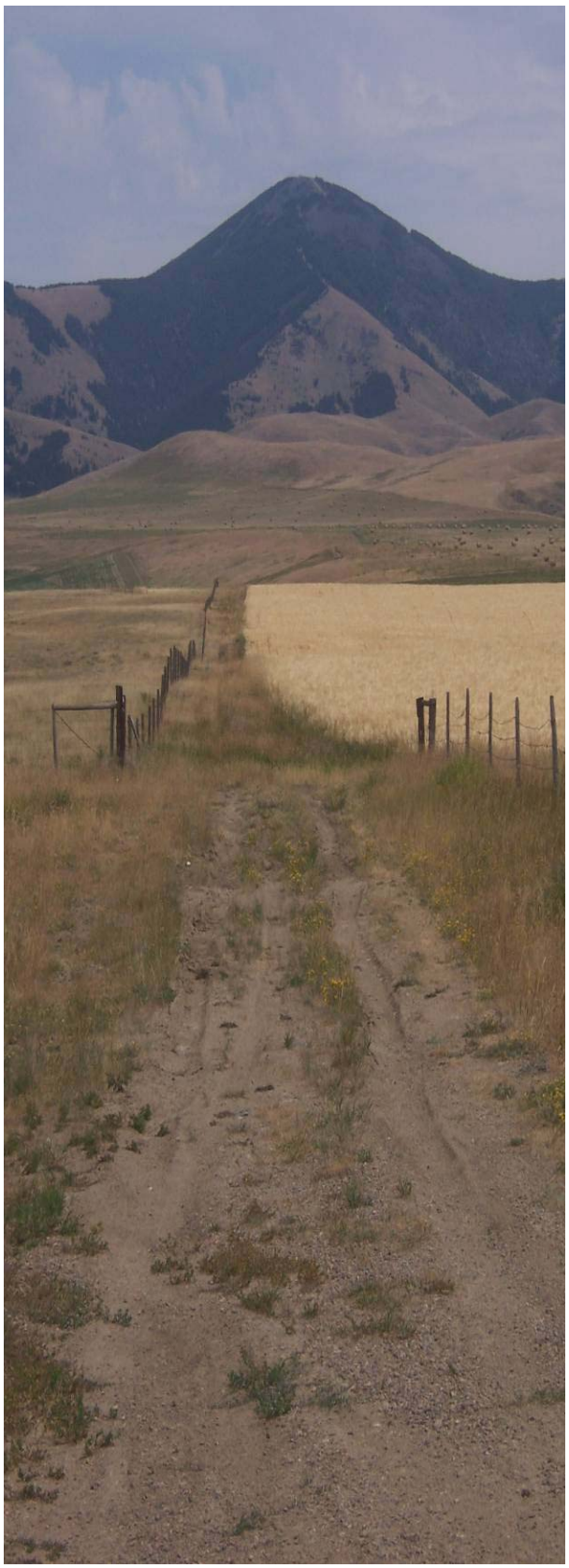

Liberty County, Montana,

Community Wildfire Protection Plan

May 14th, 2007

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

This plan was developed by the Liberty County Community Wildfire Protection 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 Community Wildfire Protection 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.

Liberty County Commissioners
and the employees of Liberty County

State of
Montana

USDI Bureau of Land Management

North Central Montana RC&D

Federal Emergency Management Agency

Montana Disaster and Emergency
Services

Montana Department of
Natural Resources and
Conservation

Bureau of Reclamation

Town of Chester
&
Local Businesses and Citizens of Liberty County

To obtain original copies of this plan contact:

Liberty County Commissioner's Office
Liberty County Courthouse
P.O. Box 725
Chester, Montana 59522

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Chapter I: Overview of this Plan and its Development

1 Introduction

This Community Wildfire Protection Plan for Liberty 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 Liberty County, Montana. This Community Wildfire Protection Plan is an amendment to the Liberty County Pre Disaster Mitigation Plan, which was approved by FEMA in 2007. The Liberty County Commissioners led the planning team responsible for implementing this project. Agencies and organizations that participated in the planning process included:

- Liberty County Commissioners and County Departments
- Liberty County Disaster and Emergency Services
- Montana Department of Natural Resources and Conservation
- USDI Bureau of Land Management
- USDA Forest Service
- Bureau of Reclamation
- Liberty County Fire Departments
- Town of Chester
- North Central Montana Resource Conservation and Development Council
- Montana Disaster and Emergency Services
- Northwest Management, Inc.

The Liberty County Commissioners and the North Central Montana Resource Conservation and Development Council (RC&D) solicited competitive bids from companies to provide the service of leading the assessment and the writing of the **Liberty County Community Wildfire Protection Plan**. The Commissioners and the RC&D selected Northwest Management, Inc. to provide this service. Northwest Management, Inc. is a professional natural resources consulting firm with an office in Helena, Montana. Established in 1984, NMI provides natural resource management services across the USA. The Project Co-Managers from Northwest Management, Inc. were Tera King and Dr. William Schlosser.

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 cover 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 Community Wildfire Protection 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 Community Wildfire Protection 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 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 Liberty County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

1.1.2.1 National Fire Plan

The goals of this Community Wildfire Protection 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 Community Wildfire Protection 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 develop 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. NFP funding can also come directly from Department of Interior agencies.

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, BIA, & 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 Fire Warden'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 Planning Committee

Each County within the state has been requested to write a Community Wildfire Protection 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.

This five-element plan is an abbreviated version of the FEMA mitigation plan and will be an amendment to the Liberty County Pre Disaster Mitigation 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 Planning Committee. It is important that this group has representation from agencies with wildland fire suppression responsibilities such as:

- County Commissioners (Lead)
- Local Fire Chiefs
- Montana Department of Natural Resources and Conservation representative
- USDA Forest Service representative
- USDI Bureau of Land Management representative
- US Fish and Wildlife representative
- Bureau of Indian Affairs
- Local Tribal leaders

- Division 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

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 Board 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, determine the community's willingness and readiness to actively participate in an identified project.
    - Third, determine 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 Liberty County Community Wildfire Protection 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 Liberty 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 Liberty 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 countywide Community Wildfire Protection Plan, a component of the County's All Hazards Pre-Disaster 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 Liberty 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 Liberty 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
- To provide a plan that will not diminish the private property rights of landowners in Liberty County
- Educate communities about the unique challenges of wildfire in the wildland-urban interface (WUI)
- Establish mitigation priorities and develop mitigation strategies in Liberty County
- Strategically locate and plan fuel reduction projects
- Provide recommendations for alternative treatment methods, such as modifying brush stand density, herbicide treatments, fuel reduction techniques, and disposal or removal of treated vegetation.
- Meet or exceed the requirements of the National Fire Plan and FEMA for a County level Community Wildfire Protection 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 Description of the Planning Process

The Liberty County Community Wildfire Protection 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 Liberty County. This included an area encompassing Hill, Toole, and Pondera Counties to insure a robust dataset for making inferences about fires in Liberty 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.

2.2 The Planning Team

Planning efforts were led by the Project Co-Managers, Tera R. King and Dr. William Schlosser of Northwest Management, Inc. Dr. Schlosser's education includes 4 degrees in natural resource management (A.S. geology; B.S. forest and range management; M.S. natural resource economics & finance; Ph.D. environmental science and regional planning). Mrs. King holds a bachelor's degree in Forest Resource Management.

They led a team of resource professionals, city and rural fire protection, county departments, Bureau of Reclamation (Reclamation), Montana Department of Natural Resources and Conservation (DNRC), the Bureau of Land Management (BLM), and the North Central Montana RC&D; also included were fire mitigation specialists, resource management professionals, and hazard mitigation experts.

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 adequately 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 meeting was held, several of the committee members were in attendance and shared their support and experiences with the planning process and their interpretations of the results.

2.2.1 Multi-Jurisdictional Participation

CFR requirement §201.6(a)(3) calls for multi-jurisdictional planning in the development of community wildfire protection plans which impact multiple jurisdictions. This Community Wildfire Protection Plan is applicable to the following jurisdictions:

- Liberty County, Montana
- Town of Chester

All of these jurisdictions were represented on the planning committee and participated in the development of hazard profiles, risk assessments, and mitigation measures. The monthly planning committee meetings were the primary venue for authenticating the planning record. However, additional input was gathered from each jurisdiction in a combination of the following ways:

- Planning committee leadership visits to scheduled municipality public meeting (e.g., County Commission meetings, City Hall meetings) where planning updates were provided and information was exchanged.
- One-on-one visits between the planning committee leadership and the representatives of the municipality (e.g., meetings with County Commissioners, or City Councils in chambers).
- Special meetings at each jurisdiction by the planning committee leadership requested by the municipality involving elected officials (Mayor and County Commissioners, County Assessor, Sheriff), appointed officials (e.g. City Police, Disaster and Emergency Services Director), municipality employees, local volunteers (e.g., fire district volunteers), business community representatives, and local citizenry.
- Written correspondence was provided monthly between the planning committee leadership and each municipality updating the cooperators in the planning process, making requests for information, and facilitating feedback.

Planning committee leadership (referenced above) included: Yvonne Hunnewell, Liberty County Disaster and Emergency Services, Tera King of Northwest Management, Inc., Shannon Downey from the Bureau of Land Management, Dennis Devries with the North Central Montana RC&D, and all three of the Liberty County Commissioners.

Like other rural areas of Montana and the USA, Liberty County's human resources have many demands put on them in terms of time and availability. Recognizing this, many of the jurisdictions decided to identify a representative from the jurisdiction to cooperate on the planning committee and then report back to the remainder of their organization on the process and serve as a conduit between the planning committee and the jurisdiction.

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 Liberty County Community Wildfire Protection Plan's preparation.

NAME	ORGANIZATION
• Bill Albee	Town of Chester
• Darrel Stafford	Liberty/Toole County Disaster and Emergency Service
• David Tempel	Joplin Fire Department
• Dennis Devries	North Central RC&D
• Don Marble	Liberty County Commissioner
• Ed Diemert	Liberty County Commissioner
• Ed Hedlund	Bureau of Reclamation
• Erik Eneboe	Montana Department of Natural Resources and Conservation
• Ken Gagnon	Liberty County Conservation District
• Larry Hendrickson	Liberty County Commissioner
• Quannah S. Bailey	Chester WC Fire Department
• Rhonda Pimley	Liberty County Clerk and Recorder
• Russ Tempel	Liberty County Commissioner
• Shannon Downey	Bureau of Land Management
• Stan Huhtala	Bureau of Reclamation
• Tera King	Northwest Management, Inc.
• Yvonne Hunnewell	Liberty County Disaster and Emergency Service and EMS

2.2.2.1 Committee Meeting Notes

Committee Meetings were scheduled and held on the dates indicated with each entry. This information is useful to observe what topics were discussed, who participated, and the source of recommendations made in this planning process.

2.2.2.1.1 September 13th, 2006 – Liberty County Courthouse

Agenda Item #1 – Introduction and Sign In:

1300 hours; Yvonne began the meeting by making introductions of all committee members. Tera began by sending around the Sign In sheet and giving some background on Northwest Management, Inc.

Agenda Item #2 – Overview of Process:

Tera gave a short powerpoint presentation on some of the highlights of the CWPP planning process, guidelines, benefits, and committee responsibilities. She explained that she had spent some time in August driving around and getting familiar with Liberty County and would be handing out community assessment write ups at the next committee meeting. These write ups are a windshield overview of each community and it is the committee's job to review them for completeness and accuracy.

The committee noted that CRP throughout the County was the biggest potential wildland fire threat. The Black Coulee area southeast of Chester is continuous CRP for nearly 30 miles towards Hingham. There is a similar situation in the north end of the County where there is continuous CRP on the east side of the Sweet Grass Hills extending well into the neighboring county. Yvonne said that the CRP lands are of particular concern for fire departments because they have a lot of built up fuel, are difficult to access, and can be located in areas with rough

terrain such as along coulees. Dennis thought that the NRCS probably had fairly accurate maps of the CRP in Liberty County. Tera will try to find out if there are any limitations on potential fire mitigation strategies on CRP land. Due to the extreme risk CRP creates, landowners typically are aware of the potential danger and construct some kind of fuel break or use defensible space tactics around homes.

Tera handed out a tentative timeline for completion of the CWPP. It was decided that the next Liberty County committee meeting would be on October 3rd at 1pm. After the October meeting, committee meetings will occur once a month. It is the intent of the committee to present a public meeting while wildland fire is still on people's minds, so the Chester Public Meeting was scheduled for October 10th at 7pm. Tera will bring the materials for the meeting, but it is the committee's responsibility to attend and provide support as well as spread the word around about the meeting.

Agenda Item #3 – Mission, Vision, and Goals Statements:

Tera handed out a draft version of a potential mission, vision, and goals statement. She asked that the committee review this and provide comments by the next committee meeting. The committee noted that at first glance, the statements looked okay.

Agenda Item #4 – Public Survey and Press Releases:

Tera handed out drafts of the public survey and press releases. She asked that the committee review and make edits now as Northwest Management would like to get those out as soon as possible. The committee made some minor changes to the wording in the press release and said that the *Liberty Times* was the only local publication. There were also some edits to the survey. The committee decided that the survey would probably be better received by the public if it was on the County's letterhead. There was also some minor changes to the wording of some of the questions as well as an addition of a question regarding homes' proximity to CRP, no-till, or tall grass.

Agenda Item #5 – Resources and Capabilities Questionnaires:

Tera handed out an example of the Resources and Capabilities questionnaire which she will be asking all of the local fire departments and fire response agencies in the county to fill out. She explained the importance of having this information in the document. She also noted that it was imperative to the plan the fire departments establish a "needs" list to be included in the mitigation activities recommended in the plan.

Stan and Ed with Reclamation did not think that there were any existing written MOU agreements between Reclamation and other agencies or rural fire departments; however, currently, the local fire districts provide wildfire protection on Reclamation lands. In recent years, Reclamation has not been allowed to do prescribed burning or any other kind of fuels management work. Ed would like to see fuels reduction and other types of mitigation activities set up to benefit Liberty County. They may be able to get assistance with these projects through the BLM or other programs.

The Hutterite Colonies generally have their own fire trucks and are willing to help with fire suppression. It would be beneficial to include the colonies on maps.

There are several potential fill spots and/or hookups around the county that could be developed to help with water availability. The county is currently considering becoming part of the Rocky Boy Water System; thus, it would be a good time to make recommendations for potential fill sites.

Agenda Item #6 – Mapping Products:

Northwest Management, Inc. presented some of the mapping products they have been able to prepare to-date. These included a Fire Regime Condition Class analysis, a Historic Fire Regime analysis, and a Fire Districts map. Tera asked that the committee take a look at the map to check for accuracy of data, place names, etc. Commissioner Diemert noted that several of the ranch place names were out of date. NMI also needs to correct the reference to the 'Blackfoot' Indian Reservation' to say 'Blackfeet'. The committee thought that the NRIS had up-to-date mapping data.

Agenda Item #7 – Current and Planned Mitigation Activities:

Tera asked that all jurisdictions in county prepare a list of current or planned mitigation activities. This will help prioritize and locate recommended projects. Ed Hedlund with Reclamation noted that they would like to participate in planning future projects on Reclamation lands, particularly near Lake Elwell. Dennis Devries noted that there were several programs that could assist Reclamation with potential projects and he would send Ed that information. Tera asked that if Reclamation had ideas about projects they would like to do, to please document that and send it to her for inclusion in the plan.

Agenda Item #8 – Task List and Assignments:

Information can be sent to Tera King at king@consulting-foresters.com.*

1. Review Mission, Vision, and Goals Statements by next meeting – Committee
2. Send NMI press release edits ASAP – Committee
3. Review public survey and send edits to NMI ASAP – Committee
4. Send Ed Hedlund a list of funding programs - NMI and Dennis
5. Send Yvonne Resources and Capabilities questionnaires electronically – NMI
6. Send NMI NRCS CRP maps - Dennis
7. Find existing MOU agreements (if any) – Yvonne and Commissioners
8. Fill out Resources and Capabilities questionnaires by next meeting – Fire Departments, Wildfire Agencies, Ambulance Services, etc.
9. Send NMI organization logos by the next meeting - Committee

Agenda Item #9 – Adjournment:

The committee meeting was adjourned at 1500 hours

Next Meeting: October 3rd, 2006 in Liberty County Courthouse @ 1 pm
Public Meeting: October 10th, 2006 in Liberty County Courthouse @ 7 pm

2.2.2.1.2 October 3rd, 2006 – Liberty County Courthouse

Agenda Item #1 – Introduction and Sign In:

Tera began the meeting by making introductions and passing around the sign in sheet.

Agenda Item #2 – Housekeeping Items:

Tera asked if there were any edits to the Mission, Vision, and Goals Statements that were handed out at the previous meeting. She had not received any to-date, so they will be included in the draft plan as they currently are written.

Tera passed out the edited version of the public survey explaining that these will be launched this coming Tuesday. The committee had a few additional edits that will be included before printing.

So far, Tera has not received any of the Resources and Capabilities questionnaires from the fire departments, but will be contacting them after the public meetings to help get that process moving.

Tera asked that she get copies of any fire-related documents that the county or agencies might currently already have in place. These could include: County Comprehensive Plans, Ordinances, Burn Permit Regulations, MOU info, Logos, etc. Commissioner Marble was able to find a copy of the draft Liberty County Growth Policy and Burn Permits can be picked up at the Sheriff's Office. Yvonne has copies of all the MOU's currently on file. There is currently no MOU between the County and the BLM. It is not known if there is an existing agreement between the BLM and Reclamation; however, the BLM does not have any resources nearby.

Agenda Item #3 – Public Meetings & Press Releases:

Tera handed out a draft version of the public meeting flyer. Because the committee meeting and the public meetings are so close together, the new press release will not be able to be printed in the Liberty Times. Thus, it is important that the committee help get the word out. Yvonne agreed to hang up the flyers in Chester and Joplin. Tera also reiterated that the purpose of the committee meeting is to provide some general information about the CWPP process and gather public input on potential projects and issues.

It was also noted that the previous press release was printed in the Liberty Times.

Agenda Item #4 – Community Assessments:

Tera handed out the very rough drafts of the community assessments. She explained that these were a windshield view of the communities and the surrounding areas and that she fully expected the committee to edit these harshly. Tera asked that the committee send their edits either by snail mail or email to her by October 31st.

Agenda Item #5 – WUI Discussion:

Tera began by explaining the purpose and intent of designating a Wildland Urban Interface in Liberty County and then discussed how NMI had created the proposed WUI shown on the printed map. Shannon Downey with the BLM was also able to shed some light on the discussion as several members had questions regarding the ramifications of the WUI boundary. The initial feeling of the committee was that the population density method worked well, but that they would like to see how the public reacted before making a final decision.

Agenda Item #6 – Mitigation Projects and Action Items:

As the last item on the agenda, Tera asked the committee to use the markers to begin identifying potential project areas or areas of high concern. Because Liberty County is fairly homogenous, most of the action items discussed were applicable to the county as a whole, rather than a specific area. Mount Royal and Lake Elwell were discussed as areas potentially in need of fuel reduction projects. There is need of a better, more available access route to communications site on Mount Royal. It was also noted that the committee felt installing dry hydrants or other type of additional water sources around the Reservoir would serve several purposes. It was the committee's recommendation that water taps be requested at every road crossing as the new Rocky Boy Water System is installed. Public education would be beneficial, especially information about mowing around homes, refurbishing shelterbelts, and availability of funding programs. The committee would like to see the railroad maintain a more fire safe corridor.

Agenda Item #8 – Task List and Assignments:

Information can be sent to Tera King at king@consulting-foresters.com.*

1. Send NMI copies of MOUs - Yvonne
2. Send NMI community assessment edits by October 31st – Committee
3. Send logos, fire-related planning docs, etc to NMI – Committee
4. Send NMI ideas for additional project areas or action items - Committee
5. Continue to work with FSA to get CRP maps – NMI
6. Send NMI Resource and Capabilities surveys – Fire Response Agencies

Agenda Item #9 – Adjournment:

The committee meeting was adjourned at 1430 hours

Next Meeting: November 28th, 2006 in Liberty County Courthouse @ 10 am
Public Meeting: October 10th, 2006 in Liberty County Courthouse @ 7 pm

2.2.2.1.3 November 28th, 2006 – Liberty County Courthouse

Agenda Item #1 – Introduction and Sign In:

Tera made welcoming comments and passed around the sign in sheet.

Agenda Item #2 – Public Survey Update:

Tera reported that the third mailing of the survey had gone out last week. So far, NMI has received approximately 39% response.

Agenda Item #3 – Resource and Capabilities:

Tera reported that has not received the Resource and Capability surveys from any of the fire departments so far, but that they are working on getting them completed.

Agenda Item #4 – Public Meetings Review:

Tera gave a brief overview of the public meeting. There was a small turnout due to other meetings scheduled for the same evening; however, there was a good discussion of some of the issues in Liberty County.

Agenda Item #5 – CWPP Rough Draft Review:

Tera handed out copies of the rough draft CWPP. Although several components are still being developed, this gave the committee a chance to review the formatting and some of the background information. Tera walked through the document explaining some of the sections and answering questions. Much of the wildfire extent and ignition profile information is still missing. The last chapter of the document contains tables outlining specific action item recommendations. The committee went through each of these line items and either edited it to fit the county's needs or deleted it altogether. In some cases, the discussions of the action items led to the addition of a recommendation. All of the committees suggested edits will be incorporated into the more complete draft to be prepared for the next meeting.

Agenda Item #6 – CRP Mapping:

Per several discussions both Tera and Dennis has had with the Farm Service Agency, it is fairly clear that maps of the fields currently enrolled in the CRP program are not going to be made available to this committee in the near future. Thus, NMI has come up with a way of using aerial photography and existing vegetation layers to come up with an estimate. Although, this model will include some unharvested rangelands, it should give a fairly clear picture of where there are continuous high risk fuels in the county. This map should be ready for review by the next committee meeting.

Agenda Item #7 – Fire Occurrence History:

NMI has access to fire history data on federal and state lands in the County. In order to complete a detailed fire risk analysis, they would also like to gather information on private lands, particularly because the majority of the county is privately held. Tera is working with Yvonne and the fire departments to try to come up with this information. Tera noted that obtaining information from the State Fire Marshal's office is nearly impossible and not very helpful. The committee requested that NMI try to obtain the State's records to see if there is any useful information. The information NMI is looking for would include a date, location, acres, and cause for each fire.

Agenda Item #8 – Task List and Assignments:

Information can be sent to Tera King at king@consulting-foresters.com.*

1. Work with Yvonne to develop fire history – NMI, Yvonne, and Fire Departments
2. Review rough draft and send edits to NMI
3. Fill out Resources and Capabilities questionnaires by next meeting – Fire Departments, Wildfire Agencies, etc.
4. Send NMI organization logos by the next meeting - Committee

Agenda Item #9 – Adjournment:

The committee meeting was adjourned at 1200 hours.

2.2.2.1.4 January 23rd, 2007 – Liberty County Courthouse

Agenda Item #1 – Introduction and Sign In:

Tera made welcoming comments and passed around the sign in sheet.

Agenda Item #2 – Resources and Capabilities:

Tera reported that she was still missing the Resource and Capabilities summaries from both fire departments as well as Reclamation. However, Yvonne has been working on putting those together. It was decided that only Reclamation's contact information would be included since they do not have any firefighting equipment nearby. Reclamation is pursuing developing an Incident Agreement with the County.

Agenda Item #3 – CWPP Draft Update:

Tera reviewed the updated and edited portions of the committee draft document, particularly noting the inclusion of the wildfire analysis information as well as the prioritization of the recommendations. She asked that the committee review the completed document and provide any additional edits by February 20th. There were still a few items missing that Tera needed to track down with Yvonne. She agreed to email the committee those updates as soon as they were completed.

Dennis mentioned that the Marias River Watershed group was currently working on a restoration project at Pugsly Bridge. The committee would like to provide some support for this project as this bridge is frequently used for fire access.

Agenda Item #4 – Appendices Review:

Tera handed out the completed committee draft of the Appendices, which includes document maps, the survey information, and prioritization scores as well as additional info on training and funding sources. She asked that the committee review this document by February 20th.

Agenda Item #5 – Prioritization:

To be FEMA compliant, the CWPP must have a prioritization scheme outlined. Tera reviewed the numerical scheme used to created the "High", "Medium", or "Low" ranking of all the project recommendations. She also went over the Excel spreadsheet she created to assist the County with scoring and ranking future projects. The committee agreed that this prioritization scheme would work and was repeatable when the plan was updated.

Agenda Item #6 – Mapping:

Tera presented the committee with two new maps; Fire Prone Landscapes and CRP areas. The Fire Prone Landscapes map is a model illustrating potentially high ignition prone areas based on past fires, aspect, CRP, slope, road density, and stream density. The committee felt that the analysis was easily understood and seemed fairly accurate. The CRP map was based off of satellite imagery and cover types. Although many CRP fields were picked up, it did not pick up as much as it should. The committee suggested that Tera and Dennis take the map to the local USDA Center and see if their personnel could augment the information.

Agenda Item #7 – Task List and Assignments:

Information can be sent to Tera King at king@consulting-foresters.com.*

1. Work with Yvonne to develop fire history – NMI, Yvonne, and Fire Departments
2. Review committee draft and send edits to NMI
3. Fill out Resources and Capabilities questionnaires by next meeting – Fire Departments
4. Continue to work on CRP map - NMI

Agenda Item #8 – Adjournment:

The committee meeting was adjourned at 1100 hours.

2.3 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.

2.3.1 News Releases

Under the auspices of the Liberty County Community Wildfire Protection Plan Committee, news releases were submitted to the local newspaper, *The Liberty Times,* broadcasted on the local radio station, and distributed around communities by members of the planning committee. The following is an example of one of the press releases submitted during the planning process.

Liberty County Plans to Mitigate Wildfire Risk

The Liberty County Commissioners have created a planning committee to complete a Community Wildfire Protection Plan for Liberty County as part of the National Fire Plan and Healthy Forests Restoration Act as authorized by Congress and the White House. The Liberty County Community Wildfire Protection 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 once ignited. Northwest Management, Inc. has been retained by Liberty County to provide wildfire risk assessments, mapping, field inspections, interviews, and to collaborate with the committee to prepare the plan. The committee includes rural and wildland fire districts, land managers, city and county elected officials, agency representatives, community organizations, and many others. Northwest Management, Inc. 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 Liberty County is to conduct a homeowner's survey. Northwest Management, Inc., in cooperation with local fire officials and Liberty County, will mail a brief survey to randomly selected homeowners in the county seeking input 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 homeowners 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 a public meeting to discuss preliminary findings and to seek public involvement in the planning process. This meeting will take place on October 10, 2006 at 7 pm in the Liberty County Courthouse located in Chester.

For more information on the Community Wildfire Protection Plan in Liberty County contact Yvonne Hunnewell, Liberty County Disaster and Emergency Services Coordinator, at 406-759-5743 or William Schlosser at the Northwest Management, Inc. office in Moscow, Idaho at 208-883-4488.

2.3.2 Public Mail Survey

In order to collect a broad base of perceptions about wildland fire and individual risk factors of homeowners in Liberty County a mail survey was conducted. The survey was completed during 2005. Using the cadastral database of landowners in Liberty County, homeowners from the county were identified. Two hundred twelve residents of Liberty County were randomly selected to receive mail surveys.

The public mail survey developed for this project has been used in the past by Northwest Management, Inc. during the execution of other Hazard Mitigation Plans. The survey used The Dillman 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 the Appendices.

The first in the series of mailings was sent October 17th, 2006, and included a cover letter, a survey, and an offer of receiving a custom GIS map of the area of their selection in Liberty 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 November 8th, 2006, encouraging their response. A final mailing, with a revised cover letter urging with them to participate, was sent to non-respondents on November 15th, 2006.

Surveys were returned during the months of October, November, and December. A total of 115 residents responded to the survey as of January 18th, 2007. The effective response rate for this survey was 54%. Statistically, this response rate allows the interpretation of all of the response variables significantly at the 99% confidence level.

2.3.2.1 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.

Of the 115 respondents in the survey, approximately 68% were from the Chester area, 17% were from Joplin, 2% were from Lothair, 1% from the Hill area, with the remaining respondents from other areas in the county or neighboring counties.

The vast majority of the respondents (99%) correctly identified that they have emergency telephone 911 services in their area. When asked if their home was protected by a local fire department approximately 11% *incorrectly* responded that they did not. Of the 89% that said they were protected, 40% said that the average response time by a fire department to their home was less than 10 minutes, 26% thought the average response time was between 10 and 20 minutes, 28% of respondents thought that a fire department would be there within 20 to 30 minutes, and 6% thought it would take 30 to 45 minutes.

Respondents were asked to indicate the type of roofing material covering the main structure of their home. Approximately 57% of respondents indicated their homes were covered with a composite material (asphalt shingles). About 13% indicated their homes were covered with a metal (e.g., aluminum, tin) roofing material, and 17% of the respondents indicated they have a wooden roof (e.g. shake, shingles).

When asked if they have trees, shrubs, or a shelterbelt within 250 feet of their home or farmstead, 85% indicated that they did. About 16% of respondents indicated they had CRP, no till, or tall grass directly adjacent to structures, while 47% said they had structures within 50 to 200 yards, 12% were within 200 and 400 yards, and 25% said they had structures within ¼ mile of CRP, no till, or tall grass. 88% of respondents replied that they had a lawn and 88% of those that had a lawn keep it green year round.

The average driveway length of respondents to the survey was 1,391 feet long (.26 miles). The longest reported was two miles. Of those respondents (22%) with a driveway over ½ mile long, 28% do not have turnouts allowing two vehicles to pass. 16% of those respondents with a driveway indicated having a dirt surface, while 67% had gravel or rock and 17% had a paved driveway. Approximately 94% of the respondents indicated an alternate escape route was available in an emergency which cuts off their primary driveway access.

100% of respondents indicated they have some type of tools to use against a wildfire that threatens their home. Table 2.1 summarizes these responses.

Table 2.1. Percent of homes with indicated fire fighting tools in Pondera County.

92% – Hand tools (shovel, Pulaski, etc.)
50% – Portable water tank
23% – Stationery water tank
30% – Pond, lake, or stream water supply close
48% – Water pump and fire hose
46% - Well or cistern
42% – Equipment suitable for creating fire breaks (bulldozer, cat, skidder, etc.)

Respondents were asked to complete a fuel hazard rating worksheet to assess their home's fire risk rating. The following is an example of the worksheet and a summarization of responses (Table 2.2).

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

Table 2.2. Fuel Hazard Rating Worksheet		Rating	Results
Fuel Hazard	Small, light fuels (grasses, forbs, weeds, shrubs)	1	47%
	Medium size fuels (brush, large shrubs, small trees)	2	30%
	Heavy, large fuels (woodlands, timber, heavy brush)	3	3%
Slope Hazard	Mild slopes (0-5%)	1	89%
	Moderate slope (6-20%)	2	8%
	Steep Slopes (21-40%)	3	3%
	Extreme slopes (41% and greater)	4	0%
Structure Hazard	Noncombustible roof and noncombustible siding materials	1	22%
	Noncombustible roof and combustible siding material	3	16%
	Combustible roof and noncombustible siding material	7	36%
	Combustible roof and combustible siding materials	10	26%
Additional Factors	Rough topography that contains several steep canyons or ridges	+2	Average -1.7 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 departments, dozers)	-3	

Calculating your risk

Values below are the average response value to each question for those living in both rural and urban areas.

Fuel hazard __1.5___ x Slope Hazard ___1.1___ = ____1.65____		
Structural hazard	+	____5.9__
Additional factors	(+ or -)	____-1.7__
Total Hazard Points	=	____5.8__.

Table 2.3. Percent of respondents in each risk category as determined by the survey respondents.
00% – Extreme Risk = 26 + points
02% – High Risk = 16–25 points
32% – Moderate Risk = 7–15 points
65% – Low Risk = 6 or less points

Respondents were asked a series of questions regarding mitigation activities they had recently done or currently do on their property. The first question asked if they conducted a periodic fuels reduction program near their home or farmstead; 78% said that they did. Respondents were

also asked if livestock was grazed around their home or farmstead and 25% indicated that there was.

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 share with homeowners how to reduce the potential for casualty loss surrounding your home?" More than half, 58% of respondents, indicated a desire to participate in this type of training.

Homeowners were also asked, "How Hazard Mitigation projects should be funded in the areas surrounding homes, communities, and infrastructure such as power lines and major roads?" Responses are summarized in Table 2.4.

Table 2.4. Public Opinion of Hazard Mitigation Funding Preferences.

	100% Public Funding	Cost-Share (Public & Private)	Privately Funded (Owner or Company)
Home Defensibility Projects →	16%	48%	36%
Community Defensibility Projects →	46%	47%	7%
Infrastructure Projects Roads, Bridges, Power Lines, Etc. →	71%	17%	12%

2.3.3 Public Meeting

A public meeting was scheduled in Chester on October 10th, 2006, during the hazard assessment phase of the planning process. This public meeting was scheduled to share information on the planning process, inform details of the hazard assessments, and discuss potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated, and provide their opinions of potential treatments.

Figure 2.1. Public meeting slideshow overview.

The public meeting slide show (title slide above) is outlined below.

Table 2.5. Public meeting slide show.

Northwest Management, Inc. • Serving the Western U.S. since 1984 • Main Office in Moscow, Idaho – Hayden, Idaho – Deer Park, Washington – Helena, Montana • Full Service Natural Resource Consultants *Providing a balanced approach to natural resource management*	FEMA Pre-Disaster Mitigation Plan Liberty County Plan (Draft 2006) **Natural & Manmade Hazards** • Flooding • **Wildland Fire** • Wind & Hail Storms • Tornado • Winter Storms • Transportation/Mobile Accident • Hazardous Materials Incident • Terrorism/Bio-Terrorism • Civil Disturbance/Riot/Labor Unrest • Enemy Attack • *Plus several others* **Each Hazard is one Chapter of the PDM** *Required by November 1, 2004 for all counties*

Table 2.5. Public meeting slide show.

What is Hazard Mitigation Planning?

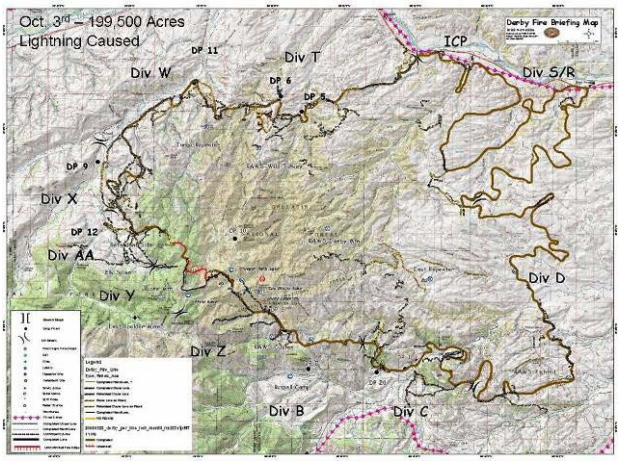
- Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. The primary purpose of mitigation planning is to systematically identify policies, actions, and tools that can be used to implement those actions.

FEMA Requirements

- Adoption by Local Government Body
- Multi-Jurisdictional Planning
- Identification of Hazards & Risk Assessment
  - Profiling Hazard Events
  - Mapping Juxtaposition of Hazards, Structures, Infrastructure
  - Potential Dollar Losses to Vulnerable Structures (B/C Analysis)
- Documented Planning Process
- Assessing Vulnerability
- Mitigation Goals
- Analysis of Mitigation Measures
- Monitoring, Evaluating & Updating the Plan (5 year cycles)
- Implementation Through Existing Programs
- Public Involvement

Wildland Fire Mitigation: National Policy

- **National Fire Plan (2000)**
  - Preparedness
  - Rehabilitation & Restoration
  - Hazardous Fuel Reduction
  - Community Protection
  - Accountability
- **Healthy Forests Restoration Act**
  - The HFRA gives communities the opportunity to define their own Wildland Urban Interface (WUI) boundary rather than using the default definition of 1 ½ miles from the community center.
  - The HFRA directs federal agencies to give special consideration to prioritized project areas and methods of treatment identified in a community plan.



Liberty County CWPP Committee

Formed by invitation from the County Disaster and Emergency Services Coordinator:

- County Commissioners
- County Departments
- Chester City Mayor
- City Offices
- Local Fire Departments
- BLM
- DNRC
- North Central RC&D
- Bureau of Reclamation
- Local Residents

Meetings are chaired by Northwest Management, Inc., representing the County Commissioner's Office

Public Involvement

- Public Mail Survey was sent to 200 households in Liberty County
- Planning Committee Meetings
- Press Releases & Advertisements
- Public Meeting in Chester
- Public Review of the DRAFT Plan will be facilitated once all sections have been completed and reviewed by the committee

Table 2.5. Public meeting slide show.

Hazard Mitigation Approach

- Hazard Profile
- Risk Assessment
- Vulnerability Appraisal
- Mitigation Strategy Development
- Prioritization and Planning
- Implement the Plan!

Wildland-Urban Interface

- **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.

Defining Liberty County's Wildland-Urban Interface

- Based only on population density = unbiased approach
- Unique to each area & it changes over time
- Based on where structures are currently located
- Uses mathematical formulae and geospatial relationships to visually represent where the WUI exists
- *When you see it, you'll understand what we mean*

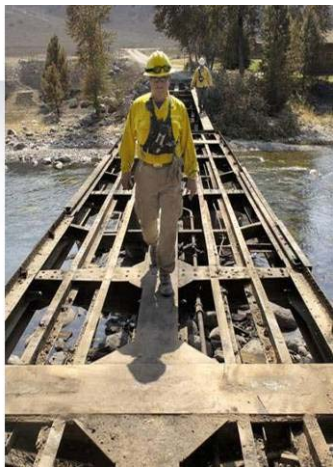
Preparedness

- City Fire Protection
- Rural Fire Protection
- Wildland Fire Protection
- EMS
- Local Utility Companies
- Burlington Northern Railroad

Table 2.5. Public meeting slide show.

How prepared are you (really)?

- How many escape routes do you have?
- Firefighter Access?



How prepared are you (really)?

- Construction Materials?
- Landscaping Techniques?
- Power lines?

Recommendations

- WUI Safety & Policy
- People & Structures
- Infrastructure
- Resources & Capabilities
- Regional Land Management Recommendations

Are we accomplishing these goals?

Types of Projects

- Defensible Space
  - Thinning, pruning, mowing, construction materials, types of landscaping, wood piles, propane tanks, awareness, etc.
- Roadside Fuels Treatments
- Access Issues
  - Bridges, turnouts, road width, turnarounds, overhangs, etc.
- Emergency Response Needs
  - Training, equipment, recruitment, PPEs, etc.
- Communication
- Policy Issues
  - Building codes, road restrictions, public education, burn permits, etc.
- Regional Land Management Recommendations
  - BLM, BOR, DNRC

Your Input

- Maps on the Walls – Mark them up!
- Talk to one of the planning committee members.
- Let us know your ideas and concerns.
- Make this YOUR Plan!

- Thank you for attending and participating! Please visit with us.

2.3.4 Documented Review Process

Reviews of sections of this document were conducted by the committee during the planning process as maps, summaries, and written assessments were completed. These individuals included fire mitigation specialists, firefighters, 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 Community Wildfire Protection Plan. This plan was given to members of the planning committee on November 28th, 2006 with comments provided by February 20th 2007. Public review of the revised DRAFT document was made from February 23rd, 2007 until March 23, 2007. All comments were integrated into the final version of the mitigation plan.

The final plans were prepared on April 5th, 2007. Adoption of the Community Wildfire Protection Plan was completed by the listed municipalities on the dates indicated in section 6.4 (Signature Pages) as being formally adopted on those dates by the municipalities. Other agencies and organizations indicated their cooperation and collaboration in the planning process by signing the final version of the Plan as participants.

2.3.5 Continued Public Involvement

Liberty County is dedicated to involving the public directly in review and updates of the Community Wildfire Protection Plan. The Liberty County Commissioners, through the Community Wildfire Protection Plan Committee are responsible for the annual review and update of the plan as recommended in Chapter 5 of this document.

The public will have the opportunity to provide feedback about the Plan annually on the anniversary of the adoption of this plan, at a meeting of the County Commissioners. Copies of the Plan will be catalogued and kept at all of the appropriate agencies in the county. The existence and location of these copies will be publicized. The Plan also includes the address and phone number of the County Commissioners Office, responsible for keeping track of public comments on the Plan.

A public meeting will be held as part of each annual evaluation or when deemed necessary by the Community Wildfire Protection Plan Committee. The meetings will provide the public a forum for which they can express its concerns, opinions, or ideas about the plans. The County Commissioners will be responsible for using county resources to publicize the annual public meetings and maintain public involvement.

Chapter 3: County Characteristics & Risk Assessment

3 Background and Area Description

3.1 Location and Land Forms

Liberty County is located in north central Montana bordering Hill County to the east, Choteau County to the south, Toole County to the west, Pondera County to the southwest, and Alberta, Canada to the north. The County contains on incorporated community, the Town of Chester, which also serves as the county seat. Liberty County encompasses 1,439 square miles with an approximate density of 1.5 persons per square mile (Beck Consulting 2006).

Elevations in Liberty County range from just over 3,000 feet above sea level in the southeast corner of the county to 6,958 feet on the top of East Butte. East Butte is part of the Sweet Grass Hills in the north central region of the county. Intermittent and perennial streams, the largest of which is the Marias River, generally drain south and east eventually reaching the Missouri River. Tiber Dam, located on the Marias River impounds water in Lake Elwell. Originally constructed for irrigation, the reservoir also provides flood control and an exceptional fishery (Beck Consulting 2006).

3.2 Description of Liberty County

Liberty County was created from sections of Chouteau and Hill Counties in 1919. Most of the county is characterized by rolling prairies, gullies, and coulees. In the north-western part of the County, the Sweet Grass Hills rise nearly 7,000 feet. The 1,300,000 acres of rolling prairies within Liberty County are used for livestock grazing and growing wheat, barley, and mustard (Liberty County Growth Policy 2006).

The Marias River is the major drainage in the county. Tributaries north of the river originate in the Sweet Grass Hills. Cottonwood and Eagle Creeks drain most of the land in the western half of the county south of the Sweet Grass Hills. Sage and Little Sage Creeks and O'Brien Coulee are the major drainages in the eastern part of the county. These waterways flow eastward into Hill County before draining into the Marias River. Lake Elwell, also known as Tiber Reservoir, covers over 17,000 acres and impounds the Marias River in the south central part of the County. Lake Elwell and Tiber Dam provide numerous recreational opportunities including campgrounds, picnic areas, boat launch facilities, RV hookups, swimming areas, and concessions.

Petroleum and natural gas are the two natural resources found in Liberty County. The County's gas fields are one of the largest natural gas fields in Montana. The number of producing wells has been declining for the past several years. However, horizontal drilling techniques, used successfully in other parts of the country, are currently being considered as a method of reactivating the older, unproductive oil fields (Liberty County Growth Policy 2006).

3.2.1 Demographics

In 2004, the county was home to an estimated 2,020 residents. Between 1990 and 2000, Liberty County had a decreasing population trend showing a 6% loss in residency. According to the U.S. Census Bureau figures from 2000, the county had 833 households averaging 2.51 persons per household. The home ownership rate was 71.3%. The 2000 Census reported the Town of Chester to have a population of 870; nearly half of the residents in the County (Beck Consulting 2006).

3.2.2 Socioeconomics

Liberty County residents had a per capita personal income (PCPI) of $26,880 in 2004, which was 97% of the state average and 81% of the national average. This PCPI reflected an increase of 12% from 2003, more than twice the state and national increase for the same period.

According to the Bureau of Labor Statistics, the County had an unemployment rate of 4-4.9% for the period February 2005 through January 2006, slightly under the 5% national average for the same period. Liberty County had 71 private non-farm establishments with paid employees in 2004. The private non-farm employment was 420 as of March 12, 2004 (Census 2004).

Table 3.1. Liberty County Business Patterns.

Industry	Number of Employees	Annual Payroll	Total Establishments
Forestry, fishing, hunting, and agriculture support	0-19	0	2
Mining	0-19	0	4
Utilities	0-19	0	2
Construction	20-99	0	3
Manufacturing	0-19	0	3
Wholesale Trade	13	$231,000	3
Retail Trade	66	$908,000	14
Transportation & warehousing	0-19	0	2
Information	0-19	0	2
Finance & insurance	30	$647,000	6
Real estate & rental & leasing	0-19	0	2
Professional, scientific, & technical services	0-19	0	4
Educational services	0-19	0	2
Health care and social assistance	100-249	0	3
Arts, entertainment, & recreation	5	$41,000	5
Accomodation & food service	29	$222,000	7
Other services	23	$203,000	7
Total	**420**	**$8,921,000**	**71**

Cash receipts from the sale of principal agricultural products and government payments in the county for 2002 totaled $49,923,000. Liberty County ranked 10th among Montana counties in crop revenue and 42nd in revenues from livestock and livestock products. Overall, Liberty County ranked 18 in all cash receipts in Montana. (Beck Consulting 2006)

3.2.3 Development Trends

Of the 1.3 million acres of land in Liberty County, 905,171 are in farms. The average farm size is 3,048 acres with a median farm size of 2,433 acres. There are 280 farms in the County with a cumulative total of 652,316 in crop land. Of the 280 farms, 79 indicated no harvested crop land leaving 292,598 acres categorized as harvested. The remaining 293,365 acres are either grasslands or water. There are 19 irrigated farms totaling 5,974 acres (Liberty County Growth Policy 2006).

Despite its small size, the county ranked 8th in the state in winter wheat production and 10th in the state in spring wheat production in 2004. Of Montana's 56 counties, Liberty County ranked 10th in the state for revenues from crop production and 42nd in the state for revenues from livestock and livestock products (Beck Consulting 2006).

3.2.4 Land Ownership

Land ownership in the county is primarily private. Private lands are owned by individuals, farms and ranches, oil companies, and the Burlington Northern Santa Fe railroad. State-owned "school" sections (640 acres), so named because of their constitutional purpose to fund the school system, and half sections (320 acres) are distributed across the county in the remnants of the checkerboard railroad land grant pattern. The Bureau of Land Management (BLM) owns a total of 7,001 acres located on East Butte and along the Marias River. In addition, the BLM manages 36,984 subsurface acres. Reclamation's Lower Marias Unit (Tiber Dam and Lake Elwell) consists of approximately 17,678 water surface acres and 21,244 land acres. The county also contains some 59,000 acres of lands known as "split estate". These are lands where the surface ownership is non-federal, but mineral rights (or subsurface acres) are federally owned. Vegetation across the county consists primarily of grasses and forbs with woody shrubs and cottonwoods found along the creek bottoms and in shelterbelts (Beck Consulting 2006).

Table 3.2. Land Ownership in Liberty County.

Surface Ownership	Acres
Private	801,967
Bureau of Land Management	7,586
Bureau of Reclamation	19,131
State	86,981

Source: BLM Havre Field Office, Amanda Keefer
Note: The acreage for BLM ownership is accurate. The acreage for other owners is estimated.

3.2.5 Climate

Liberty County is located east of the Continental Divide in Montana and subject to continental weather patterns. In general summers are hotter, winters are colder, precipitation is less evenly distributed, skies are sunnier, and winds are stronger than on the west side of the divide. According to the Liberty County Soil Survey, however, winters are not usually as cold as what might be expected for this latitude due to the warm Chinook winds. Cold waves with sub-zero temperatures are common, but short-lived and frequently terminated by the southwesterly Chinook winds. The ground is usually bare of snow even in winter due to these winds (Beck Consulting 2006).

Mean annual precipitation is 10.58 inches with 8.2 inches of this total falling during the growing season. There are considerable differences in the amounts of precipitation across the county. The wettest areas are located in the higher elevations of the Sweet Grass Hills with annual precipitation of 20-24 inches. By contrast, the drier southeastern areas of the county receive only 10-12 inches Freezing temperatures occur most often during the months of September through May. The frost-free period at Chester averages 108 days (Beck Consulting 2006).

3.2.6 Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation

officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions.

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

Typical archeological sites include settlements, lithic scatters, village sites, rock art, and hunting blinds. The Crow had a network of trails throughout the area which included various trade routes, as well as gathering and hunting routes. Some of the same trails were later used by homesteaders and trappers. Traditional Cultural Properties (TCPs) are cultural resources defined as a significant place or setting, and does not necessarily have any associated material remains. For example, a TCP can be a mountain, river, or natural feature (i.e., rock formation, meadow, etc.). Some of these are present in Liberty County. The integrity of some cultural resources has been impacted in the past by logging activities, road building, mining, and grazing.

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 3.3.

Table 3.3. National Register of Historic Places in Liberty County, Montana.

Item Number	Resource Name	Address	City	Listed	Architect, Builder, or Engineer
1	First Episcopal Methodist Church of Chester	Jct. of Second St. and Madison	Chester	1997	
2	First State Bank of Chester (Museum)	Jct of Washington Ave. and First St E.	Chester	1997	

3.2.6.1 Sweet Grass Hills – Native American Cultural Site

The Sweet Grass Hills possess special significance to the Blackfeet Indians and to other tribes on the northern Great Plains. According to legend, the creator Napi fashioned the hills in the dim past out of rocks left over from the formation of the Rocky Mountains. Napi liked his creation so much that the hills became a favored resting place for the old trickster. Located in the heart of bison hunting ground, the hills served as a vantage point for game and as a lookout for enemies trespassing in Blackfeet territory. Because of their isolation and connection with the creation of the earth, they have deep cultural significance to the Blackfeet as a spiritual refuge where teen-age boys made vision quests to help guide them into adulthood. Many of the Blackfeet's traditional stories take place in and around the hills (Blackfeet Country 2006).

Hazard mitigation activities in and around these sites has the potential to affect historic places. In all cases, mitigation work will be intended to reduce the potential of damaging the site due to natural and man caused disasters. Areas where ground disturbance will occur will need to be inventoried depending on the location. Such actions may include, but are not be limited to, constructing firelines (handline, mechanical line, etc.), building 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, 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) may 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.

3.2.7 Infrastructure

Liberty County has both significant infrastructure and unique ecosystems within its boundaries. These resources will be considered in the protection of infrastructural components for Liberty County and to the larger extent of this region, and the rest of Montana.

3.2.7.1 Transportation

The primary transportation corridor through the county is U.S. Highway 2 crossing in an east-west direction. There is no interstate highway in Liberty County. State Highway 223 runs south from Chester connecting the town with Fort Benton. A network of county roads completes the public vehicle transportation network. Private ranch roads throughout the county provide the remainder of the access for rural residents.

The Burlington Northern Santa Fe (BNSF) railroad also passes through the county. The railroad track closely follows the U.S. Highway 2 corridor. The BNSF tracks pass immediately north of the heart of Chester, however, the nearest passenger service stop is in Shelby.

The Montana Aeronautics Division lists two airports in Liberty County. One airport is located on the southwest side of Chester and the other is a turf strip located near Tiber Dam on the southeast end of Lake Elwell. Neither airport has regularly-scheduled commercial air services. The nearest commercial airports are in Great Falls and Havre.

3.2.7.2 Communications

Mount Royal serves as Liberty County's only vantage point for communication towers. There are thirteen small structures on the peak of Mount Royal each administering several repeaters for television, radio, and other communications. The Northern Tier Interoperability Project is also planning to establish a repeater station and tower on Mount Royal that will serve several counties in north central Montana.

3.2.7.3 Solid Waste

The Town of Chester Solid Waste Disposal District provides disposal services to all residents within the County living outside the incorporated town for a minimal permit cost of $50/ All residents within the District boundaries may utilize the Town of Chester Solid Waste Disposal site (Liberty County Growth Policy 2006).

3.2.7.4 Water Supply

With the exception of Chester, all rural Liberty County communities discharge sewage effluent into the ground. Chester's water is currently supplied by the Tiber Reservoir; however, the city is also participating in the development of the Rocky Boy's North Central Montana Regional Water System. Joplin obtains water from the Hill County Water District. Whitlash relies on wells and/or springs for its drinking water. Lothair also relies on wells and is a member of the Galata Water District that originates in Toole County. The Sage Creek Water District serves the drinking water needs of the Sage Creek Colony (Liberty County Growth Policy 2006). The Tiber

Water District serves residents on the south side of Lake Elwell, while the South Chester and Hay Coulee Water Districts service rural residents in the southeast corner of the County.

3.2.7.5 Sewer

Other than Chester, there are no community sewer systems in Liberty County. All communities including Whitlash, Lothair, and the Hutterite colonies use separate systems which discharge effluent into local septic systems (Liberty County Growth Policy 2006).

3.2.7.6 Oil Extraction

There are numerous oil rigs, pump houses, and storage facilities used for oil extraction scattered throughout Liberty County, particularly in the north end. These sites are typically unmanned.

3.2.7.7 Power Lines

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 Liberty County but of surrounding counties. The protection of these lines allows for community sustainability, support of the economic viability of Liberty 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.

3.2.8 Recreation

Liberty County has a wide variety of recreational opportunities ranging from hunting, fishing, camping, and hiking to playing or watching sports. Lake Elwell/Tiber Dam-Located South of Chester on the Marias River, one of the largest lakes in Montana, attracts fishermen and boaters from all over. Major game fish include northern pike, walleye, and rainbow trout. Lake Elwell and Tiber Dam provide numerous recreational opportunities including campgrounds, picnic areas, boat launch facilities, RV hookups, swimming areas, and concessions. Tiber Marina, located on the north shore of Lake Elwell, currently offers a convenience store, restaurant, and bait shop. Restrooms and showers are also available. Reclamation has plans to further develop Tiber Marina by adding more camping units and improving several of the existing facilities.

The Marias River runs through northern Montana and Liberty County. The river holds vast fishing, rafting, and canoeing opportunities. Trout fishing in the Marias is the best of any place in the state. Sandford Park, located on the Marias River below Tiber Dam, offers a campground with shelters and well equipped restrooms and an RV waste station. A small launch ramp is located on the river for rafting and canoeing. VFW Park , located next to Lake Elwell, has close, easy access to the newly-repaved boat ramp. Its facilities include toilets, fire rings, and picnic tables.

Although there is limited access, the Sweet Grass Hills, in northern Liberty County offer hunting, hiking, and some tent camping opportunities. The 4-H Camp near Whitlash and the BLM campground on the north side of East Butte provide picnicking areas and undeveloped tent camping sites.

3.2.9 Vegetation

Vegetation in Liberty 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 3.4.

The most represented vegetated cover types are Agricultural at 51% of the total area and Upland Grasslands at 42%.

Table 3.4. Landcover Types in Glacier County.

Category	Acres	Percent
Urban	547	0%
Agricultural	471,528	51%
Upland Grasslands	387,133	42%
Moist Shrubland	4,599	0%
Moist Shrub/Grassland	1,052	0%
Dry Shrub/Grassland	1,881	0%
Tree/Grassland	716	0%
Mixed Deciduous-Aspen	29	0%
Mixed Deciduous	4,171	0%
Moist Conifer Forest	107	0%
Conifer Forest	6,860	1%
Mixed Deciduous-Conif	146	0%
Water	11,999	1%
Mixed Riparian	29,668	3%
Barren Land	1,172	0%
Exposed Rock	1,424	0%
Badlands	2,724	0%
Mixed Conifer Forest	107	0%
Total	**925,862**	

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

3.3 Ecosystems

Liberty 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 and farming) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, rangelands and forestlands in Liberty 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).

3.4 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 was evaluated. Soils formed in place tend to contain silt, sand, and moderate amounts of organic material in the surface horizons. The transported soils found in the Marias River valley are more loam rich. On average, soils in Liberty County are well drained with moderate permeability.

Low to moderate intensity fires would be 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 not 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).

3.4.1 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, large scale pile burning would result in greater soil heating, but with 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. Loosely stacked hand piles resulting from typical defensible space projects in Liberty County would not be expected to have lasting affects on soil properties.

Indirect effects of prescribed burning to slope stability are highly variable in the soil types found in Liberty 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. Grazing across Liberty County was observed to be maintained in a sustainable manner without the overgrazing found in other areas of the region. Mining also has significant effects on soil quality through soil compaction and mass displacement.

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.

3.5 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, 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. Clayey soils also have a high shrink swell potential. Disrupted vegetation patterns from 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.

3.5.1 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 and rangeland health, and enhancement, protection, and maintenance of old growth and riparian areas. The majority of the burned areas are expected to receive low intensity ground fires with some areas of moderate intensity. This may include occasional torching of single trees or larger clumps of 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.

3.6 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. 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. Air quality is also affected by winter inversions trapping emissions form internal combustion engines and wood burning stoves.

Liberty County is in the Montana Airshed Unit 9: Idaho/Montana Airshed Group Operating Guide (Levinson 2002). 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). The USDA Forest Service, Bureau of Land Management, and the Montana Department of Natural Resources and Conservation are all members of the Idaho/Montana 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 Idaho/Montana 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, 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 are most restrictive for this Class. There are no Class I areas that would be affected by wildland fires or prescribed burning in Liberty County.

All of the communities within Liberty 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).

3.6.1 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 roll 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. 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, some of the principles that govern fire behavior have been identified and are recognized.

4.1.3.1 Conservation Reserve Program Lands

The Conservation Reserve Program is administered by the USDA Farm Services Agency. The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. Through CRP, farmers can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. The Commodity Credit Corporation (CCC) makes annual rental payments based on the agriculture rental value of the land and it provides cost-share assistance for up to 50 percent of the participant's costs in establishing approved conservation practices. Participants enroll in CRP contracts for 10 to 15 years.

The program is administered by the CCC through the Farm Service Agency (FSA), and program support is provided by Natural Resources Conservation Service, Cooperative State Research and Education Extension Service, state forestry agencies, and local Soil and Water Conservation Districts. Approximately 3.4 million acres of farm land in Montana have been enrolled in the CRP program through February 2005.

USDA Farm Service Agency's (FSA) Conservation Reserve Program (CRP) is a voluntary program available to agricultural producers to help them safeguard environmentally sensitive land. Producers enrolled in CRP plant long-term, resource-conserving covers to improve the quality of water, control soil erosion, and enhance wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance.

The Food Security Act of 1985, as amended, authorized CRP. The program is also governed by regulations published in 7 CFR, part 1410. The program is implemented by FSA on behalf of USDA's Commodity Credit Corporation.

CRP protects millions of acres of American topsoil from erosion and is designed to safeguard the Nation's natural resources. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country.

Although there are many benefits to the County stemming from CRP land enrollment, the impact on wildfire control is problematic. When these lands, often near communities and homes, build up heavy fuels consistent with natural grasses and shrubs, the fuel loading increases dramatically above that found on farmlands or that would have been found with a natural fire return interval. Fires in these fuels can move very rapidly when fanned by winds (common during the fire season).

During fiscal year 2005, Montana had over 3.4 million acres enrolled in the Crop Reserve Program with Liberty County contributing approximately 140,000 acres. The FSA allows periodic fuels mitigation treatments on CRP lands including the establishment of fuel breaks around buildings or along road corridors. Existing CRP contracts can be modified to include some types of fuels reduction and/or hazard mitigation treatments. These fuel treatments or projects are critical to the development of a successful wildfire mitigation program in Liberty County and are fully endorsed and encouraged by the Wildfire Protection Plan Committee.

4.2 Wildfire Hazard Profiles

4.2.1 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 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 region for thousands of years (Steele *et al.* 1986, Agee 1993).

Currently past fire information is recorded as hardcopies by the Joplin and Chester Fire Departments. Data on cause and acres burned has been compiled for 2002 through 2006.

Table 4.1. Summary of Wildfire Ignitions and Acres Burned by Cause from 1985 – 2004.

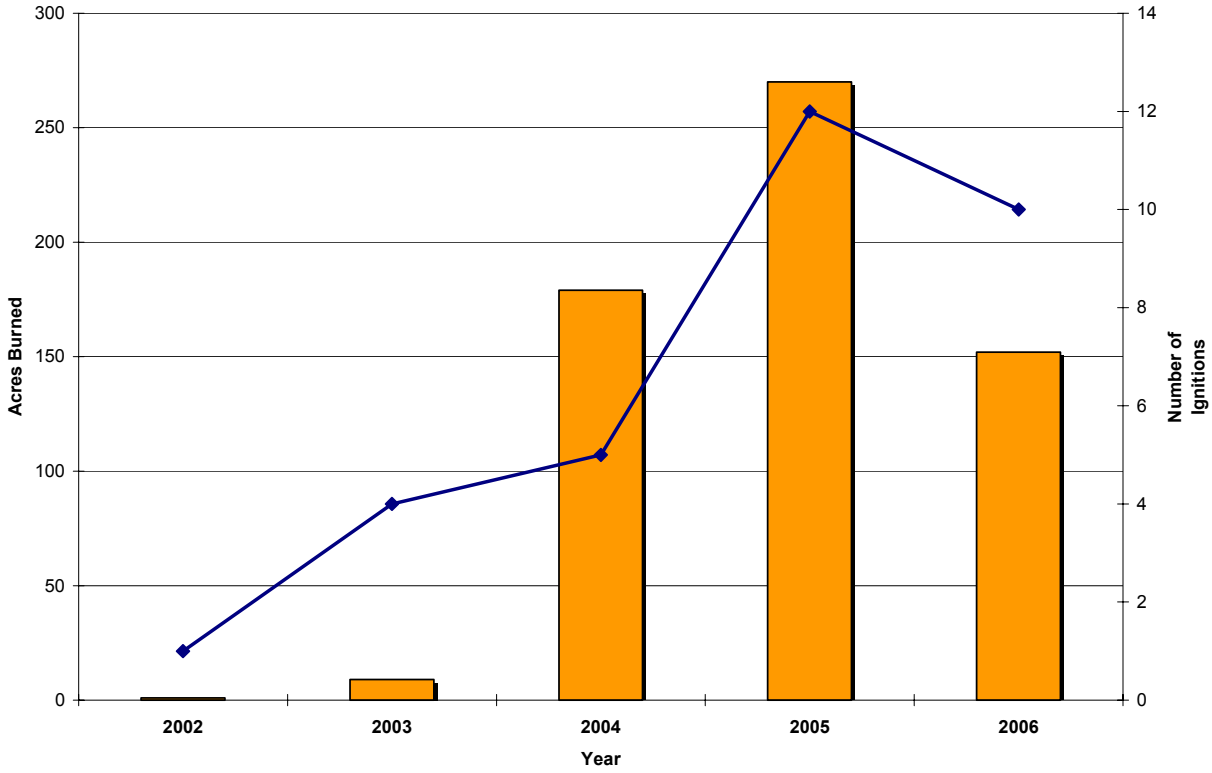
Cause	Acres Burned	Percent of Total	Number of Ignitions	Percent of Total
Children	1	0%	1	3%
Debris	28	5%	9	28%
Equipment	135	22%	8	25%
Lightning	187	31%	5	16%
Crop	250	41%	3	9%
Railroad	1	0%	1	3%
Electrical	2	0%	2	6%

Table 4.1. Summary of Wildfire Ignitions and Acres Burned by Cause from 1985 – 2004.

Cause	Acres Burned	Percent of Total	Number of Ignitions	Percent of Total
Unknown	7	1%	3	9%
Total	**611**		**32**	

Since 2002, it would appear that the vast majority of fires in Liberty County were human or equipment caused. There may be many factors contributing to this statistic, but the agrarian economy is likely responsible for much of it. Human caused fires have also contributed to the most acres burned throughout Liberty County.

Figure 4.1. Wildfire Extent and Ignition Profile for Liberty County, 2002 – 2006.



4.2.2 Wildfire Extent Profile

Across the west, wildfires have been increasing in extent and cost of control. The National Interagency Fire Center (2005) reported over 77,500 wildfires in 2004 which burned a total of 6.7 million acres and cost $890 million in containment (Table 4.2). Data summaries for 2000 through 2004 are provided and demonstrate the variability of the frequency and extent of wildfires nationally (Table 4.2). It is important to note that the 10 year moving average number of acres burned reported each year has been increasing constantly since 2000.

Table 4.2. National Fire Season Summaries.

Statistical Highlights	2000	2001	2002	2003	2004
Number of Fires	122,827	84,079	88,458	85,943	77,534
10-year Average ending with indicated year	106,393	106,400	103,112	101,575	100,466
Acres Burned	**8,422,237**	**3,570,911**	**6,937,584**	**4,918,088**	**6,790,692**
10-year Average ending with indicated year	3,786,411	4,083,347	4,215,089	4,663,081	4,923,848
Structures Burned	861	731	2,381	5,781	1,095
Estimated Cost of Fire Suppression (Federal agencies only)	$1.3 billion	$542 million	$ 1.6 billion	$1.3 billion	$890 million

The National Interagency Fire Center, located in Boise, Idaho, maintains records of fire costs, extent, and related data for the entire nation. Tables 4.3 and 4.4 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.

These statistics (Table 4.3) 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.

Table 4.3. Total Fires and Acres 1960 - 2004 Nationally.

Year	Fires	Acres	Year	Fires	Acres
2004	77,534	* 6,790,692	1981	249,370	4,814,206
2003	85,943	4,918,088	1980	234,892	5,260,825
2002	88,458	6,937,584	1979	163,196	2,986,826
2001	84,079	3,555,138	1978	218,842	3,910,913
2000	122,827	8,422,237	1977	173,998	3,152,644
1999	93,702	5,661,976	1976	241,699	5,109,926
1998	81,043	2,329,709	1975	134,872	1,791,327
1997	89,517	3,672,616	1974	145,868	2,879,095
1996	115,025	6,701,390	1973	117,957	1,915,273
1995	130,019	2,315,730	1972	124,554	2,641,166
1994	114,049	4,724,014	1971	108,398	4,278,472
1993	97,031	2,310,420	1970	121,736	3,278,565
1992	103,830	2,457,665	1969	113,351	6,689,081
1991	116,953	2,237,714	1968	125,371	4,231,996
1990	122,763	5,452,874	1967	125,025	4,658,586
1989	121,714	3,261,732	1966	122,500	4,574,389
1988	154,573	7,398,889	1965	113,684	2,652,112
1987	143,877	4,152,575	1964	116,358	4,197,309
1986	139,980	3,308,133	1963	164,183	7,120,768
1985	133,840	4,434,748	1962	115,345	4,078,894
1984	118,636	2,266,134	1961	98,517	3,036,219
1983	161,649	5,080,553	1960	103,387	4,478,188
1982	174,755	2,382,036			

(National Interagency Fire Center 2004)

Table 4.4. 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
2004	$ 147,165,000	$ 63,452,000	$ 7,979,000	$ 34,052,000	$ 637,585,000	**$890,233,000**
2003	$151,894,000	$ 96,633,000	$ 9,554,000	$ 44,557,000	$ 1,023,500,000	**$1,326,138,000**
2002	$ 204,666,000	$ 109,035,000	$ 15,245,000	$ 66,094,000	$ 1,266,274,000	**$1,661,314,000**
2001	$ 192,115,00	$ 63,200,000	$ 7,160,000	$ 48,092,000	$ 607,233,000	**$917,800,000**
2000	$180,567,000	$ 93,042,000	$ 9,417,000	$ 53,341,000	$ 1,026,000,000	**$1,362,367,000**
1999	$ 85,724,000	$ 42,183,000	$ 4,500,000	$ 30,061,000	$ 361,000,000	**$523,468,000**
1998	$ 63,177,000	$ 27,366,000	$ 3,800,000	$ 19,183,000	$ 215,000,000	**$328,526,000**
1997	$ 62,470,000	$ 30,916,000	$ 2,000	$ 6,844,000	$ 155,768,000	**$256,000,000**
1996	$ 96,854,000	$ 40,779,000	$ 2,600	$ 19,832,000	$ 521,700,000	**$679,167,600**
1995	$ 56,600,000	$ 36,219,000	$ 1,675,000	$ 21,256,000	$ 224,300,000	**$340,050,000**
1994	$ 98,417,000	$ 49,202,000	$ 3,281,000	$ 16,362,000	$ 678,000,000	**$845,262,000**

(National Interagency Fire Center 2005)

Although many very large fires, growing to over 250,000 acres have burned in Montana, fires 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.

4.2.2.1 Prescribed Burning of Federal Acres

Prescribed fire has been effectively used as a mitigation tool, primarily on Federal and State lands across the US, and especially in the Western US. Federal Agencies report prescribed fire usage, with summaries provided by the National Interagency Fire Center, located in Boise, Idaho. National data is provided in Tables 4.5 and 4.6.

Table 4.5. Federal Wildland Fire Agency Prescribed Fire Acres Treated

Agency	1995 Acres	1996 Acres	1997 Acres	1998 Acres	1999 Acres	2000 Acres
USDA Forest Service	570,300	617,163	1,097,658	1,489,293	1,379,960	728,237
Bureau of Indian Affairs	21,000	16,000	37,000	48,287	83,875	3,353
Bureau of Land Management	56,000	50,000	72,500	200,223	308,000	125,600
National Park Service	62,000	52,000	70,000	86,126	135,441	19,072
U.S. Fish and Wildlife Service	209,000	180,000	324,000	285,758	300,508	201,052
Total	**918,300**	**915,163**	**1,601,158**	**1,889,564**	**2,240,105**	**1,077,314**

(National Interagency Fire Center 2005)

Table 4.6. Prescribed Fire Costs, Nationally.

Year	Bureau of Land Management	Bureau of Indian Affairs	Fish and Wildlife Service	National Park Service	USDA Forest Service	Totals
1995	$ 0	$ 840,000	$ 0	$ 3,200,000	$ 16,406,000	$ 20,446,000
1996	$ 1,200,000	$ 650,000	$ 0	$ 3,200,000	$ 24,500,000	$ 29,550,000
1997	$ 1,600,000	$ 800,000	$ 0	$ 4,600,000	$ 29,146,000	$ 36,146,000
1998	$ 6,700,000	$ 2,268,000	$ 4,825,000	$ 7,000,000	$ 50,000,000	$ 70,793,000
1999	$ 10,600,000	$ 6,300,000	$ 7,404,000	$ 9,800,000	$ 65,000,000	$ 99,104,000

4.2.2.2 Firefighter Accidents

The United States currently depends on approximately 1.2 million firefighters (municipal and wildland) to protect its citizens and property from losses caused by fire. Of these firefighters, approximately 210,000 are career/paid and approximately 1 million are volunteers. The National Fire Protection Association (NFPA) and the U.S. Fire Administration estimate that on average, 105 firefighters die in the line of duty each year (NIFC 2005).

Due to the growing number of homes in the wildland/urban interface, it is almost inevitable that wildland and structural firefighters will find themselves in dangerous role reversals for which they may not be adequately trained or equipped. For example, wildland firefighters may be called on to protect threatened homes, and structural firefighters may be called on to help battle the surrounding blazes in the wildlands.

In addition to the obvious difference of size, wildland fires and structure fires differ in that wildland fires require:

- more personnel, some of whom may have little or no fire fighting experience
- more resources spread out over a larger area.

Because of these factors, wildland fires present personal safety concerns to three areas:

- the firefighter
- the area immediately surrounding the firefighter
- the overall environment of the fire itself.

The most direct way to improve the safety of both structural and wildland firefighters is cross-training of all firefighters and improved equipment. While cross-training is being done in some regions throughout the country, it is still not standard practice everywhere. Until cross-training programs become universal, awareness may be the tool that saves lives.

Of the 1,046 firefighters who died while on duty from 1987 through 1996, 163 (15.6%) died while fighting wildland fires. The number of deaths was generally between 12 and 22 per year, with the exception of seven deaths in 1993 and 1996, and 33 deaths in 1994. Over the period, 23.6% of all fire ground deaths occurred at wildland fires (Firewise 2005).

This analysis includes members of municipal fire departments who responded to grass, brush and forest fires within their jurisdictions as well as career, seasonal and contract employees of state and federal wildland agencies who were involved in assigned firefighting activities at the time there were fatally injured (Firewise 2005). The federal wildland agencies include the U.S. Forest Service, the Bureau of Indian Affairs, the Bureau of Land Management, the Fish and Wildlife Service, the National Park Service and the military.

The 163 victims (1987-1996) ranged in age from 15 to 83, with a median age of 34. Fourteen of the victims were women. Approximately 70% of all wildland fire deaths (114) occurred during fire suppression activities. Another 49 deaths occurred when firefighters were responding to or returning from such fires.

4.2.2.2.1 Deaths on the Ground from Fire

The largest proportion of deaths during fire suppression activities resulted from being caught or trapped by fire progress. Twenty-five of these 38 firefighters died of smoke inhalation; the other 13 died as a result of burns. Fourteen of these 38 deaths occurred in a single incident in 1994.

Wildland fire deaths by nature of fatal injury, more commonly referred to as the medical cause of death, is important to understanding this issue. State and federal wildland officials believe that

their rigorous fitness requirements lower the risk of heart attack death among firefighters under their jurisdiction. For this analysis, then, the fire ground deaths were broken down by type of department municipal (career or volunteer) or wildland agencies. A profile of the 114 fire ground victims shows that 50 were members of municipal fire departments (44 were volunteer firefighters and six were career firefighters). The other 64 firefighters were career, seasonal or contract employees of state and federal wildland agencies, or military personnel.

4.2.2.2.2 Municipal Firefighters

As shown in Table 4.7, heart attacks accounted for over half of the deaths of municipal firefighters during fire ground operations, while most of the deaths of state and federal employees were due to internal trauma, asphyxiation and burns.

Of the 17 municipal heart attack victims for whom medical documentation was available, nine had had prior heart attacks or bypass surgery, three had severe arteriosclerotic heart disease, three had hypertension and one was diabetic. The municipal volunteer firefighters who suffered fatal heart attacks ranged in age from 27 to 83, with a median age of 58. The one wildland agency firefighter who died of a heart attack was 38 years old and had severe arteriosclerotic heart disease.

The lower proportion of heart attacks among wildland agency firefighters may be a result of stricter fitness requirements, but it could also be a function of age. Older firefighters are more likely to suffer heart attacks and if the wildland agencies employ a significantly lower percentage of old firefighters, their experience would reflect this. Looking at all fire ground deaths, municipal vs. wildland agencies, the ages of wildland firefighters who died ranged from 18 to 64, with a median age of 32 years, while volunteer municipal firefighters ranged in age from 18 to 83, with a median age of 50. The six career municipal firefighters ranged in age from 20 to 49, with a median age of 29. Other factors besides age and fitness requirements that may impact the incidence of heart attack deaths at wildland fires include the equipment provided. In many of the incidents handled by municipal firefighters, those involved in fighting the fire did so in full protective clothing designed for structural firefighting, while wildland firefighters wear clothing, helmets and boots more appropriate to outdoor work (Firewise 2005).

Table 4.7. Wildland firefighter deaths on the fire ground by nature of Fatal Injury 1987-1996.

Fatality Cause	Federal and State Wildland Agencies	Municipal		Total
		Volunteer	Career	
Heart attack	1	27	0	28
Internal trauma	24	3	1	28
Asphyxiation	23	2	0	25
Burns	9	4	3	16
Crushing	4	4	0	8
Electric shock	1	2	0	3
Heat stroke	0	1	2	3
Stroke	2	0	0	2
Bleeding	0	1	0	1
Total	64	44	6	114

As far as the other types of injuries suffered on the fire ground are concerned, increased use of fire shelters could result in a reduction in fatal burns and smoke inhalation deaths and safer handling of aircraft could reduce the number of deaths due to aircraft crashes during suppression activities.

4.2.2.2.3 Deaths While Responding to or Return from Alarms

Of the 163 wildland-related deaths that occurred between 1987 and 1996, 49 occurred when firefighters were responding to or returning from such fires. Thirty four of the 49 deaths were the result of vehicle crashes, 12 were heart attacks, one firefighter was crushed when a tree fell on the crew area of a moving truck, one firefighter was crushed between two pieces of apparatus while he attempted to start the rear-mounted pump in preparation for response to an incident and one firefighter drowned at a base camp after returning from the fire line.

The 34 deaths in crashes occurred in 25 separate incidents. Ten contractors and four federal employees were killed in six aircraft crashes. Eleven firefighters were killed in 10 crashes involving tankers, and five firefighters were killed when their personal vehicles crashed. The remaining four deaths resulted from crashes involving an engine, a brush unit, a supply vehicle and a military vehicle.

The 12 heart attack victims included eight municipal firefighters, three forestry employees and one contractor. Five of the 12 firefighters had had prior heart attacks or bypass surgery, one had severe arteriosclerotic heart disease and one was diabetic. No medical information was available for the other five heart attack victims.

4.2.2.2.4 Montana State Fatalities

Within Montana State, wildland fire injuries have been documented by the National Interagency Fire Center (2005) and are summarized in Table 4.8. From 1932-2003, there have been 38 fatalities during 16 incidents involving significant injuries. Burn over and entrapments are common themes in the listed fatalities. In order to reduce the risks to firefighters responding to wildland fire events, these issues must be addressed and eliminated.

Table 4.8. Wildfire accidents reported in Montana, 1910-2003.

Year	Place	Type of Accident	Organization	Fatalities
1933	Basin	Hypothermia	Federal	1
1934	Glacier NP	Snag	Federal	1
1934	Lincoln NF	Snag	Federal	1
1937	Missoula	Burnover	Federal	1
1949	Helena NF	Burnover	Federal	13
1967	Kootenai NF	Burnover	Federal	2
1984	Humansville	Burnover	Unknown	2
1988	Flathead NF	Snag	Federal	1
1988	Not Reported	Engine Rollover	Federal	1
1988	Not Reported	Snag	Other	1
1988	Not Reported	Vehicle	Federal	1
1991	Missoula	Fire Training	Federal	1
1991	Not Reported	Aircraft	Federal	2
1994	Missoula	Air tanker	Contractor/Federal	2
1996	Colstrip	Burnover	Private	2
1999	Pompeys Pillar	Dozer Burnover	Contractor	0
2001	Livingston	Helicopter	Contractor	3
2001	Not Reported	Snag	Federal	1
2002	Dillon	Work Capacity Test	State	1
2003	Missoula	Heart Attack	State	1

(National Interagency Fire Center 2005)

4.3 Wildfire Hazard Assessment

Liberty County was analyzed using a variety of techniques, managed on a GIS system (ArcGIS 9). 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 and rangeland health issues and treatment options. This information was analyzed and combined to develop an assessment of wildfire risk in the region.

4.3.1 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. This analysis procedure has been completed on approximately 45 million acres across Montana, Wyoming, Idaho, Washington, and Nevada since 2002.

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 frequency 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 9. 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 Montana Vegetation and Land Cover Classification System, modified from Redmond (1997) and Homer (1998).

Riparian Zones: Riparian zones were derived from stream layers.

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 Montana area including the Bureau of Land Management and the Montana Department of Natural Resources and Conservation. Liberty County fire districts provided additional fire history and occurrence information that was digitized into a GIS system so that a full wildfire database was available to characterize wildfire occurrence in Liberty County. This data was used in the formation of the Fire Prone landscapes assessment.

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.

Table 4.9. Fire Prone Landscape rankings and associated acres in each category for Liberty County.

Color Code	Value	Total Acres	Percent of Total Area
	0	-	0%
	10	156,617	17%
	20	296,548	32%
	30	96,523	10%
	40	144,557	16%
	50	128,064	14%
	60	62,546	7%
	70	32,764	4%
	80	8,131	1%
	90	4	0%
	100	-	0%

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. A map of the Fire Prone Landscapes in Liberty County is included in Appendix I.

4.3.2 Historic Fire Regime

The US Forest Service has provided their assessment of Historic Fire Regimes for western Montana. These measures of forest conditions are the standard method of analysis for the USDA Forest Service. The Historic Fire Regime map is presented in Appendix I.

In the fire-adapted ecosystems of Montana, fire is undoubtedly the dominant process in terrestrial systems that constrain vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historical fire regimes (that is, fire frequency and fire severity prior to settlement by Euro-Americans) to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historical fire regimes vary across the landscape.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Obviously, historical fire regimes are a critical component for characterizing the historical range of variability in the fire adapted ecosystems of Montana. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems. In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historical fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

We used a database of fire history studies in the region to develop modeling rules for predicting historical fire regimes (HFRs). Tabular fire-history data was stratified into spatial data ecoregions, potential natural vegetation types (PNVs), slope classes, and aspect classes to derive rule sets which were then modeled spatially. Expert opinion was substituted for a stratum when empirical data was not available.

Fire is the dominant disturbance process that manipulates vegetation patterns in Montana. The HFR data were prepared to supplement other data necessary to assess integrated risks and opportunities at regional and subregional scales.

4.3.2.1 General Limitations

These data were derived using fire history data from a variety of different sources. These data were designed to characterize broad scale patterns of historical fire regimes for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:50,000. Although the resolution of the HFR theme is 30 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).

Table 4.10. Historic Fire Regime by area in Liberty County.

Historic Fire Regime Description	Regime	Acres	Percent
Non-Lethal Fires	I	1,402	0%
Stand Replacement-Short Interval	IV	978	0%

Table 4.10. Historic Fire Regime by area in Liberty County.

Historic Fire Regime Description	Regime	Acres	Percent
Stand Replacement-Long Interval	V	272	0%
Mixed Severity-Short Interval	I	2,432	0%
Mixed Severity-Long Interval	III	9,944	1%
Non-forest-Stand Replacement-Short Interva	II	403,999	44%
Non-forest-Mixed Severity-Moderate Interva	III	8,574	1%
Non-forest-Stand Replacement-Moderate Inte	IV	5,267	1%
Non-forest-Stand Replacement-Long Interval	V	555	0%
Agriculture	Agriculture	477,182	52%
Urban	Urban	555	0%
Sparce Vegetation	Sparce Vegetation	2,666	0%
Water	Water	11,929	1%

4.3.3 Fire Regime Condition Class

The US Forest Service has provided their assessment of Fire Regime Condition Class for Liberty County to this Community Wildfire Protection 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 4.11. Maps depicting Fire Regime and Condition Class are presented in Appendix I.

Table 4.11. Fire Regime Condition Class Definitions.

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 Liberty County shows that approximately 2% of the County is in Condition Class 1 (low departure), just about 35% is in Condition Class 2

(moderate departure), with the remaining 8% of the area is in Condition Class 3 (high departure)(Table 4.12).

Table 4.12. Fire Regime Condition Class by Area in Liberty County.

Condition Class	Acres	Percent
Low Departure	14,265	2%
Moderate Departure	326,739	35%
High Departure	73,748	8%
Agriculture	477,182	52%
Sparse Vegetation	2,666	0%
Urban	555	0%
Water	11,929	1%
Clouds	18,670	2%

4.3.4 Current 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). A Current Fire Severity map is depicted in Appendix I.

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).

4.3.4.1 Purpose

Fire is a dominant disturbance process in Montana. 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).

4.3.4.2 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 4.13. Current Predicted Fire Severity by area in Liberty County.

Predicted Fire Severity	Regime	Acres	Percent of Area
Mixed Severity-Short Interval	I	2,446	0%
Mixed Severity-Long Interval	III	10,381	1%
Stand Replacement	V	1,250	0%
Non-Lethal Fires	I	952	0%
Non-forest-Mixed Severity-Moderate Interval	III	8,574	1%
Non-forest-Stand Replacement-Short Interval	II	403,999	44%
Agriculture	Agriculture	477,182	52%
Urban	Urban	555	0%
Sparse Vegetation	Sparse Vegetation	2,666	0%
Water	Water	11,929	1%
Non-forest-Stand Replacement-Moderate Interval	IV	5,267	1%
Non-forest-Stand Replacement-Long Interval	V	555	0%

4.3.5 On-Site Evaluations

Fire control and evaluation specialists as well as hazard mitigation consultants evaluated the communities of Liberty 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 the written narratives presented in the following sections.

4.4 Liberty County Conditions

Liberty County is characterized by cold winters and dry summers. The communities of Chester, Joplin, Lothair, and Whitlash make up the population centers; however, the entire county is quite rural. Farming and ranching operations are wide 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 majority of the county is covered by native rangelands, agricultural fields, and CRP land. Undeveloped rangelands and CRP acreages are characterized by blue gama, needle and thread, western wheat grass, green needle grass, and Sandberg blue grass. Shrub species growing in Liberty County include Gardner Saltbrush, silver sage, and greasewood; all of which grow well in saline soils. Rangelands are typically grazed, thereby keeping the fine fuel buildup to a minimum. Agricultural fields are generally not considered to be at high risk of uncontrolled wildland fires; however, fires in this type of vegetation could burn very intensely with large flame

lengths depending on the crop type and season. Annual burning of stubble after harvest occasionally leads to escaped grass fires. Usually, these fires are relatively easily controlled at road crossings or by using available farm implements to modify the vegetation in its path.

Since the induction of the Conservation Reserve Program by the federal government, many former crop producing fields have been allowed to return to native grasses. CRP fields are creating a new fire concern all over the West. As thick grasses are allowed to grow naturally year after year, dense mats of dead plant material begin to buildup. Due to the availability of a continuous fuel bed, fires in CRP fields tend to burn very intensely with large flame lengths that often times jump roads or other barriers, particularly under the influence of wind. Many landowners and fire personnel are researching allowable management techniques to deal with this increasing problem. Currently, according to the CRP Handbook, all management must be part of the landowner's Conservation Plan of Operations, which includes burning to reduce the fuel loading, and must be in the best interest of the CRP. Under certain circumstances, burning may be used as a process to enhance or renovate the existing vegetative cover for wildlife, especially if it is overgrown and stagnant. As noted in Montana CRP-542, burning can only be conducted under an approved burn plan by qualified personnel. The County must also issue a burn permit for any controlled burning on CRP fields. CRP contracts can be modified to include the construction of fuel breaks along road corridors or around structures to help reduce wildfire risks.

The portion of Sweet Grass Hills that lies within Liberty County consists primarily of the East Butte and a few surrounding foothills. East Butte, particularly the north side, is forested by stunted balsam fir. Balsam fir bark is thin bark, ash gray, and smooth except for numerous blisters of sticky, liquid resin. These characteristics make balsam fir very vulnerable to mortality as a result of wildland fires. Typically, fires in this habitat type would be infrequent, but stand replacing.

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 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.

4.5 Liberty County's Wildland Urban Interface

The Wildland-Urban Interface (WUI) has gained attention through efforts targeted at wildfire mitigation; however, this analysis technique is also useful when considering other hazards because the concept looks at where people and structures are concentrated in any particular region. For Liberty County, the WUI shows the relative concentrations of structures scattered across the county.

A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments, or where forest or rangeland fuels meet urban fuels in the case of wildfires (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes that lead directly to a risk to urban developments. Reducing the hazard in the wildland urban interface requires the efforts of federal, state, and local agencies and private individuals (Norton 2002). "The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, 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 danger by creating defensible areas around them and taking other measures to minimize the 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 against other hazard risks. 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);
- improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Three wildland-urban interface conditions have been identified (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded 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

In addition to these classifications detailed in the Federal Register, four additional classifications of population density have been included to augment these WUI categories:

- **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.
- **High Density Urban** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries: it is set by very high population densities (more than 7-10 structures per acre or more). Many counties and reservations in the west do not have high density urban areas. Liberty County, Montana, was

determined not to have any areas of high density urban based on current (2006) structure locations.

- **Infrastructure WUI** – those locations where critical and identified infrastructure are located outside of populated regions and may include high tension power line corridors, critical escape or primary access corridors, municipal watersheds, areas immediately adjacent to facilities in the wildland such as radio repeater towers or fire lookouts. These are identified by county or reservation level planning committees.
- **Non-WUI Condition** - a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure crossing these unpopulated regions. This classification is not WUI.

In summary, WUI designations by the Liberty County planning committee includes:

- Interface Areas: WUI
- Intermix Areas: WUI
- Occluded Areas: Not Present
- Rural Areas: WUI
- Infrastructure Areas: Not Present
- High Density Urban: Not Present
- Non-WUI Condition: Not Present

The locations of structures in Liberty County have been mapped and are presented on a variety of map products in this analysis document; specifically in Appendix I. The location of all structures was determined by examining remotely sensed images. Detailed information was garnered from digital ortho-photos at a resolution of 1 meter (from 1998). These records were augmented with structure data provided by the Liberty County GIS department.

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 disaster in the region.

By evaluating this structure density, WUI areas can be defined 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 above). 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. This mapping procedure was followed and is presented in the maps included in the Appendix I.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the County or Reservation when a formal and adopted Community Wildfire Protection Plan is in place. It further states that the Federal Agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The Liberty County Community Wildfire Protection Plan committee evaluated a variety of different approaches to determining the WUI for the County and selected this approach and has adopted it for these purposes. In addition to a formal WUI map for use with the Federal Agencies, it is hoped that it will serve as a planning tool for the county and local fire districts.

A map of the Wildland Urban Interface in Liberty County as defined by the Community Wildfire Protection Plan committee is included in Appendix I.

4.5.1 Potential WUI Treatments

The definition and mapping of the WUI is the creation of a planning tool to identify where structures, people, and infrastructure are located in reference to each other. This analysis tool does not include a component of fuels risk. There are a number of reasons to map and analyze these two components separately (population density vs. fire risk analysis). The primary among these reasons is the fact that population growth often occurs independent from changes in fire risk, fuel loading, and infrastructure development. Thus, making the definition of the WUI dependant on all of them would eliminate populated places with a perceived low level of fire risk today, which may in a year become an area at high risk due to forest or rangeland health issues or other concerns.

By examining these two tools separately the planner is able to evaluate these layers of information to see where the combination of population density overlays areas of high current fire risk and then take mitigative actions to reduce the fuels, improve readiness, directly address factors of structure ignitability, improve initial attack success, mitigate resistance to control factors, or (more often) a combination of many approaches.

It should not be assumed that just because an area is identified as WUI, that it will therefore receive treatments because of this identification alone. Nor should it be implicit that all WUI treatments will be the application of the same prescription. Instead, each location targeted for treatments must be evaluated on its own merits: factors of structural ignitability, access, resistance to control, population density, resources and capabilities of firefighting personnel, and other site specific factors.

Most treatments may begin with the home evaluation, the implicit factors of structural ignitability (roofing, siding, deck materials), and vegetation within the treatment area of the structure. However, treatments in the low population areas of rural lands (mapped as yellow) may look closely at access (two ways in and out) and communications through means other than land based telephones. On the other hand, the subdivision with densely packed homes (mapped as brown – interface areas) surrounded by forests and dense underbrush, may receive more time and effort implementing fuels treatments beyond the immediate home site to reduce the probability of a crown fire entering the subdivision.

4.6 Liberty County Communities At Risk

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 4.14. Liberty County Communities

Community Name	Planning Description	Vegetative Community	National Register Community At Risk?[1]
Chester	Town	Rangeland	No
Joplin	Community	Rangeland	No
Lothair	Community	Rangeland	No
Tiber	Community	Rangeland	No
Whitlash	Community	Rangeland	No
Hill	Community	Rangeland	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.

4.7 Communities in Liberty County

4.7.1 Overall Fuels Assessment

The land ownership pattern in Liberty County is primarily private with scattered acreages of state and federal ownership. Tillable or grazable ground is generally utilized for the production of agricultural products or has been converted to CRP. The vast majority of the county is covered by rangelands with the Sweet Grass Hills providing the only forested ground in the county. The East Butte area of the Sweet Grass Hills is mostly owned by the Bureau of Land Management with sections of private and state land in the surrounding area.

The native mixed grass rangelands present throughout the majority of the county are fairly inconsistent. Farming, ranching, and housing development has broken the continuity of native fuels. Where native rangelands do exist, they are dominated by blue gramagrass, needle and thread, western wheatgrass, green needle grass, and Sandberg blue grass. Harsh winters, low precipitation, short growing season, and periodic droughts limit the establishment of trees in low elevation areas.

Much of the rangeland is actively grazed by livestock, mule deer, pronghorn antelope, and other ungulates. Grazing helps keep fine fuel loads low, reducing available fuel for rangeland fire. Fires in areas dominated by grasses and scattered sage tend to spread rapidly, but burn at relatively low intensities. 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 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 very rapidly. 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 not only demonstrate the potential for fires in these fuels to grow to enormous size, but they also demonstrate fire behavior atypical of these fuel complexes.

Balsam fir grows at moderate densities on the higher elevations of East Butte. Fires in this habitat type occur very rarely and are typically stand replacing. However, elk herds as well as other wildlife and harsh weather help keep understory fuels to a minimum. So far, this isolated stand is not showing signs of widespread mortality due to age, disease, or insects. The East Butte area has significant cultural importance; thus, mitigating the potential wildland fire risk in this area is imperative to the residents of Liberty County and the nearby Blackfeet Indian Reservation.

4.7.2 Overall Mitigation Activities

There are many specific actions that will help improve the safety in a particular area; however, there are also many potential mitigation activities that apply to all residents and all fuel types. General mitigation activities that apply to all of Liberty County are discussed below while area specific mitigation activities are discussed within the individual community assessments.

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.

Active prevention techniques involve mass media, radio, or the local newspapers. Fire districts in other counties have contributed to 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 “tip of the week” to reduce the threat from wildland and structure fires. The federal government as well as the Montana Department of Natural Resources and Conservation has been a champion of prevention, and could provide ideas for such tips. When fire conditions are high, brief public service messages could warn of the hazards of misuse of fire or any other ignition sources.

Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Liberty County must be made aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. “Living with Fire, A Guide for the Homeowner” is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Liberty County should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, forest management efforts must be considered to slow the approach of a fire that threatens a community. The survey of the public conducted during the preparation of this Community Wildfire Protection Plan indicated that approximately XX% of the respondents are interested in participating in wildfire education programs.

Also of vital importance is the accessibility of the homes to emergency apparatus. The fate of the home often will be determined by homeowner actions prior to the event. Homes’ survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or mowing driveways and creating a turnaround area for large vehicles.

Recreational facilities, such as the Lake Elwell area and surrounding rangelands, should be kept clean and maintained. In order to mitigate the risk of an escaped campfire, escape proof fire rings and barbeque pits should be installed and maintained. Surface fuel accumulations can also be kept to a minimum by periodically mowing or conducting prescribed burns.

Other actions to reduce fire hazards are creating fire resistant buffers along roads and power line corridors and strictly enforcing fire-use regulations. High tension power lines coming from Hill, Toole, and Choteau Counties are the only sources of electrical power to Liberty County; thus, protecting these corridors is a high priority. Ensuring that the area beneath the lines has been cleared of potential high risk fuels and making sure that the buffer between the

surrounding rangelands is wide enough to adequately protect the poles as well as the lines is imperative.

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.

Other specific mitigation activities are likely to include improvement of emergency water supplies, management of decadent shelterbelts, and fuels reduction along roads and power line right-of-ways. Furthermore, building codes should be revised to provide for more fire conscious construction techniques such as using fire resistant siding, roofing, and decking.

4.7.3 Individual Community Assessments

4.7.3.1 Chester

Chester is a small agriculturally-based community in the center of Liberty County. Chester is the largest town and serves not only as the county seat, but is also the commercial and economic hub of Liberty County. The community of Chester is nearly halfway between the larger cities of Havre and Shelby, Montana

4.7.3.1.1 Fire Potential

The fuels surrounding Chester consist primarily of agricultural development and native rangelands. The topography is relatively flat with occasional rolling hills. There are also patches of livestock pasture and CRP fields that add to the potential fuel complex. Agriculture and ranching activities dominate the landscape resulting in a discontinuous pattern of native fuels. A wind-driven fire in the dry native fuel complexes would produce a rapidly advancing, but variable intensity fire. Fires burning in some types of unharvested fields would be expected to burn more intensely with larger flame lengths due to the greater availability of fuels. Agricultural fields currently managed under the Crop Reserve Program (CRP) burn very intensely due to an increased amount of fuels, particularly dead grasses from previous years. Larger flame lengths and intense heat make fires in CRP fields difficult to control. Under extreme weather conditions, particularly high winds, there is a high potential for a rapidly advancing rangeland fire. Nevertheless, many homeowners maintain groomed yards or are surrounded by agricultural fields; thus, decreasing the risk of a wildland fire threatening structures. Grazing around homes and communities helps decrease build up of fine fuel loads. Livestock grazing can be an effective tool to reduce the primary fuel load component of the arid rangeland ecosystem.

In this part of Montana, lightning is a significant source of ignitions, but vehicle use on and off roads also has the potential to ignite fires. Not only do sparks from vehicles ignite fuels along roadways, but fires may also be started by vehicles driving through dry fields or on unimproved trails. Farm equipment, ATV's, and pick ups are used regularly for farming purposes and recreational operations. Many trains travel through the Chester area daily on the Burlington

Northern rail lines that parallel Highway . Sparks from the trains' passage ignite several fires each year.

Stubble fires escape landowner's boundaries relatively regularly. These fires are generally quickly suppressed by modifying the vegetation with available farm implements and homes are rarely threatened.

4.7.3.1.2 Ingress-Egress

The primary ingress and egress to Chester from either the east or the west is U.S. Highway 2. This is a well traveled, two-lane highway. State Route 223 also provides a paved, two-lane route into Chester from the south. In addition, there are numerous graveled secondary routes crisscrossing the area. The Burlington Northern rail line parallels U.S. Highway 2 through Chester offering both passenger and freight services.

4.7.3.1.3 Infrastructure

Residents within the city limits of Chester have access to the municipal water system; however, outlying homes, farms, and ranches rely on personal or multiple-structure well systems.

Above ground power lines run along U.S. Highway 2 from Chester to the east and along State Route 223 south. Another major east-west power line is located about three miles south of the community center.

4.7.3.1.4 Fire Protection

The Chester Volunteer Fire Department is responsible for structural and wildland fire protection within the Town of Chester, while the West Liberty Fire District covers the surrounding area.

All fifty-six Montana Counties are currently enrolled in the State/County Cooperative Fire program. According to agreements signed with the state, each county is obligated to fight wildland fire on all state and private ground not covered by an existing fire agency. The Montana Department of Natural Resources and Conservation, in turn, assists counties when fires exceed their capability, provides training in wildland fire fighting, administrative support to county fire agencies through involvement in the County Rural Fire Councils and Fire Protective Associations, as well as the loan of Federal Excess Personal Property (FEPP) fire equipment.

4.7.3.1.5 Community Risk Assessment

Residents of Chester have a moderate risk of experiencing a wildland fire due to the extensive agricultural development. However, farming and ranching activities throughout the area increase the risk of a man-caused wildfire spreading to the community. Large expanses of CRP fields, such as in the Black Coulee area, provide a continuous fuel bed extending for several miles that has the potential to threaten several homes and farmsteads along the way. Fields enrolled in the CRP program have high accumulations of fuels and are typically problematic to access due to the lack of roads making fire suppression difficult and potentially dangerous. In addition, the frequent passage of trains along Highway 2 significantly increases the likelihood of an ignition near the community or along one of the primary access routes.

Under extreme weather conditions, escaped agricultural fires could potentially threaten individual homes or the townsite; however, this type of fire is usually quickly controlled. The Chester area experiences frequent high winds, which generally increase the rate of fire spread and intensity of rangeland fires. It is imperative that homeowners implement fire mitigation

measures to protect their structures and families prior to a wildfire event. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

4.7.3.1.6 Mitigation Activities

As with all other communities, constructing a defensible space around homes, businesses, and other structures is one of the most effective ways to protect them from wildfire. In the Chester area, this will likely include mowing and removing weeds and other vegetation from around structures and moving flammable items such as propane tanks and wood piles a safe distance away. Maintaining a clean and green yard around home sites is also an effective fire mitigation measure. Additionally, using fire resistant siding, decking, and roofing will help reduce the ignitability of the structure.

Designing a plan to help firefighters control CRP fires would significantly lessen the fire danger to the community. Mitigation associated with this type of fire might include plowing a fire resistant buffer zone around fields and along pre-designed areas to tie into existing natural or manmade barriers or implementing a prescribed burning regimen during less risky seasons of the year.

Roads and rail lines can be made more fire resistant by frequently mowing along the edges to reduce the fuels or planting more fire resistant grasses in these highly prone areas. Aggressive initial attack on fires occurring along travel routes will help insure that these ignitions do not spread to nearby home sites.

Maintaining developed drafting sites and mapping alternative water resources such as underground tanks near the community will increase the effectiveness and efficiency of emergency response in a wildfire situation.

4.7.3.2 Joplin

Joplin is a small farming community located along U.S. Highway 2 about nine miles east of Chester. Nearly all of the businesses in Joplin support the agricultural-based economy in the area.

4.7.3.2.1 Fire Potential

Fuels surrounding Joplin consist primarily of dryland crops and CRP fields. There are very few low growing shrubs and the only trees that exist are ornamentals planted in residents' yards. Farming activities dominate the landscape, resulting in a discontinuous pattern of native fuels. A wind-driven fire in the dry native fuel complexes would produce a rapidly advancing, but variable intensity fire. Agricultural fields currently managed under the Crop Reserve Program (CRP) and fields set in fallow burn very intensely due to increased amount of fuels, particularly dead grasses from previous years. Larger flame lengths and intense heat make fires in CRP fields difficult to control. Under extreme weather conditions, particularly high winds, there is a high potential for a rapidly advancing rangeland fire. Nevertheless, many homeowners maintain groomed yards or are surrounded by planted fields; thus, decreasing the risk of a wildland fire threatening structures. Grazing around homes and communities helps decrease build up of fine fuel loads. Livestock grazing can be an effective tool to reduce the primary fuel load component of the arid rangeland ecosystem.

In this part of Montana, lightning is a significant source of ignitions, but vehicle use on and off roads also has the potential to ignite fires. Not only do sparks from vehicles ignite fuels along

roadways, but fires may also be started by vehicles driving through dry fields or on unimproved trails. Farm equipment, ATV's, and pick ups are used regularly for farming purposes and recreational operations. Many trains travel through the Joplin area daily on the Burlington Northern rail lines that parallel Highway . Sparks from the trains' passage ignite several fires each year.

Stubble fires escape landowner's boundaries relatively regularly. These fires are generally quickly suppressed by modifying the vegetation with available farm implements and homes are rarely threatened.

4.7.3.2.2 Ingress-Egress

Like Chester, the primary access route for Joplin is U.S. Highway 2. State Route 224 also provides a paved, two-lane access north from Joplin almost to the Canadian border. There are also numerous secondary routes throughout the area that access many of the rural farms and ranches.

4.7.3.2.3 Infrastructure

The community of Joplin and structures in the outlying areas all depend on personal or multiple structure well systems.

An above ground power line parallels U.S. Highway 2 through the community of Joplin.

A Burlington Northern rail line also parallels U.S. Highway 2 through the town site; however, Chester is the only loading and unloading stop the train makes in Liberty County.

4.7.3.2.4 Fire Protection

Much of the eastern half of Liberty County including the community of Joplin has structural and wildland fire protection provided by the Joplin Volunteer Fire Department.

All fifty-six Montana Counties are currently enrolled in the State/County Cooperative Fire program. According to agreements signed with the state, each county is obligated to fight wildland fire on all state and private ground not covered by an existing fire agency. The Montana Department of Natural Resources and Conservation, in turn, assists counties when fires exceed their capability, provides training in wildland fire fighting, administrative support to county fire agencies through involvement in the County Rural Fire Councils and Fire Protective Associations, as well as the loan of Federal Excess Personal Property (FEPP) fire equipment.

4.7.3.2.5 Community Risk Assessment

Residents of Joplin have a moderate risk of experiencing a wildland fire due to the relatively flat topography and relatively sparse vegetation surrounding most structures. However, agricultural activities throughout the area and heavy traffic on the highway and rail lines increase the risk of a man-caused wildfire spreading to the community. It is important that homeowners implement fire mitigation measures to protect their structures and families prior to a wildfire event. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

Under extreme weather conditions, escaped agricultural fires could potentially threaten individual homes or the townsite; however, this type of fire is usually quickly controlled. The Joplin area experiences frequent high winds, which generally increase the rate of fire spread and intensity of rangeland fires. It is imperative that homeowners implement fire mitigation

measures to protect their structures and families prior to a wildfire event. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

4.7.3.2.6 Mitigation Activities

As with all other communities, constructing a defensible space around homes, businesses, and other structures is one of the most effective ways to protect them from wildfire. In the Joplin area, this will likely include mowing and removing weeds and other vegetation from around structures and moving flammable items such as propane tanks and wood piles a safe distance away. Maintaining a clean and green yard around home sites is also an effective fire mitigation measure. Additionally, using fire resistant siding, decking, and roofing will help reduce the ignitability of the structure.

Designing a plan to help firefighters control CRP fires would significantly lessen the fire danger to the community. Mitigation associated with this type of fire might include plowing a fire resistant buffer zone around fields and along pre-designed areas to tie into existing natural or manmade barriers or implementing a prescribed burning regimen during less risky seasons of the year.

Roads and rail lines can be made more fire resistant by mowing along the edges frequently to reduce the fuels or planting more fire resistant grasses in these highly prone areas. Aggressive initial attack on fires occurring along travel routes will help insure that these ignitions do not spread.

Maintaining developed drafting sites and mapping alternative water resources such as underground tanks near the community will increase the effectiveness and efficiency of emergency response in a wildfire situation.

4.7.3.3 Whitlash and Hill

Whitlash and Hill are two very small farming and ranching communities located in northwestern Liberty County on opposite sides of East Butte in the Sweet Grass Hills. There are multiple ephemeral streams that drain off of East Butte creating shallow coulees and seasonal riparian areas. The Whitlash Port of Entry into Alberta, Canada is located about seven miles north of the Whitlash town. Haystack Butte is a very steep sided cone that rises from the rangeland four miles west of Hill and is an obvious local landmark.

4.7.3.3.1 Fire Potential

Fuels surrounding Whitlash and Hill consist primarily of native rangeland grasses, crop fields, or livestock pasture. There are a few low growing shrubs and other vegetation in the coulees and small riparian areas. A stunted stand of trees exists on the steep slopes of the Sweet Grass Hills that rise abruptly east of Whitlash and north of Hill. Agriculture and ranching activities dominate the landscape and the economy in this very rural area resulting in a discontinuous pattern of native fuels. A wind-driven fire in the dry native fuel complexes would produce a rapidly advancing, but variable intensity fire. Fires burning in some types of unharvested fields would be expected to burn more intensely with larger flame lengths due to the greater availability of fuels. Under extreme weather conditions, particularly high winds, there is a high potential for a rapidly advancing rangeland fire. Nevertheless, many homeowners maintain groomed yards or are surrounded by agricultural fields; thus, decreasing the risk of a wildland fire threatening structures. Grazing around homes and communities helps decrease build up of

fine fuel loads. Livestock grazing can be an effective tool to reduce the primary fuel load component of the arid rangeland ecosystem.

Access into the Sweet Grass Hills in Liberty County is very limited due to the very steep slopes and surrounding private property; thus, a fire occurring in this timbered area would be very difficult to suppress and would likely result in a mostly stand replacing fire.

In this part of Montana, lightning is a significant source of ignitions, but vehicle use on and off roads also has the potential to ignite fires. Not only do sparks from vehicles ignite fuels along roadways, but fires may also be started by vehicles driving through dry fields or on unimproved trails. Farm equipment, ATV's, and pick ups are used regularly for farming purposes and recreational operations. Stubble fires escape landowner's boundaries relatively regularly. These fires are generally quickly suppressed by modifying the vegetation with available farm implements and homes are rarely threatened.

4.7.3.3.2 Ingress-Egress

There are several access routes into both Whitlash and Hill, all of which are two-lane graveled roads. State Routes 552 and 217 provide access into Whitlash from neighboring Toole County and Whitlash Road or State Route 409 travel to Whitlash from Chester. Hill is accessed via Whitlash Road from Chester to the south or off of Black Jack Road from northeast. There is also a multitude of graveled secondary roads that crisscross northwest Liberty County that provide additional access to the Whitlash and Hill communities.

4.7.3.3.3 Infrastructure

All structures and livestock watering troughs in both Whitlash and Hill rely on personal or multiple structure well systems.

There are no main power line corridors in this part of the County; however, there are several above ground distribution lines leading to individual homes or groups of homes.

4.7.3.3.4 Fire Protection

The West Liberty Fire District provides structural and wildland fire protection to the communities of Whitlash and Hill as well as most of western Liberty County.

All fifty-six Montana Counties are currently enrolled in the State/County Cooperative Fire program. According to agreements signed with the state, each county is obligated to fight wildland fire on all state and private ground not covered by an existing fire agency. The Montana Department of Natural Resources and Conservation, in turn, assists counties when fires exceed their capability, provides training in wildland fire fighting, administrative support to county fire agencies through involvement in the County Rural Fire Councils and Fire Protective Associations, as well as the loan of Federal Excess Personal Property (FEPP) fire equipment.

4.7.3.3.5 Community Risk Assessment

Residents of Whitlash and Hill have low to moderate risk of experiencing a wildland fire due to the relatively flat topography and agricultural development. However, ranching and farming activities throughout the area increase the risk of a man-caused wildfire spreading to the communities. The receptive nature of fuels increases the likelihood of a fire start. In the event of wildfire, the dry, flashy fuels would likely support a very fast-moving rangeland fire. Therefore, it is important that homeowners implement fire mitigation measures to protect their structures and

families prior to such an event. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds. Community defensible space is also maintained by livestock grazing. A planned, integrated grazing system around the communities could help enhance the fire reduction benefits derived from grazing.

4.7.3.3.6 Mitigation Activities

Constructing a defensible space around homes, businesses, and other structures is one of the most effective ways to protect them from wildfire. In the very rural Whitlash and Hill area, this will likely include mowing and removing weeds and other vegetation from around structures and moving flammable items such as propane tanks and wood piles a safe distance away. Maintaining a clean and green yard around home sites is also an effective fire mitigation measure. Additionally, using fire resistant siding, decking, and roofing will help reduce the ignitability of the structure.

Designing a plan to help firefighters control CRP fires would significantly lessen the fire danger to the community. Mitigation associated with this type of fire might include plowing a fire resistant buffer zone around fields and along pre-designed areas to tie into existing natural or manmade barriers or implementing a prescribed burning regimen during less risky seasons of the year.

Roads can be made more fire resistant by mowing along the edges frequently to reduce the fuels or planting more fire resistant grasses in these highly prone areas. Aggressive initial attack on fires occurring along travel routes will help insure that these ignitions do not spread.

In more remote communities such as Whitlash and Hill, development of fuel breaks and creating access to water for firefighting would enhance the survivability of the community and the efficiency of emergency fire response.

4.7.3.4 Lothair

There are very few residents remaining in the immediate Lothair area. Although there is an identified community center, most residents are larger landowners in the surrounding area. Lothair is located along the Burlington Northern railroad corridor on U.S. Highway 2 about thirteen miles west of Chester.

4.7.3.4.1 Fire Potential

Fuels surrounding Lothair consist primarily of native rangeland grasses, crop fields, or livestock pasture. Agriculture and ranching activities dominate the landscape and the economy resulting in a discontinuous pattern of native fuels. A wind-driven fire in the dry native fuel complexes would produce a rapidly advancing, but variable intensity fire. Fires burning in some types of unharvested fields would be expected to burn more intensely with larger flame lengths due to the greater availability of fuels. Under extreme weather conditions, particularly high winds, there is a high potential for a rapidly advancing rangeland fire. Nevertheless, many homeowners maintain groomed yards or are surrounded by agricultural fields; thus, decreasing the risk of a wildland fire threatening structures. Grazing around homes and communities helps decrease build up of fine fuel loads. Livestock grazing can be an effective tool to reduce the primary fuel load component of the arid rangeland ecosystem.

In this part of Montana, lightning is a significant source of ignitions, but vehicle use on and off roads also has the potential to ignite fires. Not only do sparks from vehicles ignite fuels along roadways, but fires may also be started by vehicles driving through dry fields or on unimproved

trails. Farm equipment, ATV's, and pick ups are used regularly for farming purposes and recreational operations. Stubble fires escape landowner's boundaries relatively regularly. These fires are generally quickly suppressed by modifying the vegetation with available farm implements and homes are rarely threatened.

4.7.3.4.2 Ingress-Egress

The primary access into Lothair is provide by U.S. Highway 2, a paved, two-lane route. Lothair Road, a north-south provides and additional graveled ingress and egress route.

4.7.3.4.3 Infrastructure

All structures and livestock watering troughs in the Lothair area rely on personal or multiple structure well systems.

An above ground power line parallels U.S. Highway 2 about three miles south of Lothair.

A Burlington Northern rail line also parallels U.S. Highway 2 through the town site; however, Chester is the only loading and unloading stop the train makes in Liberty County.

4.7.3.4.4 Fire Protection

Lothair as well as most of western Liberty County has structural and wildland fire protection provided by the West Liberty Fire District.

All fifty-six Montana Counties are currently enrolled in the State/County Cooperative Fire program. According to agreements signed with the state, each county is obligated to fight wildland fire on all state and private ground not covered by an existing fire agency. The Montana Department of Natural Resources and Conservation, in turn, assists counties when fires exceed their capability, provides training in wildland fire fighting, administrative support to county fire agencies through involvement in the County Rural Fire Councils and Fire Protective Associations, as well as the loan of Federal Excess Personal Property (FEPP) fire equipment.

4.7.3.4.5 Community Risk Assessment

Residents of Lothair have a moderate risk of experiencing a wildland fire due to the relatively flat topography, sparse vegetation surrounding most structures, and the nearby access to water resources available at Lake Elwell about five miles to the south. However, agricultural activities throughout the area increase the risk of a man-caused wildfire spreading to the community. It is important that homeowners implement fire mitigation measures to protect their structures and families prior to a wildfire event. Most homeowners maintain an adequate defensible space around structures by watering their yards or mowing grass and weeds.

4.7.3.4.6 Mitigation Activities

Constructing a defensible space around homes and other structures is one of the most effective ways to protect them from wildfire. In the very rural Lothair area, this will likely include mowing and removing weeds and other vegetation from around structures and moving flammable items such as propane tanks and wood piles a safe distance away. Maintaining a clean and green yard around home sites is also an effective fire mitigation measure. Additionally, using fire resistant siding, decking, and roofing will help reduce the ignitability of the structure.

Designing a plan to help firefighters control CRP fires would significantly lessen the fire danger to the community. Mitigation associated with this type of fire might include plowing a fire resistant buffer zone around fields and along pre-designed areas to tie into existing natural or manmade barriers or implementing a prescribed burning regimen during less risky seasons of the year.

Roads and rail lines can be made more fire resistant by mowing along the edges frequently to reduce the fuels or planting more fire resistant grasses in these highly prone areas. Aggressive initial attack on fires occurring along travel routes will help insure that these ignitions do not spread.

4.7.3.5 Lake Elwell

The Tiber Reservoir or Lake Elwell is located in southwestern Liberty County and is formed by the damming of the Marias River. This area has been developed with multiple campgrounds, marinas, and fishing access areas; therefore, there is a significant population of recreators during the warmer months.

4.7.3.5.1 Fire Potential

Fuels surrounding Lake Elwell consist primarily of native rangeland grasses in the immediate area with crop fields and livestock pasture beyond. A wind-driven fire in the dry native fuel complexes would produce a rapidly advancing, but variable intensity fire. Fires burning in some types of unharvested fields in the area would be expected to burn more intensely with larger flame lengths due to the greater availability of fuels. Under extreme weather conditions, particularly high winds, there is a high potential for a rapidly advancing rangeland fire. Nevertheless, most of the developed areas are kept mown to reduce the potential fire risk.

In this part of Montana, lightning is a significant source of ignitions, but vehicle use on and off roads also has the potential to ignite fires. Not only do sparks from vehicles ignite fuels along roadways, but fires may also be started by vehicles driving through dry fields or on unimproved trails. Farm equipment, ATV's, and pick ups are used regularly for farming purposes and recreational operations. In highly used recreational areas such as Lake Elwell, additional ignition sources such as campfires, BBQ pits, etc. can also result in an escaped wildland fire.

4.7.3.5.2 Ingress-Egress

There are several graveled access routes into the Lake Elwell area in Liberty County including Lothair Road from the north (4 miles from U.S 2), Tiber Road from the north (14 miles from U.S. 2), and State Route 366 from the west (22 miles from I-15) and east (8 miles from SR 223). All of these routes are bordered by rangeland or developed agricultural fuels.

4.7.3.5.3 Infrastructure

Tiber LLC has a hydropower plant located at the two of the downstream slope of Tiber Dam and Marias River Electric maintains an electrical substation adjacent to it. Western Area Power Administration maintains distribution lines from the substation to the north along the west side of Tiber Road.

4.7.3.5.4 Fire Protection

The West Liberty Fire District provides structural and wildland fire protection to Lake Elwell and the surrounding area.

All fifty-six Montana Counties are currently enrolled in the State/County Cooperative Fire program. According to agreements signed with the state, each county is obligated to fight wildland fire on all state and private ground not covered by an existing fire agency. The Montana Department of Natural Resources and Conservation, in turn, assists counties when fires exceed their capability, provides training in wildland fire fighting, administrative support to county fire agencies through involvement in the County Rural Fire Councils and Fire Protective Associations, as well as the loan of Federal Excess Personal Property (FEPP) fire equipment.

4.7.3.5.5 Community Risk Assessment

There are very few permanent structures located around Lake Elwell. However, there are several campgrounds and interpretive sites as well as rural farms and ranches in the nearby area. During the summer and fall Lake Elwell has a moderate to high risk of experiencing a wildland fire due to the increased ignition sources associated with a high intensity recreational area. Although the Reservoir itself provides an abundant water source, suppression equipment responding from nearby towns may take an extended amount of time to reach a fire in this area.

4.7.3.5.6 Mitigation Activities

Insuring that all campgrounds and other highly used areas are defensible by mowing and watering is one of the most effective forms of mitigation in recreational areas. Prevention signs outlining potential ignition sources and the consequences of wildfire also can be effective educational tools.

The Bureau of Reclamation or other managing agencies should have a wildfire response plan in place prior to a wildfire emergency. Evacuation of this type of area could require additional personnel to direct traffic and post informational signs, especially during holiday or fishing tournament weekends. Since Reclamation typically has no or minimal staff working weekends, and their authority is limited, traffic direction would be the responsibility of emergency responders, if they were available. It is highly probable that a considerable percent of the recreating population at Lake Elwell is from out of Liberty County, but it is believed most are familiar with the local road system. Escape routes will be dictated by the location of the wildfire in relation to people's homes, RV's, campsites, etc. and the direction and speed of the fire. If a safe and organized evacuation in front of an encroaching fire is not possible, then 'sheltering in place' may be the best option. Sheltering in place is a good alternative for a low intensity fire where structures have good clearance, are made of fire resistant materials, and the responsible fire agency/organization believes it is safe to stay. Pre-determined public assembly points may be warranted to provide for fire resistant group safety zones throughout the recreational areas. Using signage in public areas for posting of wildfire-related safety information such as available evacuation routes, public safety zones, and sheltering in place information is recommended.

Campfire use and firework restrictions can help reduce potential ignition sources. Limiting use of ATV, motorcycles, and other off-road vehicles to designated roads and trails will also help reduce the likelihood of an ignition from this type of source.

4.8 Firefighting Resources and Capabilities

The Fire Fighting Resources and Capabilities information provided in this section is a summary of information provided by Liberty County Fire Organizations and Representatives of the Wildland Fire Fighting Agencies listed. Their answers to a variety of questions are summarized here. These summaries indicate their perceptions and information summaries.

4.8.1 Rural Fire Protection

4.8.1.1 Liberty County Communication System – Trunked Subscriber Units

Current Resources:

Law Enforcement: 1 base
3 mobiles (45W)
4 handhelds

Chester Fire: 3 mobiles (45W)

EMS: 1 base (at Emergency Services Building/EOC
1 mobile (45W)
2 mobiles (100W with rear control)
2 handhelds

Hospital: 1 base
1 handheld

4.8.1.2 City of Chester – West Rural Volunteer Fire Department

Chief: Quannah Bailey
Telephone: 406-759-5238
Address: 710 W. Monroe Chester, Montana

Current Resources:

Table 4.15. Current Equipment List for Chester/West Rural Fire Department.

Year	Number	PSI	Tank Capacity	Pump Capacity
1992	48-63	200	500	250
1999	48-109	200	500	250
1984	48-92	200	1200	250
1956	48-65	250	1000	120
1982	48-95	200	250	250
1976	DSL231	200	250	250
1977	DSL84	200	250	250
1997	DNR1620	200	250	250
1968*	48-22	300	500	750
1997*	48-34	350	1000	1000

*Indicates City of Chester Fire Department vehicle only.

Department Needs:

Equipment – Base station radio (P25), 4 mobile truck radios (P25), 2 mobile radios for city trucks (P25), replace 2 brush units, and a 3,000+ gallon tender.

Training – the department is always looking for training on structural and wildland fires as well as hazardous materials.

4.8.1.3 Joplin Volunteer Fire Department

Chief: David Tempel

Telephone: 406-390-1634
Address: Box 91 Joplin, Montana 59531

Current Resources:

Table 4.16. Current Equipment List for Joplin Fire Department.

Year	Number	PSI	Tank Capacity	Pump Capacity
1971	48-80 Pumper	150	700	500
2002	48-111	150	400	120
1958	48-30	120	600	170
1976	48-102	250	1000	120
1978	48-16	120	300	170
1982	48-91	150	350	120
1985	48-36 Tender	70	2035	250
2002	48-110 Support			

Department Needs:

Equipment – Replace aging pumper, replace 2 brush units, ATV with tank & trailer, base station radio (P25), 4 mobile radios (P25), 2 handheld radios (P25).

Training **–** the department is always looking for training on structural and wildland fires as well as hazardous materials.

4.8.2 Wildland Fire Protection

4.8.2.1 Montana Department of Natural Resources and Conservation, Central Land Office

Rural Fire Specialist: David Hamilton
Telephone:406-458-3526
e-Mail:dahamilton@mt.gov
Address:8001 N. Montana Ave, Helena, Mt. 59602

District Summary: Central Land Office(CLO) has fourteen counties in their land office. They are Glacier, Toole, Liberty, Pondera, Teton, Cascade, Lewis & Clark, Meagher, Broadwater, Jefferson, Beaverhead, Madison, Park, and Gallatin counties. Some of the counties we have direct protection in while others we support the counties as they need help. We support them with training for wildland fire incidents and also supply support as need for incidents.

Priority Areas:

Fire Fighting Vehicles: 9 type 6 Engine's, 2 Tender's, 1 Helicopter type 2 with access to more, 1 Fixed wing airplane

Burn Permit Regulations: Counties regulate this

Education and Training: Provide wildland training to all of our firefighter's. A few of our employee's are cross training thru their personal lives for all-risk incidents

Cooperative Agreements: Have agreements signed with all the above mentioned counties plus mutual aid agreements signed with them all also.

Current Resources:

Helena Unit:

seven type 6 engines with 300 gallons of water

Dillon Unit:

2 type 6 engines with 300 gallons of water

Future Considerations: all of our aircraft is stationed in Helena and available 12 months out of the year.

4.8.2.2 Bureau of Reclamation

Contact Info: Montana Area Office
2900 Fourth Avenue North
Billings, Montana 59101
406-247-7298

Lake Elwell
P.O. Box 220
Chester, Montana 59522
406-456-3226

4.8.2.3 Bureau of Land Management

Chief: Gary Kirpach
Telephone: (406) 538-1085
e-Mail: gkirpach@mt.blm.gov
Address: PO Box 1160
Lewistown MT 59457

District Summary:

The BLM Central Montana Zone is a Federal wildland fire program with lands in 16 counties in Central and North Central Montana. The BLM fire program is limited to wildland fire actions only and on BLM lands or as requested under agreements.

Priority Areas:

Residential Growth: N/A

Communications: The Central Zone has a dispatch center located in Lewistown. Our resources have the ability to field program radios.

Fire Fighting Vehicles: We have a fleet of 7 engines and other support vehicles.

Burn Permit Regulations: N/A

Other: N/A

Cooperative Agreements:

The Zone has Offset and I.A agreements with the counties that we have had a history of interaction. Our ability to support the counties to the far west of the Zone is limited by distance and the time required responding.

Current Resources:

Station #1: Lewistown

Table 4.17. BLM Current Equipment List for Lewistown.

Year	Make	Model	Tank Capacity	Pump Capacity
99	Ford	F-450	280	100 GPM

Table 4.17. BLM Current Equipment List for Lewistown.				
Year	**Make**	**Model**	**Tank Capacity**	**Pump Capacity**
99	Ford	F-450	280	100 GPM
99	Ford	F-450	280	100 GPM
01	International	4800	860	125 GPM
99	Ford	F-450	280	100 GPM
99	Ford	F-450	280	100 GPM
01	International	4800	860	125 GPM

Future Considerations: Budget

Needs: N/A

4.9 Issues Facing Liberty County Fire Protection

4.9.1 Rocky Boy's North Central Montana Regional Water System

The Chippewa Cree Tribe of the Rocky Boy's Reservation and the State of Montana, through the Reserved Water Right Commission, negotiated a settlement of the Tribe's Water Rights Claims. The Compact, ratified by the 1997 Montana Legislature and signed by President Clinton in December of 1999, provided a water allocation to the Tribe from the Lake Elwell, also known as Tiber Reservoir, south of Chester.

The importation of this water to the Rocky Boy's Reservation will involve the construction of a treatment plant, intake structure and approximately 50 miles of pipeline from Tiber Reservoir to the Reservation. Construction of the water treatment plant at Tiber Reservoir is intended to maximize the potential service area.

The system is comprised of a Core and Non-core systems. The Core system is the intake, reservoirs, treatment plant, pumping plants and transmission pipeline from Lake Elwell to the communities within the Rocky Boy's Reservation.

The Non-core system is the storage, pumping and pipeline facilities from the Core System to the Participating System, which include Town of Big Sandy, City of Conrad, City of Cut Bank, Town of Dutton, Galata County Water District, North Havre County Water District, Sweetgrass Community Water & Sewer District, Oilmont County Water District, Sage Creek Water District, City of Shelby, Town of Sunburst, Tiber County Water District, Devon Water Users Association and South Chester County Water District.

The goals of the Regional Water System are to ensure a safe and adequate rural, municipal, and industrial water supply for residents of the Rocky Boy's Reservation; and assist the citizens residing in Chouteau, Hill, Liberty, Pondera, Teton, Glacier and Toole Counties, but outside of the Reservation, in developing a safe and adequate rural, municipal, and industrial water supply.

The planning committee involved in the development of this Community Wildfire Mitigation Plan has recognized the Rocky Boy's Regional Water System as a potential asset to the continued improvement of firefighting capabilities in Liberty County. It is the recommendation of this plan that the appropriate Liberty County and Town of Chester officials begin making formal requests for the inclusion of hydrants at intersections of the Rocky Boy's main water lines and primary and secondary access routes within the county to provide additional water access for firefighting purposes. It is the belief of this planning committee that the strategic placement of water

hydrants during the original construction of the water system will be more cost efficient than post-construction improvements.

4.9.2 Augmentation of Emergency Water Supplies

In many rural areas of Liberty County, there are no readily accessible, year-round water resources available for use by local fire departments. Thus, it is necessary for firefighters to keep large amounts of water loaded on trucks at all times. In the event of a large fire situation, additional water supplies must be transported to the site. The Liberty County fire departments feel that establishing permanent augmentations to emergency water supplies is necessary throughout the County. This includes establishment of dry hydrants and drafting sites where immediate access to water is limited. The construction of the new Rocky Boy Water System in Liberty and neighboring counties affords the unique opportunity to construct hydrants at every major road crossing of the main water line. Retrofitting dependable, year-round irrigation water sources with necessary fittings for use by emergency response equipment would also be highly beneficial. Once developed, these water sources need to be mapped and use agreements need to be made between landowners, local fire departments, the Montana Department of Natural Resources and Conservation, and the Bureau of Land Management.

4.9.3 Oil and Gas Extraction and Pipelines

There are numerous oil rigs and pump houses scattered throughout Liberty County. New technology and mechanical improvements on these rigs has reduced the fire danger significantly; however, these sites are still at risk from wildland fires and are also prone to lightning strikes and arson. The local fire departments currently receive training on how to deal with fires associated with the oil and gas infrastructure in the County; however, these sites remain a significant risk factor.

4.9.4 Recruitment and Retention, Funding, Equipment Needs, Etc.

There are a number of pervasive issues that challenge volunteer districts within Liberty County. A short list of such issues include recruitment and retention of volunteers, lack of funding for equipment needs, keeping pace with increases in training requirements, as well as numerous other factors that test district's abilities. The members of all fire protection districts should be recognized for the dedication they have shown and the excellent level of protection they provide for residents throughout the county. Volunteers take time out of their lives every day in order to assure the safety of the community.

The demands on volunteer departments are considerable. Keeping pace with ever-increasing training requirements can lead to burn-out of volunteers who are scantly compensated for their time and efforts. Keeping pace with the growing needs of the communities the districts serve is a constant challenge as well. Although there are many potential funding sources available for local districts to acquire equipment and other needs, grant writing and chasing of funding sources takes considerable time and effort. Recommendations that can help to reduce these challenges will be presented in Chapter 5.

4.9.5 Mount Royal Communications Site

The peak of Mount Royal is a critical communications site for Liberty and surrounding counties. There are presently thirteen small structures housing equipment for several repeaters for each. The Northern Tier Interoperability Consortium (NITC) is in the process of constructing an additional repeater station on Mount Royal as well. Montana's Northern Tier Interoperability Project (NTIP) was established to provide a consolidated local, state, tribal, and federal radio

system for law enforcement purposes. The NTIP radio system will provide advanced digital, secure voice and data communications for law enforcement interoperability across this vital border region. It will also improve homeland security by providing the means for military and civil authorities to communicate by radio.

The Mount Royal communications site has a high risk of wildland fire. The structures on the peak are surrounded by a patch of mid-length grasses; however, the subalpine forest that dominates the slopes of Mount Royal is within 20 to 60 feet of the communications site. Although this type of forest has a long fire return interval, when it does burn, it is usually stand replacing. This area is also at high risk due to the lack of fire protection and access. Not only would it take fire departments a considerable amount of time to reach the site, the only access road is very steep with numerous switchbacks. It is likely that an aerial attack would be the only way to save the site in the event of a fire. Nearly all available methods of communication in Liberty County and the surrounding areas would be lost for a significant period of time if the Mount Royal communications site burned.

4.9.6 Recreation Sites

Liberty County has several recreational sites that are at high risk of wildfire. The Lake Elwell area, Sandford Park, the 4-H Camp near Whitlash, and others are typically vegetated by native grasslands. Areas along the Marias River also have dense riparian vegetation along the shores. Recreational areas typically have higher ignition rates due to increase in potential sources such as campfires, BBQ pits, cigarettes, fireworks, etc. It is important that these sites are cleaned and maintained on a regular basis in order to manage the high risk fuels.

4.9.7 Fires in Conservation Reserve Program Fields

Since the introduction of the Conservation Reserve Program by the federal government, many formerly crop producing fields have been allowed to return to native grasses. Conservation Reserve Program fields are creating a new fire concern all over the west. As thick grasses are allowed to grow naturally year after year, dense mats of dead plant material begin to buildup. Due to the availability of a continuous fuel bed, fires in CRP fields tend to burn very intensely with large flame lengths that often times jump roads or other barriers, particularly under the influence of wind. Many landowners and fire personnel are researching allowable management techniques to deal with this increasing problem. Currently, according to the CRP Handbook all management must be part of the landowner's Conservation Plan of Operations, which includes burning to reduce the fuel loading, and must be in the best interest of the CRP. Under certain circumstances, burning may be used as a process to enhance or renovate the existing vegetative cover for wildlife, especially if it is overgrown and stagnant. As noted in Montana CRP-542, burning can only be conducted under an approved burn plan by qualified personnel. The County must also issue a burn permit for any controlled burning on CRP fields.

4.10 Current Fire Mitigation Projects

4.10.1 Burn Permitting

Liberty County currently issues burn permits through the Sheriff's Office. The local fire departments are notified of permits issued and will generally assist on a burn, if requested by the landowner. Liberty County officials promote enforcement of the permitting process as well as any fire restrictions issued by the county, state, or other agencies.

Chapter 5: Treatment Recommendations

5 Administration & Implementation Strategy

Critical to the implementation of this Community Wildfire Protection Plan will be the identification of, and implementation of, an integrated schedule of treatments targeted at achieving an elimination of the lives lost, reduction in structures destroyed, infrastructure compromised, and unique ecosystems damaged that serve to sustain the way-of-life and economy of Liberty County and the region. Since there are many land management agencies and thousands of private landowners in Liberty 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.

Liberty County encourages the philosophy of instilling disaster resistance in normal day-to-day operations. By implementing plan activities through existing programs and resources, the cost of mitigation is often a small portion of the overall cost of a project's design or program.

The federal land management agencies in Liberty County, specifically Bureau of Land Management and the Bureau of Reclamation, are participants in this planning process and have contributed to its development. Where available, their schedule of land treatments have been considered in this planning process to better facilitate a correlation between their identified planning efforts and the efforts of Liberty County.

All risk assessments were made based on the conditions existing during 2006, thus, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the county's resources are not static. It will be necessary to fine-tune this plan's recommendations annually to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

As part of the Policy of Liberty County in relation to this planning document, the Community Wildfire Protection Plan should be reviewed annually at a special meeting of the Liberty County Commissioners, open to the public and involving all municipalities/jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. A written review of the plan should be prepared (or arranged) 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 (in accord with the Montana Open Public Meeting Laws). Amendments to the plan should be detailed at this meeting, documented, and attached to the formal plan as an amendment to the Community Wildfire Protection Plan. Total re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every 5-year period following.

5.1 Prioritization of Mitigation Activities

Prioritization of projects will occur at the County, City, agency, and private levels. Differing prioritization processes will occur, however, the county and cities will adopt the following prioritization process, as indicated through the adoption of this plan by each municipality.

The prioritization process will include a special emphasis on cost-benefit analysis review. The process will reflect that a key component in any funding decision is a determination that the project will provide an equivalent or more in benefits over the life of the project when compared with the costs. Projects will be administered by county and local jurisdictions with overall coordination provided by the County Disaster and Emergency Services Coordinator.

County Commissioners and the elected officials of all jurisdictions will evaluate opportunities and establish their own unique priorities to accomplish mitigation activities where existing funds, staffing, and resources are available and there is community interest in implementing mitigation measures. If no federal funding is used in these situations, the prioritization process may be less formal. Often the types of projects that the County can afford to do on their own are in relation to improved codes and standards, department planning and preparedness, and education. These types of projects may not meet the traditional project model, selection criteria, and benefit-cost model. The County will consider all pre-disaster mitigation proposals brought before the County Commissioners by department heads, city officials, fire districts and local civic groups.

When federal or state funding is available for hazard mitigation, there are usually requirements that establish a rigorous benefit-cost analysis as a guiding criterion in establishing project priorities. The county will understand the basic federal grant program criteria which will drive the identification, selection, and funding of the most competitive and worthy mitigation projects. FEMA's two grant programs (the post-disaster Hazard Mitigation Grant Program and Pre-Disaster Mitigation grant programs) that offer federal mitigation funding to state and local governments all include the benefit-cost and repetitive loss selection criteria.

The prioritization of new projects and deletion of completed projects will occur annually and be facilitated by the County Disaster and Emergency Services Coordinator to include the County Commissioner's Office, City Mayors and Councils, Fire District Chiefs and Commissioners, agency representatives (BLM, Reclamation, DNRC, etc.), and other community organizations. All mitigation activities, recommendations, and action items mentioned in this document are dependent on available funding and staffing. The prioritization of projects will be based on the selection of projects which create a balanced approach to pre-disaster mitigation which recognizes the hierarchy of treating in order (highest first):

- People
- Infrastructure
- Local and Regional Economy
- Traditional Way of Life
- Ecosystems

5.1.1 Prioritization Scheme

A numerical scoring system is used to prioritize projects. This prioritization serves as a guide for the county when developing mitigation activities. This project prioritization scheme has been designed to rank projects on a case by case basis. In many cases, a very good project in a lower priority category could outrank a mediocre project in a higher priority. The county mitigation program does not want to restrict funding to only those projects that meet the high priorities because what may be a high priority for a specific community may not be a high priority at the county level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying reasons and criteria is a necessity for a functional mitigation program at the County and community level.

To implement this case by case concept, a more detailed process for evaluating and prioritizing projects has been developed. Any type of project, whether county or site specific, will be prioritized in this more formal manner.

To prioritize projects, a general scoring system has been developed. This prioritization scheme has been used in statewide all hazard mitigations plans. These factors range from cost-benefit ratios, to details on the hazard being mitigated, to environmental impacts.

Since planning projects are somewhat different than non-planning projects when it comes to reviewing them, different criteria will be considered, depending on the type of project.

The factors for the non-planning projects include:

- Benefit / Cost
- Population Benefit
- Property Benefit
- Economic Benefit
- Project Feasibility (environmentally, politically, socially)
- Hazard Magnitude/Frequency
- Potential for repetitive loss reduction
- Potential to mitigate hazards to future development
- Potential project effectiveness and sustainability

The factors for the planning projects include:

- Benefit / Cost
- Vulnerability of the community or communities
- Potential for repetitive loss reduction
- Potential to mitigate hazards to future development

Since some factors are considered more critical than others, two ranking scales have been developed. A scale of 1-10, 10 being the best, has been used for cost, population benefit, property benefit, economic benefit, and vulnerability of the community. Project feasibility, hazard magnitude/frequency, potential for repetitive loss reduction, potential to mitigate hazards to future development, and potential project effectiveness and sustainability are all rated on a 1-5 scale, with 5 being the best. The highest possible score for a non-planning project is 65 and for a planning project is 30.

The guidelines for each category are as follows:

5.1.1.1 Benefit / Cost

The analysis process will include summaries as appropriate for each project, but will include benefit / cost analysis results. Projects with a negative benefit / cost analysis result will be ranked as a 0. Projects with a positive Benefit / Cost analysis will receive a score equal to the projects Benefit / Cost Analysis results divided by 25. Therefore a project with a BC ratio of 125:1 would receive 5 points, a project with a BC ratio of 250:1 (or higher) would receive the maximum points of 10.

FEMA Requirement §201.4(c)(4)(iii) details criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which should include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures. Further, the requirement states that for non-planning grants, a principal criterion for prioritizing grants shall be the extent to which benefits are maximized according to a benefit / cost review of proposed projects and their associated costs. For many of the initiatives identified in this plan, the County may seek financial assistance under FEMA's HMGP or PDM programs. Both of these programs require detailed benefit / cost analysis as part of the FEMA award process. Liberty County is committed to implementing mitigation strategies with benefits which exceed costs. For projects which do not require financial assistance from grant programs that require this type of analysis, the County reserves the right to define "benefits" according to parameters with would otherwise be considered subjective, while still meeting the needs and goals of the plan.

5.1.1.2 Population Benefit

Population Benefit relates to the ability of the project to prevent the loss of life or injuries. A ranking of 10 has the potential to impact 90% or more of the people in the municipality (county, city, or district). A ranking of 5 has the potential to impact 50% of the people, and a ranking of 1 will not impact the population. The calculated score will be the percent of the population impacted positively multiplied by 10. In some cases, a project may not directly provide population benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly effects the population, but should not be considered to have no population benefit.

5.1.1.3 Property Benefit

Property Benefit relates to the prevention of physical losses to structures, infrastructure, and personal property. These losses can be attributed to potential dollar losses. Similar to cost, a ranking of 10 has the potential to save $10,000,000 or more in losses. Property benefit of less than $10,000,000 will receive a score of the benefit divided by $10,000,000, times 10 (for property benefits below $10 million). Therefore, a property benefit of $2,000,000 would receive a score of 2 ([2,000,000÷10,000,000] x 10 = 2). In some cases, a project may not directly provide property benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly effects property, but should not be considered to have no property benefit.

5.1.1.4 Economic Benefit

Economic Benefit is related to the savings from mitigation to the economy. This benefit includes reduction of losses in revenues, jobs, and facility shut downs. Since this benefit can be difficult to evaluate, a ranking of 10 would prevent a total economic collapse, a ranking of 5 could prevent losses to about half the economy, and a ranking of 1 would not prevent any economic losses. In some cases, a project may not directly provide economic benefits, but may lead to actions that do, such as in the case of a study. Those projects will not receive as high of a rating as one that directly affects the economy, but should not be considered to have no economic benefit.

5.1.1.5 Vulnerability of the Community

For planning projects, the vulnerability of the community is considered. A community that has a high vulnerability with respect to other jurisdictions to the hazard or hazards being studied or planned for will receive a higher score. To promote planning participation by the smaller or less vulnerable communities in the state, the score will be based on the other communities being considered for planning grants. A community that is the most vulnerable will receive a score of 10, and one that is the least, a score of 1.

5.1.1.6 Project Feasibility (Environmentally, Politically & Socially)

Project Feasibility relates to the likelihood that such a project could be completed. Projects with low feasibility would include projects with significant environmental concerns or public opposition. A project with high feasibility has public and political support without environmental concerns. Those projects with very high feasibility would receive a ranking of 5 and those with very low would receive a ranking of 1.

5.1.1.7 Hazard Magnitude/Frequency

The Hazard Magnitude/Frequency rating is a combination of the recurrence period and magnitude of a hazard. The severity of the hazard being mitigated and the frequency of that event must both be considered. For example, a project mitigating a 10-year event that causes significant damage would receive a higher rating than one that mitigates a 500-year event that causes minimal damage. For a ranking of 5, the project mitigates a high frequency, high magnitude event. A 1 ranking is for a low frequency, low magnitude event. Note that only the damages being mitigated should be considered here, not the entire losses from that event.

5.1.1.8 Potential for repetitive loss reduction

Those projects that mitigate repetitive losses receive priority consideration here. Common sense dictates that losses that occur frequently will continue to do so until the hazard is mitigated. Projects that will reduce losses that have occurred more than three times receive a rating of 5. Those that do not address repetitive losses receive a rating of 1.

5.1.1.9 Potential to mitigate hazards to future development

Proposed actions that can have a direct impact on the vulnerability of future development are given additional consideration. If hazards can be mitigated on the onset of the development, the county will be less vulnerable in the future. Projects that will have a significant effect on all future development receive a rating of 5. Those that do not affect development should receive a rating of 1.

5.1.1.10 Potential project effectiveness and sustainability

Two important aspects of all projects are effectiveness and sustainability. For a project to be worthwhile, it needs to be effective and actually mitigate the hazard. A project that is questionable in its effectiveness will score lower in this category. Sustainability is the ability for the project to be maintained. Can the project sustain itself after grant funding is spent? Is maintenance required? If so, are or will the resources be in place to maintain the project. An action that is highly effective and sustainable will receive a ranking of 5. A project with effectiveness that is highly questionable and not easily sustained should receive a ranking of 1.

5.1.1.11 Final ranking

Upon ranking a project in each of these categories, a total score can be derived by adding together each of the scores. The project can then be ranking high, medium, or low based on the thresholds of:

Project Ranking Priority Score Non-Planning Projects

- High 40-65
- Medium 25-39
- Low 9-24

Project Ranking Priority Score Planning Projects

- High 18-30
- Medium 12-17
- Low 1-11

5.2 Possible Fire Mitigation Activities

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

- Homeowner and landowner education
- Policy 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 departments, merging existing departments)
- 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.

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

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.a: 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. Priority: High	Liberty County Commissioners, Liberty County Planning Department, and Liberty County Fire Departments.	Year 1 (2007): 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.

Table 5.1. WUI Action Items in Safety and Policy.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.1.b: Begin distributing "Code of the New West"-type pamphlets with building permit requests.	**Protection of people and structures** by improving the overall knowledge of wildfire risk throughout the county. Priority: High	Liberty County Commissioners, County Planning Department, and Town of Chester	Year 1 (2007): Obtain copyrights to "New Code of the West" pamphlet. Year 1 (2007): Distribute pamphlets.
5.1.c: Rural signage (road signs & house numbers) improvements across the county.	**Protection of people, structures, and infrastructure** by improving the ability of emergency services personnel, residents, and visitors to navigate roads. Priority: High	County Planning Department in cooperation with County Commissioners and Liberty County Fire Departments.	Can be completed during year 1 (2007) pending funding to implement the project. Estimate $60,000 for signs and posting.
5.1.d: Begin making formal requests to Rocky Boy's North Central Montana Regional Water System planning board to include hydrants at strategic points along the main water line at strategic road crossings.	**Protection of people and structures** by improving water access for firefighting. Priority: High	Liberty County Commissioners, County Disaster and Emergency Services, Liberty County Fire Districts, and Town of Chester.	Year 1 (2007): Contact the planning board and propose hydrants. Help planning board with cost assessments and research funding options. Ongoing: Actively participate on planning board to insure inclusion of hydrants during construction of the water system.
5.1.e: Adopt stringent regulations to insure fire-safe development of rural subdivisions (see FIREWISE or similar programs for specific recommendations).	**Protection of people and structures** by improving the ability of emergency services personnel to safely and effectively respond to home fires and decrease the overall fire risk in wildland urban interface areas. Priority: High	Liberty County Commissioners, Liberty County Fire Departments, developers, and interested residents.	Year 1 (2007): Research fire-safety related programs such as FIREWISE to determine specific recommendations for policy changes regarding development of rural subdivisions. Year 2 – 3 (2008 – 2009): Begin gathering public support of new regulations. Produce and submit necessary documentation to facilitate county adoption of recommended regulations.

5.4 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 firefighter 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 Liberty 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, Liberty 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 identify 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.
- More than half (54%) of the respondents to the public mail survey indicated 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 Liberty 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 Liberty 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 Liberty 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 Liberty 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 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.
- **Agriculture** is a significant component of Liberty 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 Liberty 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: Implementation of 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. Priority: High	Cooperative effort including: • Montana Department of Natural Resources and Conservation • State and Private Forestry Offices • Bureau of Land Management • Bureau of Reclamation • Local School Districts • Local Non-governmental Community Organizations • Local Fire Departments in Liberty County • Town of Chester and communities in Liberty County	To start immediately using existing educational program materials and staffing. Formal needs assessment should be the responsibility of MSU Extension and include the development of an integrated WUI educational series by year 2 (2008). 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.
5.2.b: Consider County supported program for the restoration of dead or dying shelterbelts.	**Protect people and structures** by increasing awareness of funding options, available equipment, and the need for restoration of shelterbelts to help reduce wildfire risk.. Priority: High	County Commissioners in cooperation with County Disaster and Emergency Services Coordinator, Liberty County Fire Departments, BLM, DNRC, MSU Extension, and local landowners.	Year 1 (2007): Research potential funding options and apply for grants, cost share, or other programs. Research available contractors and equipment in the local area. Year 2 (2008): Begin public awareness campaign to educate landowners of the potential wildfire risk associated with dead and dying shelterbelts and provide guidance on how to alleviate this risk.
5.2.c: Wildfire risk assessments of homes in high risk areas.	**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. Priority: High	To be implemented by County Commissioners in cooperation with wildland fire protection specialists, DNRC, BLM, Reclamation, Town of Chester, local communities, and Liberty County Fire Departments. Actual work may be completed by Wildfire Mitigation Consultants.	Cost: Approximately $100 per home site for inspection, written report, and discussions with the homeowners. There are approximately XXX parcels in Liberty County, roughly XXX (20%) of these structures would benefit from a home site inspection and budget determination for a total estimate of $XXX. Action Item: Secure funding and contract to complete the inspections during years 1 & 2 (2007-08) Home site inspection reports and estimated budget for each home site's treatments will be a requirement to receive funding for treatments through grants.

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.d: Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Liberty County. Priority: Medium	County Commissioners in cooperation with Town of Chester, local communities, Liberty County Fire Departments., DNRC, and BLM. *Complete concurrently with 5.2.c.*	Actual cost level will be based on the outcomes of the home site assessments. Estimate that treatments in rangelands will cost approximately $750 per home site for a defensible space of roughly 150'. Approximately XXX home site treatments (75% of those assessed) throughout the County would add up to an estimated cost of $XXX. Home site treatments can begin with the securing of funding for the treatments and immediate implementation in 2007 and will continue from year 1 through 5 (2011).
5.2.e: Community Defensible Zone WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding high risk communities in the WUI of Liberty County. Priority: Medium	County Commissioners in cooperation with Liberty County Fire Departments, DNRC, and the BLM to identify funding availability and project implementation opportunities.	Actual funding level will be based on the outcomes of the home site assessments and cost estimates. Years 2-5 (2008-11): Treat high risk wildland fuels from home site defensible space treatments to an area extending 400 feet to 750 feet beyond home defensible spaces, where steep slopes and high accumulations of risky fuels exist near homes and infrastructure. 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 parcel basis is $XXX (average 4 acres per home) depending on extent of home defensibility site treatments, estimate XXX homes (50% of treated homes) in need of this type of treatment for a cost estimate of $XXX.
5.2.f: Maintenance of Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Liberty County. Priority: Medium	County Commissioners in cooperation with Liberty County Fire Departments and local homeowners.	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 $100 per home site on all sites initially treated or recommended for future inspections ($XXX). Follow-up inspection reports with treatments as recommended years 5 through 10 (2011-2016).

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: Re-entry of Home site WUI Treatments.	**Protect people, structures, and increase firefighter safety** by reducing the risk factors surrounding homes in the WUI of Liberty County. Priority: Medium	County Commissioners in cooperation with Liberty County Fire Departments and local homeowners.	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.
5.2.h: Implement a fuels reduction and maintenance plan around Lake Elwell.	**Protect people, structures, community, and firefighter safety** by decreasing the ignition and fuels risk near Lake Elwell. Priority: High	Liberty County Commissioners, Reclamation, and area landowners.	Year 1 (2007): Locate funding sources and conduct structure and area evaluations in mapped Lake Elwell project area. High intensity recreational areas and access routes should be targeted. Write project plans for individual landowners, if necessary. Year 2 (2008): Continue to work with landowners to implement agreed upon defensible zone and fuels reduction project plans. Years 2-5 (2008-11): Treat wildland fuels in high risk or intensely used recreational areas around Lake Elwell.
5.2.i: Implement a fuels reduction and maintenance plan around 4-H Camp near Whitlash.	**Protect people, structures, community, and firefighter safety** by decreasing the ignition and fuels risk at the 4-H Camp. Priority: Low	Liberty County Commissioners, Liberty County Extension, 4-H Program, and area landowners.	Year 1 (2007): Locate funding sources and conduct site evaluation in mapped 4-H Camp project area. High intensity recreational areas and access routes should be targeted. Write project plans for individual landowners, if necessary. Year 2 (2008): Continue to work with landowners to implement agreed upon defensible zone and fuels reduction project plans. Years 2-5 (2008-11): Treat wildland fuels in high risk or intensely used recreational areas within and surround 4-H Camp.
5.2.j: Implement a fuels reduction and maintenance plan for recreational areas along Marias River (e.g. Sandford Park and Pugsly Bridge).	**Protect people, structures, community, and firefighter safety** by decreasing the ignition and fuels risk at recreational areas. Priority: Low	Liberty County Commissioners, Liberty County Fire Districts, Liberty County Disaster and Emergency Services, and area landowners.	Year 1 (2007): Locate funding sources and conduct site evaluations for all recreational areas. High intensity recreational areas and access routes should be targeted. Write project plans for individual landowners. Ongoing: Continue to work with landowners to implement agreed upon defensible zone and fuels reduction project plans.

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.k: Implement a fuels reduction and maintenance plan in BLM campground (Blackjack Road Campground) on north side of East Butte.	**Protect people, structures, community, and firefighter safety** by decreasing the ignition and fuels risk East Butte. Priority: Medium	Liberty County Commissioners, BLM, and area landowners.	Year 1 (2007): Locate funding sources and conduct site evaluation in mapped BLM Campground project area. High intensity recreational areas and access routes should be targeted. Write project plans for individual landowners, if necessary. Year 2 (2008): Continue to work with landowners to implement agreed upon defensible zone and fuels reduction project plans. Years 2-5 (2008-11): Treat wildland fuels in high risk or intensely used recreational areas around BLM Campground.

A map of the Liberty County Proposed Treatment Areas is included in Appendix I (Action Items 5.2.h, 5.2.i, 5.2.j, 5.2.k, and 5.3.f).

5.5 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 Liberty 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 DNRC 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 Liberty County. Specific infrastructure components have been discussed in this plan.

Ignitions along highways and railways 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): A number of power lines crisscross Liberty County. 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 Community Wildfire Protection 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 "fuel breaks" should be evaluated further, especially in light of the treatments enumerated in this plan (e.g., intensive livestock grazing, mechanical treatments, and herbicide treatments).

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.a: Create and maintain defensible space around critical infrastructure including, but not limited to communication sites, community shelters, government buildings (city, county, state, federal, and tribal), petroleum storage sites, hospitals, water storage sites, and PUD Service Stations.	**Protect people, structures, and increase firefighter safety** by decreasing the risk of loss of critical communications infrastructure to wildland fire. Priority: High	Liberty County Commissioners, Town of Chester, Liberty County Public Utilities District, and various facility/utility owners.	Year 1 (2007): Meet with facility and utility owners operating communications infrastructure in Liberty County and set up a criteria for maintaining a defensible space in these areas. Year 2 (2008): Develop defensible space plans and begin implementing hazardous fuel reduction projects.
5.3.b: Access improvements of bridges, cattle guards, culverts, and limiting road surfaces (e.g. Circle Bridge, Moffitt Bridge, and Pugsly Bridge).	**Protection of people, structures, infrastructure, and economy** by improving access for residents and firefighting 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. Priority: Medium	County Commissioners and County Planning Department in cooperation with the BLM, State of Montana (Lands and Transportation), BLM, Reclamation, and private landowners.	Year 1 (2007): Update existing assessment of travel surfaces, bridges, and cattle guards in Liberty County as to location. Secure funding for implementation of this project (grants). Year 2 (2008): Conduct engineering assessment of limiting weight restrictions for all surfaces (e.g., bridge weight load maximums). Estimate cost of $500,000 which might be shared between County, BLM, State, Reclamation, and private based on landownership associated with road locations. Year 2 (2008): Post weight restriction signs on all limiting crossings, copy information to rural fire districts and wildland fire protection agencies in affected areas. Estimate cost at roughly $15-$25,000 for signs and posting. Year 3 (2009): Identify limiting road surfaces in need of improvements to support wildland firefighting 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.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.c: Fuels mitigation of access routes in the county to insure these routes can be maintained in the case of an emergency.	**Protection of people and structures by** providing residents and visitors with ingress and egress that can be maintained during an emergency. Priority: High	County Commissioners in cooperation with Liberty County Fire Departments, County Planning Department, DNRC, BLM, Reclamation, and private landowners.	Year 1 (2007): Full assessment of road defensibility and ownership participation.
5.3.d: Support improvement of access to East Butte area, particularly the communications site on Mount Royal.	**Protection of people and structures by** improving access to the sole communications site in the County. Priority: High	County Commissioners, County Road Department, BLM, DNRC, and private landowners in the surrounding area.	Year 1 (2007); Identify specific access routes that need improvement and begin acquiring the necessary funding. Contact affected landowners. Year 2 (2008): Establish a project plan and begin acquiring the necessary equipment and personnel. Year 3 2009): Begin implementation of project plan.
5.3.e: Support improvement and active management of fuels along Burlington Northern Santa Fe railway through Liberty County.	**Protection of people, structures, infrastructure, and economy** by decreasing the potential for ignitions along this route. Priority: High	Burlington Northern Santa Fe Railroad and private landowners.	Year 1 (2007): Conduct assessment along railway corridor and begin development of a project action plan to reduce fuels and subsequently the potential fire hazard along this corridor. Target at least 100' from each side of the tracks for an estimated cost of approximately $700 per acre treated. Year 2 (2008): Conduct necessary environmental analyses. Year 3 (2009): Secure funding and begin laying out specific project areas. Year 4 – 9 (20010-2015): Implement projects.
5.3.f: Implement a fuels reduction and maintenance plan around the Mount Royal Communications site.	**Protection of people, structures, infrastructure, and economy** by decreasing the fire risk to critical communications. Priority: High	Liberty County Commissioners, County Disaster and Emergency Services, Bureau of Land Management, Northern Tier Interoperability Consortium, and area landowners.	Year 1 (2007): Conduct fuels assessment and develop a project plan. Begin contacting affected landowners and lease holders. Year 2 (2008): Conduct necessary environmental analyses. Year 3 (2009): Secure funding and begin laying out specific project plans. Year 4 – 5 (2010-2011): Implement project and set up a maintenance schedule.

Table 5.3. Infrastructure Enhancements.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.3.g: Establish a regular maintenance cycle and funding program for mowing roadsides in high use areas throughout the county.	**Protection of people, structures, infrastructure, and economy** by decreasing the potential for ignitions along this road corridors. Priority: High	County Commissioners, County Disaster and Emergency Services Coordinator, and County Road Department.	Year 1 (2007): Research potential funding sources and establish a prioritized list of regularly maintained roads countywide. Year 2 (2008): Acquire needed funding and begin roadside fuels maintenance program.

5.6 Resource and Capability Enhancements

There are a number of resource and capability enhancements identified by the rural and wildland firefighting departments in Liberty County. All of the needs identified by the departments 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 dry hydrants 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 equipment available for rural and city departments

Although additional, and specific, needs were enumerated by the departments in Liberty County, these items were identified by multiple departments and/or in the public meetings. The implementation of each issue will rely on either the isolated efforts of the rural fire departments or a concerted effort by the county to achieve equitable enhancements across all of the departments.

5.6.1 Proposed Activities

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.a: Enhance radio availability in each district, link in to existing dispatch, improve range within the region, and conversion to consistent standard of radio types.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	County Disaster and Emergency Services Coordinator in cooperation with Liberty County Fire Departments, wildland fire agencies, and Liberty County Commissioners.	Year 1 (2007): Summarize existing two-way radio capabilities and limitations. Identify costs to upgrade existing equipment and locate funding opportunities. Year 2 (2008): Acquire and install upgrades as needed.
5.4.b: Retention of volunteer firefighters.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	Liberty County Fire Departments and wildland fire agencies working with a broad base of county citizenry to identify options, determine plan of action, and implement it.	5 Year Planning Horizon with extended planning time frame. Target an increased recruitment (+10%) and retention (+20% longevity) of volunteers. Year 1 (2007): Develop incentives program and implement it.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.c: Establish and map onsite water sources such as hydrants or underground storage tanks and drafting or dipping sites.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	County Commissioners, County GIS Department, and Liberty County Fire Departments.	Year 1 (2007): Identify populated areas lacking sufficient water supplies and develop project plans to develop a permanent water source or drafting/dipping sites. Implement project plans and begin mapping (GPS) known water sources and drafting/dipping sites to be provided to fire response agencies and County offices.
5.4.d: Increased training and capabilities of firefighters (structural, wildland fire, hazmat, etc).	**Protection of people and structures** by direct fire fighting capability enhancements. Priority: High	Liberty County Fire Departments and wildland fire agencies working with the DNRC, BLM, and Reclamation for wildland training opportunities and with the State Fire Marshall's Office for structural firefighting training.	Year 1 (2007): 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 of each to acquire. Year 1 (2007): Begin implementing training opportunities for volunteers.
5.4.e: Improve safety equipment and PPE's for all Fire Departments in Liberty County.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: Medium	County Disaster and Emergency Services Coordinator in cooperation with County Commissioners and Liberty County Fire Departments.	Year 1 (2007): Complete an inventory of all supplies held by the Fire Departments (boots, turnouts, Nomex, gloves, modern lighting, straps, and hardware), and complete a needs assessment matching expected replacement schedule. Develop countywide re-supply process for needed equipment.
5.4.f: Encourage standardization of hydrant hookups and fittings on apparatus countywide.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	County Disaster and Emergency Services Coordinator , Chester Volunteer Fire Department, and Joplin Volunteer Fire Department.	Year 1 (2007): Complete an inventory of all hydrant hookups and fittings. Complete a needs assessment to replace unmatched hardware.
5.4.g: Encourage improvement of National Incident Management System compliance standards.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	County Disaster and Emergency Services in cooperation with County Commissioners and Liberty County Fire Departments.	Year 1 (2007): Encourage and provide necessary funding and support for continued NIMS training for all emergency personnel throughout the County.

Table 5.4. WUI Action Items in Firefighting Resources and Capabilities.

Action Item	Goals and Objectives	Responsible Organization	Action Items & Planning Horizon
5.4.h: Obtain funding for a base station radio, 4 mobile radios, and 2 handheld radios (all P25) for the Joplin Volunteer Fire Department.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	Joplin Volunteer Fire Department	Year 1 (2007): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2007-08): Acquire and deliver needed materials and equipment.
5.4.i: Obtain a newer pumper truck, a two newer brush units, and an ATV with tank and trailer for the Joplin Volunteer Fire Department.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: Medium	Joplin Volunteer Fire Department	Year 1 (2007): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2007-08): Acquire and deliver needed materials and equipment.
5.4.j: Obtain funding for a base station radio, 4 mobile truck radios, and 2 mobile radios for city trucks (all P25) for the Chester/West Rural Volunteer Fire Department.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: High	Chester/West Rural Volunteer Fire Department	Year 1 (2007): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2007-08): Acquire and deliver needed materials and equipment.
5.4.k: Obtain two newer brush units and a 3,000 + gallon tender for the Chester/West Rural Volunteer Fire Department.	**Protection of people and structures** by direct firefighting capability enhancements. Priority: Medium	Chester/West Rural Volunteer Fire Department	Year 1 (2007): Verify stated need still exists, develop budget, and locate funding and equipment (surplus) sources. Year 1 or 2 (2007-08): Acquire and deliver needed materials and equipment.

5.7 Regional Land Management Recommendations

In section 5.3 of this plan, reference was given to the role that grazing and agriculture have in promoting wildfire mitigation services through active management. Liberty 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 Bureau of Land Management, the Montana Department of Natural Resources and Conservation, the Bureau of Reclamation, 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.

5.7.1 Marias River Watershed – Pugsly Bridge Project

The Marias River Watershed group is currently working on a project to restore the roadway and bridge abutments at Pugsly Bridge in an effort to prevent further erosion of the river banks. This Community Wildfire Protection Plan committee supports this project due to the use of Pugsly Bridge for fire access in that area. There are only a few bridge crossings of the Marias River in southern Liberty County; thus, maintaining access to each one is imperative for rapid structural and wildland fire response to residents in this area.

5.7.2 Federal and State Agency Projects

The guiding documents used to determine land use are the National Fire Plan (NFP), Healthy Forest Restoration Act (HFRA), and the goal statements of the individual agency to implement ecosystem restoration, protect communities from wildland fires, and to utilize prescribed fire as a tool in the restoration of the forest and rangelands, and to reduce the effects of wildfire leading to catastrophic loss. During the development of this project, acres managed by the Bureau of Land Management, Bureau of Reclamation, and the State of Montana that are in Fire Regime Condition Class II and III, as defined by the Forest Service and within the Wildland Urban Interface (WUI), were identified by the County as high priority areas to be treated under the NFP and HFRA. Federal or State managed lands adjacent to homes are particularly high priorities for these treatments. These projects may include, but are not limited to, mechanical treatments, prescribed fire, and creation of buffer zones and greenbelts.

5.7.2.1 Bureau of Reclamation

Throughout the development of this Community Wildfire Protection Plan Reclamation has identified several goals and recommendations that they feel will reduce the wildland fire risk to both people and structures on and surrounding their lands.

- Establish a Response Agreement with Liberty County Disaster and Emergency Services. If appropriate, this agreement could identify jurisdictions, agency authorities, fire management responsibilities, contacts, staffing levels, fire protection facilities, who pays for what, how much, and how the payment process is implemented.
- Mow roadside vegetation
- Mow developed campsites
- Continue to maintain existing irrigation systems in recreation areas.
- Investigate methods to minimize heavy fuel loads in key areas.
- Develop “Location Maps” to serve as wildfire response plans for Lake Elwell Recreation Areas. They could be posted in each recreation area showing all roads leading from recreation sites to surrounding state highways. ‘Sheltering in place’ information and public safety zones could also be advertised.
- Provide gravel barriers surrounding our buildings/structures in non-irrigated areas.

5.7.3 Conservation Reserve Program

The fire hazard associated with the abundant Conservation Reserve Program (CRP) lands has become a prominent issue for all fire departments and emergency personnel in Liberty County. Due to the lack of management on CRP, a dense mat of highly flammable fuels builds up as the fields sit in fallow year after year. Fires in these fuels burn at very high intensities with large flame lengths, particularly under the influence of the strong winds common in Liberty County. Once ignited, CRP fires can burn very rapidly, jumping roads and other barriers that would

normally inhibit a natural range or grass fire. In the recent past, uncontrolled CRP fires have burned hundreds of acres and threatened countless homes and critical infrastructure such as main highways and power poles in Montana.

It is the recommendation of this plan that Liberty County enacts a policy defining an active management plan for fire hazard fuel reduction on Conservation Reserve Program lands in proximity of structures. This plan should be based on a three year rotation where a certain number of acres are treated each year. Potential treatment options may include, but are not limited to, grazing, haying, prescribed fire, and/or tilling. Liberty County believes active management will reduce the fire risk associated with these fuels and cut down on the number of CRP fires responded to each year. This is especially critical on those acres adjacent to homes, businesses, and critical infrastructure. A map of the projected Conservation Reserve Program acres is included in Appendix I.

Chapter 6: Supporting Information

6

6.1 List of Tables

6.2 Table of Figures

6.3 Signature Pages

This **Liberty County Community Wildfire Protection Plan** has been developed in cooperation and collaboration with the representatives of the following organizations, agencies, and individuals.

6.3.1 Liberty County Resolution

Resolution of the Commissioners of Liberty County, Montana
#07-07

A resolution of the Commissioners of Liberty County declaring County support and adoption of the Liberty County Community Wildfire Protection Plan.

Whereas, The Board of Liberty County Commissioners supports the Liberty County Community Wildfire Protection Plan, and

Whereas, The Liberty County Community Wildfire Protection Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation, The National Fire Plan, The Healthy Forest Restoration Act, and other purposes as deemed appropriate by the Liberty County Commissioners,

Therefore be it resolved, that the Liberty County Commissioners do hereby adopt, support, and will facilitate the Liberty County Community Wildfire Protection Plan's implementation.

Passed and approved this 4th Day of April, 2007.

Board of County Commissioners
Liberty County, Montana

Don Marble
By: Don Marble
Board of County Commissioners

Russ Tempel
By: Russ Tempel
Board of County Commissioners

By: Larry Hendrickson
Board of County Commissioners

Rhonda S Pimley
Attested by:
Rhonda Pimley, Clerk

6.3.2 City of Chester Resolution

Resolution of the City Council of Chester
located in Liberty County, Montana
103-2007

A resolution of the City Council of Chester declaring City support and adoption of the Liberty County Community Wildfire Protection Plan.

Whereas, The City Council of Chester supports the Liberty County Community Wildfire Protection Plan, and

Whereas, The City Council of Chester has participated in the development of the Liberty County Community Wildfire Protection Plan, and

Whereas, The Liberty County Community Wildfire Protection Plan will be utilized as a guide for planning as related to FEMA Pre-Disaster Mitigation, The National Fire Plan, The Healthy Forest Restoration Act, and other purposes as deemed appropriate by the City Council of Chester,

Therefore be it resolved, that the City Council of Chester does hereby adopt, support, and will facilitate the Liberty County Community Wildfire Protection Plan's implementation.

Passed and approved this 7th Day of May 2007

City Council of Chester located in Liberty County, Montana

Wayne L. Wardell

By:

Mayor, City of Chester

Attested by:
Clerk, City of Chester

6.3.3 Representatives of Community Organizations, Federal, and State Agencies

These agencies and organizations collaborated and cooperated in the development of this plan.

5/21/07

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By: David "Butch" Tempel, Chief — Date
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By: Gerald M. Smith, Chairman — Date
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6.4 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.

Community Wildfire Protection Plan (CWPP) - 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 Tactic (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.

Xeriscape - a trademark for a method of landscaping that emphasizes water conservation in its use of drought-resistant plants

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