 meters in the panchromatic band; 30 meters in the 6 visible, near and short-wave infrared bands; and 60 meters in the thermal infrared band.

The satellite orbits the Earth at an altitude of approximately 705 kilometers with a sun-synchronous 98-degree inclination and a descending equatorial crossing time of 10 a.m. daily.

Image spectrometry has great application for monitoring vegetation and biophysical characteristics. Vegetation reflectance often contains information on the vegetation chlorophyll absorption bands in the visible region and the near infrared region. Plant water absorption is easily identified in the middle infrared bands. In addition, exposed soil, rock, and non-vegetative surfaces are easily separated from vegetation through standard hyper-spectral analysis procedures.

Landsat 7 ETM images were obtained to conduct hyper-spectral analysis for this project. The image was obtained in 1998. Hyper-spectral analysis procedures followed the conventions used by the Idaho Vegetation and Land Cover Classification System, modified from Redmond (1997) and Homer (1998).

Riparian Zones: Riparian zones were derived from stream layers.

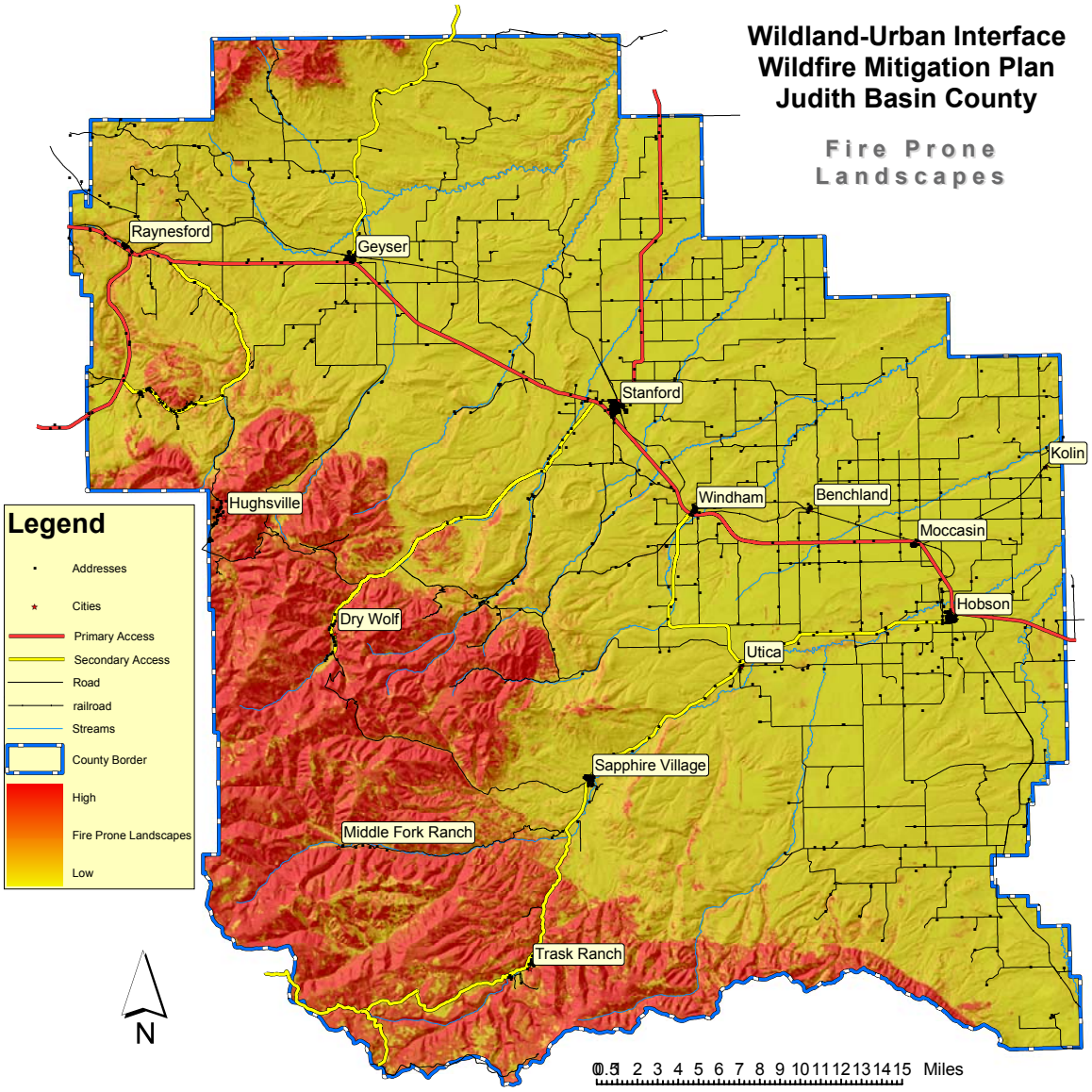
Wind Direction: Wind direction and speed data detailed by monthly averages was used in this project to better ascertain certain fire behavior characteristics common to large fire events. These data are spatially gridded Average Monthly Wind Directions in Montana. The coverage

was created from data summarized from the Interior Columbia Basin Ecosystem Management Project (Quigley *et al.* 2001).

Past Fires: Past fire extents represent those locations on the landscape that have previously burned during a wildfire. Past fire extent maps were obtained from a variety of sources for the central Idaho area including the USFS Panhandle National Forest and the Montana Department of Natural Resources and Conservation.

Fire Prone Landscapes: Using the methodology developed by Schlosser *et al.* (2002), and refined for this project, the factors detailed above were used to assess the potential for the landscape to burn during the fire season in the case of fire ignition. Specifically, the entire region was evaluated at a resolution of 30 meters (meaning each pixel on the screen represented a 30 meter square on the ground) to determine the propensity for a particular area (pixel) to burn in the case of a wildfire. The analysis involved creating a linear regression analysis within the GIS program structure to assign a value to each significant variable, pixel-by-pixel. The analysis ranked factors from 0 (little to no risk) to 100 (extremely high risk) based on past fire occurrence. In fact, the maximum rating score for Judith Basin County was 93 with a low of 3.

Figure 3.3. Fire Prone Landscapes in Judith Basin County, Montana.



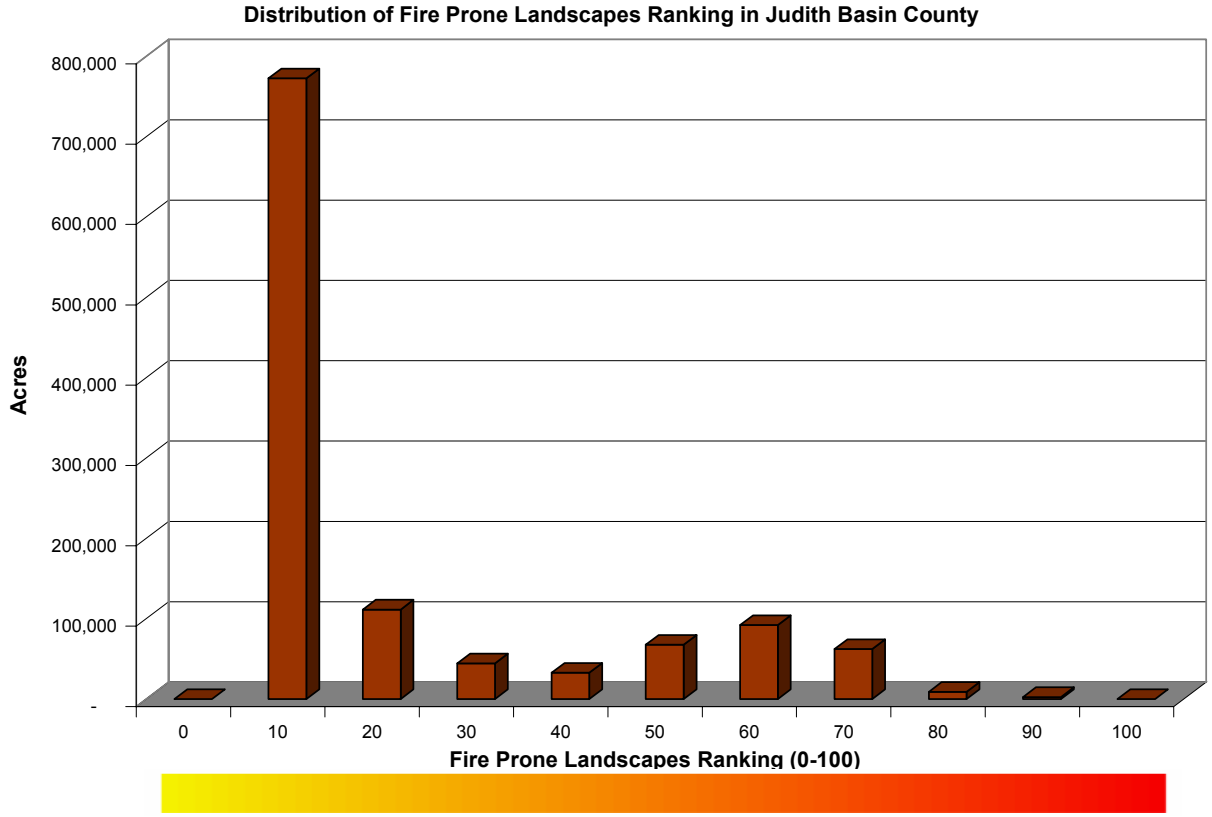
This map is presented for reference in this section of the plan. This map, and additional maps are detailed in Appendix I.

The maps depicting these risk categories display yellow as the lowest risk and red as the highest with values between a constant gradient from yellow to orange to red (Table 3.20). While large maps (16 square feet) have been provided as part of this analysis, smaller size maps are presented in Appendix I.

Table 3.20. Fire Prone Landscape rankings and associated acres in each category for Judith Basin County.

Color Code	Value	Total	Percent of Total Area
	0	-	0.0%
	10	772,813	64.6%
	20	111,543	9.3%
	30	44,527	3.7%
	40	32,843	2.7%
	50	67,728	5.7%
	60	92,248	7.7%
	70	62,282	5.2%
	80	9,126	0.8%
	90	2,507	0.2%
	100	2	0.0%

Figure 3.4: Distribution of area by Fire Prone Landscape Class.



The risk category values developed in this analysis should be considered **ordinal data**, that is, while the values presented have a meaningful ranking, they neither have a true zero point nor scale between numbers. Rating in the “40” range is not necessarily twice as “risky” as rating in the “20” range. These category values also do not correspond to a rate of fire spread, a fuel loading indicator, or measurable potential fire intensity. Each of those scales is greatly influenced by weather, seasonal and daily variations in moisture (relative humidity), solar

radiation, and other factors. The risk rating presented here serves to identify where certain constant variables are present, aiding in identifying where fires typically spread into the largest fires across the landscape.

3.9.2 Fire Regime Condition Class

The US Forest Service has provided their assessment of Fire Regime Condition Class Judith Basin County to this WUI Fire Mitigation Plan analysis. These measures of forest conditions are the standard method of analysis for the USDA Forest Service.

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse scale definitions for natural (historical) fire regimes have been developed by Hardy *et al.* (2001) and Schmidt *et al.* (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

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

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

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

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

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

As scale of application becomes finer these five classes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained.

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy *et al.* (2001) and Schmidt *et al.* (2001) (FRCC). They include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and diseased mortality, grazing, and drought). There are no wildland vegetation and fuel conditions or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime (Hann and Bunnell 2001, Hardy *et al.* 2001, Schmidt *et al.* 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g. weeds, insects, and diseases), "high graded" forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire. Determination of the amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the fire regime condition class. A simplified description of the fire regime condition classes and associated potential risks are presented in Table 3.21. Maps depicting Fire Regime and Condition Class are presented in Appendix I.

Table 3.21. Fire Regime Condition Class Definitions.

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

The analyses of Fire Regime Condition Class in Judith Basin County shows that approximately 17% of the County is in Condition Class 1 (low departure), just about 53% is in Condition Class 2 (moderate departure), with the remaining 5% of the area is in Condition Class 3 (Table 3.22).

Table 3.22. FRCC by area in Judith Basin County.

	Condition Class	Acres	Percent of Area
1	low departure	198,266	16.6%
2	moderate departure	27,139	2.3%
3	high departure	55,329	4.6%
4	moderate grass/shrub	604,281	50.5%
8	agriculture	294,778	24.6%
9	rock/barren	14,166	1.2%
10	urban	723	0.1%
11	water	1,133	0.1%
12	snow/ice	80	0.0%
13	no information	196	0.0%

See Appendix I for maps of Fire Regime Conditions Class.

3.9.3 Predicted Fire Severity

Current fire severity (CFS) is an estimate of the relative fire severity if a fire were to burn a site under its current state of vegetation. In other words, how much of the overstory would be removed if a fire were to burn today. The US Forest Service (Flathead National Forest) did not attempt to model absolute values of fire severity, as there are too many variables that influence fire effects at any given time (for example, temperature, humidity, fuel moisture, slope, wind speed, wind direction).

The characterization of likely fire severity was based upon historic fire regimes, potential natural vegetation, cover type, size class, and canopy cover with respect to slope and aspect. Each cover type was assigned a qualitative rating of fire tolerance based upon likely species composition and the relative resistance of each species to fire. The US Forest Service researchers defined 3 broad classes of fire tolerance: high tolerance (<20 percent post-fire mortality); moderate tolerance (20 to 80 percent mortality); and low tolerance (>80 percent mortality). We would expect that fires would be less severe within cover types comprised by species that have a high tolerance to fire (for example, western larch and ponderosa pine). Conversely, fires would likely burn more severely within cover types comprised by species having a low tolerance to fire (for example grand fir, subalpine fir). Data assignments were based upon our collective experience in the field, as well as stand structure characteristics reported in the fire-history literature. For example, if they estimated that a fire would remove less than 20 percent of the overstory, the current fire severity would be assigned to the non-lethal class (that is, NL). However, if they expected fire to remove more than 80 percent of the overstory, the current fire severity was assigned to a stand replacement class (that is, SR or SR3).

3.9.3.1 Purpose

Fire is a dominant disturbance process in the Northern Rockies. The likely effect of fire upon vegetation (i.e., current fire severity) is critical information for understanding the subsequent fire effects upon wildlife habitats, water quality, and the timing of runoff. There have been many reports of how fire suppression and timber harvest has affected vegetation patterns, fuels, and fire behavior. The US Forest Service researchers from the Flathead National Forest, derived the current fire severity theme explicitly to compare with the historical fire regime theme to evaluate

how fire severity has changed since Euro-American settlement (that is, to derive fire-regime condition class).

3.9.3.2 General Limitations

These data were designed to characterize broad scale patterns of estimated fire severity for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:100,000. Although the resolution of the CFS theme is 90 meter cell size, the expected accuracy does not warrant their use for analyses of areas smaller than about 10,000 acres (for example, assessments that typically require 1:24,000 data).

Current fire severity rule-set was developed for an "average burn day" for the specific vegetation types in our area. Any user of these data should familiarize themselves with the rule sets to better understand our estimate of current fire severity.

Table 3.23. Predicted Fire Severity by area in Judith Basin County.

Predicted Fire Severity		Acres	Percent of Area
1	non-lethal	5,795.39	0.5%
2	mixed severity, short interval	39,160.17	3.3%
3	mixed severity, long interval	76,474.68	6.4%
4	mixed severity, high elevation	6,022.45	0.5%
5	stand replacement, forest	153,281.84	12.8%
7	stand replacement, nonforest	604,281.37	50.5%
8	agriculture	294,778.08	24.6%
9	rock/barren	14,166.33	1.2%
10	urban	722.56	0.1%
11	water	1,132.88	0.1%
12	snow/ice	80.06	0.0%
13	no information	196.15	0.0%

See Appendix I for a map of Predicted Fire Severity.

3.9.4 On-Site Evaluations

Fire control and evaluation specialists as well as hazard mitigation consultants evaluated the communities of Judith Basin County to determine, first-hand, the extent of risk and characteristics of hazardous fuels in the Wildland-Urban Interface. The on-site evaluations have been summarized in written narratives and are accompanied by photographs taken during the site visits. These evaluations included the estimation of fuel models as established by Anderson (1982). These fuel models are described in the following section of this document.

In addition, field personnel completed FEMA's Fire Hazard Severity Forms and Fire Hazard Rating Criteria Worksheets. These worksheets and standardized rating criteria allow comparisons to be made between all of the counties in the country using the same benchmarks. The FEMA rating forms are summarized for each community in Appendix II.

3.9.5 Fuel Model Descriptions

Anderson (1982) developed a categorical guide for determining fuel models to facilitate the linkage between fuels and fire behavior. These 13 fuel models, grouped into 4 basic groups:

grass, chaparral and shrub, timber, and slash, provide the basis for communicating fuel conditions and evaluating fire risk. There are a number of ways to estimate fuel models in forest and rangeland conditions. The field personnel from Northwest Management, Inc., that evaluated communities and other areas of Judith Basin County have all been intricately involved in wildland fire fighting and the incident command system. They made ocular estimates of fuel models they observed. In an intense evaluation, actual sampling would have been employed to determine fuel models and fuel loading. The estimations presented in this document (Chapter 3) are estimates based on observations to better understand the conditions observed.

Fuel Model 0- This type consists of non-flammable sites, such as exposed mineral soil and rock outcrops. Other lands are also identified in this type.

3.9.5.1 Grass Group

3.9.5.1.1 Fire Behavior Fuel Model 1

Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area.

Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations that met the above area constraint. Annual and perennial grasses are included in this fuel model.

This fuel model correlates to 1978 NFDRS fuel models A, L, and S.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and alive, tons/acre 0.74
Dead fuel load, ¼-inch, tons/acre 0.74
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 1.0

3.9.5.1.2 Fire Behavior Fuel Model 2

Fire is spread primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and dead-down stemwood from the open shrub or timber overstory, contribute to the fire intensity. Open shrub lands and pine stands or scrub oak stands that cover one-third to two-thirds of the area may generally fit this model; such stands may include clumps of fuels that generate higher intensities and that may produce firebrands. Some pinyon-juniper may be in this model.

This fuel model correlates to 1978 NFDRS fuel models C and T.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and alive, tons/acre 4.0
Dead fuel load, ¼-inch, tons/acre 2.0
Live fuel load, foliage, tons/acre 0.5
Fuel bed depth, feet 1.0

3.9.5.1.3 Fire Behavior Fuel Model 3

Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water. Stands are tall, averaging about 3 feet (1 m), but considerable variation may occur. Approximately one-third or more of the stand is considered dead or cured and maintains the fire. Wild or cultivated grains that have not been harvested can be considered similar to tall prairie and marshland grasses.

This fuel correlates to 1978 NFDRS fuel model N.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre 3.0
Dead fuel load, ¼-inch, tons/acre 3.0
Live fuel load, foliage tons/acre 0
Fuel bed depth, feet 2.5

3.9.5.2 Shrub Group

3.9.5.2.1 Fire Behavior Fuel Model 4

Fire intensity and fast-spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, 6 or more feet tall, such as California mixed chaparral, the high pocosin along the east coast, the pinebarrens of New Jersey, or the closed jack pine stands of the north-central States are typical candidates. Besides flammable foliage, dead woody material in the stands significantly contributes to the fire intensity. Height of stand qualifying for this model depends on local conditions. A deep litter layer may also hamper suppression efforts.

This fuel model represents 1978 NFDRS fuel models B and O; fire behavior estimates are more severe than obtained by Models B or O.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch dead and live, tons/acre 13.0
Dead fuel load, ¼-inch, tons/acre 5.0
Live fuel load, foliage, tons/acre 5.0
Fuel bed depth, feet 6.0

3.9.5.2.2 Fire Behavior Fuel Model 5

Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood would qualify: laurel, vine maple, alder, or even chaparral, manzanita, or chamise.

No 1978 NFDRS fuel model is represented, but model 5 can be considered as second choice for NFDRS model D or as third choice for NFDRS model T. Young green stands may be up to 6 feet (2m) high but have poor burning properties because of live vegetation.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch dead and live, tons/acre 3.5
Dead fuel load, ¼-inch, tons/acre 1.0
Live fuel load, foliage, tons/acre 2.0
Fuel bed depth, feet 2.0

3.9.5.2.3 Fire Behavior Fuel Model 6

Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but this requires moderate winds, greater than 8 mi/h (13 km/h) at mid-flame height. Fire will drop to the ground at low wind speeds or at openings in the stand. The shrubs are older, but not as tall as shrub types of model 4, nor do they contain as much fuel as model 4. A broad range of shrub conditions is covered by this model. Fuel situations to be considered include intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan spruce taiga, and shrub tundra. Even hardwood slash that has cured can be considered. Pinyon-juniper shrublands may be represented but may over-predict rate of spread except at high winds, like 20 mi/h (32 km/h) at the 20-foot level.

The 1978 NFDRS fuel models F and Q are represented by this fuel model. It can be considered a second choice for models T and D and a third choice for model S.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch dead and live, tons/acres..... 6.0
Dead fuel load, 1/4 –inch, tons/acre 1.5
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 2.5

3.9.5.2.4 Fire Behavior Fuel Model 7

Fires burn through the surface and shrub strata with equal ease and can occur at higher dead fuel moisture contents because of the flammability of live foliage and other live material. Stands of shrubs are generally between 2 and 6 feet (0.6 and 1.8 m) high. Palmetto-gallberry understory-pine overstory sites are typical and low pocosins may be represented. Black spruce-shrub combinations in Alaska may also be represented.

This fuel model correlates with 1978 NFDRS model D and can be a second choice for model Q.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch dead and live, tons/acre 4.9
Dead fuel load, ¼-inch, tons/acre 1.1
Live fuel load, foliage, tons/acre 0.4
Fuel bed depth, feet 2.5

3.9.5.3 Timber Group

3.9.5.3.1 Fire Behavior Fuel Model 8

Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humilities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have

leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Representative conifer types are white pine, and lodgepole pine, spruce, fir and larch

This model can be used for 1978 NFDRS fuel models H and R.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch, dead and live, tons/acre 5.0
Dead fuel load, ¼-inch, tons/acre 1.5
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 0.2

3.9.5.3.2 Fire Behavior Fuel Model 9

Fires run through the surface litter faster than model 8 and have longer flame height. Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves. Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines, or southern pine plantations are grouped in this model. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning.

NFDRS fuel models E, P, and U are represented by this model. It is also a second choice for models C and S.

Fuel model values for estimating fire behavior

Total fuel load, <3-inch dead and live, tons/acre 3.5
Dead fuel load, ¼-inch, tons/acre 2.9
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 0.2

3.9.5.3.3 Fire Behavior Fuel Model 10

The fires burn in the surface and ground fuels with greater fire intensity than the other timber little models. Dead-down fuels include greater quantities of 3-inch (7.6 cm) or larger limbwood, resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties. Any forest type may be considered if heavy down material is present; examples are insect- or disease-ridden stands, wind-thrown stands, overmature situations with dead fall, and aged light thinning or partial-cut slash.

The 1978 NFDRS fuel model G is represented.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre 12.0
Dead fuel load, ¼-inch, tons/acre 3.0
Live fuel load, foliage, tons/acre 2.0
Fuel bed depth, feet 1.0

The fire intensities and spread rates of these timber litter fuel models are indicated by the following values when the dead fuel moisture content is 8 percent, live fuel moisture is 100 percent, and the effective windspeed at mid-flame height is 5 mi/h (8 km/h):

Table 3.24. Comparative Fire Intensities and Rates of Spread in Timber Fuel Models.

Fuel Model	Rate of Spread Chains/hour	Flame length Feet
8	1.6	1.0
9	7.5	2.6
10	7.9	4.8

Fires such as above in model 10 are at the upper limit of control by direct attack. More wind or drier conditions could lead to an escaped fire.

3.9.5.4 Logging Slash Group

3.9.5.4.1 Fire Behavior Fuel Model 11

Fires are fairly active in the slash and herbaceous material intermixed with the slash. The spacing of the rather light fuel load, shading from overstory, or the aging of the fine fuels can contribute to limiting the fire potential. Light partial cuts or thinning operations in mixed conifer stands, hardwood stands, and southern pine harvests are considered. Clearcut operations generally produce more slash than represented here. The less-than-3-inch (7.6-cm) material load is less than 12 tons per acre (5.4 t/ha). The greater-than-3-inch (7.6-cm) is represented by not more than 10 pieces, 4 inches (10.2 cm) in diameter, along a 50-foot (15 m) transect.

The 1978 NFDRS fuel model K is represented by this model.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch, dead and live, tons/acre 11.5
Dead fuel load, ¼-inch, tons/acre 1.5
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 1.0

3.9.5.4.2 Fire Behavior Fuel Model 12

Rapidly spreading fires with high intensities capable of generating firebrands can occur. When fire starts, it is generally sustained until a fuel break or change in fuels is encountered. The visual impression is dominated by slash and much of it is less than 3 inches (7.6 cm) in diameter. The fuels total less than 35 tons per acres (15.6 t/ha) and seem well distributed. Heavily thinned conifer stands, clearcuts, and medium or heavy partial cuts are represented. The material larger than 3 inches (7.6 cm) is represented by encountering 11 pieces, 6 inches (15.3 cm) in diameter, along a 50-foot (15-m) transect.

This model depicts 1978 NFDRS model J and may overrate slash areas when the needles have dropped and the limbwood has settled. However, in areas where limbwood breakup and general weathering have started, the fire potential can increase.

Fuel model values fore estimating fire behavior

Total fuel load, < 3-inch, dead and live, tons/acre 34.6
Dead fuel load, ¼-inch, tons/acre 4.0
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 2.3

3.9.5.4.3 Fire Behavior Fuel Model 13

Fire is generally carried across the area by a continuous layer of slash. Large quantities of material larger than 3 inches (7.6 cm) are present. Fires spread quickly through the fine fuels and intensity builds up more slowly as the large fuels start burning. Active flaming is sustained for long periods and a wide variety of firebrands can be generated. These contribute to spotting problems as the weather conditions become more severe. Clearcuts and heavy partial-cuts in mature and overmature stands are depicted where the slash load is dominated by the greater than-3-inch (7.6 cm) diameter material. The total load may exceed 200 tons per acre (89.2 t/ha) but fuel less than 3 inches (7.6 cm is generally only 10 percent of the total load. Situations where the slash still has "red' needles attached but the total load is lighter, more like model 12, can be represented because of the earlier high intensity and quicker area involvement.

The 1978 NFDRS fuel model I is represented. Areas most commonly fitting his model are old-growth stands west of the Cascade and Sierra Nevada Mountains. More efficient utilization standards are decreasing the amount of large material left in the field.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre 58.1
Dead fuel load, ¼-inch, tons/acre 7.0
Live fuel load, foliage, tons/acre 0
Fuel bed depth, feet 3.0

For other slash situations:

Hardwood slash .....Model 6
Heavy "red" slash.....Model 4
Overgrown slash .....Model 10
Southern pine clearcut slash.....Model 12

The comparative rates of spread and flame lengths for the slash models at 8 percent dead fuel moisture content and a 5 mi/h (8 km/h) mid-flame wind are presented in Table 3.25.

Table 3.25. Comparative Fire Intensities and Rates of Spread in Slash Fuel Models.

Fuel Model	Rate of Spread Chains/hour	Flame length Feet
11	6.0	3.5
12	13.0	8.0
13	13.5	10.5

3.10 Wildland-Urban Interface

3.10.1 People and Structures

A key component in meeting the underlying need is the protection and treatment of fire hazard in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments, or where forest fuels meet urban fuels (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes and fuels that lead directly to a risk to urban developments. Reducing the fire hazard in the wildland urban interface requires the efforts of

federal, state, local agencies, and private individuals (Norton 2002). “The role of [most] federal agencies in the wildland urban interface includes wildland fire fighting, hazard fuels reduction, cooperative prevention and education and technical experience. Structural fire protection [during a wildfire] in the wildland urban interface is [largely] the responsibility of Tribal, state, and local governments” (USFS 2001). Property owners share a responsibility to protect their residences and businesses and minimize fire danger by creating defensible areas around them and taking other measures to minimize the fire risks to their structures (USFS 2001). With treatment, a wildland-urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities. In addition, a wildland urban interface that is properly thinned will be less likely to sustain a crown fire that enters or originates within it (Norton 2002).

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing defensible space, landowners would protect the wildland-urban interface, the biological resources of the management area, and adjacent property owners by:

- minimizing the potential of high-severity ground or crown fires entering or leaving the area;
- reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior (McCoy *et al.* 2001 as cited in Norton 2002);
- improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Four wildland/urban conditions have been identified for use in the wildland urban interface (Norton 2002). These include the Interface Condition, Intermix Condition, Occluded Condition, and Rural Condition. Descriptions of each are as follows:

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;
- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation, the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres;
- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size; and
- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.

The location of structures in Judith Basin County have been mapped and are presented on a variety of maps in this analysis document; specifically in Appendix I. The location of all structures was determined by examining two sets of remotely sensed images. The more detailed information was garnered from digital ortho-photos at a resolution of 1 meter (from 1998). For those areas not covered by the 1 meter DOQQ images, SPOT satellite imagery at a resolution of 10 meters was used (from 2002). These records were augmented with data

collected on hand-held GPS receivers to record the location of structures, especially in areas where new housing developments were seen.

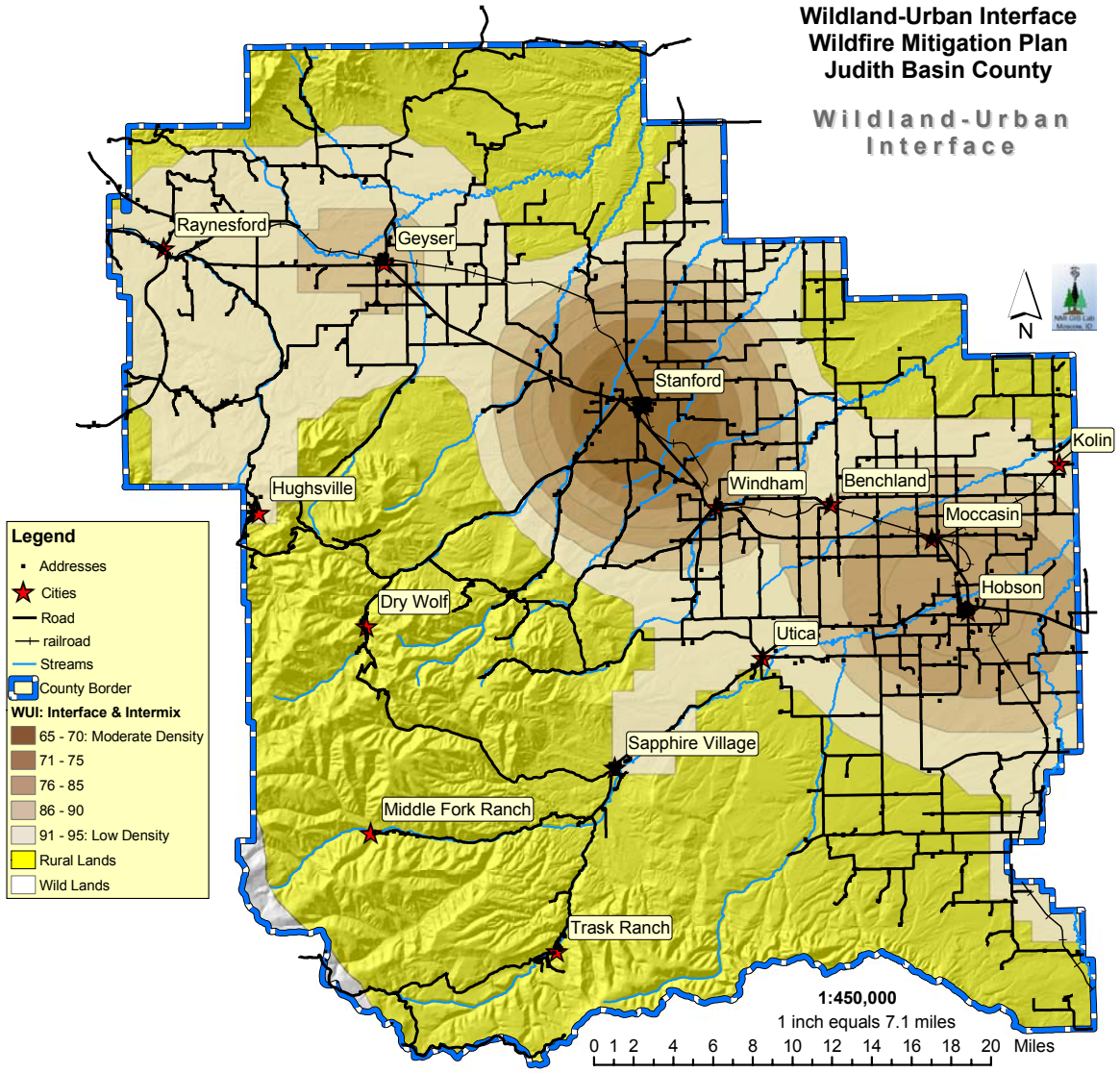
All structures are represented by a “dot” on the map. No differentiation is made between a garage and a home, or a business and a storage building. The density of structures and their specific locations in this management area are critical in defining where the potential exists for casualty loss in the event of a wildfire in the region.

By evaluating this structure density, we can define WUI areas on maps by using mathematical formulae and population density indexes to define the WUI based on where structures are located. The resulting population density indexes create concentric circles showing high density areas of Interface and Intermix WUI, as well as Rural WUI (as defined by Secretary Norton of the Department of Interior). This portion of the analysis allows us to “see” where the highest concentrations of structures are located in reference to high risk landscapes, limiting infrastructure, and other points of concern.

It is critical to understand that in the protection of people, structures, infrastructure, and unique ecosystems, this portion of the analysis only serves to identify structures and by some extension the people that inhabit them. It does not define the location of infrastructure and unique ecosystems. Other analysis tools will be used for those items.

The WUI interface areas as defined here are presented in map form in Appendix I.

Figure 3.5. Wildland-Urban Interface of Judith Basin County, Montana.



This map is presented for reference in this section of the plan. This map and additional maps are detailed in Appendix I.

3.10.2 Infrastructure

Judith Basin County has both significant infrastructure and unique ecosystems within its boundaries. Of note for this WUI Fire Mitigation Plan is the existence of highway routes (eg., State Highways 200 and 244), oil fields, and the presence of power lines supplying surrounding counties. These resources will be considered in the protection of infrastructural resources for Judith Basin County and to the larger extent of this region, and the rest of Montana.

High Tension Power Lines have been mapped and are presented in Appendix I. Protection of these lines from loss during a wildfire is paramount in as much as the electrical power they provide serves not only the communities of Judith Basin County but of surrounding counties. The protection of these lines allows for community sustainability, support of the economic viability of Judith Basin County, and the protection of people who rely on that power. Fuels

mitigation under power lines has received considerable attention in forested ecosystems as timber is thinned and heavy accumulations of brush are managed. This practice should be mandated into the future. However, the importance of management of rangeland ecosystems under high tension power lines should not be overlooked. Brush intermixed with grasses and other species, during extreme fire weather events, coupled with steep slopes can produce considerable heat and particulate matter. When this occurs under power lines, the result can be arcing between lines and even failure of the electrical media itself. Fuel mitigation treatments in high risk areas, especially where multiple lines are co-located, will be recommended for treatments.

3.10.3 Ecosystems

Judith Basin County is a diverse ecosystem with a complex array of vegetation, wildlife, and fisheries that have developed with, and adapted to fire as a natural disturbance process. A century of wildland fire suppression coupled with past land-use practices (primarily livestock grazing) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, forests and rangelands in Judith Basin County have become more susceptible to large-scale, high intensity fires posing a threat to life, property, and natural resources including wildlife and special status plant populations and habitats. High-intensity, stand-replacing fires have the potential to seriously damage soils and native vegetation. In addition, an increase in the number of large high intensity fires throughout the nation's forest and rangelands, has resulted in significant safety risks to firefighters and higher costs for fire suppression (House of Representatives, Committee on Agriculture, Washington, DC, 1997).

3.11 Soils

Our soil resource is an extremely important component for maintaining a healthy ecosystem and economy. Fire can play an intricate role in this process, if it occurs under normal conditions of light fuels associated with low intensity underburns. However, the buildup of fuels and consequent high severity fires can cause soils to become water repellent (hydrophobic), and thus greatly increases the potential for overland flow during intense rains. Soil in degraded conditions does not function normally, and will not be able to sustain water quality, water yield, or plant communities that have normal structure, composition, and function. Fire is also strongly correlated with the carbon-nutrient cycles and the hydrologic cycle. Fire frequency, extent, and severity are controlled to a large degree by the availability of carbon, as well as the moisture regime (Quigley & Arbelbide 1997).

Soils were evaluated for their propensity to become hydrophobic during and after a fire as evidenced by the presence of clay and clay derivatives (e.g., clay loam, cobbly clay) in the upper soil layers. In addition, their permeability and tendency to allow runoff to infiltrate the soil rapidly was evaluated. In general, with notable exceptions, the majority of the area within Judith Basin County has high clay content in the surface horizons. The A and C horizons are predominately clay loam with underlying shale. On average these soils are well drained with moderate permeability. Forested areas have somewhat more developed soils. These areas are characterized by a thin O horizon made up of decomposing forest litter underlain by cobbly silty clay loam.

Low to moderate intensity fires would not be expected to damage soil characteristics in the region, especially if the hotter fires in this range were limited to small extents associated with jackpots of cured fuels. Hot fires providing intense heat to the C horizon substrate depth have the potential to create hydrophobic characteristics in that layer. This can result in increased

overland flow during heavy rains, following wildfire events, potentially leading to mass wasting. Rocky and gravelly characteristics in the A horizon layer would be expected to be displaced, while the silty and loamy fines in these soils may experience an erosion and displacement potential. These soils will experience the greatest potential impacts resulting from hot fires that burn for prolonged periods (especially on steep slopes).

3.11.1 Fire Mitigation Practices to Maintain Soil Processes

Firelines constructed by hand or with the use of machinery will have varying impacts, depending upon construction techniques. If only the surface litter is removed in the fireline construction, minor increases to soil erosion may occur. If trenches are dug which channelize runoff down steep slopes, heavy rilling or gullying could occur depending upon rock content of surface layers exposed. Jackpot burning and, to a greater extent, pile burning would result in greater soil heating and localized impacts. Loss of soil carbon, nitrogen, sulphur, phosphorus, potassium, and soil organisms would be high in the soil surface layer. Soil physical structure could be altered thereby creating hydrophobic soils, especially where clay content is moderate or high.

Indirect effects of prescribed burning to slope stability are highly variable in the soil types found in Judith Basin County. Vegetation structure, including root strength after over burning, is maintained from three to fifteen years following low to moderate intensity burns and therefore soil saturation potential is not greatly altered. Re-vegetation of burned areas within this time frame will be a critical component to maintaining soil resources and pre-empting noxious weeds and invasive species from occupying the site. Locale experiencing high intensity burns will need to be evaluated immediately for mechanical erosion control followed by re-vegetation efforts. Holding soils in place will be a difficult challenge in many locations, especially on moderate to steep slopes.

Where heavy grazing has occurred in the past, there is also a possibility that soil productivity has been reduced. This is especially true in riparian areas where animal concentrations have historically been the greatest. These areas generally have easily compacted soils, and are where cattle tend to linger if not managed well. Mining also has significant effects on soil quality through soil compaction and mass displacement. Grazing across Judith Basin County was observed to be maintained in a sustainable manner without the overgrazing found in other areas of the region.

Severe fires in the past have consumed surface organics and volatilized nitrogen into the air. On some sites, however, these severe burns are a natural process, and therefore the inherent soil productivity may not be reduced. On other sites, however, where low intensity underburns typically occurred, high intensity wildland fires have consumed amounts of soil organics in excess of the historic patterns. Furthermore, excessive soil heating in these intense fires likely resulted in creation of water repellent soils, and therefore increased overland flow and soil erosion. In these cases, it can be assumed that wildland fires have reduced long-term soil productivity. Soil compaction damage typically is persistent in the area; several decades of rest from further compactive forces are needed until adequate soil recovery occurs. Loss of organics due to displacement and severe fire also requires decades to recuperate. This slow recovery from soil damage makes cumulative effects to soil productivity and soil hydrologic function a major concern.

To avoid potential impacts, wherever possible firelines should be located outside of highly erosive areas, steep slopes, intermittent streams, and riparian and other sensitive areas. Following prescribed fire or fire suppression activities, firelines should be rehabilitated.

3.12 Hydrology

The Montana Department of Natural Resources and Conservation Water Resources Division is charged with the development of the Montana State Ground Water Plan. Included in the Plan is the statewide water policy plan along with detailed subsections regarding the protection, education, and remediation of Montana's ground water resources. The Montana DNRC Water Resources Division has prepared Surface Water Supply Index Maps for all of the surface water systems in Montana. This agency also addresses statewide floodplain management, streamflow conditions, and dams and canals, and water rights issues.

The geology and soils of this region lead to slow to moderate moisture infiltration. Soils that have a clay pan or clay layer near the surface inhibit downward water transmission; thus, have a high potential for overland flow. Clay soils also have a high shrink swell potential. Disrupted vegetation patterns from logging or agriculture (soil compaction) and wildland fire (especially hot fires that increase soil hydrophobic characteristics), can lead to increased surface runoff and debris flow to stream channels.

A correlation to mass wasting due to the removal of vegetation caused by high intensity wildland fire has been documented for the central Montana region. Burned vegetation can result in changes in soil moisture and loss of rooting strength that can result in slope instability, especially on slopes greater than 30%. The greatest watershed impacts from increased sediment will be in the lower gradient, depositional stream reaches.

3.12.1 Fire Mitigation Practices to Maintain Hydrologic Processes

The effects of wildland fire and prescribed burning on water quality are variable. The removal of the vegetative canopy will tend to reduce transpiration and increase water yield, especially during the growing season and immediately afterwards (MacDonald *et al.* 1991). Prescribed burning is used to maintain a healthy, dynamic ecosystem while meeting land management objectives. Prescribed burning objectives include reduction of natural fuels, assuring current and future habitat conditions for native plants and animals, improvement of forest health, and enhancement, protection, and maintenance of old growth and riparian areas. The majority of the burned areas are expected to receive a low intensity ground fires with some areas of moderate intensity. This may include occasional torching of single trees or larger clumps or trees and consumption of some patches of regeneration. Impacts to soil and large woody debris are expected to be minimal, given project targets. In rangeland ecosystems, prescribed fire will have variable impacts dependant on burn intensity and proximity to streams. Stream buffering (low intensity to no burn around streams) has been shown to preserve most if not all normal sediment filtering functions.

A large, stand-replacing fire could have negative effects on watershed conditions, thus affecting both fish and habitat in streams. Treatment with low to moderate intensity fire would result in a mosaic pattern of burned and unburned areas of ground level vegetation species and ground level natural fuels. Some patches of shade-tolerant, fire intolerant species may also be consumed. Prescribed burning is not designed to consume all vegetation within project areas. Each treatment will leave a mosaic of burned and unburned areas. Once the target fuels and the risk of fire carrying from one tributary to another have been reduced, hand ignition may be considered on a site-specific basis.

The effects on sediment yield vary according to the intensity of fire; degree of soil disturbance; steepness of the slope and drainage network; the size of the area burned; and the extent to which the vegetation controls the movement and storage of sediment. Fire also increases surface erosion and sediment delivery rates by removing the litter layer and organic debris that

traps sediment both on slopes and in the stream channel (MacDonald *et al.* 1991). The magnitude of these effects will depend on the geomorphic sensitivity of the landscape, which is largely a function of slope steepness and parent material (Swanson 1978).

Fire can greatly increase surface erosion by temporarily creating a hydrophobic soil layer. Soils within the project area are generally at moderate risk for hydrophobic conditions due to their fine-grained textures and clay content. In addition, the relatively low burn intensity of the prescribed fires will also help prevent the formation of hydrophobic soils.

The effects of wildland fire or prescribed fire are generally considered in terms of potential short-term, negative effects and long-term benefits of fuels reduction, which will result in a decreased risk of high intensity, stand-replacing fire. Potential short-term effects to streams and fish include increased risk of landslides, mass movement and debris torrents, increases in surface sediment erosion, possible reduction in streamside vegetation resulting in changes within management areas, and possible increases in water yield depending on the amount and severity of the vegetation burned. Long-term effects include increases in nutrient delivery, possible increases in woody debris in streams, and possible increases in stream temperature if shading is significantly reduced. The design criteria described above minimizes the risk that landslides, mass movement, significant increases in surface sediment yield, and significant changes in water yield will occur.

Reduction of vegetation will mostly be limited to creeping ground fires, which will reduce understory vegetation, but will not affect mature trees or result in significant mortality to the overstory. Spring burning often results in minimal riparian vegetation burned because streamside areas have higher humidity and live plant moisture. Fall burning will more likely result in understory vegetation removal, with a possibility of some tree and large shrub mortality, especially outside of riparian zones where live plant moisture is less.

Riparian buffer strips will be maintained, thereby preserving canopy cover for shading, sediment filtering, and streambank and floodplain stability (PACFISH guidelines). Areas not burned will provide significant protection from adverse water quality impacts associated with wildland fire and prescribed burning. Therefore, effects to fish and habitat in these streams from increased water yield are unlikely. The area has been roaded from past management activities. Therefore, increased road densities from road construction are not expected to be of a magnitude to increase sedimentation to affected drainages, provided adequate planning for new road construction is implemented. Forest practices in the area will be conducted to meet the standards of the Montana Streamside Management Law. These rules are designed to use best management practices that are adapted to and take account of the specific factors influencing water quality, water quality objectives, on-site conditions, and other factors applicable to the site where a forest practice occurs.

3.13 Air Quality

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA Forest Service 2000).

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in Central Montana are governed by a combination of factors. Large-scale influences include latitude, altitude, prevailing hemispheric wind patterns, and mountain barriers. At a smaller scale, topography and vegetation cover also affect air movement patterns. In Judith Basin County, winds are predominantly from the southwest but occasionally blow from the west to northwest. Air quality in the area and surrounding airshed is generally

good to excellent. However, locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall. All major river drainages are subject to temperature inversions which trap smoke and affect dispersion, causing local air quality problems.

Smoke management in Judith Basin County is managed by the Idaho/Montana Airshed Group. The entire county falls into Airshed Unit 9. An airshed is a geographical area which is characterized by similar topography and weather patterns (or in which atmospheric characteristics are similar, e.g., mixing height and transport winds). There are currently no impact zones near Judith Basin County. The USDA Forest Service, Bureau of Land Management, and the Montana Department of Natural Resources and Conservation are all members of the Montana/Idaho State Airshed Group, which is responsible for coordinating burning activities to minimize or prevent impacts from smoke emissions. Prescribed burning must be coordinated through the Missoula Monitoring Unit, which coordinates burn information, provides smoke forecasting, and establishes air quality restrictions for the Montana/Idaho Airshed Group. The Monitoring Unit issues daily decisions which may restrict burning when atmospheric conditions are not conducive to good smoke dispersion. Burning restrictions are issued for airsheds, impact zones, and specific projects. The monitoring unit is active March through November. Each Airshed Group member is also responsible for smoke management all year.

The Clean Air Act, passed in 1963 and amended in 1977, 1990 and 1999 is the primary legal authority governing air resource management. The act established a process for designation of Class I and Class II areas for air quality management. Class I areas receive the highest level of protection and numerical thresholds for pollutants. There are no Class 1 areas within or near Judith Basin County.

Residents and resources in Judith Basin County could be affected by smoke or regional haze from burning activities in the region. Montana Department of Environmental Quality maintains Air Pollution Monitoring Sites throughout Montana. The Air Pollution Monitoring program monitors all of the six criteria pollutants. Measurements are taken to assess areas where there may be a problem, and to monitor areas that already have problems. The goal of this program is to control areas where problems exist and to try to keep other areas from becoming problem air pollution areas (Louks 2001).

The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, OAQPS (Organization for Air Quality Protection Standards) is responsible for setting standards, also known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring these air quality standards are met, or attained (in cooperation with state, Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources (Louks 2001).

3.13.1 Fire Mitigation Practices to Maintain Air Quality

Smoke consists of dispersed airborne solids and liquid particles, called particulates, which can remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effects. They include:

1. **Avoidance -** This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions exist. Sensitive receptors can be human-related (e.g. campgrounds, schools, churches, and retirement homes) or wildlife-related (threatened and endangered species and their critical habitats);
2. **Dilution –** This strategy ensures proper smoke dispersion in smoke sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems are unstable, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground; and
3. **Emission Reduction –** This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand reduces the amount of fuel available. Prescribed burning when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or by using certain firing techniques such as mass ignition.

If weather conditions changed unexpectedly during a prescribed burn, and there was a potential for violating air quality standards or for adverse smoke impacts on sensitive receptors (schools, churches, hospitals, retirement homes, campgrounds, wilderness areas, and species of threatened or endangered wildlife), the management organization may implement a contingency plan, including the option for immediate suppression. Considering 1) the proposed action would result in prescribed fire on a relatively small number of acres, 2) burning as part of this mitigation plan's implementation in the County will most likely occur over a 5-year or 10-year period at a minimum, and 3) the County will adhere to Montana/Idaho Airshed Group advisories and management strategies to minimize smoke emissions, prescribed fire activities would not violate national or state emission standards and would cause very minor and temporary air quality impacts. The greatest threat to air quality would be smoke impacts on sensitive receptors; however, the relative scarcity of sensitive receptors within the County minimizes this potential air quality impact.

In studies conducted through the Interior Columbia Basin Management Project, smoke emissions were simulated across the Basin to assess relative differences among historical, current, and future management scenarios. In assessing the whole Upper Columbia Basin, there was a 43 percent reduction in smoke emissions between the historical and current periods (Quigley and Arbelbide 1997). The projected smoke emissions varied substantially with the vastly different management scenarios. The consumptive demand and passive management scenarios were projected to substantially increase smoke emissions above current levels. The active management scenarios were projected to result in a decrease of current levels.

Although prescribed fire smoke would occur more frequently than wildland fire smoke, since prescribed fires are scheduled during the year, the effects of wildland fire smoke on visibility are more acute. Prescribed fires produce less smoke than wildland fires for comparatively shorter periods, because they are conducted under weather conditions that provide for better smoke dispersion. In a study conducted by Holsapple and Snell (1996), wildland fire and prescribed fire scenarios for the Columbia Basin were modeled. In conclusion, the prescribed fire scenarios did not exceed the EPA particulate matter (PM 10) standard in a 24-hour period. Similar projections were observed for a PM 2.5 threshold. Conversely, all wildland fire scenarios exceeded air quality standards. Similar responses were reported by Huff *et al.* (1995) and Ottmar *et al.* (1996)

when they compared the effects of wildland fire to prescribed fire on air quality. The impacts of wildland fire and management ignited prescribed fire on air quality vary because of the differences in distribution of acres burned, the amount of fuel consumed per acre (due to fuel moisture differences), and the weather conditions in which typical spring and fall prescribed burns occur. This analysis reveals wildland fire impacts on air quality may be significantly greater in magnitude than emissions from prescribed burns. This may be attributable, in part, to the fact that several states within the project area have smoke management plans requiring favorable weather conditions for smoke dispersion prior to igniting wildland fires (Quigley and Arbelbide 1997).

Chapter 4: Summaries of Risk and Preparedness

4 Overview

4.1 Wildland Fire Characteristics

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn; the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, the topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment, the fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to determine how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

4.1.1 Weather

Weather conditions are ultimately responsible for determining fire behavior. Moisture, temperature, and relative humidity determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant affect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

4.1.2 Topography

Fires burning in similar fuel conditions burn dramatically different under different topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influence vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing of fuels, and lower rates of spread. The combination of light fuels and dry sites lead to fires that typically display the highest rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. These slopes also tend to be on the windward side of mountains. Thus these slopes tend to be “available to burn” a greater portion of the year.

Slope also plays a significant role in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.

4.1.3 Fuels

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, logs, logging slash, forest floor litter, conifer needles, and home sites (the structures) are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content and continuity and arrangement all have an affect on fire behavior. Generally speaking, the smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, “fine” fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease, as surface to volume ratio decreases. Fires in large fuels generally burn at a slower rate, but release much more energy, and burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potentially development of crown fire. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determine how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected affect small changes in any single component has on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless observations and repeated research, the some of the principles that govern fire behavior have been identified and are recognized.

4.2 Judith Basin County Conditions

Judith Basin County is characterized by cold winters and dry summers. Although fairly large, Judith Basin County is sparsely populated, with a population density of only 1.2 persons per square mile. Much of the county is quite rural, due in large part to the agricultural economy of the region. Farms and ranches tend to be widely spread. Grazing activity on both public and private lands by livestock and wildlife tends to decrease the build up of fine fuel loads; however, this does not drastically reduce the fire potential. The Little Belt Mountains in the southwestern corner of the county provide ample economic and recreational resources. Overcrowded forest conditions in some areas increases the potential for high intensity, possibly stand replacing fires.

In addition to homes, other economic resources could be threatened by wildland fire. Judith Basin County sits atop valuable oil and gas reserves, particularly in the eastern portion of the county. Numerous active oil rigs dot the landscape, each rig being fed by electrical power lines. This creates a web of power lines throughout the dry rangelands. The number of power lines and oil rigs in the area somewhat increases the potential for electrical malfunctions and ignition sources.

Human activity is strongly correlated with fire frequency, with increasing numbers of fires as use increases. Discarded cigarettes, tire fires, and hot catalytic converters have increased the number of fires experienced along roadways. Careless and unsupervised use of fireworks also contributes their fair share to unwanted and unexpected wildland fires. Further contributing to

ignition sources are the debris burners and the practice of ditch burning where fire is used to rid ditches of weeds and other burnable materials.

4.2.1 County Wide Potential Mitigation Activities

There are four basic opportunities for reducing the loss of homes and lives to fires. There are many single actions that can be taken, but in general they can be lumped into one of the following categories:

- Prevention
- Education/ Mitigation
- Readiness
- Building Codes / Planning and Zoning

4.2.1.1 Prevention

The safest, easiest, and most economical way to mitigate unwanted fires is to stop them before they start. Generally, prevention actions attempt to prevent human-caused fires. Campaigns designed to reduce the number and sources of ignitions can be quite effective. Prevention campaigns can take many forms. Traditional “Smokey Bear” type campaigns that spread the message passively through signage can be quite effective. Signs that remind folks of the dangers of careless use of fireworks, burning when windy, and leaving unattended campfires can be quite effective. It’s impossible to say just how effective such efforts actually are, however the low costs associated with posting of a few signs is inconsequential compared to the potential cost of fighting a fire.

Slightly more active prevention techniques may involve mass media, such as radio or the local newspaper. Fire districts in other counties have contributed the reduction in human-caused ignitions by running a weekly “run blotter,” similar to a police blotter, each week in the paper. The blotter briefly describes the runs of the week and is followed by a weekly “tip of the week” to reduce the threat from wildland and structure fires. The federal government has been a champion of prevention, and could provide ideas for such tips. When fire conditions become high, brief public service messages could warn of the hazards of misuse of fire or any other incendiary devise. Such a campaign would require coordination and cooperation with local media outlets. However, the effort is likely to be worth the efforts, costs and risks associated with fighting unwanted fires.

Fire Reporting: Fires cannot be suppressed until they are detected and reported. As the number and popularity of cellular phones has increased, expansion of the #FIRE program throughout Montana may provide an effective means for turning the passing motorist into a detection resource.

Burn Permits: The issues associated with debris burning during certain times of the year are difficult to negotiate and enforce. However, there are significant risks associated with the use of fire adjacent to expanses of flammable vegetation under certain scenarios. Burning permits are required by State law on all forested lands within the State during the official fire season of May 1 to September 30. The wildland fire agencies (DNRC, USFS, BLM, and US Fish and Wildlife Service) each have their own guidelines for issuing burn permits in their jurisdictions. Since local government fire agencies area also involved with burn permit regulation, close coordination between the two types of agencies is needed to ensure safe burning and to exchange information. Enforcement of burning permit requirements is the responsibility of the County Sheriff’s Department. Although this is a state-wide regulation, compliance and enforcement has been variable between fire districts. There is also considerable confusion on the part of the

public as to when a permit is necessary and the procedure for which to obtain the permit. The best-intentioned citizen may unknowingly break this law for a lack of understanding. Clearly, there is a need to coordinate this process and educate the public.

4.2.1.2 Education

Once a fire has started and is moving toward homes or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. Also of vital importance is the accessibility of the home to emergency apparatus. If the home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to the event.

The majority of the uncultivated vegetation in Judith Basin County is comprised of timberlands. These fuels tend to be very flammable and can support very fast moving and intense fires. In many cases, homes can easily be protected by following a few simple guidelines that reduce the ignitability of the home. There are multiple programs such as FIREWISE that detail precautions that should be taken in order to reduce the threat to homes, such as clearing timber or cured grass and weeds away from structures and establishing a green zone around the home.

However, knowledge is no good unless acted upon. Education needs to be followed up by action. Any education programs should include an implementation plan. Ideally, funds would be made available to financially assist the landowner making the necessary changes to the home. The survey of the public conducted during the preparation of this WUI Fire Mitigation Plan indicated that approximately 51% of the respondents are interested in participating in this type of an activity.

4.2.1.3 Readiness

Once a fire has started, how much and how large it burns is often dependent on the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire. For many districts, the ability to reach these suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition can improve response times and subsequently reduce the potential for resource loss.

In order to assure a quick and efficient response to an event, emergency responders need to know specifically where emergency services are needed. Continued improvement and updating of the rural addressing system is necessary to maximize the effectiveness of a response.

4.2.1.4 Building Codes / Planning and Zoning

The most effective, albeit contentious, solution to some fire problems is the adoption of building codes in order to assure emergency vehicle access and home construction that does not “invite” a fast and intense house fire. Codes that establish minimum road construction standards and access standards for emergency vehicles are an effective means of assuring public and firefighter safety, as well as increasing the potential for home survivability. County building inspectors should look to the fire departments in order to assure adequate minimum standards. Fire districts may want to consider apparatus that may be available during mutual aid events in order that the adopted standards meet the access requirements of the majority of suppression resources. In Judith Basin County, such standards may be drafted in consultation with the Fire Chiefs in order to assure accessibility is possible for all responding resources.

Coupled with this need is the potential to implement a set of requirements or recommendations to specify construction materials allowed for use in high risk areas of the county. The Judith Basin County Commissioners may want to consider a policy for dealing with this situation into the future as more and more homes are located in the wildland-urban interface.

4.3 Judith Basin County's Wildland-Urban Interface

Individual community assessments have been completed for all of the populated places in the county. The following summaries include these descriptions and observations. Local place names identified during this plan's development include:

Table 4.1. Judith Basin County Communities

Community Name	Planning Description	Vegetative Community	National Register Community At Risk?[1]
Hughsville	Community	Rangeland	No
Hobson	Community	Rangeland	No
Stanford	Community	Rangeland	No
Moccasin	Community	Rangeland	No
Sapphire Village	Community	Forestland	Yes
Windham	Community	Rangeland	No
Geyser	Community	Rangeland	No
Raynesford	Community	Rangeland	No
Limestone Canyon	Community	Forestland	No
Arrow Creek	Community	Rangeland	No
Dry Wolf Road	Community	Forestland	No
Utica	Community	Rangeland	No
Trask Ranch	Community	Forestland	No

[1]Those communities with a "Yes" in the National Register Community at Risk column are included in the Federal Register, Vol. 66, Number 160, Friday, August 17, 2001, as "Urban Wildland Interface Communities within the vicinity of Federal Lands that are at high risk from wildfires". All of these communities have been evaluated as part of this plan's assessment.

Site evaluations on these communities are included in subsequent sections. The results of FEMA Hazard Severity Forms for each community are presented in Appendix II.

4.3.1 Mitigation Activities Applicable to all Communities

4.3.1.1 Homesite Evaluations and Creation of Defensible Space

Individual home site evaluations can increase homeowners' awareness and improve the survivability of structures in the event of a wildfire. Maintaining a lean, clean, green zone within at least 100 feet of structures to reduce the potential loss of life and property is highly recommended. Assessing individual homes in the outlying areas can address the issue of escape routes and home defensibility characteristics. Educating the homeowners in techniques for protecting their homes is critical in these environments.

4.3.1.2 Travel Corridor Fire Breaks

Ignition points are likely to continue to be concentrated along the roads and railway lines that run through the county. These travel routes have historically served as the primary source of human-caused ignitions. In areas with high concentrations of resource values along these

corridors, fire lines may be considered in order to provide a fire break in the event of a roadside ignition. Access route mitigation can provide an adequate control line under normal fire conditions. Alternatively, permanent fuel breaks can be established in order to reduce the potential for ignitions originating from the main travel roads to spread into the surrounding lands.

4.3.1.3 Power Line Corridor Fire Breaks

The treatment opportunities specified for travel corridor fire breaks apply equally for power line corridors. The obvious difference between the two is that the focus area is not an area parallel to and adjacent to the road, but instead focuses on the area immediately below the infrastructure element. Protection under the high tension power lines is strongly recommended. This may be an opportunity for intensive livestock grazing practices as a tool for reducing fine fuels around significant infrastructure.

4.4 Communities in Judith Basin County

4.4.1 Overall Fuels Assessment

The suitability of the lands within Judith Basin County to agricultural has led to a profusion of farming activity. Dry land farming and to a lesser extent, irrigated fields dominate the rolling hills and flat lands north of the Little Belt Mountains. Native vegetation is confined to remnant patches in steep coulees and along river bottoms. Domestic livestock graze many areas that are not actively cultivated. The grass fuels in many areas tend to be relatively sparse and short, with little continuity, limiting fire spread in the absence of wind. Agricultural fields can also serve to fuel a fire after curing; burning in much the same manner as consistent grass fuels. Fires in grass and rangeland fuels tend to burn at relatively low intensities, with moderate flame lengths and only short-range spotting. Suppression resources are generally quite effective in such fuels. Homes and other improvements can be easily protected from the direct flame contact and radiant heat through adoption of precautionary measures around the structure.

Although fires in these fuels may not present the same control problems as those associated with large, high intensity fires in timber fuel types, they can cause significant damage if precautionary measures have not taken place prior to a fire event. Wind driven fires in these short grass fuel types spread rapidly and can be difficult to control. During extreme drought and pushed by high winds, fires in these fuel types can exhibit extreme rates of spread, thwarting suppression efforts. The fires within the Missouri Breaks Complex of 2003 demonstrate the potential for fires in these fuels to reach enormous size and demonstrate fire behavior atypical of these fuel complexes.

The combination of farming and livestock production has generally led to a landscape that is at low potential for wildland fire. Irrigated or cultivated fields surround nearly all community centers, with natural or man-made fire breaks such as roads separating the agricultural fields from structures. This reduces the potential for infringement by wildland fire. The overall threat to structures and communities in the agricultural portion of the County is quite low.

However, there are areas of notable exception within the County. Forested lands flank the southern portion of the county along the Little Belt Mountains. Many of these forest types are dry Douglas-fir and ponderosa pine forests that have become heavily overstocked, resulting in multistoried conditions with abundant ladder fuels. Increased activities by pathogens will continue to increases levels of dead and down fuel, as host trees succumb to insect attack and stand level mortality increases. Overstocked, multi-layered stands and the abundance of ladder fuels lead to horizontal and vertical fuel continuity in many stands. These conditions, combined with an arid and often windy environment, can encourage the development of stand replacing

fire. These fires can burn with very high intensities and generate large flame lengths and fire brands that can be lofted long distances. Such fires present significant control problems for suppression resources, often developing into large, destructive wildland fires.

Examples of large, stand replacing fires can be seen throughout the Little Belt Mountains, most notably in the vicinity of Woodhurst Mountain. These fire events threaten natural resource values as well as homes and other improvements important to Judith Basin residents.

4.4.2 Overall Ignition Profile

The dry climate, xeric vegetation, and prevalence of hot and windy conditions in Judith Basin County create an environment that will sustain fire spread for many months of the year. This increases the probability that ignition sources from both natural (lightning) causes and human causes will find a receptive fuel bed. Natural ignitions are most likely to occur during summer storms over the high ridges and mountains of the Little Belt Mountains. Although not as common as over the mountains, lighting strikes do occur in the broad valley. Human ignitions can stem from numerous activities, including debris burning, fireworks, cigarettes, welding, campfires, and so on. Included in human ignition sources are fires sparked by vehicles or hot catalytic converters. Also included in an ignition profile are the fires sparked by downed power lines or malfunctioning transformers. All of these potential ignition sources and the dry nature of vegetation in Judith Basin County increase the potential for fire occurrence.

4.4.3 Individual Community Assessments

4.4.3.1 Arrow Creek

Arrow Creek flows south from the Lewis and Clark National Forest, near the border of Chouteau and Judith Basin Counties. There are a few scattered homes and ranches in the upper portion of the drainage, just to the south of the National Forest Border.

4.4.3.1.1 Community Assessment

The homes and other ranches along Arrow Creek are considered to be at moderate risk to wildland fire. Mixed deciduous and coniferous forest vegetation is generally isolated in stringers along the Arrow Creek drainage bottom. These timbered stringers tend to be surrounded by open meadows. Forest type tends to shift increasingly toward deciduous species further down the Arrow Creek drainage. The aspen and other hardwood species in the drainage bottom tend to pose less of a fire hazard than coniferous tree species. To the west of Arrow Creek, large grassy areas along the lower slopes of the Highwood Mountains dominate before transitioning to timber upslope.

Most of the homes in the area are on the west side of Arrow Creek, in the grassy meadows leading to the Highwood Mountains. Their location outside of the timbered stringers reduces the overall threat to the structures. The lack of consistency in forest vegetation reduces the potential for a high-intensity crown fire to threaten the structures. Such an event would require fire moving from the continuous timber near the headwaters of Arrow Creek down slope, to the homes. Although improbable, such an event is possible under extreme conditions. A greater threat is likely to come from fires originating in the vicinity of the structures, from human or natural causes, spreading through the grass toward the home. Although such fires can move with rapid rates of spread, they generally do not pose the same control problems as high intensity crown fires. Fire intensity is considerably lower in grass fires and spotting distance is

significantly less. Thus home and structure protection can be accomplished through the implementation of some simple precautionary measures.

Most have adequate defensible space and have been built with materials that are fire resistant. However, there are some outbuildings and barns of wooden construction in the wooded stringers, with little to no defensible space. During the dry summer months, fires in these fuel types may develop into high intensity fires in areas where dead and down and ladder fuels have accumulated. The higher intensity with which these fires burn increases the potential for fire to transition from the wildland to the structure.

Access to homes in the area is via a single lane, unimproved road. The road is adequate for most emergency traffic. It is unlikely that access would be compromised in the event of a fire, although there are some heavily stocked areas to the east of the road. The small bridges over Arrow Creek that access some homes may not be adequate for large emergency traffic.

4.4.3.1.2 Mitigation Activities

Effective risk mitigation strategies begin with public awareness campaigns designed to educate individual homeowners about the risks associated with living in a flammable environment. "Home protection starts at the home." Educating the homeowner in techniques for protecting their homes is critical in areas surrounded by light, flashy fuels. Fires in these fuel types leave little time to react, as their rates of spread can be quite rapid. Thus, it is critical that mitigation activities take place prior to a fire event. Individual home site evaluations can increase homeowners' awareness and provide the impetus to reduce the ignition potential of structures in the event of a wildfire. Maintaining a lean, clean, green zone and adequate defensible space is the most effective means of protecting structures against wildland fire.

In cases where flammable materials have been used in home construction, there are no easy solutions to reducing the vulnerability to fire. Wooden roofing material is vulnerable to ignition for firebrands lofted from considerable distances. In such cases, homeowners should consider re-roofing with fire resistant materials in the future.

Vegetative treatments designed to reduce hazardous fuels along Arrow Creek Road would help to assure access in the event of a wildfire, and reduce the potential for fire starts associated with roadside ignitions from developing into large wildland fires.

4.4.3.2 Dry Wolf Road

4.4.3.2.1 Community Assessment

There are a number of seasonal cabins south of the Dry Wolf Ranger Station in the Dry Wolf Creek drainage that are at considerable risk to damage or loss in the event of a wildland fire. Vegetation within the drainage bottom is a multi-layered stand of spruce and fir with moderate levels of dead and down and ladder fuels. Immediately to the east of Dry Wolf Road rise steep slopes and gulches dominated by Douglas-fir. To the west lies a relatively broad meadow following the Dry Wolf Creek drainage, beyond which lay heavily forested slopes rising toward Big Baldy Mountain.

Contributing the overall risk in the drainage is the concentration of human use in the area. There are multiple recreational opportunities in the area, including multiple trailheads and the Dry Wolf Campground. These attractions draw considerable numbers of recreational users in the summer months. Concentrated human use significantly increases the potential for human ignitions.

Unattended campfires, discarded cigarettes, and fireworks all add to the potential for person-caused fires.

Natural ignitions from summer lightning storms also contribute to the overall ignition profile in the area. Although ignitions typically occur further upslope on ridges and mountainsides, natural ignitions can occur in the drainage bottom. During extreme weather events, fires upslope of Dry Wolf Creek can be pushed down toward the homes and recreation sites in the area. Although the probability of such events is quite low, it is possible.

The steep slopes, dry forest fuels and multi-layer stands increases the potential for development of high intensity, stand replacing fire. These fires present significant control problems due to large flame lengths, tremendous heat output, and the potential for long-range spotting. Such fires in this area would potentially pose significant threat to homes and lives in the area.

Many of the cabins have utilized construction materials and techniques that are not favorable for protection against wildland fire. Wooden siding and porches are common. Some homes have been constructed utilizing cedar shake or other flammable roofing materials. Many homes also lack defensible space, with grass, shrubs and small trees in very close proximity to the structures. All of these building characteristics increase the potential for fire to spread from the wildland to the structure.

Access to the homes and trailheads and the Dry Wolf Campground is via the one-way in-one way out, unimproved Dry Wolf Road. There is no other suitable emergency road access to the area north of the Dry Wolf Ranger Station. The road corridor narrows considerably to the south of the Ranger Station as it passes through a tight notch along Dry Wolf Creek. Although the broadness of the valley on either side of the notch decreases the potential for such an event, the potential cannot be ruled out. A fire start in this area could potentially cut off the only available escape route for recreational users and residents further up the drainage.

The Dry Wolf Road and Campground is within the Judith Basin Rural Fire District. USDA Forest Service has wildland fire responsibilities.

4.4.3.2.2 Mitigation Activities

Effective risk mitigation strategies designed to protect homes and structures begin with public awareness campaigns designed to educate individual homeowners about the risks associated with living in a forested environment. “Home protection starts at the home.” Educating the homeowners in techniques for protecting their homes is critical in these fire prone landscapes. Individual home site evaluations can increase homeowners’ awareness and provide the impetus to reduce the ignition potential of structures in the event of a wildfire. Maintaining a lean, clean, green zone and adequate defensible space is the most effective means of protecting structures against wildland fire.

In cases where cedar shakes or wood siding and decking have been used in home construction, there are no easy solutions to reducing the vulnerability to fire. Cedar shake roofing material significantly increases the risk to individual homes due to the material’s ignition potential from spotting. In cases where this material has been used, homeowners should consider re-roofing with fire resistant materials in the future.

Improving travel corridor access should also be emphasized along Dry Wolf Road. An understory treatment designed to remove ladder fuels and increase canopy base height can reduce the potential for fire to move from surface fuels to the overstory. Hazardous fuels treatments should also be considered in the vicinity of the Dry Wolf Campground in order to reduce the potential for torching and spotting from fires originating in the campground.

Lastly, aggressive fire prevention campaigns should continue in the area to help reduce the risk of human-caused fires caused by ignorance or carelessness.

4.4.3.3 Geyser

The community of Geyser is located at the junction of Highway 200 and 551. Like most of the small towns in Judith Basin County, the economy of Geyser is directly tied to the greater agricultural economy of the area, serving as a rail stop for transportation of grain and other crops to markets out of the area.

4.4.3.3.1 Community Assessment

Geyser is considered to be at very low risk to wildland fire. Nearly all the land surrounding the community is in agricultural production. The agricultural nature of the landscape greatly reduces the overall threat to the community. Although agricultural lands can support fire during portions of the year, expected fire intensities and flame lengths would not pose a significant threat to the community or most homes in the area. There is a clear line of demarcation between the agricultural lands and the homes and businesses within the community with natural firebreaks. Homes within the community are surrounded by streets and maintained yards, eliminating any wildland fire threat.

Most ranches in the area are also surrounded by adequate defensible space. Most primary dwellings associated with ranches have also been constructed with fire-resistant materials. The structures at greatest risk to loss are remote outbuildings associated with ranches around which dried grass and weeds have been allowed to accumulate. Many remote outbuildings lack a defensible space, and in many cases have dried fuels in direct contact with the structure. These fuels could potentially carry fire to the structure.

The system of wide streets and roads provides good emergency access for all the homes within the community. House numbers and street names are present throughout the community, reducing emergency response times.

Geyser is within the Judith Basin Rural Fire District. Structural protection is provided by the Geyser Volunteer Fire Department.

4.4.3.3.2 Mitigation Activities

Further reducing the existing minimal threat can be accomplished by implementing simple precautionary measures around the home. Individual home site evaluations can increase homeowner's awareness of the potential risks and methods by which to protect against home loss. Generally, this can be accomplished by establishing a non-combustible buffer around the home. These same actions can also be applied around outbuildings and barns.

4.4.3.4 Hobson

Hobson is located off Highway 200 toward the east side of Judith Basin County. The economy of the community is largely tied to the agricultural industry that dominates the area. As such, the community is completely surrounded by irrigated and non-irrigated agricultural land.

To the southeast of Hobson is the Ackley Lake State Park. This popular state grassland park offers diverse water sports opportunities, good fishing and 23 picnic and camping sites.

4.4.3.4.1 Community Assessment

Hobson is considered to be at very low risk to wildland fire. The prevalence of agricultural land has eliminated almost all natural fuels in the area. Paved streets and well-maintained yards dominate the community center. This contributes to a non-flammable urban character. Although agricultural lands can support fire during portions of the year, expected fire intensities and flame lengths would not pose a significant threat to the community or most homes in the area. There is a clear line of demarcation between the agricultural lands and the homes and businesses within the community with natural firebreaks. Homes within the community are surrounded by streets and maintained yards, eliminating any wildland fire threat.

Most ranches in the area are also surrounded by adequate defensible space. Most primary dwellings associated with ranches have also been constructed with fire-resistant materials. The structures at greatest risk to loss are remote outbuildings associated with ranches around which dried grass and weeds have been allowed to accumulate. Many remote outbuildings lack a defensible space and in many cases have dried fuels in direct contact with the structure. These fuels could potentially carry fire to the structure.

Street signs and house numbers are present throughout the community. These attributes increase the efficiency of emergency services, further reducing risk to the community. Access to all homes within the community is adequate for all emergency traffic.

Ackley Lake State Park is also considered to be at very low risk to wildland fire. Furthermore, the potential for fire to spread from within the park to areas beyond is also negligible. There is generally an adequate non-flammable buffer around the campsites and fire rings. Furthermore, agricultural fields surround the area reducing the potential for fire to move into or out of the park.

Hobson District structural protection is provided by the Hobson Volunteer Fire Department.

4.4.3.4.2 Mitigation Activities

Further reducing the existing minimal threat can be accomplished by implementing simple precautionary measures around the home. Individual home site evaluations can increase homeowner's awareness of the potential risks and methods by which to protect against home loss. Generally, this can be accomplished by establishing a non-combustible buffer around homes, barns and outbuildings.

The potential for human-caused ignitions within Ackley State Park can be mitigated in part by continuing with an active fire prevention program. Such a program would focus on public awareness campaigns designed to remind users of responsible use of campfires.

4.4.3.5 Limestone Butte Road (west of Highway 427)

4.4.3.5.1 Community Assessment

Homes to the south of Limestone Butte within the steep walls of the Otter Creek drainage represent a high urban interface risk area for Judith Basin County. Vegetation composition shifts from open grassland and pine and fir savannahs to the west of Limestone Butte to thick stands of ponderosa pine and Douglas-fir within the narrow Otter Creek canyon. Within these dry, overstocked forests, a number of homes have been constructed with little regard to the fire hazard associated with the forest conditions within the canyon.

Most of the timbered areas within the Otter Creek canyon are overstocked with small to medium size Douglas-fir and ponderosa pine, creating both vertical and horizontal fuel continuity

throughout the area. The combination of fuel continuity and steep slopes increases the potential for rapid spread of fire and transition of surface fires to crown fires, especially under extreme weather conditions. Such fires burn at extremely high intensities with large flame lengths. Frequent spotting and rapid rates of spread reduce the effectiveness of suppression resources.

The presence of homes and roads within the drainage contributes to the overall ignition profile and increases the chance of human-caused fires. Debris burning, campfires, fireworks and discarded cigarettes are all possible ignition sources that could spark a wildland fire. Furthermore, electricity in the area is supplied via aboveground wires, which could initiate a fire start.

Access to homes within the canyon is by a single narrow loop road that could potentially be compromised in the event of a wildland fire. This potential is greatest toward the narrow, east end of the canyon. An even greater access issues are the small bridges that access homes on the south side of Otter Creek. Many of these bridges would not accommodate large emergency vehicles. Furthermore, most driveways are narrow with inadequate turn-around space for large vehicles. These characteristics present significant safety issues to suppression resources that would preclude engagement under active burning conditions.

Many of the interface homes utilized construction materials and techniques that are not favorable for protection against wildland fire. Wooden siding, wood porches, and in some cases, wood roofing materials all increase the probability of wildland fire spreading to the home. Many homes also lack defensible space, further increasing the wildland fire risk to homes.

4.4.3.5.2 Mitigation Activities

"Home protection starts at the home." Effective risk mitigation strategies begin with public awareness campaigns designed to educate individual homeowners about the risks associated with living in a forested environment. Educating the homeowners in techniques for protecting their homes is critical in these dry environments. Individual home site evaluations can increase homeowners' awareness and provide the impetus to reduce the ignition potential of structures in the event of a wildfire. Maintaining a lean, clean, green zone and adequate defensible space is the most effective means of protecting structures against wildland fire.

In cases where cedar shakes or wood siding and decking have been used in home construction, there are no easy solutions to reducing the vulnerability to fire. In such cases, homeowners should consider re-roofing with fire resistant materials in the future.

Finally, reducing the response time for emergency resources allows fires to be controlled quickly, before they pose a threat to homes and resources. Measures that ease location of and access to a developing fire further reduces the potential for loss.

4.4.3.6 Moccasin

Moccasin is located on Highway 200 in the eastern portion of Judith Basin County, at the junction of the Central Montana and Burlington Northern Railway lines. As such, Moccasin serves as a center for the transportation of agricultural crops to markets outside the area. The economy is Moccasin is directly tied to the larger agricultural economy of the region.

4.4.3.6.1 Community Assessment

Moccasin is considered to be at very low risk to wildland fire. The abundance of cropland and agricultural activity in the area reduces the threat of fire encroaching on the community. The homes and structures associated with the community tend to be surrounded by roads and

irrigated lawns, reducing any threat to the community. Access to homes and the community is via wide improved roads suitable for emergency traffic. Road signs and house numbers are generally present, facilitating location in the event of an emergency.

4.4.3.6.2 Mitigation Activities

Individual home site evaluations can raise homeowner's awareness of hazardous conditions around the home and identify the precautions that can be taken to mitigate this risk. Creation of a green or non-combustible defensible space is the most effective means of reducing the potential of home loss from uncontrolled grass fires. Also, taking measures to further facilitate emergency response to homes can reduce response time and increase the probability of stopping fire spread before structures or other valuable resources become involved.

4.4.3.7 Raynesford

The community of Raynesford is located at the west end of the County, just to the east of the junction of Highway 200 and 427. Raynesford sits in the bottom of the Otter Creek drainage. To the south of Otter Creek rise brushy hills that transition into small stands of dry limber pine. To the north of town, short and steep grassy hills extend into the distance. The Burlington Northern Railroad runs through the north end of town.

4.4.3.7.1 Community Assessment

Raynesford is considered to be at very low risk of loss to wildland fire. Generally, there are few areas where natural fuels are in close proximity to structures. Residential property or streets surround most structures within the community of Raynesford. This effectively eliminates the probability of fire spreading from natural fuels to structures within the community. The drainage bottom location and close proximity to Otter Creek as a water source further reduces the risk to the community.

The main bridge over Otter Creek is unrated. Posting of weight limit would ensure safety of emergency apparatus.

On the south side of Highway 200 exists one group of structures that are in very close proximity to the brush fuels on the North Slope. Not only are the structures dangerously close to fuels, but a number of large canisters and tanks within the area are placarded as hazardous materials. In some cases, these tanks are in direct contact with tall grass, weeds and brush. This would present a serious hazard in the event of a grass or range fire.

The greatest risk to homes within Raynesford and the surrounding area would come from fires spreading from dry grass along ditches and vacant lots to the home. Taking some simple precautionary measures such as creation of a non-combustible, defensible space around the home can easily mitigate this risk. Although most homes in the community have adequate defensible space, some homes could be at risk from grass fires originating from debris burning or other human ignitions. Since fire moves quickly through light grass fuels, home defensibility precautions need to be taken prior to a fire event, as there is little time to react to an advancing grass fire.

Raynesford is within the Judith Basin Rural Fire District. Structural protection is provided by the Raynesford Volunteer Fire Department.

4.4.3.7.2 Mitigation Activities

The overall wildland fire threat to the community of Raynesford is considered to be low. The drainage bottom location, good emergency access and lack of wildland fuels result in little potential for rapid wildland fire spread. However, there is a slight chance of structure loss due to a lack of defensible space surrounding the home. A few simple precautions on the part of the homeowner can reduce this potential. Individual home site evaluations can raise homeowner's awareness of hazardous conditions around the home and identify the precautions that can be taken to mitigate this risk. Creation of a green or non-combustible defensible space is the most effective means of reducing the potential of home loss from uncontrolled grass fires. Also, taking measures to further facilitate emergency response to homes can reduce response time and increase the probability of stopping fire spread before structures or other valuable resources become involved.

4.4.3.8 Sapphire Village

Sapphire Village lies on the Judith River in the southeast portion of Judith County. Rolling hills that transition from grass and light brush at low elevations to juniper and mixed conifer surround the community to the north and south. To the east runs the riparian corridor of the Judith River, with thick brush and Cottonwood trees along the river bottom. To the west lie the 7,745-acre Judith River Wildlife Management Area and the Little Belt Mountains of the Lewis and Clark National Forest. Evidence of past fires can be seen on Reed Hill and beyond to the north, demonstrating the potential for wildland fire in the area.

4.4.3.8.1 Community Assessment

Sapphire Village is considered to be at moderate risk to the effects of wildland fire. Light grass fuels surround the majority of homes and buildings within the community. The drainage bottom location of the community reduces the probability of wildfire encroaching on the community. However, wind events and extreme weather conditions could push a fire from the National Forest or the Wildlife Management Area into the community. There are a number of campgrounds and other recreation opportunities available within National Forest Lands to the south and west of Sapphire Village. Road access and concentrated human use increases the potential for person-caused fire starts. Additionally, natural ignitions from lightning are also probable during the summer months, raising the possibility of wildland fire moving from within the Forest boundary to the light fuels outside the forest boundary. Wind driven fires in these fuels can spread rapidly.

Although fires in these fuel types burn at relatively low intensities, the rapid rates of spread would not allow adequate time to prepare a home in advance of an oncoming fire. Adding to the overall threat to the community is the lack of defensible space around some homes in the area and the choice of materials used in home construction. Some homes have been constructed with flammable wood siding and, in some cases, flammable cedar shake roofing material. Others have dry vegetation abutting the home and wood and other debris close to structure. These two attributes increase the potential for fire to move from the wildland to the home.

The primary access to the area is via Pig Eye Road running along the Judith River. Although this provides the only readily accessible access and egress to Sapphire Village, it is unlikely that this travel route would be compromised for any long duration of time. The broad nature of the Judith River Basin and the prevalence of light fuels in the area reduce the potential for this travel corridor to be compromised for an extended period of time. However the additional vegetation along the river can provide a fuel source during dry years. This vegetation would provide flashy

fuels that could carry a short duration fire of high intensity that could compromise traffic flows on Pig Eye Road for a short period of time.

Road access to most of the homes in the area is adequate for emergency vehicle traffic. Fire protection for the community is provided by the community fire station on Arrot Road, within minutes of all residences. There are two type 6 fire engines parked in at this heated fire station. The local volunteer fire department mans these engines for both structural and wildland fire protection.

In order to reduce the potential for large fire development on federal lands, the Lewis and Clark National Forest is in the process of preparing an Environmental Impact Statement to address the mounting forest health concerns developing within the Judith River watershed. When complete, the analysis will likely open the door for vegetative treatments in the area, including hazard reduction treatments utilizing pre-commercial and commercial thinning of forest fuels and use of prescribed fire. These treatments are supported by this planning committee.

4.4.3.8.2 Mitigation Activities

In general, this wildland fire risk to homes and structures within Sapphire Village can be mitigated by raising public awareness and by taking a few simple precautions. Individual home site evaluations can increase homeowners' awareness and provide the impetus to improve the survivability of structures in the event of a wildfire. Maintaining a lean, clean, green zone within at least 100 feet of structures is the most effective means of protection against a wildland fire in these fuel types. In cases where cedar shakes or wood siding and decking have been used in home construction, there are no easy solutions to reducing the vulnerability to fire. In these cases, expanded defensible space zones may be the best precaution. Homeowners should consider using less combustible building materials in the future. Educating the homeowners in techniques for protecting their homes is critical in these hot, dry environments.

Outside of Sapphire Village additional fuels reduction and widening of the Pig Eye Road would provided more secure access to the area in during a wildfire. The US Forest Service planned activities outlined in section 4.7.2 of this document are consistent with creating a defensible community and are strongly recommended for implementation.

4.4.3.9 Stanford

Stanford, the county seat of Judith Basin County, is located in central portion of the county at the intersection of Highways 200 and 80, along the Burlington Northern rail line. Like most towns along the railway in the county, Stanford serves as a service community for the agricultural industry that dominates the lands around the community.

4.4.3.9.1 Community Assessment

Due to the abundance of agriculture in the area and the urban character of the community center, Stanford is considered to be at low risk to wildland fire. Although cured crops are capable of sustaining fire spread during late summer and early fall, fires in the vicinity of Stanford are unlikely to present a significant threat to homes or infrastructure in the area. This is due in large part to the separation of flammable fuels from homes and other buildings. Roads, residential yards, and other areas of irrigated vegetation provide adequate firebreaks to stop the spread of agricultural fire prior to reaching the home. In addition, most homes have been constructed with flame resistant materials, reducing the potential for fire to move to the structure.

The network of city streets provides adequate access throughout the community. Roads signs are generally posted throughout Stanford and the outlying areas, facilitating location of homes during emergency events.

Stanford is within the Judith Basin Rural Fire District. Structural fire protection is provided by the Stanford Volunteer Fire Department.

4.4.3.9.2 Mitigation Activities

The minimal risk to Stanford can further be reduced if homeowners take a few simple precautions. The greatest threat to homes and outbuildings in the area comes from accumulations of dry grass and weeds that are sometimes allowed to accumulate around the base of a structure. If ignited, these fuels can serve to carry fire to the structure. Maintaining a lean, clean, green zone within 100 feet of structures is the most effective means of protection against a wildland fire throughout the Stanford area. Individual home site evaluations can increase homeowners' awareness and provide the impetus to improve the survivability of structures in the event of a grass or field fire.

Furthermore, roadside treatments such as mowing of grass and weeds after the growing season can reduce the potential for roadside ignitions. It appears this is already a practice in many areas of the county and should continue to be encouraged countywide.

4.4.3.10 Utica

The small, historic town of Utica is located near the banks of the Judith River, at the Junction of Pig Eye Road and South River Road. The community is linked to a small museum outlining the historic role of this small town. Utica and the landscapes beyond were frequently used as subject matter in paintings by the famous cowboy painter Charlie Russell. Most homes associated with Utica area are large ranches spread throughout the Judith River bottom.

4.4.3.10.1 Community Assessment

The overall threat to Utica and the ranches in the surrounding area is low. Hay and other crop farming accounts for the majority of land use in the area. The agricultural use of the land generally reduces the overall threat to homes and buildings throughout the area. Most homes, ranches and outbuildings have an adequate defensible space radius around the structure. Green lawns and constant machinery use and livestock activity help to either keep green areas around homes or keep areas around barns and outbuildings relatively devoid of flammable vegetation. Most homes have been constructed with non-flammable materials, although many barns and outbuildings are of wooden construction. However, as mentioned previously, the risk to most of these buildings is mitigated by day-to-day ranching operations in their immediate vicinity.

4.4.3.10.2 Mitigation Activities

Although Utica and area homes and ranches are considered to be at low risk to wildland fire, the potential exists for fire to threaten buildings and homes in the area. During late summer and early fall, hay and straw fields are capable of supporting fire. The greatest risk to structures comes from accumulations of cured grass and weeds and other flammable debris that is sometimes allowed to accumulate around the base of structures. If ignited, these accumulations can serve to carry fire to a structure.

Maintaining a non-flammable zone within 100 feet of structures is the most effective means of protection against unexpected fire events. Individual site evaluations can increase homeowners' and ranch owners' awareness of potential fire threats to buildings. This awareness can serve to prompt actions that can improve the survivability of structures in the event of a grass or field fire.

Furthermore, roadside treatments such as mowing of grass and weeds after the growing season can reduce the potential for roadside ignitions. It appears this is already a practice in many areas of the county and should continue to be encouraged countywide.

4.4.3.11 Windham

Windham is a small agricultural community near the junction of Highway 200 and 541. The community is almost entirely surrounded by agricultural fields. Most of the structures in the area are buffered from field by roads and maintained lawns.

4.4.3.11.1 Community Assessment

The overall threat to the community of Windham and the ranches in the surrounding area is very low. The predominant land use in the area greatly reduces the threat for fire to threaten the community. Although it is possible for cured crops to support fire spread during certain times of the year, it is unlikely that a fire in the vicinity of Windham would pose a significant threat. This is due in large part to the number of roads and residential lawns that surround the community. These features serve as effective barriers to halt the spread of fire before reaching homes or other infrastructure.

Further reducing any potential threat to the community is the proximity of emergency services. Windham Rural Fire Department maintains a station in the community, within minutes of homes in the area.

4.4.3.11.2 Mitigation Activities

The minimal risk to Windham can further be reduced if homeowners take a few simple precautions. The greatest threat to homes and outbuildings in the area comes from accumulations of dry grass and weeds that are sometimes allowed to accumulate around the base of a structure, as is sometimes the case around rural ranch buildings. If ignited, these fuels can serve to carry fire to the structure. Maintaining a lean, clean, green zone within 100 feet of structures is the most effective means of protection against a fire in the Windham vicinity. Individual home site evaluations can increase homeowners' awareness and provide the impetus to improve the survivability of structures in the event of a grass or field fire.

Furthermore, roadside treatments such as mowing of grass and weeds after the growing season can reduce the potential for ignitions. In addition to protecting homes and buildings, this can help reduce the potential for loss of crops. It appears this is already a practice in many areas of the county and should continue to be encouraged countywide.

4.4.3.12 Trask Ranch

The Trask Ranch lies on the South Fork of the Judith River in the southeast portion of Judith County. The vegetation in the area is composed of Juniper and mixed conifer surrounding the community that is scattered along the river. Most of the homes in the area have been built in open meadows along the river. The South Fork of the Judith River runs north south through the valley, with thick brush and some Cottonwood trees along the river bottom. To the west lie the Little Belt Mountains of the Lewis and Clark National Forest. Evidence of past fires can be seen

on the hills in the area and beyond to the north, demonstrating the potential for wildland fire in the area.

4.4.3.12.1 Community Assessment

The Trask Ranch is considered to be at moderate risk to the effects of wildland fire. Light grass fuels surround the majority of homes and buildings within the community. The drainage bottom location of the community reduces the probability of wildfire encroaching on the community. However, wind events and extreme weather conditions could push a fire from the surrounding forest into the community. There are a number of campgrounds and other recreation opportunities available within National Forest Lands around the Trask Ranch. Road access and concentrated human use increases the potential for person-caused fire starts. Additionally, natural ignitions from lightning are also probable during the summer months, raising the possibility of wildland fire moving from within the Forest boundary to the light fuels outside the forest boundary. Wind driven fires in these fuels can spread rapidly.

Although fires in these fuel types burn at relatively low intensities, the rapid rates of spread would not allow adequate time to prepare a home in advance of an oncoming fire. Adding to the overall threat to the community is the lack of defensible space around some homes in the area and the choice of materials used in home construction. Some homes have been constructed with flammable material. Others have dry vegetation near the home and wood and other debris close to structure. These two attributes increase the potential for fire to move from the wildland to the home.

The primary access to the area is from the Sapphire village area via Pig Eye Road and South Fork roads running along the South Fork of Judith River. This provides the only readily accessible access and egress to the Trask Ranch. It is likely that this travel route would be compromised for a period of time if a wildfire were to pass through the area. The compromising of this road would greatly reduce the ability of emergency services to services the homes in the Trask Ranch. There are some secondary roads, but they are best described as 4 wheeler access and are not suitable to larger fire vehicles.

Road access to most of the homes in the area is adequate for emergency vehicle traffic. Some private bridges in the area should be reviewed for their ability to hold fire trucks.

In order to reduce the potential for large fire development on federal lands, the Lewis and Clark National Forest is in the process of preparing an Environmental Impact Statement to address the mounting forest health concerns developing within the South Fork Judith River watershed. When complete, the analysis will likely open the door for vegetative treatments in the area, including hazard reduction treatments utilizing pre-commercial and commercial thinning of forest fuels and use of prescribed fire.

4.4.3.12.2 Mitigation Activities

In general, this wildland fire risk to homes and structures within the Trask Ranch can be mitigated by raising public awareness and by taking a few simple precautions. Individual home site evaluations can increase homeowners' awareness and provide the impetus to improve the survivability of structures in the event of a wildfire. Maintaining a defensible space within at least 100 feet of structures is the most effective means of protection against a wildland fire in these fuel types. In cases where cedar shakes or wood siding and decking have been used in home construction, there are no easy solutions to reducing the vulnerability to fire. In these cases, expanded defensible space zones may be the best precaution. Homeowners should consider

using less combustible building materials in the future. Educating the homeowners in techniques for protecting their homes is critical in these hot, dry environments.

Consistent with these recommendations are planned activities by the US Forest Service (Section 5.6.1.3 and Table 5.7) which include targeted fuels reduction activities on over 1,500 acres of Forest Service lands. These projects and others are consistent with the intent of this planning effort and are highly recommended for implementation. Natural fuels reduction work on National Forest System lands adjacent to the road and private property has the potential to minimize the chances for crown fire establishment and spread. These activities will increase the chances of effective fire control operations near structures.

4.5 Fire Fighting Resources and Capabilities

The Fire Fighting Resources and Capabilities information provided in this section is a summary of information provided by the Judith Basin County Cooperative Fire Management Plan and the Rural Fire Chiefs or Representatives of the Wildland Fire Fighting Agencies listed. Their answers to a variety of questions are summarized here. ***In an effort to correctly portray their observations, little editing to their responses has occurred.*** These summaries indicate their perceptions and information summaries.

4.5.1 Wildland Fire Districts

4.5.1.1 Montana Department of Natural Resources and Conservation

Lewistown Northeastern Land Office
406-538-7789

Available Resources:

Aircraft:

- Recon flights available with a County Fire Advisor if warranted and weather conditions permit
- Retardant aircraft available if warranted and weather conditions permit

Ground Resources:

- 15 programmable King portable radios
- 50-person mobile fire cache
- Mobile command trailer
- DSL-376 4x4 1-ton flatbed
- DSL-353 ½ ton 4x4 pickup
- DSL-838 ½ ton 4x4 pickup
- DSL-842 ½ ton 4x4 pickup
- DSL-919 ½ ton 4x4 pickup (IC for CAT team)
- DSL-257 ½ ton 4x4 pickup (IOFR for CAT team)

4.5.1.2 Bureau of Land Management

The Central Zone's fire suppression/operations resources are based in Lewistown at the Central Zone Fire Complex located at the Lewistown Airport, and the Little Rockies Fire Station located just north of Zortman, Montana.

In addition to BLM lands, the Central Zone is also responsible by agreement for initial attack on USFS lands in the Big and Little Snowy Mountains (Musselshell & Judith Ranger Districts). They also provide initial attack on wildland fires, under offset agreements for parts of Blaine, Phillips and Valley Counties. Lewistown Interagency Dispatch (LID) will be responsible for all IA dispatching functions.

Lewistown Interagency Dispatch Center
406-538-7461

4.5.1.3 U. S. Forest Service

USDA Forest Service

Lewis and Clark National Forest

Judith Ranger District

Stanford, MT

406-566-2292

The Judith Ranger District fire operations personnel and resources are located in Stanford, Montana (Judith Basin County). Dispatching for these resources is through the Great Falls Interagency Dispatch Center located in Great Falls, Montana.

In addition to USFS lands within the county, the Judith Ranger District provides initial attack on designated and private lands under two offset agreements.

The current (2004) district fire operations resources that are available:

District Fire Management Officer (ICT3)—2002 Dodge 4x4 ¾ ton pickup

District Assistant Fire Management Officer (ICT3-Trainee)—2000 Ford 4x4 ½ ton pickup

1 Type 6 Engine with 5 person crew (staffed 7 days/week with 3 person crew) 2002 Ford 4x4 F-550 with 300 gallons

1 Initial Attack handcrew (staffed 5 to 6 days/week with 6 person crew)—2004 Chevy 4x4, 6 passenger pickup

Additional non fire funded district personnel:

1- ICT3

3 – Type 2 firefighters

Total firefighting personnel on the Judith Ranger District is 18.

4.5.2 Rural Fire Districts

4.5.2.1 Geyser Volunteer Fire Department

Available Resources:

- 250 gallon engine, 1973 Chev K20, radio equipped, Frequencies Table 1
- 300 gallon engine w/foam, 1989 Chev K3500, radio equipped, Frequencies Table 1
- 1,800 gallon tender w/ fold-a-tank, 1980 GMC C7000, radio equipped, Freq. Table 1
- 200 gallon engine – Located at Raynesford, 1963 Dodge W200, radio equipped, Frequencies Table 1

4.5.2.2 Hobson Volunteer Fire Department

Available Resources:

- 1,250 gallon water tender w/ 1,500 gallon port-a-tank & foam 1982 Chev 2-ton, radio equipped, Frequencies Table 2
- 500 gallon water engine1965 IHC, 2-ton, radio equipped, Frequencies Table 2
- 350 gallon engine w/ foam, 1986 Chev 1-ton, radio equipped, Frequencies Table 2
- 200 gallon engine (State owned) – Located at Sapphire Village or Bernard Taylor, 1985 Chev 1-ton, (DSL-089) radio equipped, Frequencies Table 2
- 200 gallon engine – Located at Buffalo, 1998 Chev 3/4–ton, radio equipped, Frequencies Table 2
- 200 gallon engine – Located at Sapphire Village, 1977 ¾ ton Dodge
- 250 gallon with foam engine, 1995 Ford 1-ton

4.5.2.3 Raynesford Volunteer Fire Department

Available Resources:

- 320 gallon water engine w/ foam, 1975 Dodge W-30, radio equipped, Frequencies Table 1
- 200 gallon engine w/ foam (State owned)(DSL 272), 1979 Dodge W-20, radio equipped, Frequencies Table 1
- 2,000 gallon tender w/ port-a-tank and BB-4 pump,1981 Ford F-800, radio equipped, Frequencies 1
- 300 gallon engine w/ foam and BB-4 pump, 1997 Ford, F-350, radio equipped, Frequencies Table 1

4.5.2.4 Stanford Volunteer Fire Department

Available Resources:

- 500 gallon structure engine, 500 gpm, radio equipped, Frequencies Table 1
- 500 gallon engine w/ foam 1975 Ford F-500, (State owned) (DSL-251), radio equipped, Frequencies Table 1
- 300 gallon engine w/ foam 1984 Chev K-30, Gold 84, radio equipped, Frequencies Table 1
- 300 gallon engine 1994 Chev k-3500, Blue, radio equipped, Frequencies Table 1
- 1000 gallon engine, 1300 gpm (City only) Howe, radio equipped, Frequencies Table 1

4.5.2.5 Windham Volunteer Fire Department

Available Resources:

- 200 gallon engine (State owned)(DSL-780 w/foam) 1978 GMC K-35, radio equipped, Frequencies Table 1
- 300 gallon engine w/ foam, 1978 GMC K-35, radio equipped, Frequencies Table 1
- 200 gallon engine-Located at Dick Holzer, 1971 Ford, F-250
- 1,000 gallon engine w/ foam (State owned) (DSL-464), 1976 Dodge D-700, radio equipped, Frequencies Table 1
- 200 gallon engine – Located at Benchland, 1994 Chev K-30, radio equipped, Frequencies Table 1

4.5.2.5.1 Judith Basin County Support Equipment

- 3,000 gallon water tank – supply tank
- 1,700 gallon water tank – supply tank
- D-7 Dozer x2
- TD15 International Dozer
- John Deere 772 BH 6x6 Motor Grader
- 140 Cat Motor Grader x4
- Weed Spray Trucks w/250 gallon tanks and pumps
- 5th wheel trailer w/ 500 gallon supply tank
- ATV w/ saddle and front tank – 24 gallon capacity
- Chevy Truck w/ 800 gallon tank and pumps – sprayer
- Low band radios in all units
- Base unit at Stanford and Road Service Pickup

4.6 Issues Facing Judith Basin County Fire Protection

Judith Basin County Fire Protection has several issues requiring support and action to meet protection of County resources. Most County roads are in need of basic signage designation. To provide fire fighting resources, the County needs facility improvements with heating capability, maintenance and storage buildings, and it needs to develop with all Agencies a system to report all fires by ignition type, size and location.

4.7 Current Wildfire Mitigation Activities in Judith Basin County

4.7.1 Bureau of Land Management

Assistance activities potentially cover 14 counties within the Lewistown Field Office. Assistance to communities focuses on fire hazard assessment and mitigation planning, hazardous fuel reduction, natural resource-based economic development, fire education and Rural Fire Assistance.

Assistance agreements for assessments, planning, hazardous fuel reduction and landowner education have been signed with four county entities (Fergus, Chouteau, Lewis and Clark, and Teton counties) and one economic development council that covers three counties (Judith Basin, Fergus and Petroleum counties) within the field office area.

Projects currently underway through the assistance agreements include hazardous fuel reduction in Fergus, Chouteau and Lewis and Clark counties; county-wide fire mitigation

assessment and planning in Fergus, Judith Basin, Petroleum, Chouteau and Teton counties; individual community assessments in Lewis and Clark county; education and outreach to landowners in Judith Basin, Fergus and Petroleum counties.

The potential for biomass energy development is currently being pursued for school and medical facilities in Lewistown (Fergus County) and for schools in Judith Basin County. Such a project has the potential to result in energy savings for public buildings, create a market for natural resource small business, and tie in with hazardous fuel reduction plans on federal lands for both BLM and the U.S. Forest Service.

4.7.2 U.S. Forest Service Current Activities

The U.S Forest Service has over 20 projects planned and documented and is currently working on the summary of all wildfire mitigation activities on the Forest.

There is currently an Annual Operating Plan between Judith Basin County Fire Districts and the Lewis and Clark National Forest. This is a continuation of Annual Operations Plans that started in 2002. The purpose of this agreement is to implement the Cooperative Fire Protection Agreement on a local basis. This agreement is signed by the Northeastern Land Office, Montana DNRC; Judith Basin Commissioner, Chairman; and the Lewis and Clark National Forest, Forest Supervisor.

Structural assessments are on-going with Special Use Cabins and USFS managed structures. The USFS has assisted Judith Basin County on structural assessments in the Middle Fork Ranch areas. The USFS is willing to continue to assist the county in this endeavor.

Public fire education, fire training and fire prevention activities and assisting the Montana DNRC and Judith Basin County will continue.

Table 4.2. Past and Current US Forest Service Projects (located in Judith Basin County).

PAST			
Indian Hill	Treated 523 acres in 1997.	NFS lands north of Indian Hill.	Prescribed burning to maintain historically open grasslands.
Tollgate/Game Range	Treated 439 acres in 1998.	NFS lands and MT-FWP 3 miles west of Sapphire Village.	Prescribed burning for grassland and dry forest maintenance. Fuels reduction.
Sawmill/Tollgate	Treated 935 acres in 1999.	NFS and MT-FWP lands. 3 miles SW of Sapphire Village.	Prescribed burning for Ponderosa pine stand, Douglas fir and grassland maintenance. Fuels reduction.
Myers Slashing	Treated 140 acres in 2000.	NFS lands in eastern end of Little Belts (SW of Buffalo, MT)	Removing with chainsaws, conifer encroachment in historically open meadows. Resulting slash was being lopped and scattered to 18 inches.
South Game Range	Treated 1,100 acres in 2000.	NFS lands. North off Judith Station.	Prescribed burning for Ponderosa pine savannah restoration and fuels reduction.
South Game Range 2	Treated 140 acres in 2001.	NFS lands north of Middle Fork trailhead.	Prescribed burning for Ponderosa pine and grasslands restoration and fuels reduction.
South Game Range 3	Treated 125 acres in 2003.	NFS lands located northwest of Judith Station.	Prescribed burning for Ponderosa pine and grasslands restoration and fuels reduction.
Lonetree #2	Treated 50 acres in 2003	NFS lands located in Lonetree Park area.	Prescribed burning to maintain historically open grasslands.
Lonetree #1,3,4	Treated 160 acres in	NFS lands located in	Prescribed burning to maintain

	2004	Lonetree Park area.	historically open grasslands.
S. Judith WMA	Treated 125 acres in 2004.	NFS lands located NW of Judith Station.	Prescribed burning for Ponderosa pine restoration and fuels reduction.
CURRENT			
Indian Hill Mechanical	150 acres (currently being worked on)	NFS Lands in Indian Hill area.	Removing with chainsaws: conifer encroachment in historically open meadows. Resulting slash is being lopped and scattered to 18 inches.
Dry Wolf Cabin	5 acres	NFS lands located at Dry Wolf cabin.	Removed with chainsaws: excess trees, ladder fuels and ground fuels from around the USFS cabin. Created defensible space adjacent to the FS cabin. The resulting handpiles will be burned later by the USFS. Project is completed, except for handpile disposal.

Chapter 5: Treatment Recommendations

5 Overview

Critical to the implementation of this Wildland-Urban Interface Wildfire Mitigation Plan will be the identification of, and implementation of, an integrated schedule of treatments targeted at achieving an elimination of the lives lost, and reduction in structures destroyed, infrastructure compromised, and unique ecosystems damaged that serve to sustain the way-of-life and economy of Judith Basin County and the region. Since there are many land management agencies and hundreds of private landowners in Judith Basin County, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across all ownerships.

The Federal land management agencies in Judith Basin County, specifically the USDA Forest Service and the Bureau of Land Management, and the state land management agency, the Montana Department of Natural Resources and Conservation, are participants in this planning process and have contributed to its development. Where available, their schedule of WUI treatments has been summarized in this chapter to better facilitate a correlation between their identified planning efforts and the efforts of Judith Basin County.

5.1 Possible Fire Mitigation Activities

As part of the implementation of fire mitigation activities in Judith Basin County, a variety of management tools may be used. Management tools include but are not limited to the following:

- Homeowner and landowner education
- Building code changes for structures and infrastructure in the WUI
- Home site defensible zone through fuels modification
- Community defensible zone fuels alteration
- Access improvements
- Access creation
- Emergency response enhancements (training, equipment, locating new fire stations, new fire districts, merging existing districts)
- Regional land management recommendations for private, state, and federal landowners

Maintaining private property rights will continue to be one of the guiding principles of this plan's implementation. Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. Net gains to the public benefit will be an important component of decisions.

5.2 WUI Safety & Policy

Wildfire mitigation efforts must be supported by a set of policies and regulations at the county level that maintain a solid foundation for safety and consistency. The recommendations enumerated here serve that purpose. Because these items are regulatory in nature, they will not necessarily be accompanied by cost estimates. These recommendations are policy related in

nature and therefore are recommendations to the appropriate elected officials; debate and formulation of alternatives will serve to make these recommendations suitable and appropriate.

As part of the Policy of Judith Basin County in relation to this planning document, this entire **Wildland-Urban Interface Wildfire Mitigation Plan** should be reviewed annually at a special meeting of the Judith Basin County Commissioners, open to the public, where action items, priorities, budgets, and modifications can be made or confirmed. A written review of the plan should be approved by the Chairman of the County Commissioners, detailing plans for the year's activities, and made available to the general public ahead of the meeting. Amendments to the plan should be detailed at this meeting, documented, and attached to the formal plan as an amendment to the WUI Wildfire Mitigation Plan (signatures by the cooperators would be collected at the Chairman's discretion). Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every 5-year period following.

Prioritization of activities recommended in this plan should be made by the Judith Basin County Commissioners consistent with the recommendations made in Chapter 1 of this document. During the annual review of this plan, reprioritization can be justified in response to changing conditions and funding opportunities.

5.2.1 Existing Practices That Should Continue

Judith Basin County currently is implementing many projects and activities that, in their absence, could lead to increased wildland fire loss potential. By enumerating some of them here, it is the desire of the authors to point out successful activities.

- Existing rural addressing efforts have aided emergency responses well.
- The current 911 service in the county is currently dispatched out of Fergus County. Activities that build on the rural addressing and current emergency services to develop an Enhanced 911 service would serve the county well.
- Land management agencies within the county are conducting fuel reduction projects in response to increasing concerns of fire hazard in WUI areas. There is currently an Annual Operating Plan between Judith Basin County Fire Districts and the Lewis and Clark National Forest. This is a continuation of Annual Operations Plans that started in 2002.
- There is a County Cooperative Program with the Montana DNRC.
- There is a Mutual Aid Agreement with the Malmstrom Air Force Base and the county.

5.2.2 Proposed Activities

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.a: Amend existing building codes to apply equally to new single housing construction as it does to sub-divisions. Make sure existing policy is comprehensive to wildland fire risks.	**Protection of people and structures** by applying a standard of road widths, access, and building regulations suitable to insure new homes can be protected while minimizing risks to firefighters. (defensible space, roads and access management, water systems, building codes, signage, and maintenance of private forest and range lands)	**County Commissioners** in cooperation with Rural Fire Districts and Planning and Zoning.	• Year 1 debate and adoption of revised code (2004). • Review adequacy of changes annually, make changes as needed.
5.1.b: Develop County policy concerning building materials used in high-risk WUI areas on existing structures and new construction	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes in high-risk areas.	**County Commissioners Office** in cooperation with Rural Fire Departments	**Year 1 (2004) activity:** Consider and develop policy to address construction materials for homes and businesses located in high wildfire risk areas. Specifically, a County policy concerning wooden roofing materials and flammable siding, especially where juxtaposed near heavy wildland fuels.
5.1.c: Develop County policy concerning access in moderate to high-risk WUI areas where sub-divisions are built to insure adequate ingress and egress during wildfire emergencies.	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes in high-risk areas.	**County Commissioners Office** in cooperation with Rural Fire Departments	**Year 1 (2004) activity:** Consider and develop policy to address access language for homes and businesses located in moderate to high wildfire risk areas. Specifically, a County policy concerning road widths, turning radii, and number of multiple access points.
5.1.d: Develop a County Commissioner's Office policy to **support grant applications** for projects resulting from this plan.	**Protection of people and structures** by improving the ability of residents and organizations to implement sometimes costly projects.	**County Commissioners Office**	**Ongoing activity:** Support grant applications as requested in a manner consistent with applications from residents and organizations in Judith Basin County.
5.1.e. Develop a formal Rural Fire Coordinator position within the County to manage overhead responsibilities across all county fire districts.	**Protection of people and structures** by improving the ability of emergency response personnel to respond to threatened homes.	**County Commissioners Office** in cooperation with Rural Fire Departments	• Year 1 identify funding possibilities through grants or as a County permanent position (2004). • Fill the position (possible integration with Fergus County efforts).

5.3 People and Structures

The protection of people and structures will be tied together closely as the loss of life in the event of a wildland fire is generally linked to a person who could not, or did not, flee a structure threatened by a wildfire. The other incident is a fire fighter who suffers the loss of life during the combating of a fire. Many of the recommendations in this section will define a set of criteria for implementation while others will be rather specific in extent and application.

Many of the recommendations in this section involve education to increase awareness and teach mitigation strategies to the residents of Judith Basin County. These recommendations stem from a variety of factors including items that became obvious during the analysis of the public surveys, discussions during public meetings, and observations about choices made by residents living in the Wildland-Urban Interface. Unlike many other counties across the west, Judith Basin County residents demonstrated a higher awareness of wildfire risk factors such as the responses to the homeowner survey questions concerning home risk factors. The results of that survey pointed to a recognition of risk very similar to what "fire professionals" estimated in the county. However, while the risk was recognized, it was still documented, giving specialists the opportunity to concentrate efforts on conveying methods of reducing risk instead of just learning how to identifying it.

- Homeowners in the public mail survey ranked their home site wildfire risk factors very similar to the results of a random sample of home rankings completed by fire mitigation specialists.
- Discussions with the general public indicated an awareness of wildland fire risk, but they could not specifically identify risk factors.
- Over half of the respondents to the public mail survey indicated (51%) that they want to participate in educational opportunities focused on the WUI and what they can do to increase their home's chances of surviving a wildfire.

In addition to those items enumerated in Table 5.1, residents and policy makers of Judith Basin County should recognize certain factors that exist today, that in their absence would lead to an increase in the risk factors associated with wildland fires in the WUI of Judith Basin County. These items listed below should be encouraged, acknowledged, and recognized for their contributions to the reduction of wildland fire risks:

- **Livestock Grazing** in and around the communities of Judith Basin County has led to a reduction of many of the fine fuels that would have been found in and around the communities and in the wildlands of Judith Basin County. Domestic livestock not only eat these grasses, forbs, and shrubs, but also trample certain fuels to the ground where decomposition rates may increase. Livestock ranchers tend their stock, placing resource professionals into the forests and rangelands of the area where they may observe ignitions, or potentially risky activities. There are ample opportunities throughout the county to increase grazing. This could contribute to the economic output of the county as well as reduce the fuel loading. Livestock grazing in this region should be encouraged into the future as a low cost, positive tool of wildfire mitigation in the Wildland-Urban Interface and in the wildlands.
- **Forest Health*:*** The Lewis and Clark National Forest has been in the process of preparing an Environmental Impact Statement for treatment of Forest Service owned lands in the Judith River watershed. Proposed treatments are designed to treat dry ponderosa pine and Douglas-fir in order to restore conditions that will support historic natural fire patterns. Vegetation treatments are designed to reduce the fuel loads near

private in-holdings and along the Forest boundary to reduce the risk of uncharacteristic fire spread and intensities. Treatment of aspen, whitebark and limber pine, ponderosa pine, and grasslands are proposed to maintain a diversity of vegetation types across the landscape while providing valuable habitat to area wildlife. Treatments will incorporate commercial and non-commercial mechanical treatments as well as broadcast burning. Such treatment will help to reduce the probability of fires moving from within the forest to privately owned lands, thereby reducing potential for resource loss on lands across ownership boundaries. With the signing of the President's Healthy Forest Initiative, the timeline between planning and implementation may be dramatically reduced; thus, accelerating the timeline for restoration treatments on those lands most in need of management.

- **Agriculture** is a significant component of Judith Basin County's economy. The original conversion of these lands to agriculture from rangeland, was targeted at the most productive soils and juxtaposition to infrastructure. Many of these productive ecosystems were consequently also at some of the highest risk to wildland fires because biomass accumulations increased in these productive landscapes. The result today, is that much of the rangeland historically prone to frequent fires, has been converted to agriculture, which is at a much lower risk than prior to its conversion. The preservation of a viable agricultural economy in Judith Basin County is integral to the continued management of wildfire risk in this region.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.a: Youth and Adult Wildfire Educational Programs	**Protect people and structures** by increasing awareness of WUI risks, how to recognize risk factors, and how to modify those factors to reduce risk	Cooperative effort including: • Montana State University Extension Service • Montana Department of Natural Resources and Conservation • Bureau of Land Management • Local School Districts • U.S. Forest Service • Judith Basin Fire	Evaluate effectiveness of currently funded County education programs. If possible, use existing educational program materials and staffing. These programs may need reformatted using FireWISE materials. Formal needs assessment should be responsibility of Extension Service faculty and include the development of an integrated WUI educational series by year 3 (2006). Costs initially to be funded through existing budgets for these activities to be followed with grant monies to continue the programs as identified in the formal needs assessment. Detailed information on home defensible space requirements is contained on the FireWise CD, which can be purchased and personalized by the County. The CD costs $2,500.
5.2.b: Wildfire risk assessments of homes in identified communities	**Protect people and structures** by increasing awareness of specific risk factors of individual home sites in the at-risk landscapes. Only after these are completed can home site treatments follow.	To be implemented by **County Commissioners Office** in cooperation with the **Rural Fire Departments**. Actual work may be completed by Wildfire Mitigation Consultants or trained volunteers. U.S. Forest Service is willing to assist in home assessments	• **Cost:** Approximately $100 per home site for inspection, written report, and discussions with the homeowners. • There are approximately 951 housing units in Judith Basin County, roughly 300 (30%) of these structures would benefit from a home site inspection and budget determination for a total cost estimate of $30,000. • **Action Item:** Secure funding and contract to complete the inspections during years 1 & 2 (2004-05) • Home site inspection reports and estimated budget for each home site's treatments will be a requirement to receive funding for treatments through grants.
5.2.c: Home Site WUI Treatments	**Protect people, structures, and increase fire fighter safety** by reducing the risk factors surrounding homes in the WUI of Judith Basin County	**County Commissioners** in cooperation with Fire Mitigation Consulting company and Rural Fire Districts *Complete concurrently with 5.4.b.*	• Actual funding level will be based on the outcomes of the home site assessments and cost estimates • **Estimate** that treatments will cost approximately $1,000 per home site for a defensible space of roughly 150'. Approximately 300 homes in this category for an estimated cost of $300,000. Total home and business (non-governmental) assessed value in County is roughly $ $73,400,000 (average $36,995): **B/C Ratio of this treatment is approximately 245:1**, when considered across the entire county, and **37:1 on a per treated structure basis**. Actual B/C ration will vary by community. • Home site treatments can begin after the securing of funding

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
			for the treatments and immediate implementation in 2004 and will continue from year 1 through 5 (2008).
5.2.d: Community Defensible Zone WUI Treatments	**Protect people, structures, and increase fire fighter safety** by reducing the risk factors surrounding high risk communities in the WUI of Judith Basin County	**County Commissioners** in cooperation with Fire Mitigation Consultants and Rural Fire Districts	• Actual funding level will be based on the outcomes of the home site assessments and cost estimates. • **Years 2-5 (2004-08):** Treat high risk wildland fuels from home site defensible space treatments (5.4.c) to an area extending 400 feet to 750 feet beyond home defensible spaces, where steep slopes and high accumulations of risky fuels exist. Should link together home treatment areas. Treatments target high risk concentrations of fuels and not 100% of the area identified. To be completed only after or during the creation of home defensible spaces have been implemented. • Approximate average cost on a per structure basis is $750 depending on extent of home defensibility site treatments, estimate 100 homes in need of this type of treatment for a cost estimate of $75,000. Couple this cost with the home defensibility space costs of $300,000. The number of structures to benefit from these treatments include both homes and businesses (assessed value of $73,400,000). The **average B/C Ratio for these treatments combined in Judith Basin County is 196:1** when considered across the entire county (**30:1 B/C ratio per treated structure**). Actual B/C ratio by community will be variable.
5.2.e: Maintenance of Home Site WUI Treatments	**Protect people, structures, and increase fire fighter safety** by reducing the risk factors surrounding homes in the WUI of Judith Basin County	**County Commissioners Office** in cooperation with Rural Fire Departments and local home owners	• Home site defensibility treatments must be maintained periodically to sustain benefits of the initial treatments. • Each site should be assessed 5 years following initial treatment • Estimated re-inspection cost will be $50 per home site on all sites initially treated or recommended for future inspections ($15,000) • Follow-up inspection reports with treatments as recommended years 5 through 10.
5.2.f: Re-entry of Home Site WUI Treatments	**Protect people, structures, and increase fire fighter safety** by reducing risk factors around homes in the WUI of Judith Basin County	**County Commissioners Office** in cooperation with Rural Fire Departments and local home owners	• Re-entry treatments will be needed periodically to maintain the benefits of the initial WUI home treatments. Each re-entry schedule should be based on the initial inspection report recommendations, observations, and changes in local conditions. Generally occurs every 5-10 years.

Table 5.2. WUI Action Items for People and Structures.

Action Item	Goals and Objectives	Responsible Organization	Action Items, Planning Horizon and Estimated Costs
5.2.g: Access Improvements of bridges, cattle guards, and limiting road surfaces	**Protection of people, structures, infrastructure, and economy** by improving access for residents and fire fighting personnel in the event of a wildfire. Reduces the risk of a road failure that leads to the isolation of people or the limitation of emergency vehicle and personnel access during an emergency.	**County Roads and Bridges Department** in cooperation with US Forest Service, BLM, State of Montana (Dept of Transportation), and forestland or rangeland owners.	• **Year 1 (2004):** Update existing assessment of travel surfaces, bridges, and cattle guards in Judith Basin County County as to location. Secure funding for implementation of this project (grants) • **Year 2 (2005):** Conduct engineering assessment of limiting weight restrictions for all surfaces (e.g., bridge weight load maximums). Estimate cost of $10,000 which might be shared between County, USFS, BLM, State, and private based on landownership associated with road locations. • **Year 2 (2005):** Post weight restriction signs on all crossings, copy information to rural fire districts and wildland fire protection agencies in affected areas. Estimate cost at roughly $10-$12,000 for signs and posting. • **Year 3 (2006):** Identify limiting road surfaces in need of improvements to support wildland fire fighting vehicles and other emergency equipment. Develop plan for improving limiting surfaces including budgets, timing, and resources to be protected for prioritization of projects (benefit/cost ratio analysis). Create budget based on full assessment.
5.2.h: Access Improvements through road-side fuels management, especially Dry Wolf Road.	**Protection of people, structures, infrastructure, and economy** by improving access for residents and fire fighting personnel in the event of a wildfire. Allows for a road based defensible area that can be linked to a terrain based defensible areas.	**County Roads and Bridges Department** in cooperation with US Forest Service, BLM, State of Montana (Dept. of Transportation), and forestland or rangeland owners.	• **Year 1 (2004):** Update existing assessment of roads in Judith Basin County as to location. Secure funding for implementation of this project (grants). • **Year 2 (2005):** Specifically address access issues listed in column one, plus recreation areas, and others identified in assessment. Target 100’ on downhill side of roads and 75’ on uphill side for estimated cost of $15,000 per mile of road treated. If 120 miles of roadway are prioritized for treatment (est.) the cost would amount to $ 1,800,000. **B/C Ratio of 41:1 is achieved**, but is highly variable. Further, the total value of structures in the county is not “protected” by this type of treatment. • **Year 3 (2006):** Secure funding and implement projects to treat road-side fuels.

5.4 Infrastructure

Significant infrastructure refers to the communications, transportation (road and rail networks), energy transport supply systems (gas and power lines), and water supply that service a region or a surrounding area. All of these components are important to Judith Basin County. These networks are by definition a part of the Wildland-Urban Interface in the protection of people, structures, **infrastructure**, and unique ecosystems. Without supporting infrastructure a community's structures may be protected, but the economy and way of life lost. As such, a variety of components will be considered here in terms of management philosophy, potential policy recommendations, and on-the-ground activities.

Communication Infrastructure: This component of the WUI seems to be diversified across the county with multiple source and destination points, and a spread-out support network. Although site specific treatments will impact local networks directly, little needs to be done to insure the system's viability. To ensure good communications with the USFS and the BLM resources, a narrow band capability is needed and the radios need to be able to be placed in "scan mode" to monitor cooperators frequencies.

Transportation Infrastructure (road and rail networks): This component of the WUI has some potential limitations in Judith Basin County. Specific infrastructure components have been discussed in this plan.

Ignitions along highways are significant and should be addressed as part of the implementation of this plan. Various alternatives from herbicides to intensive livestock grazing coupled with mechanical treatments, have been suggested. These corridors should be further evaluated with alternatives implemented. A variety of approaches will be appropriate depending on the landowner, fuels present, and other factors. These ignitions are substantial and the potential risk of lives to residents in the area is significant.

Many roads in the county have limiting characteristics, such as narrow travel surfaces, sharp turning radii, low load limit bridges and cattle guards, and heavy accumulations of fuels adjacent to some roads. Some of these road surfaces access remote forestland and rangeland areas. While their improvements will facilitate access in the case of a wildfire, they are not necessarily the priority for treatments in the county.

Roads that have these inferior characteristics and access homes and businesses are the priority for improvements in the county. Specific recommendations for these roads are enumerated in Table 5.2.

Energy Transport Supply Systems (gas and power lines): (Judith Basin County - Appendix I) A number of power lines crisscross Judith Basin County. Nearly all of these power lines cross over rangeland ecosystems. When fires ignite in these vegetation types, the fires tend to be fast moving and burn at relatively low intensities. However, there is a potential for high temperatures and low humidity with high winds to produce enough heat and smoke to threaten power line stability. Most power line corridors have been cleared of vegetation both near the wires and from the ground below. It is the recommendation of this Wildfire Mitigation Plan that this situation be evaluated annually and monitored but that treatments not be specifically targeted at this time. The use of these areas as "fire breaks" should be evaluated further, especially in light of the treatments enumerated in this plan (eg., intensive livestock grazing, mechanical treatments, and herbicide treatments).

Water Supply: In some of Montana's communities, water is derived from surface flow that is treated and piped to homes and businesses. When wildfires burn a region, they threaten these watersheds by the removal of vegetation, creation of ash and sediment. As such, watersheds

should be afforded the highest level of protection from catastrophic wildfire impacts. In Judith Basin County, water is supplied to many homes by municipal wells or single home and multiple home wells.

5.4.1 Proposed Activities

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.a: Post FEMA "Emergency Evacuation Route" signs along the identified Primary and Secondary access routes in the county.	**Protection of people and structures** by informing residents and visitors of **significant infrastructure** in the county that will be maintained in the case of an emergency.	**Rural and Wildland Fire Districts and County Commissioners** in cooperation with the Montana Department of Natural Resources and Conservation.	• Purchase of signs (2004). • Posting roads and make information available to residents of the importance of Emergency Routes
5.3.b: Fuels mitigation of the FEMA "Emergency Evacuation Routes" in the county to insure these routes can be maintained in the case of an emergency. Signage on County Roads	**Protection of people and structures** by providing residents and visitors with ingress and egress that can be maintained during an emergency.	**County Commissioners** in cooperation with Rural Fire Districts and Roads Department.	• Full assessment of road defensibility and ownership participation (2004). • Implementation of projects (linked to item 5.2.g and 5.2.h).
5.3.c: County Wide Communications Plan including all cooperators. Radio system will need to be narrow band capable to ensure good communication between USFS and BLM	**Protection of people and structures** by providing enhanced communication within the county.	**County Commissioners** including cooperators.	• Schedule initial discussions on creating a county wide plan. • Seek funding sources for improvements suggested. • Create plan and implement.
5.3.d: Adopt official Road Name List and install signs which could include names and mileage to homes	**Protection of people and structures** by providing enhanced access capabilities in an emergency.	**County Commissioners** in cooperation with Rural Fire Districts and Roads Department.	• Purchase of signs. • Post roads

5.5 Resource and Capability Enhancements

There are a number of resource and capability enhancements identified by the rural and wildland fire fighting districts in Judith Basin County. All of the needs identified by the districts are in line with increasing the ability to respond to emergencies in the WUI and are fully supported by the planning committee.

Specific reoccurring themes of needed resources and capabilities include:

- Development of drafting sites in rural locations
- Improved radio capabilities within each district and for mutual aid operations
- Retention and recruitment of volunteers
- Training and development of rural firefighters in structure and wildland fire
- Enhancement of available equipment available for rural and city districts

- Develop a system to report all fires in one data base with ignition, acres and location documented.

The implementation of each issue will rely on either the isolated efforts of the fire districts or a concerted effort by the county to achieve equitable enhancements across all of the districts. Given historic trends, individual departments competing against neighboring departments for grant monies and equipment will not necessarily achieve region wide equity. However, the Snowy Mountain Development Corporation (SMDC), and the coordinator identified in 5.1.e above, may be uniquely suited to work with all of the districts serving Judith Basin County and adjacent counties to assist in the prioritization of needs. Once prioritized, the SMDC is in a position to assist these districts with identifying, competing for, and obtaining grants and equipment to meet these needs.

Table 5.4. WUI Action Items in Fire Fighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.a: Enhance radio availability in each district, link into existing dispatch, and improve range within the region, update to new digital, narrow band frequency adopted by feds and state.	**Protection of people and structures** by direct fire fighting capability enhancements.	**Montana Department of Natural Resources and Conservation** in cooperation with rural and wildland fire districts and County Commissioners	• **Year 1 (2004):** Summarize existing two-way radio capabilities and limitations. Identify costs to upgrade existing equipment and locate funding opportunities. • **Year 2 (2005):** Acquire and install upgrades as needed. • **Year 2-3 (2005-06):** Identify opportunities for radio repeater towers located in the region for multi-county benefits.
5.4.b: Retention of Volunteer Fire Fighters	**Protection of people and structures** by direct fire fighting capability enhancements.	**Rural and Wildland Fire Districts** working with broad base of county citizenry to identify options, determine plan of action, and implement it.	• 5 Year Planning Horizon, extended planning time frame • Target an increased recruitment (+10%) and retention (+20% longevity) of volunteers • **Year 1 (2004):** Develop incentives program and implement it.
5.4.c: Increased training and capabilities of fire fighters	**Protection of people and structures** by direct fire fighting capability enhancements.	**Rural and Wildland Fire Districts** working with the **BLM, DNRC, and USFS** for wildland training opportunities and with the **Fire Service Training School** for structural fire fighting training.	• **Year 1 (2004):** Develop a multi-county training schedule that extends 2 or 3 years in advance (continuously). • Identify funding and resources needed to carry out training opportunities and sources to acquire. • Year 1 (2004): Begin implementing training

Table 5.4. WUI Action Items in Fire Fighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
			opportunities for volunteers.
5.4.d. Acquisition of equipment needed for wildland and structure fire fighting. **Facility improvements, heating, storage, maintenance.**	**Protection of people and structures** by direct fire fighting capability enhancements.	**County Commissioners, Judith Basin County Fire Coordinator, Snowy Mountain Development Corporation, Rural and City Fire Districts.**	• Develop priority list of equipment and develop budgets • Create prioritization for acquisition • Seek grants or other funding sources and compete for them to acquire the needed equipment.

5.6 Regional Land Management Recommendations

In section 5.3 of this plan, reference was given to the role that forestry, grazing and agriculture have in promoting wildfire mitigation services through active management. Judith Basin County is dominated by wide expanses of rangelands intermixed with communities and rural houses.

Wildfires will continue to ignite and burn fuels and homes depending on the weather conditions and other factors enumerated earlier. However, active land management that modifies fuels, promotes healthy range and forestland conditions, and promotes the use of these natural resources (consumptive and non-consumptive) will insure that these lands have value to society and the local region. We encourage the US Forest Service, the Bureau of Land Management, the Montana Department of Natural Resources and Conservation, Industrial land owners, private land owners, and all other landowners in the region to actively administer their Wildland-Urban Interface lands in a manner consistent with the management of reducing fuels and risks in this zone.

5.6.1 Bureau of Land Management Planned and Potential Treatments

Lewistown Field Office out-year planning and budgeting for treatments is developed after identification and prioritization of treatment areas. Wildland urban interface communities on the Federal Register have received priority planning and treatment. Future projects will usually be identified in the Risk Assessment Mitigation Strategy (RAMS). Project planning and treatment objectives are in accordance with Resource Management Plans and area-specific planning documents.

The following proposed treatments for Fergus, Petroleum, and Judith Basin Counties have been provided by the Bureau of Land Management.

5.6.1.1 Proposed Prescribed Fire Projects in the Central Zone Region

Table 5.5 Bureau of Land Management Prescribed Fire Projects in Central Zone region.

Project Name	FMU	Acres*	Current * Condition Class (acres)	Projected * Condition Class 2(acres)	Projected * Condition Class 1 (acres)	Local Contractor
Armells Creek Watershed	Breaks, Monument	12,200	3-6,000 2-6,600	6,000	5,000	N/A
Arrow Creek	Breaks, Monument	5,795	3-2,030 2-3,769	1,500	1,000	N/A
Beaver Creek	Snowies	30	2-30		30	N/A
Becket	Island Ranges	400	3-400	40	350	N/A
BR-12	Prairie Pothole	150	2-150		75	N/A
Driftwood	Prairie Pothole	200	2-200		145	N/A
Gilmore	Big Open, Monument	1,100	2-950		700	N/A
Grass Range	Island Ranges	160	3-50 2-110	15	90	N/A
Havre Breaks	Breaks	30,000	3-5,000 2-20,000 1-5,000	3,000	2,000	N/A
Judith Mountains	Island Ranges	500	3-500	200		N/A
Lincoln Gulch	Island Ranges	30	3-30	20		N/A
Lion Coulee	Big Open, Monument	2,780	3-1,000 2-1,780	550	1,300	N/A
Lonesome Lake	Big Open	13,120	3-700 2-12,420	200	10,000	N/A
Musselshell Breaks	Breaks	5,000	3-2,000 2-3,000	1,000	1,500	N/A
North Moccasins	Island Ranges	300	3-300	200		N/A
North Peterson	Prairie Potholes	200	2-200		75	N/A
Rogers Pass	Front	250	3-250	120		N/A
Upper Missouri	Breaks	10,000	3-6,000 2-4,000	3,500	3,000	N/A

5.6.1.2 Proposed Non-Fire Fuels Treatments in the Central Zone Region

This table describes planning and implementation for non-fire treatments. It includes direction for; annual activities for implementation, equipment and seasonal use restrictions, effects monitoring requirements, and reporting, documentation, etc.

Table 5.6 Bureau of Land Management Non-Fire Fuels Treatments in Central Zone Region.

Project Name	FMU	WUI	Acres Treated	By-Product Utilization	Local Contractor	Condition Class 2 moved to 1 (acres)	Condition Class 3 moved to 2 or 1 (acres)	Current Condition Class (acres)
Maiden (JMLA)	Island Ranges	Yes	500	0	Not yet contracted	0	500	3 – 500
North Moccasins (JMLA)	Island Ranges	Yes	80	0	No	0	80	3 – 80
Dog Creek (Arrow Ck EA)	Breaks	No	300	0	No	300	0	2 – 300
Rogers Pass (Rogers Pass CMP and EA)	Front	Yes	250	0	Not yet contracted	130	120	3 – 250

5.6.1.3 Proposed Fuels Treatment Projects USFS, Judith Ranger District

Table 5.7 US Forest Service Proposed Fuels Treatment Projects, Judith Ranger District

Project	Summary	Location	Description
Weatherwax	Treat 1,042 acres	National Forest System (NFS) Lands adjacent to private lands near Grendah Mtn.	Slashing small diameter trees (non-merch.) and prescribed burning to restore whitebark pine stands. Reduce the risk of stand replacement fire.
Lost Fork	Treat 1,121 acres	NFS lands located in upper end of Lost Fork drainage.	Slashing small diameter trees (non-merch.) and prescribed burning to restore whitebark pine stands. Reduce the risk of stand replacement fire.
Big Hill	Treat 40 acres	NFS lands in Big Hill Creek drainage	Regeneration harvest of lodgepole pine stands with patch clearcuts (not to exceed 40 acres). Slash treatment will be a mix of broadcast burns and/or excavator piling.
Trib A	Treat 17 acres	NFS lands west of Russian Creek.	Regeneration harvest of lodgepole pine stands with patch clearcut. Slash treatment will be a mix of broadcast burns and/or excavator piling.
Deadhorse Creek	Treat 80 acres	NFS lands in Deadhorse Cr. drainage.	Regeneration harvest of lodgepole pine stands with patch clearcuts (not to exceed 40 acres). Slash treatment will be a mix of broadcast burns and/or excavator piling.
Russian Creek	Treat 150 acres	NFS lands, southwest of private land.	Regeneration harvest of lodgepole pine stands with patch clearcuts (not to exceed 40 acres). Slash treatment will be a mix of broadcast burns and/or excavator piling.
Russian Flat	Treat 1,327 acres	NFS lands north and northwest of Trask Ranch subdivision.	Commercial thinning on approximately 20-25% of the area. Treat all of the area with prescribed fire.
High Spring Creek	Treat 1,551 acres	NFS lands located north and NW of Trask Ranch.	Commercial thin approx 80 acres, slash 272 acres and prescribed burning on 1,551 acres. Restoration of ponderosa pine savannah.

Table 5.7 US Forest Service Proposed Fuels Treatment Projects, Judith Ranger District

Project	Summary	Location	Description
Dry Pole	Treat 1,609 acres	NFS lands located 2-3 miles east of Trask Ranch subdivision.	Slashing small diameter Douglas fir and Ponderosa pine trees and prescribed burning to maintain limber pine, ponderosa pine stands. Fuels reduction.
Waite Creek	Treat 2,919 acres	NFS lands adjacent to private land. East of Brown's Gulch.	Slashing some small diameter trees followed by prescribed fire. Fuel reduction adjacent to private land.
Indian Hill	Treat 1,276 acres	NFS lands in Indian Hill area.	Slash small diameter trees and burn to maintain grasslands and maintain ponderosa pine and limber pine stands. Fuels reduction adjacent to private land.
Hay Canyon	Treat 1,069 acres	NFS lands. Lower portion of Hay Canyon.	Commercial thin approx. 23 acres, slash approx 268 acres Prescribed burning on 1,069 acres for ponderosa pine stand maintenance. Fuels reduction.
Ettien Ridge	Treat 820 acres	NFS lands. Lower Ettien ridge area. SW of Judith Station	Slashing small diameter trees and burning to restore grasslands. Fuels reduction.
Bower Creek	Treat 411 acres	NFS lands. North of Indian Hill adjacent to private land	Prescribed burning for grassland maintenance. Limited fuels reduction.
Middle Fork	Treat 1,514 acres	NFS lands In Judith Station area.	Commercial thin in ponderosa pine and Douglas fir stands followed by Prescribed burning. Fuels treatment adjacent to private land.
Judith Guard Station	Treat 884 acres	NFS lands. In Judith Station area.	Prescribed burning for grassland restoration and ponderosa pine stand maintenance. Fuels treatment adjacent to private land.
Woodchopper Ridge	Treat 2,866 acres	NFS lands West of Yogo crossing.	Prescribed burning to maintain PP and grasslands. Fuels reduction upwind form private lands.
Yogo	Treat 344 acres	NFS lands North of Yogo mine.	Prescribed burning for grassland and dry forest mtce. Fuels reduction adjacent to private lands
Sawmill	Treat 1,298 acres	NFS lands. North of Yogo creek.	Commercial thin approx 130 acres along existing system road. Prescribed burning on 1,298 acres. Ponderosa pine stand mtce. Fuels reduction adjacent to private lands.
Skunk Creek	Treat 838 acres	NFS lands. North of Yogo Creek. Near old Yogo townsite.	Prescribed burning for Ponderosa pine savannah restoration and fuels reduction. Adjacent to private lands.
Game Range	Treat 2,126 acres	NFS lands, possibility to include MT FWP lands. Adjacent to the Judith river WMA on west side.	Prescribed burning for grassland restoration and ponderosa pine stand enhancement. Fuels reduction.
Blacktail Hills	Proposed project would treat up to 2000 acres of dry site grasslands, ponderosa pine and Douglas-fir stands	National Forest Systems (NFS) Lands adjacent to private lands.	Treat NFS lands adjacent to private land. Treatments may include commercial thinning, pre-commercial thinning, slashing, piling, mechanical and prescribed fire. Fuels reduction adjacent to private land.

Chapter 6: Supporting Information

6

6.1 List of Tables

6.2 List of Figures

6.3 List of Preparers

The following personnel participated in the formulation, compilation, editing, and analysis of alternatives for this assessment.

Table 6.1. List of Preparers

Name	Affiliation	Role
William E. Schlosser, Ph.D.	Northwest Management, Inc.	**Lead Author,** Project Manager, GIS Analyst, Natural Resource Economist, Hazard Mitigation Specialist
Gary Ellingson, B.S.	Northwest Management, Inc.	Resource Management Specialist, Deputy Project Manager
Vincent P. Corrao, B.S.	Northwest Management, Inc.	Resource Management Specialist
Tera Duman, B.S.	Northwest Management, Inc.	Natural Resource Manager, Fire Control Technician
Toby Brown, B.S.	Northwest Management, Inc.	Natural Resource Manager, Fire Control Tech.
John A. Erixson, M.S.	Northwest Management, Inc.	Range Management, Fire Specialist
Dennis S. Thomas	Northwest Management, Inc.	Fire & Fuels Specialist, Prescribed Burning
Ken Homik, M.S.	Northwest Management, Inc.	Fire Use & Air Quality Specialist
Vaiden E. Bloch, M.S.	Northwest Management, Inc.	GIS Analyst
Greg Bassler, M.S.	Northwest Management, Inc.	Roads Engineer, Harvest Manager

6.4 Signature Pages

This **Judith Basin County Wildland-Urban Interface Wildfire Mitigation Plan** has been developed in cooperation and collaboration with the representatives of the following organizations, agencies, and individuals.

By: Richard Cervenka, Chairperson Judith Basin County Commissioner	Date
By: Edward Arnott Judith Basin County Commissioner	Date
By: Jerome Kolar Judith Basin County Commissioner	Date
By: Clive Rooney Montana Department of Natural Resources and Conservation	Date
By: Lesley W. Thompson, Forest Supervisor USDA Forest Service	Date
By: USDI Bureau of Land Management	Date
By: Mark Schlepp Fish, Wildlife & Parks Judith River State Wildlife Management Area	
By: Bruce Evans Geyser Volunteer Fire Department	Date

By: Bernard Taylor Hobson Volunteer Fire Department	Date
By: Bonnie Ostertag Judith Basin Diseaster & Emergency Services	
By: Steve Hedstrom Raynesford Volunteer Fire Department; Fire Warden, Judith Basin County	Date
By: Bing Schmitt Stanford Volunteer Fire Department	Date
By: Tim Crosmer Windham Volunteer Fire Department	Date
By: Kathie Bailey Snowy Mountain Development Corporation	Date
By: William E. Schlosser, Ph.D. Project Manager–Judith Basin County WUI Wildfire Mitigation Plan, Lead Author Forester–Northwest Management, Inc.	Date

6.5 Glossary of Terms

Anadromous - Fish species that hatch in fresh water, migrate to the ocean, mature there, and return to fresh water to reproduce (Salmon & Steelhead).

Appropriate Management Response - Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Biological Assessment - Information document prepared by or under the direction of the Federal agency in compliance with U.S. Fish and Wildlife standards. The document analyzes potential effects of the proposed action on listed and proposed threatened and endangered species and proposed critical habitat that may be present in the action area.

Backfiring - When attack is indirect, intentionally setting fire to fuels inside the control line to contain a rapidly spreading fire. Backfiring provides a wide defense perimeter, and may be further employed to change the force of the convection column.

Blackline - Denotes a condition where the fireline has been established by removal of vegetation by burning.

Burning Out - When attack is direct, intentionally setting fire to fuels inside the control line to strengthen the line. Burning out is almost always done by the crew boss as a part of line construction; the control line is considered incomplete unless there is no fuel between the fire and the line.

Canyon Grassland - Ecological community in which the prevailing or characteristic plants are grasses and similar plants extending from the canyon rim to the rivers edge.

Confine - Confinement is the strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Contingency Plans: Provides for the timely recognition of approaching critical fire situations and for timely decisions establishing priorities to resolve those situations.

Control Line - An inclusive term for all constructed or natural fire barriers and treated fire edge used to control a fire.

Crew - An organized group of firefighters under the leadership of a crew boss or other designated official.

Crown Fire - A fire that advances from top to top of trees or shrubs more or less independently of the surface fire. Sometimes crown fires are classed as either running or dependent, to distinguish the degree of independence from the surface fire.

Disturbance - An event which affects the successional development of a plant community (examples: fire, insects, windthrow, timber harvest).

Disturbed Grassland - Grassland dominated by noxious weeds and other exotic species. Greater than 30% exotic cover.

Diversity - The relative distribution and abundance of different plant and animal communities and species within an area.

Drainage Order - Systematic ordering of the net work of stream branches, (e.g., each non-branching channel segment is designated a first order stream, streams which only receive first order segments are termed second order streams).

Duff - The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles, and leaves.

Ecosystem - An interacting system of interdependent organisms and the physical set of conditions upon which they are dependent and by which they are influenced.

Ecosystem Stability - The ability of the ecosystem to maintain or return to its steady state after an external interference.

Ecotone - The area influenced by the transition between plant communities or between successional stages or vegetative conditions within a plant community.

Energy Release Component - The Energy Release Component is defined as the potential available energy per square foot of flaming fire at the head of the fire and is expressed in units of BTUs per square foot.

Equivalent Clearcut Area (ECA) - An indicator of watershed condition, which is calculated from the total amount of crown removal that has occurred from harvesting, road building, and other activities based on the current state of vegetative recovery.

Exotic Plant Species - Plant species that are introduced and not native to the area.

Fire Adapted Ecosystem - An arrangement of populations that have made long-term genetic changes in response to the presence of fire in the environment.

Fire Behavior - The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Forecast - Fire behavior predictions prepared for each shift by a fire behavior analysis to meet planning needs of fire overhead organization. The forecast interprets fire calculations made, describes expected fire behavior by areas of the fire, with special emphasis on personnel safety, and identifies hazards due to fire for ground and aircraft activities.

Fire Behavior Prediction Model - A set of mathematical equations that can be used to predict certain aspects of fire behavior when provided with an assessment of fuel and environmental conditions.

Fire Danger - A general term used to express an assessment of fixed and variable factors such as fire risk, fuels, weather, and topography which influence whether fires will start, spread, and do damage; also the degree of control difficulty to be expected.

Fire Ecology - The scientific study of fire's effects on the environment, the interrelationships of plants, and the animals that live in such habitats.

Fire Exclusion - The disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

Fire Intensity Level - The rate of heat release (BTU/second) per unit of fire front. Four foot flame lengths or less are generally associated with low intensity burns and four to six foot flame lengths generally correspond to "moderate" intensity fire effects. High intensity flame lengths are usually greater than eight feet and pose multiple control problems.

Fire Prone Landscapes – The expression of an area's propensity to burn in a wildfire based on common denominators such as plant cover type, canopy closure, aspect, slope, road density, stream density, wind patterns, position on the hillside, and other factors.

Fireline - A loose term for any cleared strip used in control of a fire. That portion of a control line from which flammable materials have been removed by scraping or digging down to the mineral soil.

Fire Management - The integration of fire protection, prescribed fire and fire ecology into land use planning, administration, decision making, and other land management activities.

Fire Management Plan (FMP) - A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use plan. This plan is supplemented by operational procedures such as preparedness, preplanned dispatch, burn plans, and prevention. The fire implementation schedule that documents the fire management program in the approved forest plan alternative.

Fire Management Unit (FMU) - Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that set it apart from management characteristics of an adjacent unit. FMU's are delineated in FMP's. These units may have dominant management objectives and preselected strategies assigned to accomplish these objectives.

Fire Occurrence - The number of wildland fires started in a given area over a given period of time. (Usually expressed as number per million acres.)

Fire Prevention - An active program in conjunction with other agencies to protect human life, prevent modification, of the ecosystem by human-caused wildfires, and prevent damage to cultural resources or physical facilities. Activities directed at reducing fire occurrence, including public education, law enforcement, personal contact, and reduction of fire risks and hazards.

Fire Regime - The fire pattern across the landscape, characterized by occurrence interval and relative intensity. Fire regimes result from a unique combination of climate and vegetation. Fire regimes exist on a continuum from short-interval, low-intensity (stand maintenance) fires to long-interval, high-intensity (stand replacement) fires.

Fire Retardant - Any substance that by chemical or physical action reduces flareability of combustibles.

Fire Return Interval - The number of years between two successive fires documented in a designated area.

Fire Risk - The potential that a wildfire will start and spread rapidly as determined by the presence and activities of causative agents.

Fire Severity - The effects of fire on resources displayed in terms of benefit or loss.

Foothills Grassland - Grass and forb co-dominated dry meadows and ridges. Principle habitat type series: bluebunch wheatgrass and Idaho fescue.

Fuel - The materials which are burned in a fire; duff, litter, grass, dead branchwood, snags, logs, etc.

Fuel Break - A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Fuel Loading - Amount of dead fuel present on a particular site at a given time; the percentage of it available for combustion changes with the season.

Fuel Model - Characterization of the different types of wildland fuels (trees, brush, grass, etc.) and their arrangement, used to predict fire behavior.

Fuel Type - An identifiable association of fuel elements of distinctive species; form, size, arrangement, or other characteristics, that will cause a predictable rate of fire spread or difficulty of control, under specified weather conditions.

Fuels Management - Manipulation or reduction of fuels to meet protection and management objectives, while preserving and enhancing environmental quality.

Gap Analysis Program (GAP) - Regional assessments of the conservation status of native vertebrate species and natural land cover types and to facilitate the application of this information to land management activities. This is accomplished through the following five objectives:

1. Map the land cover of the United States
2. Map predicted distributions of vertebrate species for the U.S.
3. Document the representation of vertebrate species and land cover types in areas managed for the long-term maintenance of biodiversity
4. Provide this information to the public and those entities charged with land use research, policy, planning, and management
5. Build institutional cooperation in the application of this information to state and regional management activities

Habitat - A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Heavy Fuels - Fuels of a large diameter, such as snags, logs, and large limbwood, which ignite and are consumed more slowly than flash fuels.

Hydrologic Unit Code - A coding system developed by the U. S. Geological Service to identify geographic boundaries of watersheds of various sizes.

Hydrophobic - Resistance to wetting exhibited by some soils, also called water repellency. The phenomena may occur naturally or may be fire-induced. It may be determined by water drop penetration time, equilibrium liquid-contact angles, solid-air surface tension indices, or the characterization of dynamic wetting angles during infiltration.

Human-Caused Fires - Refers to fires ignited accidentally (from campfires or smoking) and by arsonists; does not include fires ignited intentionally by fire management personnel to fulfill approved, documented management objectives (prescribed fires).

Intensity - The rate of heat energy released during combustion per unit length of fire edge.

Inversion - Atmospheric condition in which temperature increases with altitude.

Ladder Fuels - Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Landsat Imagery - Land remote sensing, the collection of data which can be processed into imagery of surface features of the Earth from an unclassified satellite or satellites.

Landscape - All the natural features such as grasslands, hills, forest, and water, which distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

Lethal - Relating to or causing death; extremely harmful.

Lethal Fires - A descriptor of fire response and effect in forested ecosystems of high-severity or severe fire that burns through the overstory and understory. These fires typically consume large woody surface fuels and may consume the entire duff layer, essentially destroying the stand.

Litter - The top layer of the forest floor composed of loose debris, including dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Maximum Manageable Area - The boundary beyond which fire spread is completely unacceptable.

Metavolcanic - Volcanic rock that has undergone changes due to pressure and temperature.

Minimum Impact Suppression Strategy (MIST) - "Light on the Land." Use of minimum amount of forces necessary to effectively achieve the fire management protection objectives consistent with land and resource management objectives. It implies a greater sensitivity to the impacts of suppression tactics and their long-term effects when determining how to implement an appropriate suppression response.

Mitigation - Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

Monitoring Team - Two or more individuals sent to a fire to observe, measure, and report its behavior, its effect on resources, and its adherence to or deviation from its prescription.

National Environmental Policy Act (NEPA) - This act declared a national policy to encourage productive and enjoyable harmony between humans and their environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and will stimulate the health and welfare of humankind; to enrich the understanding of important ecological systems and natural resources; and to establish a Council on Environmental Quality.

National Fire Management Analysis System (NFMAS) - The fire management analysis process, which provides input to forest planning and forest and regional fire program development and budgeting.

Native - Indigenous; living naturally within a given area.

Natural Ignition - A wildland fire ignited by a natural event such as lightning or volcanoes.

Noncommercial Thinning - Thinning by fire or mechanical methods of precommercial or commercial size timber, without recovering value, to meet MFP standards relating to the protection/enhancement of adjacent forest or other resource values.

Notice of Availability - A notice of Availability published in the Federal Register stating that an EIS has been prepared and is available for review and comment (for draft) and identifying where copies are available.

Notice of Intent - A notice of Intent published in the Federal Register stating that an EIS will be prepared and considered. This notice will describe the proposed action and possible alternatives, the proposed scoping process, and the name and address of whom to contact concerning questions about the proposed action and EIS.

Noxious Weeds - Rapidly spreading plants that have been designated "noxious" by law which can cause a variety of major ecological impacts to both agricultural and wild lands.

Planned Ignition - A wildland fire ignited by management actions to meet specific objectives.

Prescribed Fire - Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescription - A set of measurable criteria that guides the selection of appropriate management strategies and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Programmatic Biological Assessment - Assesses the effects of the fire management programs on Federally listed species, not the individual projects that are implemented under these programs. A determination of effect on listed species is made for the programs, which is a valid assessment of the potential effects of the projects completed under these programs, if the projects are consistent with the design criteria and monitoring and reporting requirement contained in the project description and summaries.

Reburn - Subsequent burning of an area in which fire has previously burned but has left flareable light that ignites when burning conditions are more favorable.

Riparian Habitat Conservation Areas (RHCA) - Portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris, and nutrient delivery systems.

Riparian Management Objectives (RMO) - Quantifiable measures of stream and streamside conditions that define good fish habitat and serve as indicators against which attainment or progress toward attainment of goals will be measured.

Road Density - The volume of roads in a given area (mile/square mile).

Scoping - Identifying at an early stage the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the environmental analysis accordingly.

Seral - Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition.

Serotinous - Storage of coniferous seeds in closed cones in the canopy of the tree. Serotinous cones of lodgepole pine do not open until subjected to temperatures of 113 to 122 degrees Fahrenheit causing the melting of the resin bond that seals the cone scales.

Stand Replacing Fire - A fire that kills most or all of a stand.

Sub-basin - A drainage area of approximately 800,000 to 1,000,000 acres, equivalent to a 4th - field Hydrologic Unit Code.

Surface Fire - Fire which moves through duff, litter, woody dead and down, and standing shrubs, as opposed to a crown fire.

Watershed - The region draining into a river, river system, or body of water.

Wetline - Denotes a condition where the fireline has been established by wetting down the vegetation.

Wildland Fire - Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP) - A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two-three stages of the WFIP completed while some fires that receive a suppression response may only have a portion of Stage I completed).

Wildland Fire Situation Analysis (WFSA) - A decision making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Use - The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in FMP's. Operational management is described in the WFIP. Wildland fire use is not to be confused with "fire use", which is a broader term encompassing more than just wildland fires.

Wildland Fire Use for Resource Benefit (WFURB) - A wildland fire ignited by a natural process (lightning), under specific conditions, relating to an acceptable range of fire behavior and managed to achieve specific resource objectives.

6.6 Literature Cited

Agee, J.K. 1993. Fire ecology of the Pacific Northwest forests. Washington: Island Press.

Agee, J.K. 1998. The Landscape Ecology of western Forest Fire Regimes. Northwest Science, Vol. 72, Special Issue 1998.

Anderson, H. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service, Intermountain Forest and Range Experiment Station. INT-GTR-122. 22 pp.

Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

Brown, J.K. 1995. Fire regimes and their relevance to ecosystem management. Pages 171-178 *In* Proceedings of Society of American Foresters National Convention, Sept. 18-22, 1994, Anchorage, AK. Society of American Foresters, Wash. DC.

Dillman, D.A. 1978. Mail and Telephone Surveys: The Total Design Method. Hoboken: John Wiley & Sons, Incorporated. 344 p.

Fiedler, Carl E., Charles E. Keegan III, Chris W. Woodall, Todd A. Morgan, Steve H. Robertson, John T. Chmelik. 2001. A STRATEGIC ASSESSMENT OF FIRE HAZARD IN MONTANA. Report submitted to the Joint Fire Sciences Program, September 29, 2001. Pp. 39.

Hann, W.J., Bunnell, D.L. 2001. Fire and land management planning and implementation across multiple scales. Int. J. Wildland Fire. 10:389-403.

Hardy, C.C., Schmidt, K.M., Menakis, J.M., Samson, N.R. 2001. Spatial data for national fire planning and fuel management. International Journal of Wildland Fire 10:353-372.

Holsapple, L.J., Snell, K. 1996. Wildfire and prescribed fire scenarios in the Columbia River Basin: relationship to particulate matter and visibility. In: Keane, R.E., Jones, J.L., Riley, L.S., Hann, W.J., tech. eds. Compilation of administrative reports: multi-scale landscape dynamics in the Basin and portions of the Klammath and Great basins. On file with: U. S. Department of Agriculture, Forest Service, Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

Homer, C.G. 1998. Idaho/western Wyoming landcover classification report and metadata. Department of Geography and Earth Resources. Utah State University. Logan, UT 84322-9635. chomer@gis.usu.edu

Huff, M.H., Ottmar, R.D., Alvarado, E., et al. 1995. Historical and current forest landscapes in eastern Oregon and Washington. Part II: Linking vegetation characteristics to potential fire behavior and related smoke production. Gen. Tech. Rep. PNW-GTR-355. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 43p. (Everett, Richard L., team leader; Eastside forest health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.).

Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosytems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.

Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.

Levinson, D.H. 2002. Montana/Idaho Airshed Group; Operating Guide. Montana / Idaho Airshed Group, Missoula, MT 59808

Louks, B. 2001. Air Quality PM 10 Air Quality Monitoring Point Source Emissions; Point site locations of DEQ/EPA Air monitoring locations with Monitoring type and Pollutant. Idaho Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Id.

McCoy, L., K. Close, J. Dunchrack, S. Husari, and B. Jackson. 2001. May 6 –24, 2001. Cerro Grande Fire Behavior Narrative.

MacDonald, L. H.; Smart, A.W.; and Wissmar, R.C. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. USEPARegion 10 Report No. 910/9-91-001.

Montana Department of Natural Resources and Conservation. Division of Forestry. 2004. Fire and Aviation Management Bureau. Missoula, Montana.Information posted at agency's website at http://dnrcapps.discoveringmontana.com/forestry/dnrcfiresite/Prevention_NFP/NFPinMT.aspx.

Montana Department of Natural Resources and Conservation. 2004. Water Resources Division. Information posted at agencies website at http://www.dnrc.state.mt.us/wrd/home.htm.

National Interagency Fire Center. 2003. Information posted on the Agency's Internet web site at http://www.nifc.gov/

National Register of Historic Places. 2003. Internet web site listings for Judith Basin County, Montana. On the Internet at www.nationalregisterofhistoricalplaces.com

Northern Rockies Coordinating Group (NRCG). July 1, 2004. Information posted at agency's website at http://www.fs.fed.us/r1/fire/nrcg/about_index.htm.

Norton, P. 2002. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment, June 20, 2002. Fish and Wildlife Service, Bear Valley National Wildlife Refuge.

Ottmar, Roger D.; Alvarado, E.; Hessburg, P.F.; [and others]. 1996. Historical and current forest and range landscapes in the interior Columbia River basin and portions of the Klammath and Great basins. Part III: Linking vegetation patterns to potential smoke production and fire behavior. Draft report. On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of interior, Bureau of Land management; Interior Columbia Basin Ecosystem Management project, 112 E. Poplar, Walla Walla, WA.

Polzin, P.E. 1998. Regional Economic Impacts in the Northern Plains and Rocky Mountain States. in Conference proceedings titled, "Markets, Prices, Policies, and Risks: The Economic Future of Agriculture in the Northern Plains". Montana State University, Bozeman, MT. May 14-15, 1998.

Quigley, T. and S. Arbelbide (Tech. Editors). 1997. An assessment of Ecosystem Components in the Interior Columbia Basin. Pacific Northwest Research Station, Walla Walla, WA. GTR-405. pp. 372, 460, 462, 480-486, 855-869.

Quigley, T.M., R.A. Gravenmier, R.T. Graham, tech. eds. 2001. Interior Columbia Basin Ecosystem Management Project: project data. Station Misc. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Redmond, R.L. 1997. Mapping existing vegetation and land cover across western Montana and Northern Idaho. Wildlife Spatial Analysis Lab. Montana Cooperative Fish and Wildlife Research Unit. University of Montana, Missoula, MT 59812.

Schlosser, W.E., V.P. Corrao, D. Thomas. 2002. Shoshone County Wildland Urban Interface Fire Mitigation Plan, Final Report. Northwest Management, Inc., Moscow, ID.

Schmidt, K.M., Menakis, J.P. Hardy, C.C., Hann, W.J., Bunnell, D.L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. General Technical Report, RMRS-GTR-87, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Scott, H.S. 1998. Fuel reduction in residential and scenic forests: a comparison of three treatments in western Montana ponderosa pine stand. Res. Pap. RMRS-RP-5. Ogden, UT. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 19 p.

Steele, R.; Arno, S.F.; and Geier-Hayes, K. 1986. Wildfire patterns change in Central Idaho's ponderosa pine-Douglas-fir forest.

Swanson, F.J. 1978. Fire and geomorphic processes; in Fire Regimes and Ecosystem Properties. USDA Forest Service Gen. Tech. Rep. WO. 26 pp.

USDA-Forest Service (United States Department of Agriculture, Forest Service). 2000. Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide. April 2000. - Draft

USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html

Vogl, R.J. 1979. Some basic principles of grassland fire management. Environmental Management 3(1):51-57, 1979.

Wright, H.A. and A.W. Bailey. 1980. Fire ecology and prescribed burning in the Great Plains – A research review. United States Department of Agriculture, Forest Service, Intermountain Forest Range Experiment Station, Ogden, Utah. General Technical Report. INT-77.

Wright, H. A. and Bailey, A.W. 1982. Fire ecology: United States and Southern Canada. John Wiley and Sons, Inc. 501 pp.

This plan was developed by Northwest Management, Inc., under contract with the Judith Basin County Commissioners and the Snowy Mountain Development Corporation, with funding provided by the USDI Bureau of Land Management and Judith Basin County.

Citation of this work:

Schlosser, W.E. *Lead Auth.* 2004. Judith Basin County, Montana, Wildland-Urban Interface Wildfire Mitigation Plan. Northwest Management, Inc., Helena, Montana. September 14, 2004. Pp. 129.

Schlosser, W.E. *Lead Auth.* 2004. Judith Basin County, Montana, Wildland-Urban Interface Wildfire Mitigation Plan Appendices. Northwest Management, Inc., Helena, Montana. September 14, 2004. Pp. 35.

Last Page of Document

Northwest Management, Inc.
P.O. Box 565
Helena, MT 59624

Phone: (406) 442-7555
Fax: (406) 495-9605
NWManage@consulting-foresters.com e-Mail
http://www.Consulting-Foresters.com/ Internet

(Remainder Intentionally Blank)