Tri-County Fire Working Group

Regional Community Wildfire Protection Plan

Prepared as a collaborative effort for the three county region we serve: Lewis & Clark, Jefferson, and Broadwater Counties.

2005

Table of Contents

References:

Broadwater County PDM plan
Jefferson County PDM plan
Lewis & Clark County PDM plan
Augusta area community protection plan (when completed)
Lincoln Fire District protection plan
Wolf Creek Fire Service Area protection plan
The “South Hills Preplan” suppression response plan
The “Wildland-Urban Interface Communities-At-Risk Hazard Assessment”, BLM, 2004
The “Wildland-Urban Interface Communities-At-Risk Mitigation Plan”, BLM, 2004

1. Signatures of plan concurrence

_____
Chairperson, Lewis & Clark County Commission

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Chairperson, Broadwater County Commission

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Chairperson, Jefferson County Commission

_____
City of Helena, and for the Helena Fire Dept

_____
Lewis & Clark County Rural Fire Council

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Jefferson County Rural Fire Council

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Broadwater County Fire District

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Montana Dept of Natural Resources & Conservation
Central Land Office

2. Statement of Purpose/Executive Summary

This community protection plan has been developed to act as a compilation of the data that has been generated by many members of the TCFWG. Each county has met the requirements of the FEMA Pre-disaster Mitigation (PDM) plan process; the BLM has published a WUI Communities-At-Risk Mitigation Plan; the Forest Service has presented a series of projects throughout the planning area for fuels reduction; several communities have written their own plans; and TCFWG has numerous projects on privately owned non-industrial forest land and City of Helena Open Space lands. Much of the data found in this plan is extracted from the work done on those plans. Complete details can be found in those plans listed as an annex to this plan.

This plan will serve as a process for the collaborative working of fuel hazard assessment and prioritization of projects to address that hazard in a unified manner. It is believed that this approach will provide a contiguity of projects and economy of scale where possible and the most economical methods of spending the fuel modification dollars and capitalize on the work already done by these individual entities. It is viewed as a most likely approach for the federal, state, local agencies, and local communities to work collectively to the regions benefit.

Fuel, weather and physical setting determine fire behavior and in particular fire intensity. Fuels are the leg of the fire environment triangle (countryman 1972) that land managers can change to achieve desired post-fire conditions. Treatments provide a window of opportunity for effective fire suppression and protecting high value areas (Pollet and Omi). Managing to reduce fuel quantity, and changing the spatial arrangement both horizontally and vertically will be the focus of our efforts.

Goals and objective statements for mitigating the wildland fire hazard.

1). Develop a strategic plan that looks across jurisdictional boundaries. Propose and implement projects that will protect communities at risk from wildfire. Develop and propose protection measures for municipal watersheds. Take measures to insure that escape routes are made defensible for the public and public safety workers.

2). Continue to support programs that educate the public about the things that people can do to provide defensible space around homes and how to use fire wise building materials and landscaping design. Continue the program to use grant money to provide assistance to homeowners to create defensible space and insure ingress and egress for fire suppression personnel. Encourage the federal and state agencies to continue creating fire defensible space around homes that border agency land if the home-owner has done work on their own land. (Jack Cohens research on defensible space)

3). Focus first on the wildland urban interface communities at risk.

4). Attempt to stabilize the municipal watersheds of Helena and East Helena.

5). Use state of the art fire modeling methods to determine the best places to spatially locate dispersed fuels treatments in the general forested areas outside of the wildland urban interface area. Propose to treat a minimum of approximately 20 percent of the general forested area. (Spatial Strategies for Landscape Fuel Treatments, Mark A. Finney).

Broadwater, Jefferson and Lewis and Clark Counties Community Wildfire Protection Plan **Executive Summary**

The incentive for communities to engage in comprehensive forest planning and project prioritization was given impetus with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. This legislation included the first meaningful statutory incentives for the US Forest service and the Bureau of Land Management to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects.

In order for a community to take full advantage of this new opportunity, it must first prepare a Community Wildfire Protection Plan (CWPP). This plan will serve as the CWPP for Broadwater, Jefferson and Lewis and Clark counties. This plan helps the communities within these counties to clarify and refine priorities for the protection of life, property, and critical infrastructure in the wildland-urban interface.

The HFRA provides communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands and how additional federal funds may be distributed for projects on nonfederal lands. This CWPP is the most effective way to take advantage of this opportunity.

The minimum requirements for a CWPP as described in the HFRA are:

1) A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.
2) A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at risk communities and essential infrastructure.
3) A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area.

The HFRA requires that three entities must mutually agree to the final contents of the CWPP:

The local county and city governments
The local fire departments; and
The Department of Natural Resource Conservation

Findings in the document.

The people in Broadwater, Jefferson and Lewis and Clark counties live, work and play in an environment that is frequented by wildfire. Our statistics show that during the past 20 years over 450,000 acres have burned as a result of wildfires. On average over 20,000 acres burn annually, resulting in a significant risk to life and property.

We defined our wildland urban interface (WUI) boundary as the area within four miles from communities that possess a population density exceeding 250 people per square mile. Projects proposed in the WUI would become a priority for accomplishment. This plan contains a map that displays the combined risk of wildfire in the three counties. All lands within the counties were assigned a numerical value of risk based upon the existing fuel hazard, number of people in the immediate area, and past history of wildland fires starting in the immediate area. This map will be consulted when evaluating the merits of proposed projects. All proposed projects will receive a high, moderate, or low priority rating in an effort to help develop a strategic plan for protecting the communities at risk.
Using this plan should result in the counties successfully competing for money that would be used to implement projects on nonfederal land.

3. Tri-County Fire Working Group

The group membership includes individual citizens, local government, state and federal agencies, interested contractors, and fire suppression departments. Members are from the counties of Lewis & Clark, Jefferson, and Broadwater. This group was the recipient of the FEMA “EXEMPLARY PRACTICES” award in the year 2000 for it’s outstanding

outreach program. Our program was featured in the 2004 FEMA publication *At Home in the Woods; Lessons Learned in the Wildland/Urban Interface.*

The group meets on a monthly basis. Since it's initiation following the North Hill fire of 1984 this group has had the primary mission of fire prevention education. It undertook a project to map the fuel hazard risk in the interface areas of the counties it represents. When Lewis & Clark County received the Federal Emergency Management Agency "PROJECT IMPACT" grant program this committee was well suited to be the "fire" committee. The group found that with the money available for hazard mitigation in general, and with the generous match provided by numerous members and landowners it was able to step out of the role of talking about fire prevention and mitigation to a very proactive position of wildland fuel hazard reduction projects. The mapping project continues in the three counties, along with the education and awareness programs and fuel hazard reduction in the wildland urban interface.

With the FEMA Project Impact funding no longer available, the committee has been successful in receiving Hazard Mitigation grants through Montana Disaster and Emergency Services for fuel hazard reduction on City of Helena open space land, and private lands in the Wolf Creek, MT area. The group has been successful in obtaining National Fire Plan Grants in 2001, 2002 and 2004 to develop the program for individual defensible space projects, and develop projects for Non-Industrial Private Forest owners. The Bureau of Land Management is assisting the fuel hazard reduction program with Community Assistance Agreements entered into during the fall of 2003.

The number, scope, and types of projects has continued to grow with available funding opportunities and experience levels of the parties involved. The program continues to provide defensible space around homes in the interface, but has undertaken subdivision-wide protection projects, and is expanding into projects with larger tract non-industrial private forest landowners.

The Tri-County Fire Working Group is continuing its work with the local and state Disaster and Emergency Services agencies through the FEMA Pre-Disaster Mitigation Program. The goal is to maintain the interagency flavor and relationships developed over the past years to provide wildland fire mitigation planning, population protection, and meaningful projects to sustain forest health and natural aesthetics in wildland/urban interface settings.

4. Plan Goals

A. Define our local Wildland/Urban (WUI) boundaries.

By:

- Utilizing the input from the local residents and individual local plans
- Utilizing available GIS technology
- Utilizing known fuel hazard and applying local fire behavior expectation

- Utilizing local topographic features
- Utilizing fire history of the area
- Utilizing the known weather patterns of the area
- Understanding the fire response and suppression capabilities in the area

B. Reduction of impacts to the community from wildland fires.

By:

- Homeowner fuel reduction programs
- Strategic fuel break placement
- Land owner education
- Controlled burns
- Forest fuel reduction focusing resources on the highest priority areas
- Seek out every opportunity for financial support for projects
- Streamlined permitting process for fuel reduction
- Ingress and egress fuel reduction projects
- Fuel reduction in utility right-of-ways
- Encourage fire insurance incentives
- Provide local support to legislative efforts when appropriate
- Reduce long-term costs of fire suppression and fire mitigation

C. Reduce hazardous fuels in the forest and rangeland areas.

By:

- A strong project oriented program
- Support of a strong, qualified, private contractor network to develop and complete projects
- Cooperate with Federal and State partner agencies through contiguous project identification and completion
- Maximize the opportunities of future ecosystem health
- Encourage expansion of resources (public and private) to support mitigation work

D. Continue to assess and address the current wildland urban interface (WUI) problems at all levels.

By:

- County/City/Town/Fire District fire protection and mitigation plans
- Coordination with federal and state land management agencies
- Encouraging the need for water supply systems in existing subdivisions
- Centralize fire history documentation
- Support a statewide, consistent, fire risk assessment system
- Recognize that this plan is dynamic and needs to be continually updated

E. Education and Awareness programs for developers and homeowners in WUI.

By:

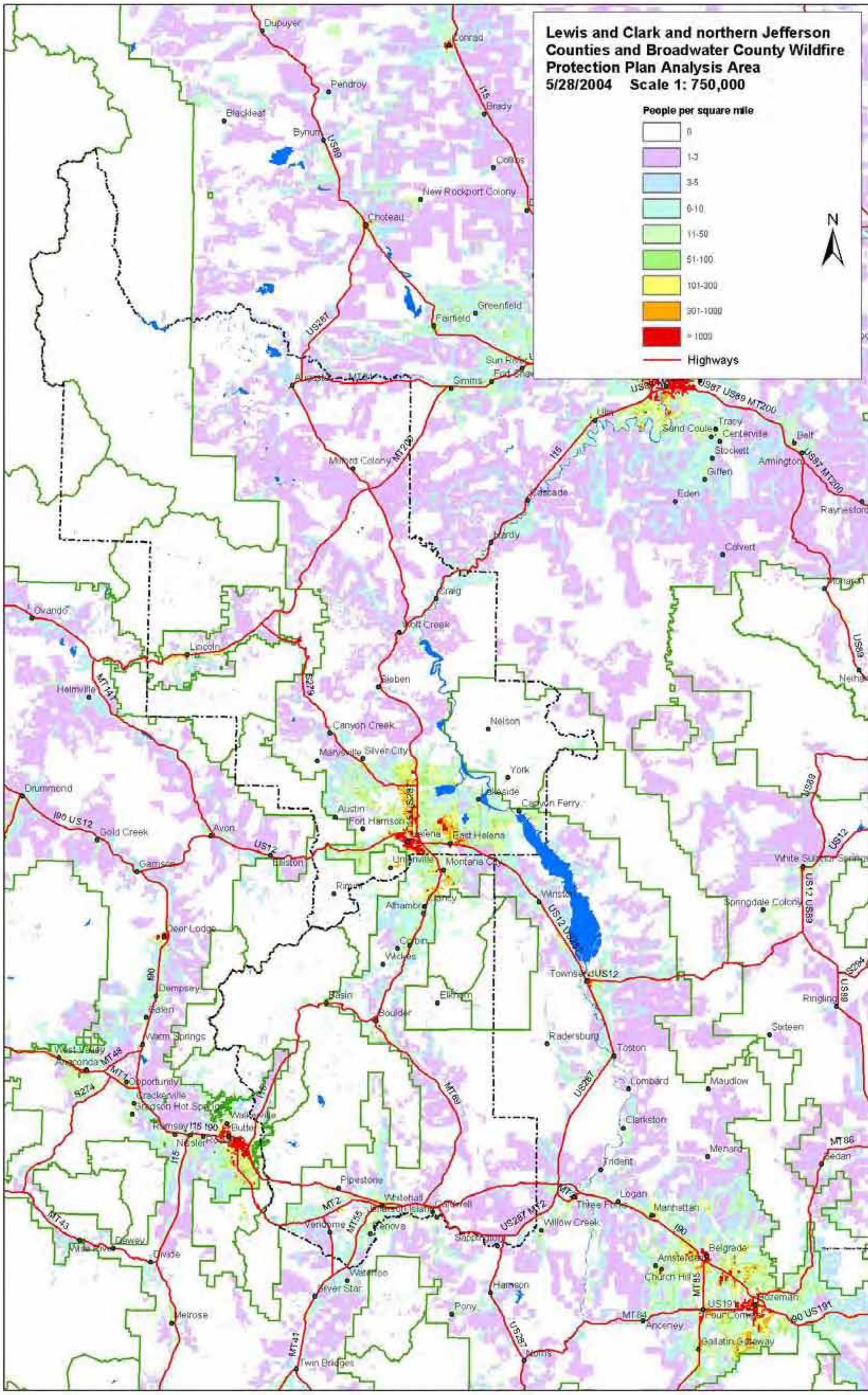
- Support wildland/urban interface fuel hazard mitigation subdivision regulations
- Support water supply requirements
- Promotion of fire-resistant building materials
- Support emergency access regulations

- Work with real estate professionals and developers concerning educating their customers on the wildland fuel hazard in their area.
- Sponsorship of programs such as *FIREWISE.*
- Work with the media to make the risk known to the public, and celebrate the project success.
- Break down jurisdictional boundaries for mitigation and awareness programs

F. Work with local fire jurisdictions to address their WUI issues.

By:

- Participation in fire department sponsored fire prevention programs
- Support the development of response pre-planning.
- Support rural addressing programs


Lewis and Clark and northern Jefferson Counties and Broadwater County Wildfire Protection Plan Analysis Area
5/28/2004 Scale 1: 750,000
People per square mile
0
1-2
3-5
6-10
11-50
51-100
101-300
301-1000
> 1000
Highways
N

5. Area Description

TCFWG planning covers all of the three member counties. The area includes the borders of 3 National Forests, 2 BLM field offices, areas on both sides of the continental divide, and 27 different city and volunteer fire jurisdictions. This plan however focuses on those portions of the three counties that include the Helena National Forest. It uses a natural topographical and watershed approach to looking at the wildland fire risk and the populations within its area of influence.

Community Protection Plans are being developed by the Beaverhead-Deer Lodge National Forest to the south and the Lewis & Clark National Forest to the north which will also cover portions of our three counties. Our plan is intended to make any transitions with plans in other adjacent areas as seamless as possible. This plan covers the area from Basin, MT on the southwest to the Lewis & Clark County line on the north, east to the eastern Broadwater county border and back to the south and west to Basin, completing the area boundary.

The population of Jefferson County is 10,049, with approximately 4,500 located in the area north of the Boulder Hill to the northern county line. Basin, Boulder*, Clancy, Elkhorn, Jefferson City, Montana City, and Wickes are directly covered by this plan. The Whitehall area and southern portions of the county are included by reference to the Jefferson County CWPP. Land ownership is split: 45% Private; National Forest 43%; BLM 9%; and State 3%.

The population of Broadwater County is 4,300. Land ownership of the 1,193 square miles in the county is split: 60.4% private; 23.5% National Forest; 8.1% BLM; and 3 % state. The county encompasses portions of the Elkhorn Mountains on the west and the Big Belt Mountains on the north.
This plan directly covers the communities of Townsend*, Toston, Radersburg, Winston, and the Canyon Ferry Lake area. The growth potential in parts of the county is considered high, particularly in the western portions near the border with Lewis & Clark County. The areas around Canyon Ferry Lake that lay in Broadwater County are attractive for recreational users including full and part time residential development. The county identifies the National Forest to be at the greatest risk from crown fire in its adopted PDM plan. That plan indicates the impact on the population as moderate, with a moderate to high probability of occurrence, with a high magnitude or severe impact on the community if a major wildfire happens. Critical infrastructure does exist, ie. Power transmission lines.

The population of Lewis & Clark County is 56,554. Here we again see a geographic split in population with those living in the various areas of the county; Augusta (400), Baxendale, Canyon Cr*, Canyon Ferry, Craig* (100), East Helena (1,650), Helena*(26,000), Helena Valley (18,328), Lakeside, Lincoln*(1,100), Marysville*, Nelson, Wolf Creek ( ),York (180), and Unionville (275). Land ownership is split: 44% National Forest; 42% private; 17.2% state; and 3.2% BLM.

*****Indicates a ***Community-at-Risk*** as identified in the Federal Register.

According to the Montana Statewide Pre-Disaster Mitigation Plan, Lewis & Clark County ranks among the highest counties in the state for Class II /III condition class land. Of the total 2,232,434 acres, 641,980 acres (28.76%) are in Condition Class II, and 356,573 acres (15.97%) are in Condition Class III. A total of 998,453 acres (45%) in these two condition classes, considered highly vulnerable to future wildland fire.

Lewis & Clark County alone has 309,948 acres that are mapped and risk rated at the "High" level. There are 1,115 homes found in these same acres. There is an estimated 155,796 acres risk rated in the "High to Severe" level, with 1,502 homes located in that ranking. A population estimate of 2 occupants per home would calculate to a minimum of 5,234 people living in these two risk rated areas. (numbers from 2005 GIS mapping data, growth in the interface is ongoing)

The identified communities within this boundary vary widely in population, elevation, infrastructure, transportation systems, fire protection organization, density of development, type of development, and the wildland fuel hazard. There are however, similarities in topography, recreational use, fuel types, and fire history.

6. Fire History

A tabulation of the fires in this area since 1984 and the cause of that fire are found in Appendix B of this plan. All three of our counties have experienced large fires and many of the areas where earlier fires occurred are now further developed for residential subdivision than at the time of the fires.

Totals by county beginning 1984 through 2003.

Broadwater County human caused acres burned	85,802 acres
Broadwater County lighting caused acres burned	2532 acres
Jefferson County human caused acres burned	59,495 acres
Jefferson County lightning caused acres burned	0 acres (over 100acres)
Lewis and Clark County human caused acres burned	100,944 acres
Lewis and Clark County lightning caused acres burned	200,930 acres
Total acres by county	
Broadwater county	88,334 acres
Jefferson County	59,495 acres
Lewis and Clark County	311,874 acre
Total burned acres in the tri county area	459,703 acres.

Recent large fires in Lewis & Clark County include: Jimtown Fire (2003) 1,000 acres human caused; Lincoln Complex (2003) 37,707 acres; Moose-Wasson Fire (2003) 1,802 acres; Box Canyon Fire (2003) 161 acres human caused; Buck Snort Fire (2000) 14,500

acres human caused; Cave Gulch Fire (2000) 29,200 acres human caused; Little Hellgate Fire (1999) 200 acres human caused; Hauser Dam Fire (1999) 220 acres campfire caused; Willow Creek Fire (1997) 2,000 acres human caused; Lower Coxcy Fire (1996) human caused; Valley #1 Fire (1994) 50 acres fireworks caused; Dearborn River (1992) 1,300 acres human caused; the 125 acre Holter Lake fire in 1991 and the 350 acre Wolf Creek fire in 2000; Beartooth Fire (1990) 33,000 acres human caused The 550 acre Roberts Mountain fire in 1988,. All of these recent fires resulted in private property being destroyed, may have included evacuations of local populations, and homes threatened.

Jefferson county fires include: High Ore, Boulder Hill, Warm Springs Cr

Broadwater county fires include: Toston-Maudlow, Angus, Lower Coxcy

7. Community Collaborative Information

Planning sessions were held through the auspices of Tri-County Fire Working Group with representatives of the agencies and individual members represented. These include the regular monthly meetings of the Tri-County Fire Working Group. Presentations of the Wildland/Urban Interface designation, maps, and the plan preparation discussion were made at:
Whitehall VFD (2); Lewis & Clark County Rural Fire Council (3); Rimini Community/ Upper Ten Mile Cr watershed protection group; Jefferson County Rural Fire Council; A joint L & C County/City of Helena Commission work session; The lower Ten Mile Cr watershed protection group; Basin Community; Lincoln Community Council; Boulder Community; Helena Open Lands Management Council (2); Broadwater County LEPC; Lewis & Clark County LEPC; Augusta VFD; a joint meeting with HFD, City of Helena Parks and Recreation, HOLMAC forester, USFS representative, and private foresters.

8. Climatology

Helena's weather is usually clear, sunny and dry. Low relative humidity levels make both summer and winter temperatures seem more comfortable then those temperatures would seem in other parts of the country. Because Helena is on the "dry side" of the Continental Divide, there are generally more sunny days than west of the Divide.

Dry winters accompanied by a wet spring season are typical for the Helena Area. Summer rainstorm systems typically produce more moisture in early June. These same frontal systems tend to become drier in July and August. In most instances storm systems produce enough rain to extinguish any fires that are started by lightning. However, as the summer season progresses rain storms become drier or more centralized resulting in more frequently started lightning fires.

As for the annual seasonal snowfall, warming periods between snowfalls prevent heavy snow accumulations in the lower elevations. Snow depths rarely exceed five or six inches in and around the immediate town, while averaging approximately fifty inches in the surrounding mountainous areas. Since 1969, the average number of days per season with an inch or more of snow on the ground is 61 days.

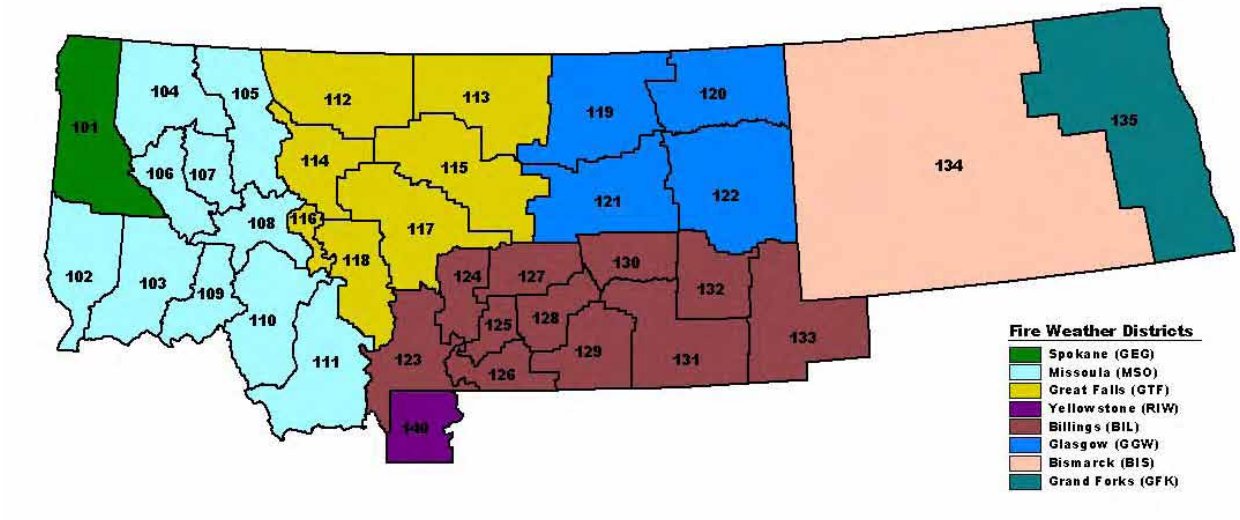
Helena Yearly Climate Averages

Average relative humidity	57%
Average Annual Precipitation	11.37 inches
Average Annual Snowfall	47.6 inches
Average Number of Days with Snow on the Ground	61
Average Length of Freeze-Free Season	120-130 days

	January	April	July	October
Average Daily High Temperature	28.1	54.7	83.6	58.6
Average Daily Low Temperature	8.1	29.5	52.2	31.5
Average Precipitation (inches)	.66	1.01	1.04	.65
Average Monthly Days of Sunshine	14	18	24	19

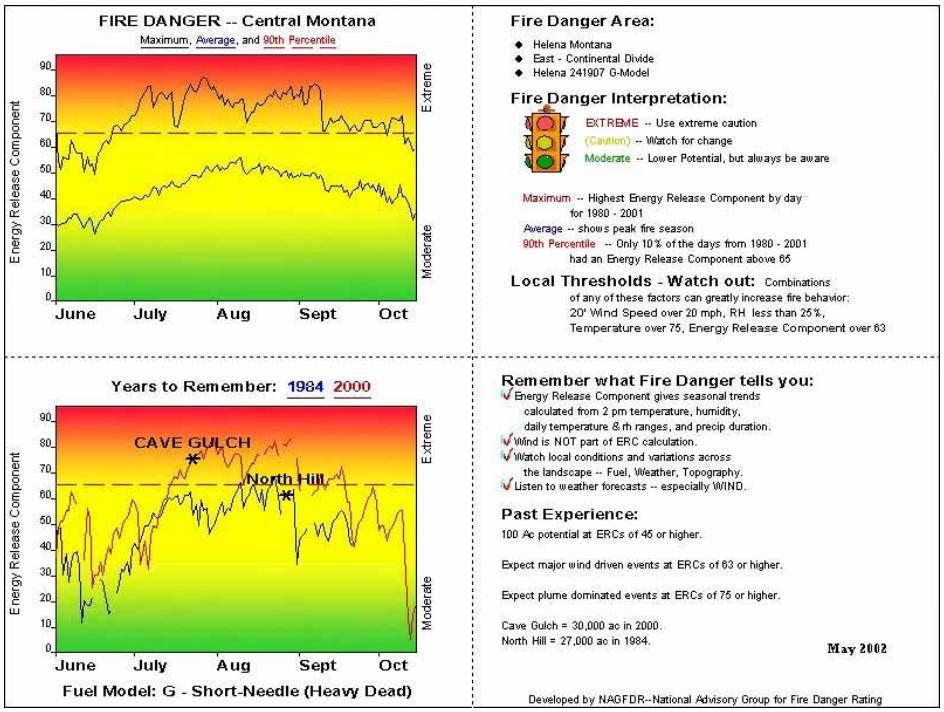
Need to include regional weather synopsis of Jeffco and Broadwater. NRIS sources?

This area is covered by three Fire Weather Zones; zone114 on the north; zone 118 on the south; and zone 116 on the west. The area covered in the plan is located in the designated fire weather zones 114, 116, and 118. These zones are typified by frequent high wind events, thunderstorms, and low relative humidity.
BLM lightning strike data shows 13,672 lightning strikes for a 90-day period during the 2003 fire season within this area of Lewis & Clark County alone.

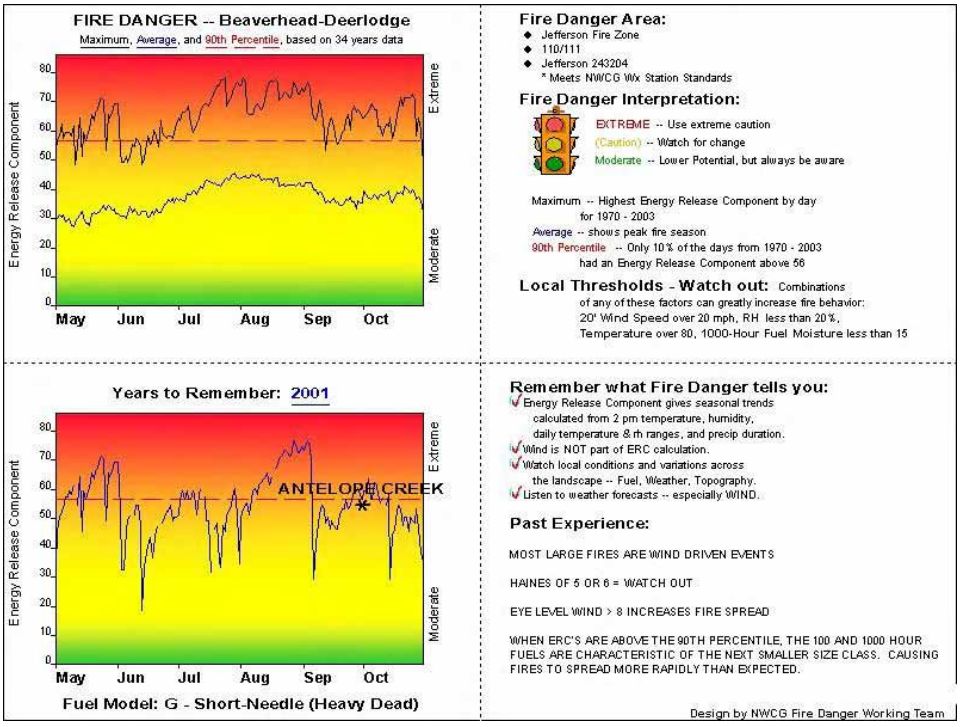


Fire Danger Pocket Cards

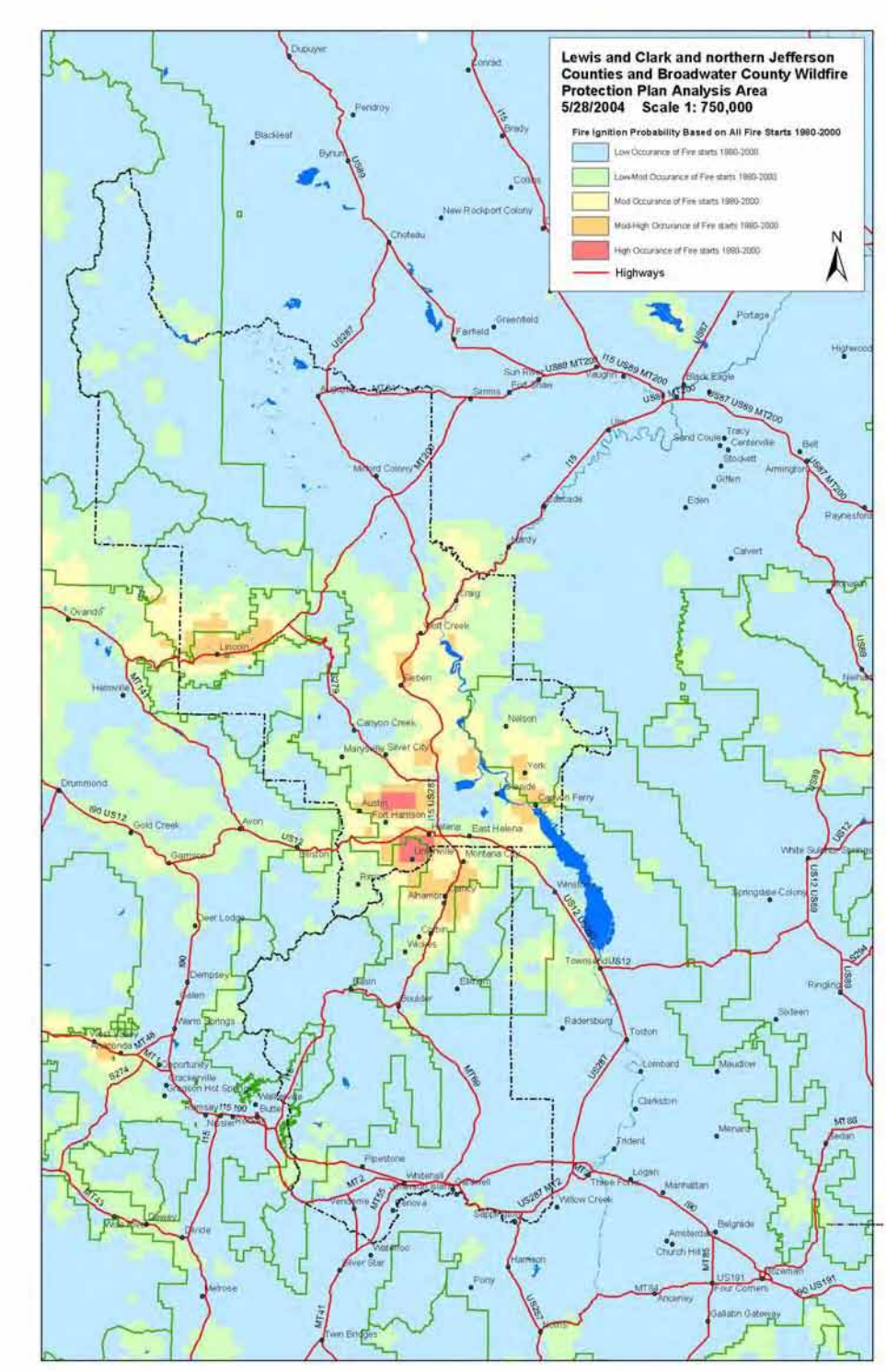
Helena area:



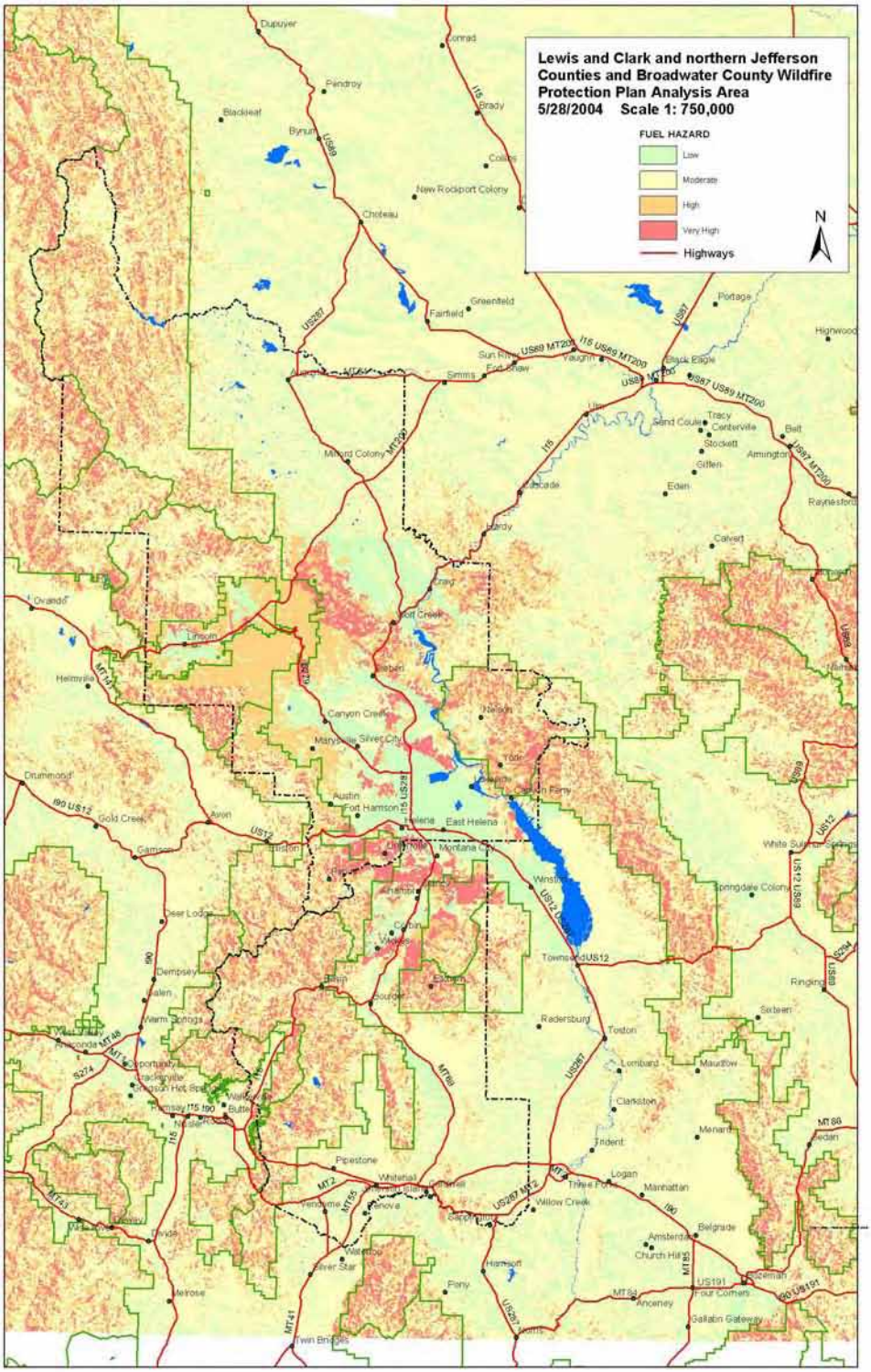
Jefferson Ranger District:



9. Area fire ignition probability map



10. Wildland Fuel Hazard Rating Map



Tri-County Fire Working Group

Guidelines for Fuel Hazard Map Rating

Fuel Hazard Classes.
Fuel Hazard Rating Maps prepared by Tri-County Fire Working Group for Broadwater, Jefferson, and Lewis & Clark Counties. Field work by Montana Prescribed Fire Services, Inc.

Vegetation as it relates to wild land fire has been classified into four primary "Fuel Hazard" groups considering steepness of slope as well as vegetation. Slope steepness simulates wind in its effect on fire spread. Changing from level ground to a 30% slope approximately doubles rate-of-spread in surface fires.

Group A: Low fuel hazard with potential for fast spreading fires when grass is cured. (Early Spring before green-up and late summer and fall). These are areas of grass, weeds, and brush less than 2 feet high. The fire hazard can easily be mitigated in these fuels.

These areas are generally not a problem for development from a fire protection standpoint. Humans can usually avoid burning areas with ease and firefighters can work easily and efficiently under normal weather conditions. Heavy damages are still possible when items are within the burning area without adequate fuel treatments, clearances, or protection. This fuel type will accommodate the heaviest and widest range of developments with respect to wildfire hazards.

Group B: These areas represent a medium fuel hazard. They are medium density Conifer stands with primarily a grass and brush under story. The conifer Over story tends to reduce the density of the grass and brush. Minimal fuel Reduction is needed to reduce this Group to a less severe state.

Inexperienced people are usually afraid and can panic when these areas burn. Property, real and personal, can sustain heavy losses due to the greater burning intensities. Due to the burning characteristics and resultant dangers for "B" rated fuels, it will be advantageous to coordinate and regulate development in these areas. Development can only exist if fuel modifications and treatments are completed prior to completion of the development.

Group C: This Group represents a high fuel hazard with potential for high intensity crown fires. These are dense conifer stands. Fuel can be reduced to a less severe state on slopes less than 30% but usually require some form of commercial harvest.

Experienced firefighters are most cautious in these fuels and are ever fearful of the crown fire potential. Rescue of persons entrapped by hot wildfires these fuels are nearly impossible. Property, real and personal, can face complete destruction. Injuries can be serious and deaths may easily occur. The burning characteristics and resultant dangers in "C" fuels make it one in which close, coordinated and regulated development is advantageous to all interests, both

public and private. At best development in these areas will only be marginal in safety and then only after modifications and treatments are completed prior to completion of the development itself.

Group X: This Group represents a high to severe fuel hazard with potential for high Intensity fire and extreme rates-of-spread. These are dense, flammable vegetation over two feet high including tall sagebrush and conifer reproduction (regeneration). Fuels can be readily reduced to a less sever state on slopes less than 30%.

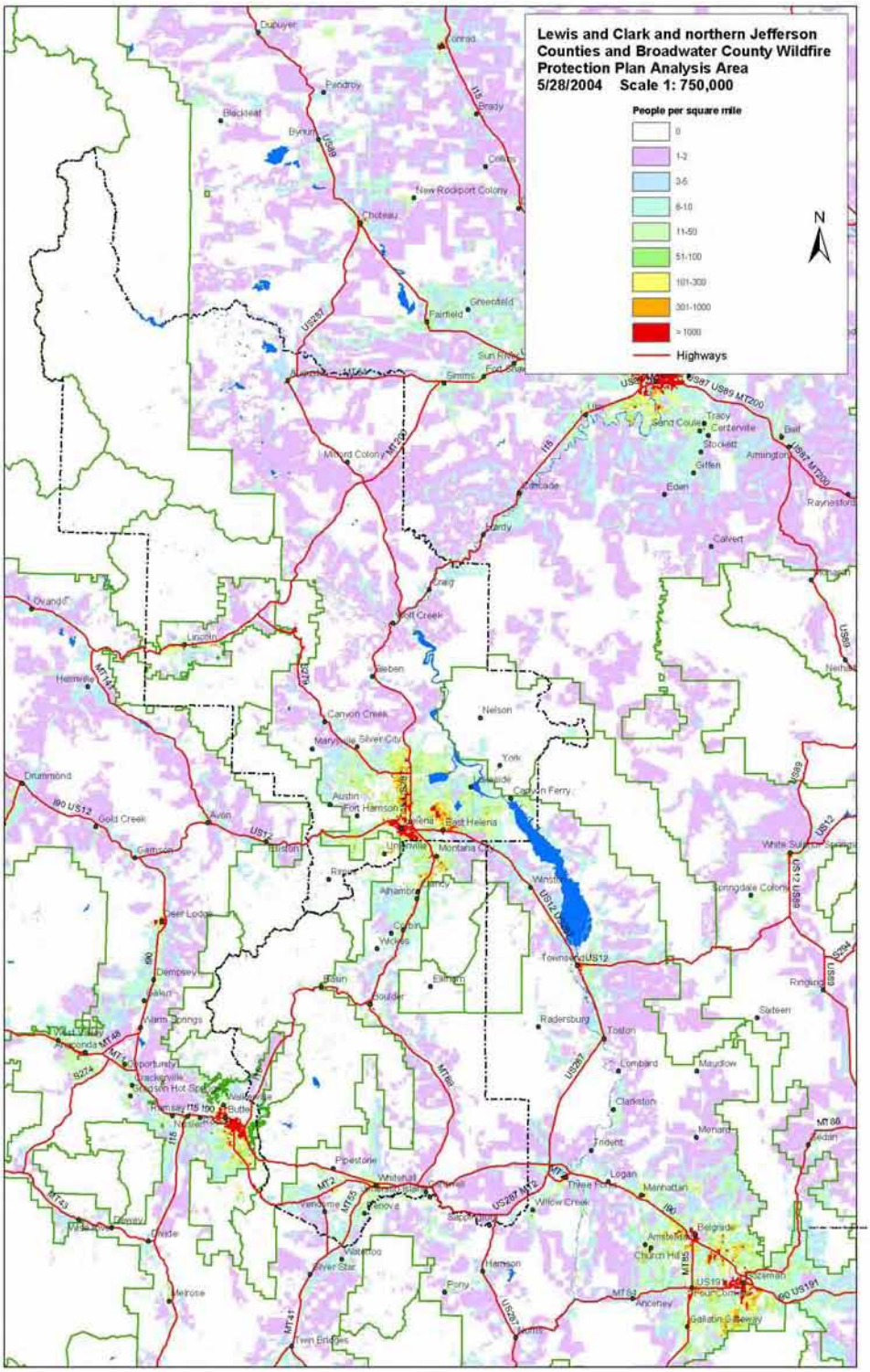
Although very similar to "C" fuels when subjected to wildfire, the "X" type is delineated separately from "C" fuels because of its higher intensity burning characteristics, rapid rates of spread and its different requirements for mitigation. The dangers of intense, destructive wildfires are greatest in "X" fuels. Property, real and personal, will face heavy damage and possibly complete destruction during wildfires. Injuries can be serious and deaths may easily occur due to entrapment. The burning characteristics and resultant dangers make it one in which close, coordinated, and regulated development is imperative to all interests, both public and private. Fuel Hazard "X" lends itself to modification and can usually be readily reduced to a type "B" classification.

Numerical comparison of fuel hazard classes is not possible because many different considerations are involved. Classes "A" and "X" are most likely to have fires that spread rapidly because of the abundance of grass and small diameter surface fuels (fine fuels) that dry rapidly and are exposed to the wind. In Class "A" fuels the threat to life is negligible but fire fighters have sustained severe and debilitating burns without proper personal protective gear. Property damage occurs only where fuels are tolerated right up to structures.

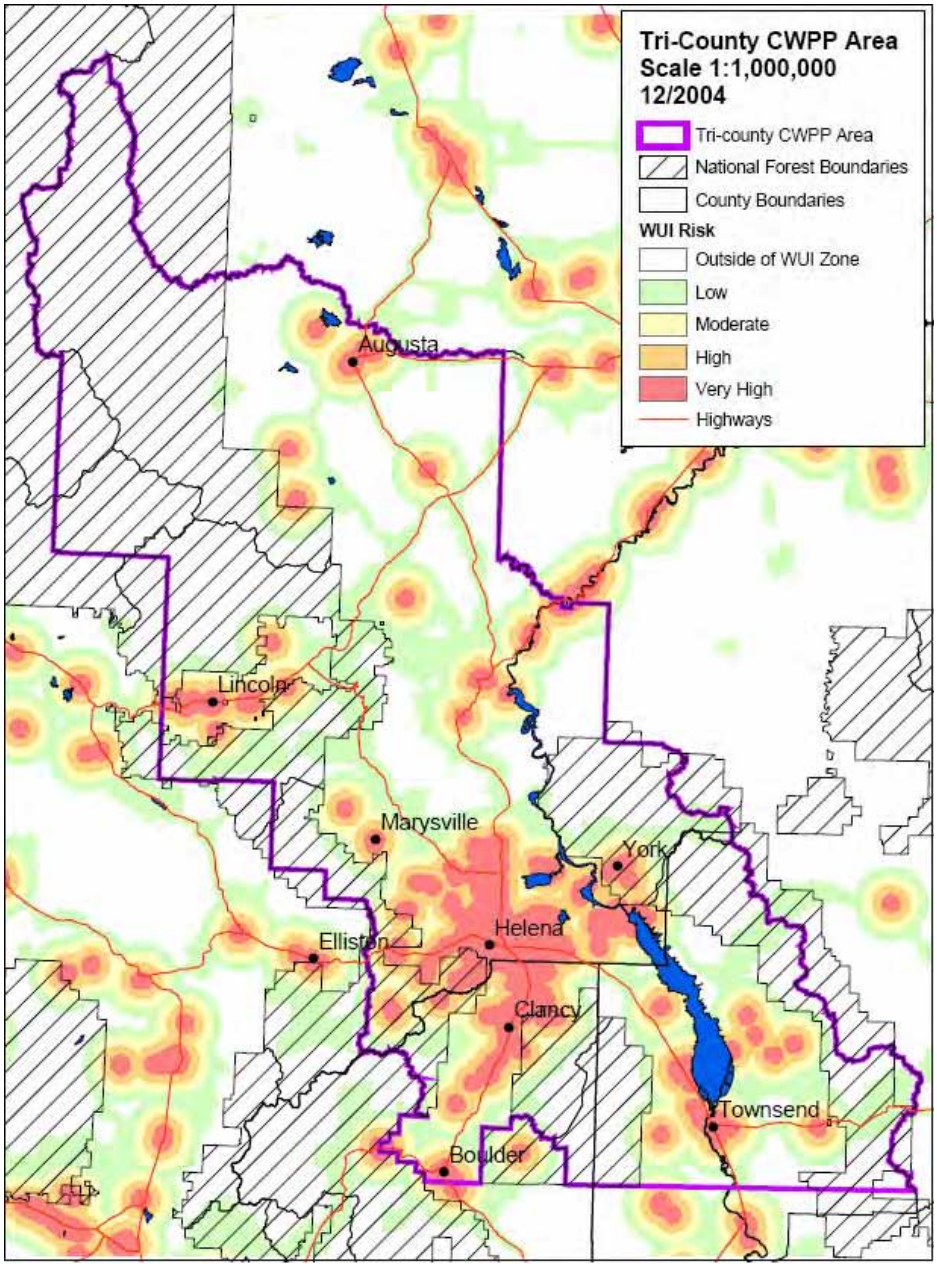
Fires that occur in Class "X" during dry, windy, conditions can burn with sufficient intensity to endanger life and ignite structures at some distance. Quite troublesome destructive fires have occurred in Class "X" fuels. The usual fire in Class "B" fuels is a moderately spreading surface fire depending upon the amount of fine fuels present. The medium density over story tends to reduce the mid-flame wind speed at the surface reducing the rate-of-spread from that exhibited by Class "A" and "X" fuels. Fires in Class "B" fuels are usually easily controlled.

Fires in Class "C" fuels are normally slow spreading, of low intensity, and rather easily controlled. However, dry conditions coupled with wind or steep slopes over 30% can produce the type of inferno typified by the fires of 1988, 1990, and 2000 in our area. All of these fires contained large areas of "X" fuels intermingled with Class "C" fuels.

11. Population Density Map



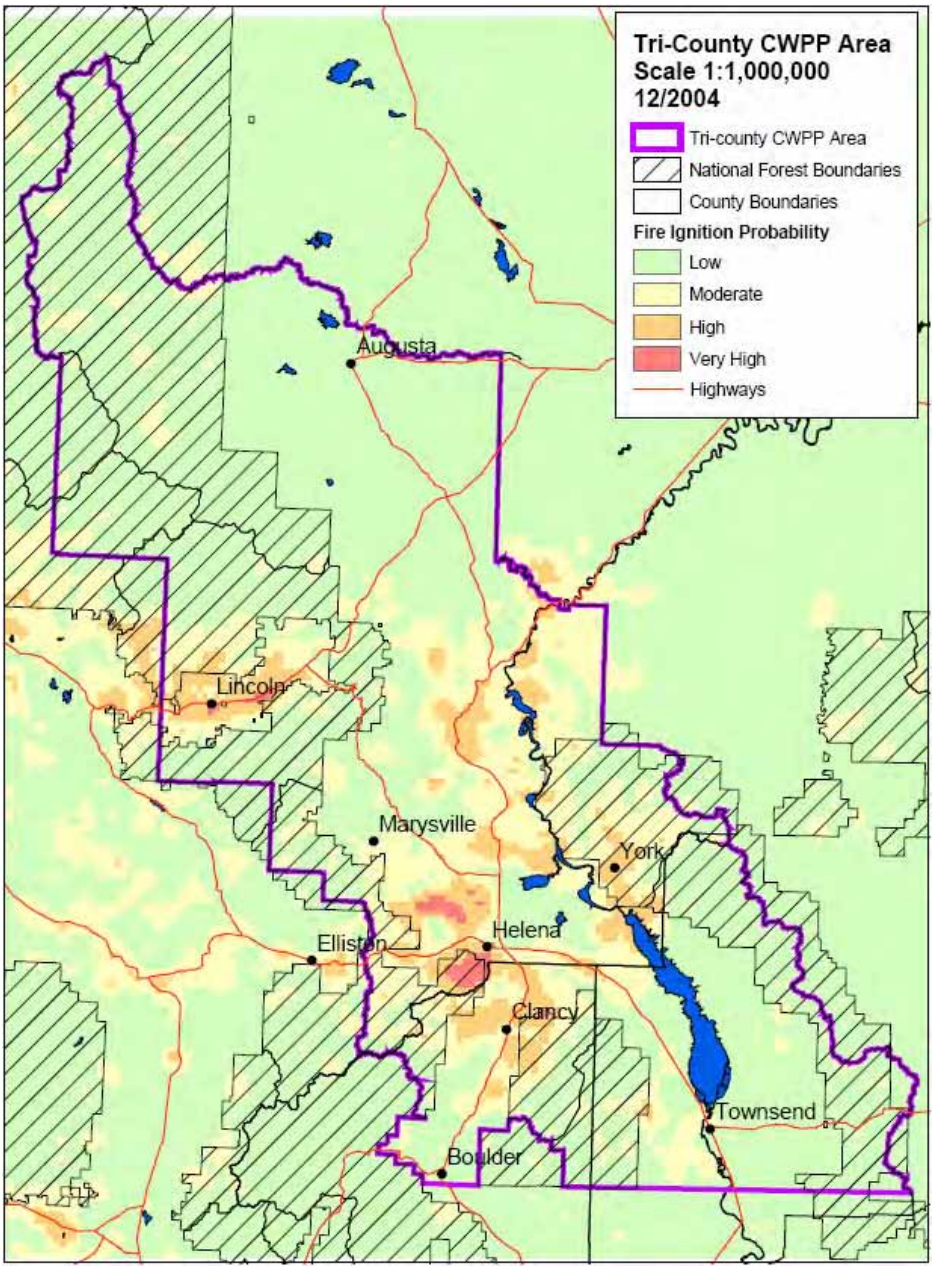
12. Wildland/Urban Interface Boundary Designation Map



A wildfire fire risk analysis was completed for the Lewis and Clark, Northern Jefferson, and Northern Broadwater counties (tri-county area). Three principle input layers were used to assess risk of wildfire damage to lands and structures in the tri-county area. The input layers were: fuel hazard risk, fire ignition probability, and wildland urban interface risk (based on proximity to interface communities). Each of the input layers had four hazard ratings: 1(low), 2 (moderate), 3 (high), and 4 (very high). A fire risk output layer was created by combining the three input layers with result values from 1 (low) to 12 (very high). This document summarizes how each of the three layers were created and how they were combined to create a fire risk analysis layer. The results of this analysis are intended for landscape level fuel reduction project priority comparisons within the tri-county area (approx 3 million acres). The input and output layers are 30m grids and are suitable for landscape level analysis at scales of 1:100,000 or greater.

Fuel Hazard Layer

A fuel hazard risk 30m grid for the tri-county area was developed by combining three input fuel hazard risk layers. The three input layers were: Lewis and Clark County fuel risk, Broadwater County fuel risk, and National Forest lands fuel risk. Each input layer had four fuel hazard risk classes: 1 (low), 2 (mod), 3 (high), and 4 (very high). An additional fuel hazard risk class for large water bodies was added: 0 (water). The two county fuel hazard risk layers were based on local fuel surveys and local fire department input. The Lewis and Clark County fuel hazard risk layer was developed in 2002 and primarily covered urban interface areas within the county. The Broadwater County fuel hazard risk layer was developed in 2003 for the Deep Creek Canyon area. The National Forest lands layer was developed following a fuel hazard risk mapping protocol developed by the USFS Region One National Fire Plan analysis group. Land cover type, tree canopy, aspect, and slope inputs were given fuel hazard weights and then summed to provide overall fuel hazard risk. The National Forest lands layer was developed in 2004 for all tri-county analysis areas not mapped in the two county layers. The final fuel hazard risk layer was created by combining data from Lewis and Clark County first, Broadwater County second, and all remaining areas from the National Forest layer. Each 30 meter cell has a fuel hazard risk of: 0 (water), 1 (low), 2 (mod), 3 (high), and 4 (very high).



Fire Ignition Map

Fire Ignition Layer

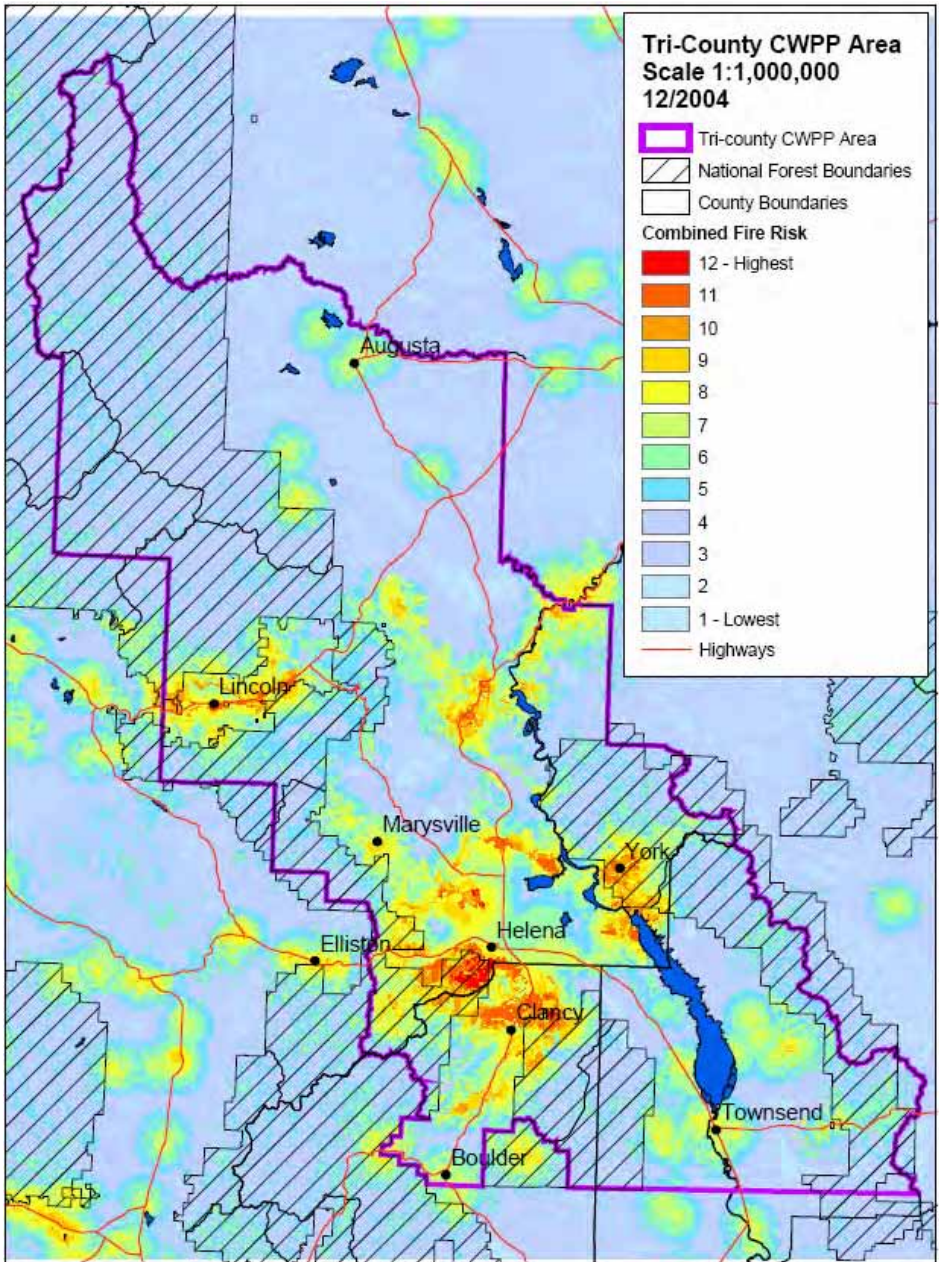
The fire ignition probability 30m grid for the tri-county area was developed by the Wildlife Spatial Analysis Lab at the University of Montana for the USFS Region One Cohesive Strategy Team. The layer was based on an analysis of natural and human caused fire starts from 1981 through 2000. Fire start densities per 1 km cell were calculated using a point interpolate function based on the fire start data. A fire ignition probability layer was then created based on a natural breaks analysis of the fire start densities. Four fire ignition probability classes were mapped: 1 (low), 2 (mod), 3 (high), and 4 (very high). This layer was based on a fire start point coverage assembled from multiple sources but some data gaps are possible during the 20 year period covered. Each 30 meter cell has a fire ignition probability of: 1 (low), 2 (mod), 3 (high), and 4 (very high).

Wildland Urban Interface (WUI) Risk

The wildland urban interface risk 30m grid for the tri-county area was developed by combining two input wildland urban interface layers. The two input layers were: Tri-county wildland urban interface zones and USFS Region One Healthy Forest Restoration Act (R1HFRA) wildland urban interface. The tri-county WUI zone layer was developed based on recommendations from the tri-county fire planning group. Wildland interface zones up to four miles from interface communities (defined in the Federal Register notice of January 4, 2001 as areas where population density >= 250 people per square mile), were identified by the tri-county fire planning group as important areas for reducing fuel hazards. A wildland urban interface zone mapping procedure was created based on buffering interface communities by four miles. First, pixels with population density >= 250 were selected from a 30m population density grid (Wildlife Spatial Analysis Lab at The University of Montana). The selected pixels were converted to a polygon coverage and the polygons were buffered by four miles using one mile zones. Each one mile buffer zone in the four mile area was assigned a WUI risk class of: 4 (very high) for the nearest, 3 (high) for the next, 2 (mod) for the next, and 1 (low) for the farthest. An additional WUI risk class of: 0 was assigned to areas outside of the WUI zones.

Additional WUI areas were added from the R1HFRA WUI layer. The R1HFRA WUI layer was created based on WUI mapping methods outlined in the Healthy Forest Restoration Act using communities at risk, population density, and topography modeling. First all Communities at Risk (identified in the January 4, 2001 Federal Register), point locations were buffered by ½ mile. Second all pixels with population density >= 28 people per square mile were selected from a 30m population density grid, converted to a polygon coverage, and buffered by ½ mile. Third, all major roads in Montana were buffered by ½ mile. All three buffered layers were then combined together to form initial WUI areas. The combined initial WUI areas were then buffered by an additional 1 mile for a total buffer distance of 1.5 miles (1/2 mile initial buffer + 1 mile buffer) to form an intermediate WUI area. The intermediate WUI area was then intersected with areas of sustained steep slopes (slopes > 25% that were at least 5 acres in size). Finally, the 1.5 mile buffered areas were reduced back to the sustained steep slope areas or to the ½ mile initial buffer. The final result were WUI areas extending the first ½ mile from communities at risk, areas of population density > 28 people per square mile, or major roads, and then extending up to an additional mile where there were sustained steep slopes.

In particular, the R1HFRA WUI layer identified corridor routes along major roads not identified by the Tri-county WUI layer. The additional R1HFRA WUI areas were assigned WUI risk values of: 1 (low) because they were more than 4 miles from interface communities. Each 30m cell in the final wildland urban interface risk grid has a WUI risk of: 0 (outside WUI zone), 1 (low), 2 (mod), 3 (high), and 4 (very high).



Combined fire Risk Map

FIRE RISK

The fire risk layer for the tri-county area was created by combining the three 30m input grids described above. A combined risk value was assigned by adding the fuel hazard risk, fire ignition probability risk, and WUI risk values from each 30m input grid. Each 30m cell has a combined fire risk value from 1 (lowest) to 12 (highest).

13. Definition of the area WUI boundary.

The Healthy Forest Restoration Act defines the wildland urban interface as:

A) an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or

B) in the case of any area for which a community wildfire protection plan is not in effect-

   i) an area extending ½ mile from the boundary of an at-risk community

   ii) an area within 1.5 miles of the boundary of an at-risk community including any land that

      I) Has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community.

      II) Has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or

      III) Is in condition class 3 as documented by the Secretary in the project-specific environmental analysis; and

      IV) An area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at- risk community.

In developing our **localized WUI**, the following was taken in to account:
In the development stage of a plan dealing with the impacts to communities by wildfire, crown fires are often the focus of attention. Since the focus of attention is generally centered around crown fires and their effects on surrounding communities, for the sake of consistency, crown fire models will be used to determine the appropriate Wildand Urban Interface (WUI) area. It is important to state not all fires will become crown fires and in most cases only affect the surface structure of the forest.

Crown fire data available to determine a WUI area is based upon only a few actual crown fires, which is taken from Rothermel's "Predicting Behavior and Size of Crown Fires in the Northern Rocky Mountains (1991)." With data available the following two methodologies are offered:
Number One:

- The crown runs studied by Rothermel had a duration time of two to five hours. To calculate an average rate of spread between the different fires, all seven of the times were added together then divided by the total number of fires analyzed. Resulting in the following calculation:

$$\frac{(5+2+4+3+3+.83+4+2.5)}{7 \text{ fires}} = 3.5 \text{ hours.}$$

- The forward rate of spread was also reached through the same process as previously stated. The sum of the seven fires observed rate of spread per hour was divided by the total number of fires analyzed, once again that being seven.

$$\frac{(1.4+3.0+.52+.92+1.04+1.56+.55+0.55)}{7 \text{ fires}} = 1.4 \text{ miles per hour}$$

- Therefore using these calculations in the following formula:
  (3.5 hours avg duration of crown fire X 1.4 mph spread rate)= 4.9 miles

Number two:

- Similarly the distance covered by the different fires was established using the same type of methodology. To calculate the miles of travel by the seven different fires their distance was added together then divided by the total number of fires analyzed, that being seven.

$$\frac{(7+6+2+2.8+3.12+1.3+2.2+1.29)}{7\text{fires}} = 3.7 \text{ miles.}$$

The conclusion reached, after analyzing Rothermel's findings, and our calculations from actual fires, was that a half to one and a half of mile area, as prescribed by the Healthy Forest Restoration Act, is not adequate to substantially effect the forward progression of a crown fire. In most of those cases studied the forward rates of spread, when duration and distance are taken into account, exceed the prescribed allowable limit and would have resulted in negative impacts to the community and its infrastructure. Therefore, to have a substantial affect on fire behavior the area of vegetation manipulation has to be expanded from at least 3.7 to 4.9 miles. It would be reasonable to expand the WUI area from half to one and a half miles to **four miles**. This conclusion is easily deduced from Rothermel's averaged duration times and distance covered by the seven different fires he studied. Furthermore, when looking at the averaged rates of spread, calculated in miles per hour, if left to the prescribed WUI distance of half to one and half miles, the time period for responding emergency resources would be approximately one hour. By expanding the boundary to four miles, the allowable time would also be subsequently lengthened providing a significant increase in the time for those emergency resources to formulate a safe plan of attack. The increase time period would also allow for greater amounts of time for those living in the WUI area to be systematically evacuated in a reasonable fashion.

Crown fires: Crown fires are often the focus of attention when developing plans for dealing with wildfires. Data is available for only a few crown fires. With limited data the following information is offered.

Of the crown runs studied most ranged from 2 to 5 hours in duration.
Distance covered varied from 2 to 7 miles.
Forward rate of spread ranged from .51 to 3.0 miles per hour.
Average forward rate of spread was 1.13 miles per hour.
20 foot wind speed varied from 10 to 45 miles per hour.
(This last piece of information highlights the difference between wind driven and plume dominated crown fires.) (Rothermel, 1991)

Spotting distances: These were taken into account in the study of the crown fire runs.

14. Critical/Essential Infrastructure.

This plan is not meant to provide a listing of specific sites nor the locations of such areas considered as critical to this area or to a broader public area. We are however making the reader aware that we are cognizant of the need to protect designated areas of certain particular interest and projects may be geared toward the protection of various community infrastructure. Examples include: Transportation corridors; Power line corridors; City of Helena water supply/Ten Mile Cr flume system; Residential Development infrastructure on the South side of the City of Helena; Communications system components. We are working through the county DES coordinators for key contacts with those entities who own or are responsible for such infrastructure to develop mitigation plans and actions for protection from wildland fire.

15. Methods of Fuel Hazard Reduction.

TECHNIQUES AVAILABLE TO MANAGE VEGETATION FOR FIRE PROTECTION

Within the fire environment of fuels, weather and topography, the fuel component is the only one which can be modified in the attempt to reduce or eliminate the wildland fire threat. Changing the fuel characteristics can effectively reduce the fire hazard or the fire intensities to a point where the fire threat is manageable. Fuel treatment options range from elimination of all fuels to create a firebreak to reducing the fuel's quantity. These options will be effective in breaking up the continuous fuels and isolating fuels or your home or development.

1. Hand Clearing - The most common method for the homeowner. Debris must be removed from the site or piled for later burning under safe conditions with a burning permit. Common tools include rakes, axes, shovels, chain saws, pruning saws and the power-string trimmer.

2. Mechanical - A quick method to reduce or remove large amounts of flammable vegetation. Tools and machinery include tractors, mowers and chippers.

3. Grazing - A simple and often overlooked method. Grazing can be a useful method to reduce some grasses and shrubs thereby reducing fuels. Cattle, sheep, goats and other grazers can be employed depending on terrain and vegetation type.

4. Irrigation - During prolonged dry weather, homeowners should irrigate their landscape and surrounding vegetation to increase its live and dead fuel moisture content.

5. Chemical - The application of herbicides either to kill existing plants or to prevent the growth of undesirable vegetation.

6. Thinning - Thinning involves removing a portion of the trees in a given area while leaving others. Various spacing of leave trees can be used depending on objectives. Spacing will usually vary from 10 feet to 20 feet between leave tree crowns.

7. Pruning - Pruning is usually done at the same time as thinning. After the trees to be removed are thinned out, the remaining trees are pruned. Pruning can be used to reduce

fuels by removing the lower portion of tree crowns. Both dead and live lower branches are removed during the pruning operation. This removes unwanted ladder fuels that can carry fire from the ground to the tree tops. Pruned trees should retain a minimum of 30% live crown after pruning. That means that at least 30% of the total tree height is composed of live branches.

8. Logging - Selective logging under carefully prescribed conditions will reduce the fuels on a site, and in some locales provide a profit from the harvested trees. Depending on size class and stand conditions, different harvest methods should be used. Methods vary from removing all trees in a given area to removing only selected trees. A trained forester or silviculturist should be consulted to determine the appropriate harvest method. Logging will leave tops and other debris that must be piled and burned, chipped, or taken care of in other ways such as removing from the site.

9. Piling - Piling of residues created by thinning, pruning and/or logging is one way to dispose of the fuel that results from these operations. Piling can be done either by hand, or by machine if there is enough room to operate. Normally, unusable boles, limbs, etc., from thinning and pruning operations, can be bucked up into pieces small enough to hand pile. Unusable logging residue normally requires machine piling. Piles must be kept away from any live vegetation, if the piles are to be burned after they dry out. Small piles can be covered with inexpensive plastic or other material so that the piles can be burned safely during wet weather.

10. Chipping - Another method to reduce the slash is to chip the excess material. This operation leaves small, easily disposed, chips. There are several advantages to chipping. Chipping eliminates the need to burn which can be troublesome due to the chance for escaped fire and smoke dispersion problems. Chipping is normally less expensive than hauling the debris from the site. And, scattering the chips over the site can inhibit grass and shrub growth thus reducing the fine fuels that can carry fire when dry.

11. Prescribed Burning - Prescribed burning is the application of fire to natural vegetation over a broad area. This can be over several hundred acres or as small as a homeowners yard. Prescribed burning can be utilized to reduce the accumulation of flammable debris but must be accomplished under controlled conditions of weather and fuel moisture and must be carried out in compliance with local policies and regulations. Landowners should consult with a fire or fuels management specialist before planning a large prescribed burn.
*Combinations of all of the above treatments can be used effectively depending on vegetation, terrain, and desired objectives.

Recommended treatment options. Treatments should be proposed on a landscape scale. There are two basic strategies. These strategies involve fundamentally different ideas on the role of the individual treatment units.

A. Fuel breaks. Fuel breaks are intended to reinforce defensible locations and thus reduce fire size by facilitating suppression. Fuel breaks facilitate suppression by indirect tactics. Fuel breaks have little effect on fire behavior or severity if the fire does not reach the fuel break or jumps (spots) over it. Fuel breaks may lead

to larger wildfire sizes and larger areas burned severely if extensive burnout operations are used as intended along fuel breaks (burnout operations can be more intense and uniform than wildfires and may include areas that would not have burned). Fuel breaks are good strategies to use in the urban interface or intermix where suppression activities are assured.

B. Dispersed treatments. Dispersed treatments rely on the unit size and spatial placement of the treatment units as parts of a pattern to reduce spread rate and intensities. Dispersed treatments facilitate all suppression tactics (direct, indirect, and parallel attacks) by slowing overall fire growth and allowing units to be connected by fire-lines at the time the fires occur. Extensive coverage by a dispersed treatment pattern can change fire behavior irrespective of suppression actions. (Finney) Strategically placed dispersed treatment patterns are recommended for the general landscape because of their spatial flexibility in the context of uncertain fire locations, variable land ownership, restrictions on treatments, and suppression responses. With respect to protecting a wildland urban inter-mix, dispersed treatments slow the progress of fire toward the inter-mix, whereas fuel breaks provide defensible space for crews immediately adjacent to developed areas. Densities and total coverage of dispersed treatment units can be decreased with distance from higher-value areas. A treatment pattern including partial overlapping units is recommended.

The main features of the partially overlapping treatment pattern are:

- The size of the treatment units is unimportant, only the relative dimensions of the pattern affect spread rate through the pattern.
- The separation between units in the heading direction must be smaller than the fires
- Spread rate in the treatment area must be slower than in the untreated areas.

Recommended treatment options in the dry forest type (Ponderosa pine and Douglas fir)

There are at least three ways to reduce tree densities an accomplish fuel treatment: wildfire, prescribed fire, and mechanical thinning.

a. Reliance on wildfires is impractical. Letting natural fires play their historical role may have unwanted effects in forests that have undergone major stand structural changes over the past years of fire exclusion. In ponderosa pine forests choked with dense small-diameter trees or encroached by shade tolerant trees, allowing fires to burn may no longer be a strategic option. Fires would burn with uncharacteristically high fire intensities, killing all trees including the high value “old growth”. Non-native species can easily invade the site. High intensity wildfires which denude large areas, can have unwanted effects associated with runoff.

b. Restoring the dry type forest with prescribed burning is likely to be effective in stands that have moderate or low tree densities, little encroachment or ladder fuels, moderate to steep slopes which preclude

mechanical treatment, and expertise in personnel to plan and implement prescribed burns.

c. Mechanical tree removal works best on forests that are too densely packed to burn safely, that have nearby markets for small-diameter trees, and areas where expertise and personnel are not available for prescribed burning programs, or where risk of fire escape or smoke management issues preclude burning. Mechanical tree removal may be accomplished with the use different types of equipment. Severing and hand piling is an acceptable option although it is very labor intensive. By itself mechanical thinning with machinery does little to beneficially affect surface fuels with the exception of possible compacting or crushing.

Post treatment Environment:

Thinning and prescribed fires can modify under story microclimate that was previously buffered by over story vegetation. Thinned stands (with more open tree canopies) allow incoming solar radiation to penetrate to the forest floor, which then increases surface temperatures, decreases fine fuel moisture and decreases relative humidity compared to un-thinned stands—conditions that can increase surface fire intensity. An increase in surface fire intensity may increase the likelihood that over story tree crowns may ignite. Therefore, it is important that the gap between the surface and crown fuels be maintained through either prescribed fire or pruning. Changing crown structure, while ignoring surface fuels, will only affect the likelihood of active crown fires—it will not necessarily reduce the likelihood of surface fires severe enough to damage soils or intense enough to ignite tree crowns. **It must be emphasized that all fuel strata need to be managed to minimize the unwanted consequences of wildfires. Mechanical treatments accompanied with prescribed fire can be a good approach.**

6. Prioritized Fuel Hazard Reduction Projects.

Each member of TCFWG was as to present a listing of potential project ideas by location within their area. The City of Helena Fire Dept, Recreation and Parks Dept, and Public Works Dept. presented their priorities which run from Fuel Break construction to recognition of the threat of a severe fire in the municipal watersheds. Rural Fire chiefs provided specific locations for population protection, strategically placed fuel breaks, safe zone creation, and access and egress routes. Once the potential projects were identified the TCFWG, collaboratively prioritized the list.
The agency members are also being asked to provide any projects they may have for inclusion in the prioritization. This plan provides the ability for annual review of project submittals by any entity. The prioritization process will remain the same and will be performed by a committee of the TCFWG.

Project ideas received from any source are screened to identify in the prioritization process the following: location within or adjacent to the identified WUI; population impacts and affected population numbers; project size; cost/benefit factors for the values at risk; and points are assigned for location distance within the WUI map layer. This provides us with a hazard factor and a loss potential.

HIGH---------Look at the Fuel Hazard rating map, potential project location and……where they are the same. High ignition probability.

MEDIUM-----Look at the ratings on the map ---"C" locations and use the same criteria of population, etc.

LOW-------Low fuel hazard, or high fuel hazard with not much at risk.

Lewis & Clark County fire chief identified several projects in the Unionville area, grizzly gulch, and Dry gulch. He suggested a check of power line areas in his district. Any place of concentration on road access issues area concern. The county road in Upper Grizzly gulch as a roadside project, and strategic fuel break above the location of the intersection with Grizzly Gulch loop road.
Wolf Cr Fire Dist. Chief wants a project in Evergreen Subdivision on Rogers Pass, which has contiguity with BLM lands.
Wolf Cr Fire Dist. Chief also wants to extend the fuel break project in Little Wolf Cr. drainages. He suggests ingress and egress roads such as the Little Wolf Cr road and tributary drainages, ie., Gladstone Cr, French Cr, Woods Cr.

The City of Helena Fire Department and the **City Recreation and Parks Department** provided project locations of a priority for them on Mt Helena, Mt Ascension, Dry Gulch areas, Bompart Hill on the southeast side of town, and the "Donaldson" area on the southeast side of town. Some of these areas are extensions of previous work, others are new projects, but in either case they are submitted to address a known wildland fuel hazard. **The City of Helena Public Works Department** is concerned about the watershed in the Rimini/10-Mile Creek drainage. Infrastructure protection here is a very high priority for the city, as is the forest health issue of the watershed.

Not all projects for consideration are going to be on the ground. We also need to think about the Education and Awareness and Fire Prevention projects. Part of community protection is in the prevention of fire in the first place. FIREWISE presentations, "Open House" at the local fire stations, and presentations of the TCFWG programs and community involvement appearance requests will all be considered a high priority even though the impact may be hard to measure.

DNRC at Lincoln has the following proposal for the Lincoln area.

SWLO TIMBER SALE PROJECT LIST & SCHEDULE

FISCAL YEAR 2005, 2006, 2007,2008

Updated November 19, 2004 (SBK)

FISCAL YEAR 2005

Sale Name/Unit	Section(s)	Township	Range	Volume (MMBF)	Acres	Harvest Type	New Road (miles)	R/W Needs
Lincoln Flats PCT	16	14N	8W	none	127	PCT	0	none
Golden Arches Timber Sale	6	14N	7W	2.5	450	Sel, ST	0.29	Private

FISCAL YEAR 2006

Sale Name/Unit	Section(s)	Township	Range	Volume (MMBF)	Acres	Harvest Type	New Road (miles)	R/W Needs
Old McDonald Timber Sale	36 12	15N 14N	8W 8W	3.0	420	Sel, ST	0	Private, USFS
Cool Flat 4x4 Timber Sale	8,16,19,22	14N	8W	1.0	300	Sel	0	Private, county

FISCAL YEAR 2007

Sale Name/Unit	Section(s)	Township	Range	Volume (MMBF)	Acres	Harvest Type	New Road (miles)	R/W Needs

FISCAL YEAR 2008

Sale Name/Unit	Section(s)	Township	Range	Volume (MMBF)	Acres	Harvest Type	New Road (miles)	R/W Needs
ABC Timber Sale	2,10,12,16	15N	7W	3.0	600	Sel, ST	1.0	TNC, private

Note: DNRC Fiscal Years begin on July 1st of every year.

DNRC- Central Land Office projects for the CWFPP:

1. The work on state land contiguous to a private project in Warm Springs Cr Ranchettes.
2. Additional slash and pre-commercial thinning treatments on this same section, west of the highway, after we complete the commercial operations there.
3. Pre-commercial thinning projects along the county and public roads in Lump Gulch, section 36-T9N-R4W.
4. Pre-commercial thinning along the county road in sections 14, 23, & 24 in T15N-R5W Little Wolf Creek. We are going to analyze a commercial operation for some of the state lands in section 16-T15N-R5W, and along the county road on the above described tracts, analysis to start this winter.
5. What does the group think about the fuel break location(s) west of Helena, tying in down to Highway 12? As per some of our previous discussion, it looks to me that a fuel break east of the state land in section 28-T10N-R4W is an area of higher need. The forest conditions open up enough on parts of the state land in this section that expending funds there would not buy us the most benefit. That said, if funding was available and supported by public comment for the area, DNRC would also support it.

6. The DNRC input for fuel breaks on the USFS lands south of Helena is that we should go wider, landscape level wider, like a half mile wide, if possible.
7. Consider purchase of one of those air curtain burner units for slash disposal. Chris Town, Forester at our Anaconda Unit, has been using one that is owned by the Dept. of Livestock on projects over by Georgetown lake, with some success. I am not sure how it compares cost-wise with chipping.

Bureau of Land Management suggested project areas for TCFWG consideration:
WUI project on BLM land in the Central Zone that we feel would be important to include in the Tri-Counties CWPP is in the Rogers Pass area, adjacent to the Elk Meadows subdivision. This land would include all BLM land in T16N, R06W (sections or parts of sections 20, 22, and 32-34). The priority for implementation would depend on the activities and interests of the adjacent landowners. Ideally, we would like to plan a project jointly with Tri-Co that would treat the public and private land together, as we feel that merely treating the public land would not be effective (and probably vice versa).

The BLM Western Zone of Montana has suggested areas for TCFWG consideration.
In 2002, the BLM contracted a Risk Assessment for the Helena Valley. Findings from that assessment prioritize the following areas in order: (1) Clancy FMU; (2) Scratch Gravel FMU; (3) North Hills FMU; and (4) Marysville FMU. Currently, there are on-going projects in the Clancy FMU, with more planning scheduled for out years. Planning for
Scratch Gravel Hills FMU has begun this year, and planning for North Hills and Marysville is scheduled for out years. The BLM will work closely with Tri-county Fire Working Group to develop projects in these priority areas.

Lincoln Ranger District proposed projects:
NF south of wilderness boundary from Black Mountain, including face of Stonewall to Sucker Contour Road, this includes a project we currently are in NEPA on called "Lincoln Springs" which focuses on fuels reduction on NF around private land in the Lincoln Springs, Lone Point, and Spieling area.
Little Moose Creek to Dalton Mountain: this is a project we are planned in '05 to begin a watershed analysis on to look at the potential opportunities for fuels reduction, timber harvest, weed treatments, and landscape/ecosystem burning.
Stemple (both west and east sides): currently have a NEPA proposal for the east side of Stemple called "East Stemple" and have been working with many land/home owners to incorporate their ideas and thoughts for future treatment.
Flesher (both east and west sides): same as above except for project is called "Flesher Acres"

The Rocky Mountain Ranger District (USFS) provided their project suggestions in Augusta area in Lewis & Clark County. There are numerous recreational cabin sites in the Benchmark area and defensible space projects are encouraged there. Projects have been identified at Double Falls; Green Timber; Mule Cr; Benchmark Wilderness Ranch; and Benchmark proper. The Lewis & Clark NF will work with TCFWG in additional project identification in Lewis & Clark County. The Augusta VFD is also continuing population protection planning in their fire district.

Helena Ranger District (USFS) project areas of concern for TCFWG:
The TCFWG has strongly recommended the implementation and completion of the "Clancy/Unionville" area projects. This area of the South Hills remains a high priority for fuel hazard reduction work.(2002 TCFWG Fuel Hazard Rating Map)
A 1000 acre treatment area of handpile and burn project south of Helena between the City Limits and the Brooklyn Bridge Divide.
The road between York and Nelson presents an opportunity for thinning treatment on approximately 700 acres just north of the York community center.
The 10-Mile Creek drainage in the Rimini area is also rate in the High to Extreme Fuel hazard. A project for the protection of the City of Helena watershed and the flume structures that transport that water to Chessman Reservoir from Scott Reservoir and into the City of Helena water supply system. TCFWG notes this project is also identified by the City of Helena Public Works Dept.
A field trip to the Ten Mile Creek watershed on 9-28-2004, by members of the Tri-County Fire Working Group was held. This opportunity was discussed at the meeting of TCFWG and anyone who wanted to attend were to meet at the City Water Treatment plant at 13:30.

Present: Duane Harp, USFS
JR Feucht, HFD
Chuck Seeley, Smurfitt-Stone
John Schwartz, City of Helena, Water Dept.
Pat McKelvey, L&C County

The purpose of the tour of the Ten Mile Cr area was to determine possible project locations. The list that follows is not a prioritized list, but does contain the results of the groups discussions of those areas that that appear to have the risk from wildland fire and what from a mitigation standpoint might be addressed by fuel hazard reduction projects.

1. Roadside on City owned property on the Rimini road, and the Walker Cr drainage which includes privately owned land. This is near the entrance to the area off of Hiway 12 and roadside projects make sense from an evacuation and access perspective.
2. The lower edge of the watershed itself below Rimini. The discussion pointed to the fact that a fire here would have minimal impact on the treatment plant itself. It would however be a flooding and major erosion issue. Mitigation treatments would be directed at dispersed treatments to prevent a rapid fire growth. It was also pointed out that there actually would be an increase in available water quantity realized from such treatments.
3. The Moose Cr campground and recreational area. Fuel reduction treatments would focus on "key-holing" the access and campground areas to prevent human starts from becoming larger fires.
4. Minnehaha Cr drainage provides 2 million gallons of water per day into the system. Projects here would be directed at watershed protection with dispersed fuel reduction treatments. A place of interest is the "Travis" (referred to nominally) feeder area to Ten Mile Cr. This area needs the thinning projects for additional water collection opportunities.
5. The ridgeline between Minnehaha drainage and the Little Blackfoot drainage is a natural place for a fuel break.

6. The area around the town of Rimini itself. USFS can do treatments on the forest. The community needs to consider addressing the structural risk present within the town itself.
7. The flume structures. 65% of the ditch system has these wooden structures that hold the water flume up. If lost to wildfire (or any reason) it would render the water flow system totally inoperable. Fuel reduction projects below the structures are needed to prevent a wildland fire from consuming these infrastructure necessities.
8. City Owned buildings. The City maintains a log structure at Banner Cr for purposes of storing equipment, providing shelter to its employees, and for emergency shelter for the public if needed. Defensible space creation is recommended here.
9. Mr. Schwartz pointed out that ash and debris in Beaver Cr, where it is open below Chessman Reservoir would shut the water movement to the treatment plant down. He suggests fuel hazard reduction projects along the whole length of the drainage to encourage more grass growth. His point made is that with more grass growth along the creek, a more stable soil, better water quality, and less susceptibility to water interruption caused by fire ash and debris would be attained.
10. Along the ditch that flows water from Scott Reservoir to Chessman Reservoir, in addition to the wooden flumes, the issue of erosion in the ditch itself is major. Not the fire itself threatening the ditch, but the result of the clogging and filling of the ditch making it inoperable and unable to carry the required flow of water.
11. A cost of the loss of the ditch has been estimated and will be presented to Tri-county at our meeting. The loss is of course a direct loss in water movement into the system, but also a cost to cure the damage from a fire, increased water loss from the system, increased filtration costs, possible damage to the system from ash and chemicals.
12. We need an acreage determination of the watershed that we are looking at. Photos of the flume system will be taken to accurately depict what is there. Those on the tour were surprised at the number of residential dwellings that are springing up in some pretty remote locations throughout the area. These owners need to recognize the risk from wildfire and develop defensible space around these structures.
13. The overall view of the watershed, the forest health issues (stand density, stand age, forest type, fuel condition, down and dead material, etc.), all point to the real possibility of a stand replacement fire situation. We discussed the threat not only from the watershed itself, but to the entire "South Hills" as we know them and heightened risks involved when rapid fire growth to the north and east would be experienced.

Broadwater County, through their DES coordinator and the volunteer fire department identified several areas needing fuel hazard reduction for population protection (addresses and location lat-long identification are maintained in the file but will not be published in this plan). These project ideas were identified following a public meeting in Townsend with the LEPC and the VFD. Specific areas on Indian Creek Road, Forest Service Road 4031, River Road, Battle Drive in Confederate Gulch, and on Ambush Drive in Confederate Gulch. They noted that the Confederate Gulch Homeowners Association expressed interest in working with the Tri-County Fire Working Group to

address the wildland fuel hazard. They also identified sites with potential in the area beyond the Toston-Maudlow (2000 fire) fire perimeter that are on USFS lands that need treatment.

The Montana Department of Transportation suggested a fuels reduction project on the East Side of McDonald Pass where the wildland fuels are heavy near the existing highway. The ability to keep the highway open during a fire in that area is a main concern. Reduction of the fuels would also allow more sunlight onto the road surface aiding in the melting of snow in the winter months.

Other projects are on the drawing board for TCFWG and we will use the "combined risk map" to focus our future efforts.

Appendix A: Acronyms used in this plan
BLM- Bureau of Land Management
CWPP- Community Wildfire Protection Plan
DES- Disaster and Emergency Services
FEMA- Federal Emergency Management Agency
GIS- Geographic Information System
HFRA- Healthy Forest Restoration Act
HOLMAC- Helena Open Lands Management Advisory Committee
LEPC- Local Emergency Planning Committee
PDM- Pre-Disaster Mitigation Plan
MT-DNRC- Montana Department of Natural Resources & Conservation
TCFWG- Tri-County Fire Working Group
USFS- United States Forest Service
VFD- Volunteer Fire Department
WUI- Wildland Urban Interface

Appendix B: Fires over 100 acres in the Tri-County region, 1984-2004

1984 there were 4 fires that were 100+ acres in the tri-county area. The total acres burned in those were 27,945 acres. There was 1 natural and 3 human caused fire.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
North Hill	26,950	Lewis & Clark	Human
Timber Hill	600	Lewis & Clark	Lightning
Lime Stone	120	Broadwater	Human
Little Sheep Cr.	275	Lewis & Clark	Human

1985 there were 3 fires that were 100 + acres in the tri-county area. The total acres burned in those fires were 600 acres. Of those 2 were Lightning and 1 human.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Baking Powder	160	Lewis & Clark	Lightning
Lime Stone	120	Broadwater	Human
Indian Cr.	120	Broadwater	Lightning

1986 there were no fires over 100 acres in the tri-county area.

1987 there was 1 fire complex over 100 acres. They were all caused by lightning and burned 175 acres.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Broadwater Co. Complex	175	Broadwater	Lightning

1988 there were 5 fires in the tri-county area. Four were human caused and the other one I didn't find any information. They burned for a total 93,747 of that 47,700 was the Canyon Creek fire that burned in the Scapegoat Wilderness.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Warm Springs	46,900	Jefferson	Human
Roberts Mt.	550	Lewis & Clark	
Holter Lake	468	Lewis & Clark	Human
Canyon Creek	45,700	Lewis & Clark	Lightning
Squaw Gulch	129	Lewis & Clark	Human

In 1989 there was one fire that burned 2,400 acres.

NAME	*SIZE IN ACRES*	*COUNTY*	*CAUSE*
Indian Creek	2,400	Broadwater	Human

In 1990, 1991, 1992, 1993 and 1994 there was one fire a year that went over 100 acres. All were man caused.

YEAR	*NAME*	*SIZE IN ACRES*	*COUNTY*	*CAUSE*
1990	Beartooth Complex	32,968	Lewis & Clark	Human
1991	Holter Lake	125	Lewis & Clark	Human
1992	Black Butte	1,466	Broadwater	Human
1993	Lyons Creek	135	Lewis & Clark	Human
1994	Missouri River	246	Broadwater	Human

In 1995 there were 2 fires that were 100+ acres in the tri-county area. The total acres burned in those were 298 acres. Both were human caused fire.

NAME	*SIZE IN ACRES*	*COUNTY*	*CAUSE*
Sentinel Ranch	198	Lewis & Clark	Human
Foster Gulch	100	Lewis & Clark	Human

In 1996 there were 6 fires that were 100+ acres in the tri-county area. The total acres burned in those were 2,950 acres. There were 5 natural caused fires and 1 I didn't find any information on.

NAME	*SIZE IN ACRES*	*COUNTY*	*CAUSE*
Electric Mt.	320	Lewis & Clark	Lightning
Ostrich	175	Lewis & Clark	Lightning
Ext. 216	110	Lewis & Clark	Lightning
Angus	2,100	Broadwater	Lightning
Timber Man	110	Lewis & Clark	Lightning
Cavern Fire	135	Jefferson	Human

In 1997 and 1998 there was 1 fire each year that burned 100+ acres in the tri-county area. The total acres burned in those were 2,050 acres.

YEAR	*NAME*	*SIZE IN ACRES*	*COUNTY*	*CAUSE*
1997	Willow Creek	1,940	Lewis & Clark	Human
1998	Copper Creek	110	Lewis & Clark	Human

In 1999 there were 3 fires that were 100+ acres in the tri-county area. The total acres burned in those were 650 acres. All 3 were human caused fire.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Claymore	230	Broadwater	Human
Little Hellgate	200	Lewis & Clark	Human
Hauser Dam	220	Lewis & Clark	Human

In 2000 there were 7 fires that were 100+ acres in the tri-county area. The total acres burned in those were 139,390 acres. All 7 were human caused fire.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Wolf Creek	359	Lewis & Clark	Human
Toston-Maudlow	81,220	Broadwater	Human
Reef	100	Lewis & Clark	Human
High Ore Rd.	9,978	Jefferson	Human
Boulder Hill	2,482	Jefferson	Human
Bucksnort	15,251	Lewis & Clark	Human
Cave Gulch	30,000	Lewis & Clark	Human

In 2001 and 2002 there were no fires over 100 acres in the tri-county area.

In 2003 there were 5 fires that were 100+ acres in the tri-county area. The total acres burned in those were 39,043 acres. There was 1 human and 4 natural caused fire.

NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Jimtown	1,001	Lewis & Clark	Human
Slim Sam	137	Broadwater	Lightning
Flat Creek #2	377	Lewis & Clark	Lightning
NAME	***SIZE IN ACRES***	***COUNTY***	***CAUSE***
Snowbank	37,405	Lewis & Clark	Lightning
Talon	500	Lewis & Clark	Lightning

In 2004 there were no fires over 100 acres in the tri-county area.