



**Greater Sisters Country
Community Wildfire Protection Plan**

**Revised, Updated and Approved
May 15, 2006**

A project of:
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Greater Sisters Country Community Wildfire Protection Plan

The Healthy Forests Restoration Act requires that the applicable local government, the local fire department, and the state entity responsible for forest management agree to the Community Wildfire Protection Plan. The undersigned have reviewed this revised plan and agree to the completed document.

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Date

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Date

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Date

Greater Sisters Country Community Wildfire Protection Plan

Update May 15, 2006

The Greater Sisters Country Community Wildfire Protection Plan was originally completed and signed on June 21, 2005. As directed in the original document, the steering committee convened over the course of the following year to review the WUI boundary, the priorities and potential projects outlined in the CWPP. Directed by Sisters – Camp Sherman Fire Chief Taylor Robertson, the steering committee approved and submitted this revised plan for approval by the Deschutes County Board of Commissioners. By resolution 2006-040, the county commissioners voted to accept and approve the revised plan on May 15, 2006.

Executive Summary

Purpose

Wildland fire is a natural part of the ecosystems of central Oregon. It has shaped the forests and rangelands valued by the area's residents and visitors. However, the forests and rangelands in Greater Sisters Country have been significantly altered, resulting in increased forest fuels and more closed forests that tend to burn more intensely than in the past. In addition, recent population growth has led to more residential development close to the forests, in what is called the wildland urban interface (WUI). To address these issues, a multi-jurisdictional group of agencies, organizations, and individuals have collaborated to develop the Greater Sisters Country Community Wildfire Protection Plan (CWPP).

The purpose of the Greater Sisters Country CWPP is to protect human life and reduce property loss due to catastrophic wildland fire in the communities and surrounding areas of the Sisters/Camp Sherman, Black Butte Ranch, and Cloverdale Rural Fire Protection Districts. Although reducing the threat of wildland fire is the primary motivation behind this plan, managing the forests and rangelands for hazardous fuel reduction and fire resilience is only one part of the larger picture. Residents and visitors alike want healthy, fire-resilient forests that provide habitat for wildlife, recreation opportunities, and scenic beauty.

The mission of the Greater Sisters Country CWPP is to:

- Protect human life and property from wildland fires;
- Restore fire-adapted ecosystems;
- Increase public understanding of living in a fire-adapted ecosystem;
- Instill a sense of personal responsibility for taking preventative actions regarding wildland fire;
- Increase communities' ability to prepare for and respond to wildland fires; and
- Improve the landscape's fire resilience while protecting other social and ecological values.

The goals of the plan are to: (1) coordinate hazardous fuels reduction treatments across boundaries because wildland fires do not pay attention to political boundaries; and (2) promote a better understanding of living in a fire-adapted environment; and (3) promote personal responsibility for taking preventative action.

Planning Area Boundaries

The Greater Sisters Country CWPP is multi-jurisdictional and addresses all ownerships within the boundaries of the plan area. It includes the following communities:

- | | |
|---|---|
| <input type="checkbox"/> Aspen Lakes | <input type="checkbox"/> Plainview Estates |
| <input type="checkbox"/> Black Butte Ranch | <input type="checkbox"/> Panoramic View Estates |
| <input type="checkbox"/> Camp Sherman | <input type="checkbox"/> Sage Meadows |
| <input type="checkbox"/> Cascade Meadow Ranch | <input type="checkbox"/> Squaw Creek Canyon Estates |
| <input type="checkbox"/> City of Sisters | <input type="checkbox"/> Tollgate |
| <input type="checkbox"/> Crossroads | <input type="checkbox"/> Suttle Lake |
| <input type="checkbox"/> Indian Ford Meadows | |
| <input type="checkbox"/> Forked Horn Estates | |

Three rural fire protection districts serve these communities:

- Sisters - Camp Sherman Rural Fire Protection District
- Black Butte Ranch Rural Fire Protection District
- Cloverdale Rural Fire Protection District

Geography and the Environment

Greater Sisters Country is located in central Oregon on the east side of the Cascade Mountains. The community fire protection plan boundary lies within the larger area of the eastern Cascade slopes and foothills. The plan area contains two main vegetative ecosystems: the high desert dominated by western juniper, sage brush, and grasses in the east, and a transition from open dry-site ponderosa pine to mixed conifer to a sub-alpine mix of tree species near the crest of the Cascades in the west. The vegetation is adapted to the prevailing dry, continental climate and is highly susceptible to wildland fire.

Wildland Fire Risk Assessment

The CWPP steering committee undertook a risk assessment to gauge the relative risk and hazard due to wildland fire for the lands and communities within the planning area. It is a tool to direct implementation of wildfire mitigation activities to the highest priority areas and promotes cross-boundary coordination. The assessment:

1. Identifies “at-risk communities” within and adjacent to the Community Wildfire Protection planning area;
2. Identifies the wildland urban interface (WUI) across the plan area;
3. Assesses risk, hazard, fire protection capability, structural vulnerability, and values to be protected; and

4. Assigns community rankings to identify the priority areas for fuels reduction activities and other mitigation projects within the plan area.

The Greater Sisters Country CWPP used the risk assessment methodology from the National Association of State Foresters and the Oregon Department of Forestry. The assessment considers five categories in determining the relative severity of fire risk:

Risk – the likelihood of a fire occurring (based on past occurrences of human and lightning caused fires)

Hazard – the conditions that hinder control of a wildland fire once it starts (fuels, slope, aspect, elevation and weather)?

Values – the people, property, natural resources and other resources that could be lost in a wildland fire event

Structural Vulnerability – the elements of a structure (roof type and building materials, access to the structure, and existing defensible space or fuels reduction around the structure) that affect its likelihood of burning

Protection Capability – the ability to mitigate losses and prepare for, respond to, and suppress wildland and structural fires

Risk Assessment Findings

Risk

In general, all of the lands within the identified communities and directly adjacent are classified as high risk based on fire ignition rates between 1994 and 2003. Plainview Estates, Aspen Lakes, and Forked Horn Estates Area all have lower risk levels on their southern and eastern perimeters.

Hazard

A large portion of Greater Sisters Country is rated as high hazard. Most of the high hazard lands are located to the west of the identified at-risk communities, toward the crest of the Cascades on Forest Service land. Other high-hazard areas include:

Also, a several mile long band of high hazard lands runs north from the east side of Camp Sherman along Green Ridge to the northern boundary of the plan area. Pockets of high/extreme and extreme hazard appear on the west side of Camp Sherman and immediately north of the community boundary. The western and southern perimeter of Black Butte Ranch has areas of both high and extreme hazard. Similarly, pockets or “hot spots” of high/extreme and extreme hazard appear on the western and southern flanks of Tollgate, Crossroads, and the Sisters Area (including Remuda and Edgington Roads) as well as north of Sage Meadows. The perimeter of the Plainview Estates Area has patchwork of high and extreme areas with the exception of the northern boundary, which is classified as low and medium. In general, lands in the eastern part of the planning area are lower hazard than those to the west. A notable exception is the large block of contiguous high hazard lands northeast of Plainview Estates (basically bounded by Highway 126 to the north and Highway 20 to the south).

Values

The values systematically identified in the risk assessment include residences and businesses. In addition, the community meetings and steering committee identified many other values (ecological, cultural, and recreational) that need to be protected from wildland fire.

Structural Vulnerability

Panoramic View Estates is rated extreme and Camp Sherman, City of Sisters Area, and Crossroads all rate as high/extreme for structural vulnerability.

Protection Capability

A fire district protects all of the 14 identified at-risk communities except the northern portion of Squaw Creek Canyon Estates. Over two-dozen individual structures reside outside the boundaries of the fire protection districts. These lands are rated as higher risk due to their lack of structural protection.

Final Calculation

Combining the scores for each layer (risk, hazard, values protected, structural vulnerability, and protection capability) across the planning area created a final calculation. The 14 at-risk communities emerge as the areas with the highest risk and hazard, due to the high density of structures and the structural vulnerability ratings. This analysis tells us to focus efforts to reduce hazardous fuels in and around the communities at risk. The tables below provide a ranking for each at-risk community and its surrounding 1½ mile buffer.

Risk Assessment Community Rankings	
Community Name	Average Score
Tollgate	193
Crossroads	191
Panoramic View Estates	187
Camp Sherman	183
Sage Meadows	179
Sisters Area	178
Indian Ford Meadows	172
Squaw Creek	169
Black Butte	168
Cascade Meadows	154
Forked Horn Estates	137
Suttle Lake	133
Plainview Estates & Area	132
Aspen Lakes	116

1½ Mile Community Buffer Risk Assessment Rankings	
Buffer Name	Average Score
Indian Ford Meadows	135
Sage Meadows	120
Tollgate	118
Cascade Meadows	117
Crossroads	110
Sisters Area	107
Panoramic View Estates	106
Squaw Creek Estates	106
Aspen Lakes	102
Black Butte Ranch	98
Plainview Estates & Area	89
Forked Horn Estates	87
Camp Sherman	85
Suttle Lake	80

Action Plan Goals and Objectives

Using the risk assessment as a guide, the CWPP steering committee developed goals and objectives in seven key areas.

Education

- Increase residents' understand of living in a fire-prone environment and acceptance of personal responsibility for taking preventative actions to reduce the risk and hazard of wildland fire.
- Develop an education campaign that has one clear message, image, and material.
- Ensure that education and outreach efforts convey a *consistent* message to the public.
- Target the education campaign at children, residents, and visitors in a wide variety of settings.
- Increase residents' compliance in meeting the standards set by the Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) criteria and Fire Wise/FireFree standards.
- Coordinate education activities around ongoing fuels reduction projects.
- Use both active and passive forms of outreach including hands-on, face-to-face, as well as mailings, fliers, web sites, community meetings, etc.
- Distribute the Defensible Space Checklist at appropriate opportunities.

Structural Vulnerability

- Make all structures within the plan area as fire safe as possible.
- Make all communities and structures survivable in the event of a wildland fire.

Hazardous Fuels Reduction

Private Lands Goals

- Protect the safety of people, property, and natural resources from wildland fire.
- Increase the ability to suppress a wildland fire in the wildland urban interface by treating hazardous fuels.
- Protect and restore watersheds.
- Meet landowners' objectives for forest health and restoration.
- Maintain a balance of hazardous fuels reduction, aesthetics, wildlife habitat, and property values.
- Create fuel breaks along roadsides and property lines.
- Meet or exceed Deschutes County standards for vacant lots and defensible space.

- Focus treatments around developed home sites and access routes.
- Expand treatments to adjacent subdivisions and communities identified as high priority in the risk assessment.
- Decrease the risk of uncharacteristic wildland fire behavior.
- Treat dense seedlings, saplings and pole stands and contiguous bush to a condition that can be maintained by mechanical means.
- Continue to meet existing standards for multiple objectives (Oregon Forest Practices Act and federal requirements under grant payments).
- Protect people's property, tribal and natural resources.
- Meet landowner's objectives for forest health and restoration.

Federal Land Priorities

- Focus hazardous fuels reduction treatments in the wildland urban interface around communities identified as high risk by the risk assessment.
- Treat hazardous fuels in Condition Classes 2 and 3 with the goal of achieving Condition Class 1 while protecting and enhancing key ecological and social values associated with the areas.
- Protect people's property, tribal, and natural resources.
- Protect and restore watersheds.

Social and Ecological Values to be Protected

- Protect life and property while maintaining and enhancing the communities' sense of place.
- Preserve the areas and locations that are important to the community and visitors (historic, cultural, ecological, and economic values).
- Meet existing standards for natural resource protection.
- Treat landscapes in addition to land adjacent to homes.
- Protect social, ecological, and cultural values beyond the wildland urban interface.

Community Preparedness

- Improve management of wildland fire emergencies at the local level.
- Meet or exceed Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) and Deschutes County vacant lot ordinance standards.
- Increase cooperative training and emergency response.
- Develop and improve ingress/egress and evacuation routes.

- Educate residents and visitors about appropriate actions to take during a wildland fire.
- Coordinate actions with the Deschutes County Natural Hazard Mitigation Plan.
- Improve access to water sources for fire suppression.
- Expand community and firefighter safety zones.
- Explore expansion of “plug and play” fire camps.

Biomass Utilization

- Use woody biomass utilization as an incentive to increase the amount of hazardous fuels reduction completed by offsetting the costs of treatments.
- Increase local and regional manufacturing capacity to utilize and add economic value to woody biomass.
- Develop markets for small diameter timber and biomass products.
- Support the implementation of the Coordinated Resource Offering Protocol (CROP) in Central Oregon.
- Support the development and implementation of the Business Alliance for Sustainable Energy (BASE), a partnership with Central Oregon Intergovernmental Council and 3E Strategies.

Implementation

- Ensure that the Greater Sisters Country CWPP is implemented and maintained through continued coordination with partners in the planning area.
- Review and update the Greater Sisters Country CWPP annually.
- Develop an annual action plan that lists priorities.
- Establish an on going group to guide the implementation, coordination, and monitoring of the Greater Sisters Country CWPP.
- Convene and produce an annual update of the plan within one year of its completion.

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Chapter 1

Introduction

Introduction

Wildland fire is a natural part of the ecosystems of central Oregon. It has shaped the forests and rangelands valued by the area's residents and visitors. However, decades of timber harvest and aggressive fire suppression have changed forest composition and structure, resulting in increased forest fuels and forests that tend to burn more intensely than in the past. In addition, recent population growth has led to more residential development close to the forests, in what is called the wildland urban interface (WUI). Forests and rangelands with altered fire regimes surround many of the communities in Greater Sisters Country.

This plan seeks to promote two broad concepts: intergovernmental cooperation and personal responsibility. First, the plan is envisioned as a way to coordinate hazardous fuels reduction treatments across boundaries, because wildland fires do not pay attention to political boundaries. The development of the Greater Sisters Country Community Wildfire Protection Plan (Greater Sisters Country CWPP) has been a multi-jurisdictional collaborative effort and implementation will continue in the same vein.

Second, this plan seeks to promote a better understanding of living in a fire prone environment and to promote personal responsibility for taking preventative action. It is hoped that with education, examples, and incentives, residents will take the steps necessary to protect their homes and property from wildland fire. By working together citizens, government, and the private sector can create fire resilient communities in Greater Sisters Country.

Although reducing the threat of wildland fire is the primary motivation behind this plan, managing the forests and rangelands for hazardous fuels reduction and fire resilience is only one part of the larger picture. Residents and visitors alike want healthy, fire-resilient forests that provide habitat for wildlife, recreation opportunities, and scenic beauty. The forests and rangelands in and around the communities of Greater Sisters Country contribute significantly to the community's sense of place. Balancing the need for fuels reduction with protecting and enhancing the sense of place unique to Greater Sisters Country is another important goal of the wildland fire protection plan.

Purpose

The purpose of the Greater Sisters Country CWPP is to protect human life and reduce property loss due to catastrophic wildland fire in the communities and surrounding areas of the Sisters - Camp Sherman, Black Butte Ranch, and Cloverdale Rural Fire Protection Districts. The plan outlines a strategy, identifies priorities for action, and suggests immediate steps that can be taken to protect the communities from wildland fire while simultaneously protecting other important social and ecological values.

In recent years, Greater Sisters Country has witnessed several large wildland fires, including the Eyerly, Cache Mountain, Link, and B & B Complex fires. These fires have highlighted the need to address wildland fire risk in and around local communities. The City of Sisters, local fire protection districts, Deschutes and Jefferson Counties, Oregon Department of Forestry, U.S. Forest Service and the Bureau of Land Management teamed up with a non-profit organization, the Watershed Research and Training Center, to develop a community wildfire protection plan. The plan includes all of the communities and residences within the boundaries of the Sisters/Camp Sherman, Black Butte Ranch, and Cloverdale fire protection districts (see Greater Sisters Country CWPP Boundary Map).

Why a Community Wildfire Protection Plan?

Currently, there is no law that requires communities to develop community wildfire protection plans. Beyond the inherent logic of working together to coordinate fuels reduction treatments, education and prevention programs, and emergency preparedness activities, the development of a community wildfire protection plan is opportunistic and enabling. It allows communities and their federal land management partners to act more quickly and effectively.

A community wildfire protection plan provides several concrete benefits. It brings together a large volume of information to present a comprehensive picture of risk and possible treatments on the landscape. This enables community organizations and their partners to act in a coordinated fashion. A completed plan also allows the adjacent federal land management agencies to make use of the recent expedited authorities provided by the Healthy Forest Initiative and the Healthy Forests Restoration Act. In addition, for communities seeking federal grant funding from the National Fire Plan, a completed community wildfire protection plan has become a *de facto* requirement. Lastly, a CWPP is a powerful tool to help get local residents and visitors involved in fire prevention and protection efforts. For more on fire plan policies and programs see Appendix A.

In March 2004, the City of Sisters and the Sisters - Camp Sherman Fire Protection District invited the two other fire departments (Black Butte Ranch and Cloverdale) and other key local, state, and federal partners to develop a wildfire protection plan for Greater Sisters Country. Representatives from the City of Sisters, the three fire protection districts, Deschutes County, the US Forest Service, Oregon Department of Forestry, Bureau of Land Management, and local organizations agreed to serve on a steering committee to guide and direct the development of the wildfire protection plan.

Mission Statement

The mission of the Greater Sisters Country CWPP is to:

- Protect human life and property from wildland fires;
- Restore fire-adapted ecosystems;
- Increase public understanding of living in a fire-adapted ecosystem;
- Instill a sense of personal responsibility for taking preventative actions regarding wildland fire;

- Increase communities' ability to prepare for and respond to wildland fires; and
- Improve the landscape's fire resilience while protecting other social and ecological values.

Organization of the Plan

The plan is organized into six chapters and three appendices.

Chapter 1 (Introduction) describes the mission and intent of the Greater Sisters Country CWPP. This chapter also describes how the plan was developed, who was involved, and what steps were taken during the process.

Chapter 2 (Community Profile) provides a brief overview of the communities and rural fire protection districts involved in the Greater Sisters County CWPP.

Chapter 3 (Forest Conditions and Wildland Fire) examines the forest types, trends, and fire history for the lands in the Greater Sisters Country.

Chapter 4 (Wildland Fire Assessment Methods) illustrates the purpose and methods, of the assessment of wildland fire risk and hazard in the plan area. The chapter provides details on data sources, methods, data limitations, and future data needs.

Chapter 5 (Wildland Fire Assessment Findings) discusses the findings from the wildland fire assessment.

Chapter 6 (Identification of Community Values) provides a brief summary of the community priorities, values to be protected, threats, and potential actions that community residents identified through public meetings and written comments.

Chapter 7 (Action Plan) states the goals of the Greater Sisters Country CWPP and describes steps to achieve those goals. This section includes the priorities for both public and private land. The action plan covers hazardous fuels reduction, structural vulnerability, education, community preparedness, biomass utilization, social and ecological values, monitoring and evaluation, and implementation strategy.

Appendix A (Fire Policies and Programs) reviews some of the key local, state, and federal laws that relate to community wildfire protection planning such, as the Healthy Forest Restoration Act and the Oregon Forestland Urban Interface Fire Protection Act of 1997 (Senate Bill 360).

Appendix B (Community Meeting Summary) provides a synopsis of the community meetings held in the fall and winter of 2004 in Sisters, Black Butte Ranch, and Cloverdale, showing the variety of comments, questions, and concerns participants raised about wildland fire in their communities.

Appendix C (GIS Data Sources) identifies the data sources and statistical methods used to develop and calculate the risk assessment.

Planning Area Boundaries

The Greater Sisters Country CWPP is multi-jurisdictional and addresses all ownerships within the boundaries of the plan area. The plan includes the Sisters/Camp Sherman, Cloverdale, and Black Butte Ranch Fire Protection Districts and surrounding unprotected areas (see CWPP Boundary Map in the maps section). The Greater Sisters Country CWPP is a strategic plan; it provides a broad framework for all agencies and ownerships – private, city, county, state, and federal – within the area. Specific planning and implementation is the responsibility of each landowner/jurisdictional agency, acting in concert with the guidelines expressed in the plan.

The Planning Process

The development of the Greater Sisters Country CWPP was a collaborative effort that relied on the participation and input from many different organizations and individuals. The structure of the planning effort included the following committees:

- Steering Committee
- Fire and Fuels Technical Committee
- Structural Vulnerability Working Group

The Steering Committee:

- Provided oversight to all activities related to the CWPP
- Developed and refined goals for fire protection in the planning area
- Developed a long-term structure for sustaining the efforts of the CWPP

Participants on the steering committee included:

Ed Sherrell	Black Butte Ranch Rural Fire Protection District
Brett Smith	Black Butte Ranch Rural Fire Protection District
Lisa Clark	Central Oregon Fire Management Service
Mark Rapp	Central Oregon Fire Management Service, Cascade Division
Eileen Stein	City of Sisters
Chuck Cable	Cloverdale Rural Fire Protection District
Amanda Egertson	Deschutes Basin Land Trust
Joe Stutler	Deschutes County
Don Webber	Deschutes County Emergency Management
Bill Anthony	Deschutes National Forest, Sisters Ranger District
Toni Foster	Jefferson County Sheriff Search and Rescue
Mark Foster	Jefferson County Sheriff Search and Rescue
Glen Ardt	Oregon Department of Fish and Wildlife
Ed Keith	Oregon Department of Forestry

Stu Otto	Oregon Department of Forestry
George Ponte	Oregon Department of Forestry
Ken Enoch	Sisters-Camp Sherman Rural Fire Protection District
Tay Robertson	Sisters-Camp Sherman Rural Fire Protection District
David Wheeler	Sisters-Camp Sherman Rural Fire Protection District
Kate Fitzpatrick	Watershed Research and Training Center
Marcus Kauffman	Watershed Research and Training Center

The steering committee met monthly from April 2004 through November 2004 and more frequently after that. Although the steering committee did not identify a specific decision-making process, almost all decisions were made by consensus to ensure that the outcomes were strongly supported.

The Watershed Research and Training Center was developing the Walker Range Community Wildfire Protection Plan in northern Klamath County at the same time as the Greater Sisters Country CWPP. To increase coordination and reduce duplication of efforts, the two steering committees jointly established one Fire and Fuels Technical Committee to serve both communities' fire plan efforts.

The Fire and Fuels Technical Committee:

- Advised steering committee on technical issues related to wildland fire
- Advised geographic information system (GIS) contractor on the development of the risk assessment

Participants on the Fire and Fuels Technical Committee included:

Dennis Fiore	Bureau of Land Management, Prineville
Lisa Clark	Central Oregon Fire Management Service
Tom Goheen	Central Oregon Fire Management Service
Mark Rapp	Central Oregon Fire Management Service, Cascade Division
Doug Johnson	Central Oregon Fire Management Service, Newberry Division

The Fire and Fuels Technical Committee met monthly during the initial phases of the risk assessment. They played an important role in identifying and interpreting data and ensuring that the Greater Sisters Country CWPP was consistent with other ongoing fire management efforts.

The Structural Vulnerability Working Group:

- Developed a methodology to assess the relative vulnerability of structures in the plan area
- Provided recommended actions and remedies to the steering committee to reduce the risk of structure loss

This committee was formed specifically to address the lack of comprehensive information regarding the vulnerability of structures in the plan area. They met several times during the winter and spring of 2005.

Participants on the Structural Vulnerability Working Group included:

Ed Sherrell	Black Butte Ranch Fire Protection District
Brett Smith	Black Butte Ranch Fire Protection District
Mark Rapp	Central Oregon Fire Management Service, Cascade Division
Chuck Cable	Cloverdale Rural Fire Protection District
Daryl Davis	Deschutes National Forest, Sisters Ranger District
Ryan Karjala	Oregon Department of Forestry
Stu Otto	Oregon Department of Forestry
George Ponte	Oregon Department of Forestry
Ken Enoch	Sisters-Camp Sherman Fire Protection District
Tay Robertson	Sisters-Camp Sherman Fire Protection District
David Wheeler	Sisters-Camp Sherman Fire Protection District

Chapter 2

Community Profile

This chapter provides a brief overview of Greater Sisters Country. It discusses the communities, the general environment, and population growth, and profiles the three fire protection districts in the planning area.

Geography and the Environment

Greater Sisters Country is located in central Oregon, on the east side of the Cascade Mountains. The community fire protection plan boundary lies within the larger area of the eastern Cascade slopes and foothills.

Due to the rain shadow effect of the Cascade Mountains, the planning area has significant temperature extremes and less precipitation than the areas west of the Cascades. The climate in the Greater Sisters Country ranges from moist mountain climates to predominately high desert. Summer temperatures range from an average high of 85 degrees Fahrenheit and to an average low of 44. Average highs in winter are in the 40s and average low temperatures in the 20s. Annual precipitation ranges from 80 to 100 inches at the high elevations of the Cascades to 10 to 12 inches on the high plateau around Sisters and Cloverdale.¹ The climate in central Oregon is typical of the east slopes of the Cascade Mountains, with most of the annual precipitation coming as winter snow or fall and spring rains. Summers are dry and prone to frequent thunderstorms that may be wet or dry. These thunderstorms frequently cause multiple fire ignitions during any given storm.

July, August, and September are the most active months for wildland fire. Depending on elevation, vegetation greens between late March and early May. The general pattern in central Oregon is for fire potential to increase through June, with July, August and September being the most active months for fire suppression. The end of fire season is often signaled by snow in the fall.²

The plan area contains several vegetative ecosystems: the high desert dominated by western juniper, sage brush, and grasses in the east and a transition from open dry-site ponderosa pine to mixed conifer to a sub-alpine mix of tree species near the crest of the Cascades in the west. The vegetation is adapted to the prevailing dry, continental climate and is highly susceptible to wildland fire. Volcanic cones and buttes dot the landscape across much of the region. Most of the communities in the area lie at an elevation of 3,200 feet.³

The majority of the plan area is within Deschutes County with a small portion—Camp Sherman and Suttle Lake—in Jefferson County. The federal government manages approximately 78% of

¹ William G. Loy, ed., *Atlas of Oregon* (Eugene: University of Oregon Press, 2001).

² Central Oregon Fire Management Service, *Fire Management Plan*, 2004, Section III, page 10.

³ Deschutes County Emergency Management, Oregon Emergency Management, and Federal Emergency Management, *Deschutes Natural Hazard Mitigation Plan* (Oregon, 2004).

the land in Deschutes County, mostly by the U.S. Forest Service and, to a lesser extent, the Bureau of Land Management (BLM).⁴

Greater Sisters Country Communities

Greater Sisters Country has 14 communities including the City of Sisters and 13 unincorporated communities. These communities were identified by the committee utilizing criteria of community as defined in the Federal Register notice of January 4, 2001, or a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) in or adjacent to federal land but not including public land classified as wilderness.

The City of Sisters is the most populous and contains the largest concentration of public buildings (schools, hospitals, government offices), businesses, and public infrastructure (water and sewer facilities, etc.) in the plan area. Other communities with significant commercial development include Black Butte Ranch, Camp Sherman, and Aspen Lakes. The majority of the remaining communities are mostly rural residential.

For purposes of this CWPP, the communities in Greater Sisters Country include:

- Aspen Lakes
- Black Butte Ranch
- Camp Sherman
- Cascade Meadow Ranch
- Crossroads
- Forked Horn Estates
- Indian Ford Meadows
- Panoramic View Estates
- Plainview Estates
- Sage Meadow
- Sisters Area (including the Edgington and Remuda Road areas)⁵
- Squaw Creek Canyon Estates
- Suttle Lake
- Tollgate

Population

The City of Sisters had almost 1,490 residents in July 2004.⁶ However, the Sisters School District estimates that an additional 9,000 people live within a five-mile radius in the outlying neighborhoods and resorts.

⁴ Ibid.

⁵ Due to the proximity to the City of Sisters, the Edgington and Remuda Road areas were evaluated with the City of Sisters.

⁶ Portland State University, "Population Research Center," <http://www.upa.pdx.edu/CPRC> (accessed April 21, 2005).

Central Oregon has recently experienced a period of rapid population growth. Prior to 1999, population growth in Sisters was slow relative to other areas in Deschutes County because of the lack of a municipal sewer system. In 1998, city residents approved funding to construct the system and construction was completed in 2001. Population growth in the City of Sisters began in earnest after the completion of the municipal water and sewer facilities in 2001. From 2000 to 2004, the city's population increased by 55 percent. The city's population is expected to more than double in the next 20 years.⁷ It is clear that increased business and residential development heightens the need for wildland fire mitigation activities.

Development

Construction of the municipal sewer system brought new manufacturing, office, and light industrial facilities businesses to Sisters. The number of residential building permits doubled from 52 in 2000 to 104 in 2003. Previously, much of the economy was supported by tourism, but now other sectors contribute to the town's economic base. For example, Multnomah Publishers and Metabolic Maintenance Products now provide employment for 95 and 35 employees, respectively, within the city limits. The largest employer, Black Butte Ranch, provides 350 jobs at the destination resort community. Other large employers include the Sisters School District (142 employees) and the Sisters Ranger Station of the Deschutes National Forest (30-100 employees).⁸

Housing

Sisters' historic housing stock consists of a majority of single-family dwellings, including a substantial percentage of mobile and manufactured homes, relatively few multiple-family dwellings, and more recently, some higher-end homes. According to the City of Sisters Comprehensive Plan, between the years 2002 and 2025, approximately 1,350 new dwelling units will be needed in the City of Sisters.

In outlying areas, the housing mix is relatively similar, except that most houses are situated on larger parcels. Prior to November 2004, the rate of development in the unincorporated areas of Deschutes County was expected to decline as previously-developed destination resorts and rural residential subdivisions had been fully built out. In November 2004, state voters approved Ballot Measure 37 requiring compensation or waiver of land use regulations in certain cases. The majority of claims being filed with counties are from rural landowners seeking to subdivide previously undevelopable large lots and acreages. At the same time, Deschutes County has adopted rules for locating new destination resorts. Given these developments, it is expected that the number of buildable lots outside urban growth boundaries will grow again, bringing more residential development into the wildland urban interface.

Transportation

The communities of Greater Sisters Country are bound together by Oregon State Highways 20, 126 and 242. The City of Sisters lies at the intersection of these corridors. As central Oregon grows, more residents and tourists crowd these highways and increase congestion, particularly

⁷ Ibid.

⁸ Eileen Stein, City Manager, City of Sisters, personal communication, March 17, 2005.

during the summer months when fire season reaches its peak. The City of Sisters' Transportation System Plan calls for improving access through Sisters. This will benefit emergency response by improving access routes in the event of a major wildland fire. The Highway 242 and Highway 20 corridor as well as Forest Road 16 (Three Creek Road) are included in the consideration of community due to their critical role as roads and travel corridors that link our communities together and serve as evacuation routes.

The City of Sisters' Eagle General Aviation Airport is located at the intersection of Camp Polk Road and Barclay Drive, less than one mile from the Sisters' city limits. The airport is the center for AirLife, search and rescue, smokejumper training, and other airport related activities. Roberts Field in Redmond is the primary commercial aviation hub in Central Oregon and lies 20 miles east of the Sisters area. General aviation and wildland fire support facilities are also available at Roberts Field.

Greater Sisters Country Fire Protection Districts

Three rural fire protection districts serve Greater Sisters Country.

Sisters - Camp Sherman Rural Fire Protection District covers 240 square miles, including the communities of Sisters, Camp Sherman, Tollgate, Crossroads, Suttle Lake, Indian Ford, and Squaw Creek Estates. The district serves parts of both Deschutes and Jefferson Counties. The lands within the district contain a mix of forest types, including high mountain areas with dense mixed conifer stands, open ponderosa pine forests, and high desert with grassland and juniper. The City of Sisters is the district's population center with 1,500 residents. The district provides the full array of services to an estimated population of 4,352 residents and up to 18,000 visitors during the peak summer tourist season. Eleven career staff and 40 volunteers operate out of four stations providing fire, rescue, and emergency medical services, including advanced life support, ambulance response, and transportation. The district covers portions of Oregon State Highways 20, 126, and 242 (open seasonally).

Black Butte Ranch Rural Fire Protection District serves the residential and resort community of Black Butte Ranch. Located at the foot of the Cascade Mountains and the Three Sisters Wilderness, the district's three square miles are dominated by ponderosa pine forests with some lodgepole pine, fir, and open meadows. The district protects 1,251 rural residences and some light industrial buildings. The population of the resort changes daily and ranges from 500 to 8,000 people at any one time. Seven career staff and nine student interns respond to calls from one centrally located station. The district trains all personnel in structural firefighting, rescue operations, emergency medical delivery, hazardous materials operations, and wildland fire suppression. The fire district also provides primary services to three residences immediately adjacent to Black Butte Ranch property under contract.

Cloverdale Rural Fire Protection District protects approximately 3,200 people living in rural subdivisions scattered across 50 square miles. The district services parts of Deschutes County but has mutual aid agreements with Jefferson and Crook counties. Subdivisions in the district include Aspen Lakes, Panoramic View Estates, McKenzie Estates, Sunglo West, Demaris Acres, Forked Horn Estates, Paladin Ranch Estates, Sun Mountain Ranches, Ponderosa Cascades, and

Plainview Estates. The district is further east than the other two districts and contains more rangelands. The lands in the district are a mix of high desert rangelands with grasses and juniper and High Cascade forests with several patches of heavy forests, including ponderosa pine. The district provides fire prevention and suppression services, along with first responder medical services, to assist the Sisters' ambulance service. The district's two career staff and 20 volunteers respond to calls out of two stations with ten fire apparatuses. The major transportation routes through the district are Oregon State Highways 126 and 20 West.

Chapter 3

Forest Conditions and Wildland Fire

A basic understanding of the landscape characteristics and functions is important to effective land management. Timber harvest, fire suppression, and development have all dramatically altered the landscape of central Oregon. This chapter describes the main ecotypes in the plan area, their characteristics, and fire ecology. It also offers a brief narrative on recent wildland fire history and trends.

Ecotypes

The Greater Sisters Country is a mosaic of forest types.

- 1) Mixed conifer (Douglas-fir/true fir/ponderosa pine/larch/lodgepole pine on both wet and dry sites)
- 2) Ponderosa pine
- 3) Lodgepole pine
- 4) Western juniper woodlands⁹

1) **Mixed conifer (wet and dry)** is a complex forest type that varies considerably depending on elevation and site conditions. In the plan area, dry mixed conifer and wet mixed conifer forest types occur.

The dry mixed conifer includes Douglas-fir, ponderosa pine, and true fir. On the eastern slope of the Cascades, this forest type is usually found below the sub-alpine fir zone and above the Douglas-fir or ponderosa pine zone at elevations ranging from 3,600' to 4,500'. Depending on conditions, any one of the species can dominate. The dry mixed conifer forest type is found at lower elevations than the true fir mixed conifer forest type discussed above. It is a mix of Douglas-fir, ponderosa pine, larch, and lodgepole pine and occupies a transitional zone between the higher elevation mixed conifer zone and the true ponderosa pine or lodgepole pine zone.

The wet mixed conifer plant association is found in the higher elevations (4,000 – 7,000 feet) on the west side of the fire plan area. Productivity in wet mixed conifer wet sites is generally higher than in the dry mixed conifer plant associations. Similar to the dry mixed conifer sites, vegetation consists of Douglas-fir, white fir, ponderosa pine, western larch, and lodgepole pine. Spruce can be found in the wetter riparian areas. Understory vegetation may include traditional dry site species, as well as species that survive well in wetter, more shaded areas such as golden chinquapin and sword fern.

The fire regimes—the combination of fire frequency, predictability, intensity, seasonality, and extent characteristic of fire in an ecosystem—can vary considerably in the mixed conifer types.

⁹ William G. Loy, ed., *Atlas of Oregon* (Eugene: University of Oregon Press, 2001).

The fire cycle or fire return interval can range from 35 to 200 years. Fires may be of variable intensity; from low intensity maintenance burns to stand replacement events.¹⁰

The exclusion of natural fire in this forest type (as a result of fire suppression activities over the past 100 or more years) has led to the build up fuels and stands that are more closed in appearance than when fire was a more frequent visitor. According to Agee, “Frequent low intensity fires kept such sites open so that they were less likely to burn intensely even under severe fire weather. Fire are more likely to be more intense over time with [fire] protection.”¹¹

2) The **ponderosa pine forest type** is relatively rare in the Pacific Northwest, though it is locally prevalent. It generally separates the more closed and dense dry mixed conifer forests described above and the juniper and grassland communities found in drier and lower elevations. It also often borders lodgepole pine forest types in the southern reaches of the plan area.

Historically, ponderosa pine forest types contained more understory grasses and shrubs, than are present today. These plants, combined with fallen pine needles, formed fast-burning fuels that led to frequent widespread burning. Frequent, low-intensity ground fires that occur on a fire return interval of 11 to 15 years characterize the fire regime for ponderosa pine. The pattern of low ground fires and stand dynamics resulted in the open park-like conditions that early inhabitants and visitors to the region found.

The suppression of naturally occurring fires and decades of timber harvest have significantly altered the ponderosa pine forest type. Removal of the larger “yellow belly” pines has dramatically decreased clumpy, open forest, replacing them with more evenly spaced and smaller “black-bark” forests. Similarly to the mixed conifer forest type described above, the suppression of fire has greatly increased the stocking levels (number of trees) and density of trees, creating ladder fuels, and putting the stands at risk of attacks from insects and disease. These factors have contributed to more intense fires in ponderosa pine in recent years.¹²

3) The climax **lodgepole pine forest type** in central Oregon is characterized by dense, uniform stands, an absence of other species, and a general lack of understory shrub or herbs (although bitter brush is often associated with climax lodgepole pine). The lodgepole pine forest type exhibits a moderate severity fire regime with a fire return interval between 60 and 80 years. Fire can be low, moderate, or severe over time. In addition to fire, mountain pine beetles are an importance disturbance agent and the two processes are linked.

The fire cycle in lodgepole pine is 60 to 80 years, and occurs as follows: A stand replacement fire leads to stand regeneration. Dead snags from the fire fall to the forest floor and fuels begin to accumulate. A windstorm blows more trees to the ground. A forest fire burns some of the downed logs and leads to heart rot in the standing trees. The heart rot in the trees stresses the stand and makes it vulnerable to attack by the mountain pine beetle. A major outbreak of the

¹⁰ James K. Agee, *Fire ecology in Pacific Northwest forests* (Washington D.C.: Island Press, 1993).

¹¹ Ibid, 294.

¹² Ibid.

beetle causes significant mortality and soon the conditions are ripe for another stand replacing fire.¹³

4) Western juniper woodlands occur on the driest sites in the region that are able to support forest cover. Western juniper is often the climax species with dominant plant associations of big sagebrush and, to a lesser extent, rabbitbrush, Idaho fescue, and bluebunch wheatgrass. The fire return interval in western juniper woodlands is approximately 25 years and is generally limited by the availability of fuels. Western juniper trees have thin bark and fires kill them easily.

Western juniper appears to be expanding its range over the previous century. Several factors may account for the expansion: a) fire suppression which allows the stands to grow unchecked by fire, b) overgrazing by domestic livestock which opens up new sites for colonization, c) reestablishment of juniper after being logged, and d) climate change.¹⁴

Wildland Fire History

The forests and rangelands of Greater Sisters Country have evolved with wildland fire. According to local fire officials, systematic fire suppression in Greater Sisters Country began in approximately 1904¹⁵. Most observers agree that in recent years wildland fires have been burning hotter, moving faster, and scorching more acres than the historical pattern.

Table 1
Acres Burned by Decade in Central Oregon, 1900-2000

Decade	Acres burned	% of total
1900-1909	11,913	5%
1910-1919	45,564	18%
1920-1929	5,491	2%
1930-1939	699	0%
1940-1949	13,761	5%
1950-1959	1,123	0%
1960-1969	10,640	4%
1970-1979	5,605	2%
1980-1989	5,932	2%
1990-1999	25,519	10%
2000-2004	128,817	51%
Total	255,064	

Source: Central Oregon Fire Atlas, The Nature Conservancy, Upper Deschutes Fire Learning Network Project, v2.0, February 9, 2004 as cited in the Deschutes County Natural Hazard Mitigation Plan, 2004

¹³ Ibid.

¹⁴ Ibid, 376.

¹⁵ Mark Rapp and Geoff Babb, Central Oregon Fire Management Service, personal communication, March 2005.

The acres burned in central Oregon between 2000 and 2004 exceed the number of acres burned in the previous hundred years. The recent dramatic increase in large fires has heightened community awareness and willingness to address fire safety.

Table 2
Structures Lost to Wildland fire in Central Oregon, 1981-2003

Year	# of Structures Lost to Wildland fire	% of total
1981	5	6%
1990	22	27%
1996	30	36%
2001	5	6%
2002	20	24%
2003	1	1%
Total	83	

Source: Central Oregon Fire Atlas, The Nature Conservancy, Upper Deschutes Fire Learning Network Project, v2.0, February 9, 2004 as cited in the Deschutes County Natural Hazard Mitigation Plan, 2004

Wildland fires destroyed 83 structures between 1981 and 2003 in the greater central Oregon area. Of that number, at least several structures lost were in Greater Sisters Country.

Large Wildland Fires in central Oregon

Table 3 lists some of the larger wildland fires in the central Oregon area (mainly Crook, Deschutes and Jefferson Counties) over the last decade requiring an emergency management response beyond that of the wildland fire and natural resource agencies. The altered forest conditions discussed above, coupled with rapid population growth expanding into the wildland urban interface, have the potential to significantly increase the costs of suppressing wildland fires as well as the potential economic and social consequences in the plan area.

**Table 3
Central Oregon Large Wildland Fire History, 1999-2003**

Year	Fire name	Size (acres)	Start date	County	Conflagration Act resources mobilized? ¹⁶	Remarks
2003	Davis	21,181	6/28	Klamath Deschutes		Early season, high intensity fire with high rates of spread. Spotting potential for south half of LaPine basin. Ash fallout reported 60 miles to NE at Prineville.
	Link	3,574	7/5	Jefferson Deschutes		Concern for potential spread to Black Butte Ranch.
	18 Road	3,800	7/23	Deschutes		Threat of spread to residential areas on southwest side of Bend and High Desert Museum.
	B & B Complex	90,769	8/19	Jefferson Linn	Yes	Lightning caused fires spread east, forcing evacuation of Camp Sherman and west threatening private land and residential development along Hwy 22. Santiam Pass Hwy closed. Black Butte Ranch threatened as the fire moved south.
2002	Eyerly	23,573	7/9	Jefferson	Yes	Spread into Three Rivers subdivision burning 18 residences & multiple outbuildings.
	Cache Mountain	3,894	7/23	Deschutes Jefferson	Yes	Fire spread five miles to east, destroying two residences in Black Butte Ranch.
2000	Hash Rock	18,500	8/23	Crook	Yes	Thirty residences and 32 commercial buildings threatened in Mill Creek and Marks Creek drainages. U.S. Hwy 26 traffic controlled with pilot car.
1998	Elk Lake	252	9/2	Deschutes		Thirty-two recreational cabins adjacent to Elk Lake threatened and several destroyed.
1996	Little Cabin	2,400	7/29	Jefferson	Yes	Three Rivers subdivision threatened. No structures lost.
	Ashwood-Donnybrook	100,000 +	8/9	Jefferson Wasco	Yes	Conflagration Act resources mobilized to protect the threatened community of Ashwood.
	Smith Rock	300	8/10	Deschutes	Yes	One residence destroyed.
	Skeleton-Evans West	22,000	8/23	Deschutes	Yes	Destroyed 19 residences and 15 outbuildings.
1992	Sage Flat	1,000		Deschutes		Destroyed 5 structures.
1990	Aubrey Hall	3,032	7/5	Deschutes	Yes	Destroyed 22 residences. 2,800 Bend residents evacuated.
1990	Delicious	2,000		Deschutes		Threatened structures but none lost.

Source: 2004 Deschutes County Natural Hazard Mitigation Plan.

¹⁶ The Governor must activate the Conflagration Act. It includes authorization for the Oregon State Fire Marshal to assign fire fighting forces and equipment beyond mutual air agreements and provides a mechanism for reimbursements to those departments participating.

Chapter 4

Wildland Fire Risk Assessment Methods

One of the central purposes of planning is enable action based on current, comprehensive information. Although funding for hazardous fuel reduction and other activities around communities has increased in recent years, the need for funding greatly outstrips available resources. Thus, it is important that implementation targets the highest priority areas.

The purpose of the risk assessment is to gauge the relative risk and hazard due to wildland fire for the lands and communities within the planning area. It is a tool to direct implementation to the highest priority areas and promotes cross-boundary coordination. The risk assessment process is key to developing an understanding of the risk of potential losses to life, property, and natural resources during a wildland fire. Specifically, the risk assessment:

1. Identifies “at-risk communities” within and adjacent to the Community Wildfire Protection planning area.
2. Identifies the wildland urban interface (WUI) across the plan area.
3. Assesses risk, hazard, fire protection capability, structural vulnerability, and values to be protected.
4. Assigns community rankings to identify the priority areas for fuel reduction activities and other mitigation projects within the plan area.

The Greater Sisters Country CWPP used a risk assessment methodology based on guidance from the National Association of State Foresters and adapted by the Oregon Department of Forestry. The steering committee chose this method because it provides a simple and consistent approach that will enable comparison with other communities across the state.

Definition of Terms

Communities at Risk

The Healthy Forest Initiative (HFI) and the Healthy Forest Restoration Act (HFRA) provide multiple benefits to communities at risk from wildland fire. A community at risk is one that:

- Is an interface community as defined in the Federal Register notice of January 4, 2001, or is a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) in or adjacent to federal land.
- Have conditions conducive to large-scale wildland fire.
- Will faces a significant threat to human life or property as a result of a wildland fire.¹⁷

All 14 of the communities in Greater Sisters Country are considered to be at-risk communities.

¹⁷ USDA Forest Service, DOI Bureau of Land Management, *The Healthy Forests Initiative and the Healthy Forests Restoration Act: Interim Field Guide* (February 2004).

Wildland Urban Interface Definition

Title I of HFRA defines the wildland urban interface (WUI) as:

- A. An area within or adjacent to an at-risk community that is identified 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—
 - a. An area extending ½ mile from the boundary of an at-risk community;
 - b. An area with 1½ miles of the boundary of an at-risk community, including any land that—
 - i. Has sustained steep slopes 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 a ridge top; or
 - iii. Is in Condition Class 3, as documented by the Secretary in the project-specific environmental analysis.
 - c. 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.¹⁸

The Initial Definition came from “A report to the Council of Western State Foresters - Fire in the West -Wildland/Urban Interface Problem, dated Sept 18th 2000. Under this definition, “the urban wildland interface community exists where humans and their development meet or intermix with wildland fuels. (2001, Federal Register Vol. 66 No.3)

This initial definition and the above criteria were developed cooperatively by Federal agencies, Tribes, and States, and may be modified through further consultation with Tribes, States, local governments and other interested parties.(2001, Federal Register Vol. 66 No.3)

A subsequent updating in the Federal Register (Vol. 66, No. 160 Friday August 17th, 2001) added Camp Sherman and Tollgate Subdivision but overlooked numerous subdivisions and concentrations of residences, businesses in intermixed zones adjacent to “urban interface”.

For purposes of applying these definitions and the subsequent criteria for evaluating risk to individual communities, a structure is understood to be either a residence or a business facility, including Federal, State, and local government facilities.

¹⁸ Ibid.

The Healthy Forest Restoration Act of 2003, H.R. 1904 defined an “AT RISK COMMUNITY” as an interface community listed in the Federal Register (Vol.66, No. 3, January) the communities of Sisters, Cloverdale and Black Butte Ranch were in this initial listing.

HFRA states that community wildfire protection plans can identify the wildland urban interface for the at-risk communities in the plan. The Greater Sisters Country CWPP identifies the WUI around identified communities based on historic fire patterns, prevailing wind, and hazardous fuels.

Healthy Forest Initiative

HFI provides several categories of projects that can be categorically excluded from an environmental assessment (EA) or an environmental impact statement (EIS). Hazardous fuels reduction projects comprise only one category. To be categorically excluded under HFI, a proposed hazardous fuel reduction activity must meet the following requirements:

- Hazardous fuels reduction activities using prescribed fire are less than 4,500 acres
- Hazardous fuels reduction activities using mechanical methods are less than 1,000 acres
- Activities shall be limited to areas in the wildland urban interface or to areas in Condition Classes 2 and 3 in Fire Regime Groups I, II, or III outside of the wildland urban interface
- Projects shall be identified collaboratively using the framework identified in *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan*.¹⁹

Healthy Forest Restoration Act

HFRA authorizes special procedures for environmental assessments and environmental impact statements for a variety of land management goals including authorized hazardous fuel reduction projects. The Forest Service and the BLM are not required to analyze alternatives to the proposed action, as is typically required by the National Environmental Policy Act, if:

The project area is inside the wildland urban interface and is within 1½ miles of the boundary of an at-risk community except if the proposed action does not implement the recommendations in the adopted community wildfire protection plan. In that case, the agencies are required to analyze the recommended actions in the plan as an alternative to the proposed action.²⁰

The use of both HFI and HFRA may be powerful tools to streamline the planning process and accomplish more work on the ground. Use of both tools requires the identification of communities at risk, a determination of the wildland urban interface, and a completed community wildfire protection plan.

To determine communities at risk, the steering committee first had to define “community” using the following criteria:

¹⁹ USDA Forest Service, DOI Bureau of Land Management, *The Healthy Forests Initiative and the Healthy Forests Restoration Act: Interim Field Guide* (February 2004).

²⁰ Ibid.

1. Established city/town (Federal Register, Sisters, Cloverdale, BBR, Federal Register)
2. Incorporated subdivisions. (Tollgate, Crossroads, Deschutes County data)
3. Unincorporated subdivisions, clusters of homes, and intermixed WUI. (i.e. Indian Ford, Remuda Road, Holmes Road, Peterson Ridge properties, Stevens Canyon, Three Creek Road properties)
4. Developed Recreation complexes: USFS campgrounds, Suttle Lake complex, Metolius Basin, Three Creek area.
5. Federal and State Facilities, (Wizard Fall Trout Hatchery, Allingham Guard Station)
6. Transportation networks that link identified “communities” (Hiway 20/126, Hiway 242, Forest Road 14 and 16).

These criteria identified 14 at-risk communities.

Communities at risk in Greater Sisters Country

- Aspen Lakes
- Black Butte Ranch
- Camp Sherman
- Cascade Meadow Ranch
- Crossroads
- Forked Horn Estates
- Indian Ford Meadows
- Panoramic View Estates
- Plainview Estates
- Sage Meadow
- Sisters Area (including the Edgington and Remuda Road areas)²¹
- Squaw Creek Canyon Estates
- Suttle Lake
- Tollgate

There are many structures and residences in the plan area and WUI that are beyond the boundaries of the 14 communities named above. Although not included on the list of communities at risk, the plan provides broad recommendations that affect all of Greater Sisters Country.

²¹ Due to the proximity to the City of Sisters, the Edgington and Remuda Road areas were evaluated with the City of Sisters.

Wildland Urban Interface

The 2004 Central Oregon Fire Management Service (COFMS) Fire Management Plan initially identified the wildland urban interface (WUI) as a 1½ mile area surrounding each community on the list of over 100 central Oregon at-risk communities identified in the federal register. The plan considered the 1½ mile area sufficient to allow a crown fire to drop to the surface and burn with intensities that are manageable by ground-based suppression (flame lengths less than four feet) if the fuels in this zone are managed for that purpose (emphasis in original).²²

The Greater Sisters Country CWPP steering committee began their evaluation of the wildland urban interface with the guidelines set by the COFMS Fire Management Plan, establishing the WUI at 1½ mile around each community. After completing the risk assessment and considering potential actions to protect communities from wildland fire, the steering committee determined that the 1½ mile band around the communities did not align with the forest conditions, fuel accumulations, recent fire history, and the direction of prevailing wind. The steering committee initially identified the wildland urban interface boundary around the 14 communities at risk in the Greater Sisters Country CWPP as a two-mile band around the western perimeter of the communities contiguous with a one-mile band around the eastern perimeter of the communities at risk (see the Greater Sisters Country CWPP Boundary map).

In the spring 2006 plan review and revision, the question of the initial WUI boundary determination process was reviewed. The WUI was refined and adjusted to better reflect the definition of community as outlined in this document and included considerations of community growth, seasonal recreation areas, and access and egress corridors that were not identified in the initial plan.

The committee expanded the definition of the WUI based on the three categories of community as defined in the 2001 Federal Register (Vol.66, No. 3). Those categories include:

Category 1. Interface Community

The Interface Community exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.

Category 2. Intermix Community

The Intermix Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; 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. Fire protection districts funded by various taxing

²² Central Oregon Fire Management Service, *Fire Management Plan*, 2004.

authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28-250 people per square mile.

Category 3. Occluded Community

The Occluded Community generally exists in a situation, often within a city, where structures abut an island of wildland fuels (e.g., park or open space). There is a clear line of demarcation between structures and wildland fuels. The development density for an occluded community is usually similar to those found in the interface community, but the occluded area is usually less than 1,000 acres in size. Fire protection is normally provided by local government fire departments.

As a result of the inclusion of these definitions, the committee determined that the overall WUI boundary would include all three categories of communities as defined above, and would also include key transportation corridors and seasonal recreation areas with infrastructure. Additionally, the steering committee expanded the WUI to the edge of common boundaries of surrounding CWPP plans (Bend and Redmond) to better facilitate complete coverage of plan areas. The revised WUI boundaries are reflected in the revised maps in Appendix C.

Risk Assessment Methodology

The risk assessment illustrates the relative level of risk to life, property, and natural resources within the plan area. The assessment considers five categories to determine the relative severity of fire risk. The risk assessment uses a point system for each category of the analysis. The categories are added together to produce a final score, which is displayed graphically using GIS technology.

**Table 4
Greater Sisters Country CWPP Risk Assessment
Risk Assessment Categories and Points**

Assessment Categories	Elements	Score
Risk	Ignition Density (human and lightning caused from the last 10 years)	0-40
Hazard	Fuels (developed from vegetation information), Slope, Aspect, Elevation, Weather	0-80
Values	Structural Density (derived from tax assessor’s information on structures values over \$5,000.) Community values identified in public meetings	0-50
Structural Vulnerability	Based on the professional judgment and experience of the local fire professionals	0-90
Protection Capability	Based on the boundaries of the fire protection districts	0-40
TOTAL		300

Source: Greater Sisters Country CWPP

Risk – the likelihood of fire occurring: This factor uses density of historical fire ignitions (human and lightning caused). The layer combines fire ignition densities from the Oregon Department of Forestry and US Forest Service, and includes human and lightning-caused fires.

Hazard – the conditions that may hinder control of a wildland fire: The hazard factor is a compilation of weather, topography, and fuels information.

- **Weather** is the most important factor in the hazard layer. This factor is based on the number of days per season that forest fuels are capable of producing a significant fire event. This score is constant across the Greater Sisters Country CWPP area (although the western part of the plan area is significantly wetter than the east) because all of central Oregon is in Zone 3 - the most hazardous rating.
- **Topographic characteristics** include slope, aspect and elevation. Steeper slopes can cause wildland fires to spread more quickly and increase the difficulty of suppression efforts. Aspect is broken into three classes corresponding roughly to the amount of insulation or sun exposure expected on the site. Finally, elevation classification values are broken at 3,500 and 5,000 ft. Lower elevations are considered more hazardous due to their generally drier conditions.
- **Fuels (Vegetation)** is based on fire regime and condition class. Fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention. Coarse scale definitions for natural (historical) fire regimes have been developed and interpreted for fire and fuels management. 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.

Fire regime condition class (FRCC) is a classification that is based on a relative measure describing the degree of departure from the historical natural regime. Coarse-scale FRCC classes

include three condition classes for each fire regime.²³ 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. 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 of the natural range.²⁴

Values - the people, property, natural and other resources that could be lost in a wildland fire: The risk assessment identified structures with an assessed value of over \$5,000 to determine values to be protected. The members of the steering committee, community residents, and local fire professionals also contributed their local knowledge of the other values to be protected such as the location of riparian areas, wildlife habitat, and other scenic and natural areas.

Structural Vulnerability - the elements that affect vulnerability and ignitability of individual structures: The analysis examined the vulnerability of existing structures to wildland fire in the plan area. Unlike the other four factors in the risk assessment, this factor is not based on pre-existing quantitative information. Rather, it is based on local and professional judgment. To arrive at the quantitative and qualitative values for this layer, local fire officials developed and implemented an analysis based on their knowledge of the communities and their professional experience.

First, fire officials agreed on a definition of a “community” and identified the 14 communities, as described earlier in this chapter. Second, the fire officials developed nine criteria that they believed would affect the spread of wildland fire in the dry season with extreme fuel and fire weather conditions. Third, the group evaluated each community and awarded a score (low, medium, high, and extreme). These rankings were translated to numerical values to fit into the point system used in the risk assessment. Fourth, the group reached consensus on the rankings of the identified communities based on their review and discussion.

Criteria for evaluating structural vulnerability included:

- Community prevention and education efforts
- Structural density
- Average individual structure vulnerability (construction type, age, etc.)
- Occupancy types
- Infrastructure (roads, water supply, access, etc.)
- Emergency response capability
- Oregon Forestland-Urban Interface Fire Protection Act (SB 360) compliance
- Fuel arrangement and density
- Fuel types
- Weather and topography

²³ *Fire Regime Condition Class*, <http://www.frcc.gov> (accessed June 7, 2005).

²⁴ *Ibid.*

Protection Capability - the ability to mitigate losses, prepare for, respond to and suppress wildland and structural fires: The numerical values for this layer were based on whether or not the communities and structures were within the boundaries of a structural fire protection district.

**Table 5
Greater Sisters Country CWPP Risk Assessment
Risk Assessment Categories, Elements, Points, and Data Sources**

Category	Elements	Points
Risk	Density of fire ignitions per 1000 acres per 10 years	0–40
Low	0-.1 ignitions per 1,000 acres	5
Moderate	.1-1.1 ignitions per 1,000 acres	20
High	1.1 or more ignitions per 1,000 acre	40
Source: Oregon Department of Forestry and US Forest Service 1994-2003		
Hazard	Weather, topography, and fuels	0–80
Weather	The number of days per season that fuels are capable of producing a significant fire event.	0–40
Zone 1	Oregon Coast	0
Zone 2	Willamette Valley	20
Zone 3	Southwestern, central, and eastern Oregon	40
Source: Oregon Department of Forestry		
Topography	Slope, aspect, and elevation	0–10
Slope	0-25 %	0
	26-40 %	2
	More than 40 %	3
Aspect	N, NW, NE	0
	W, E	3
	S, SW, SE	5
Elevation	More than 5,000'	0
	3,501-5,000'	1
	0-3,500'	2
Fuels (vegetation)	Fire regime/condition class	0–30
Low	FR2-CC1, FR5-CC1	0
Moderate	FR1-CC1, FR2-CC2, FR3-CC1,	6
High	FR1-CC2, FR2-CC3, FR3-CC2, FR4-CC1, FR5-CC2	15
High-extreme	FR4-CC2	20
Extreme	FR1-CC3, FR3-CC3, FR4-CC3, FR5-CC30	30
Source: Central Oregon Fire Atlas 2004, BLM vegetation layer		
Values Protected	Density of structures valued over \$5,000	0–50
Structural Density	Structures per 10 acres	
Rural	0.1–0.9	28

Category	Elements	Points
Suburban	1–5.0	40
Urban	5.1 or more	50
Source: Deschutes and Jefferson County Tax Assessor’s data		
Structural Vulnerability	Prevention efforts, structural density, construction type, infrastructure, emergency response capability, fuels, SB 360 compliance, fuels types, density, arrangement, weather, and topography	0–90
	Low/medium	34
	Medium	45
	High	68
	High/extreme	79
	Extreme	90
Source: Structural Vulnerability Working Group, 2005		
Protection Capability	The ability to mitigate losses, prepare for, respond to, and suppress wildland fire and structural fire.	0–40
Fire Response	Both wildland and structural	5
	Wildland response only	15
	No organized response	40
Source: Rural fire protection district boundaries		
TOTAL		300

Analysis

The Greater Sisters Country CWPP Risk Assessment examined all of the lands within the boundary of the plan area. Of the five factors in the analysis, four factors (risk, hazard, values protected, and protection capability) were evaluated across the entire plan area using 30-meter pixels. The 14 identified at-risk communities were also given numerical scores developed for the structural vulnerability ranking. The lands outside of the at-risk communities did not receive scores for structural vulnerability. The inclusion of the structural vulnerability layer completed the development of the five layers of the risk assessment.

Once the layers were completed, each community was given a score by summing the scores for each of the layers inside the boundaries of the community. This produced a ranking of the relative risk inside the communities. However, this number told us little about the risk and hazard of wildland fire outside of the communities. To better understand the relative risk immediately adjacent to the communities, we developed a 1½-mile buffer and calculated the scores for the five layers within it. This analysis produced two final scores, an interior score for each community at risk and a second score for the 1½-mile buffer around each community at risk.

The Risk Assessment Findings section discusses the scores for the communities and the buffers.

Limitations of the Risk Assessment Data

“All models are wrong, some are useful.”²⁵ This aphorism neatly sums up the perils of using computer models to predict and evaluate real world conditions. The risk assessment is an approximation of what we predict to be present on the landscape. Some of the data used can no longer be considered current and some of the data are subjective. Also, some important information is not included in the analysis. For example, the only values protected considered in the risk assessment analysis are structures valued over \$5,000. Obviously, communities contain critical infrastructure and facilities that are essential to protect from wildland fire. Another obvious gap in the values data is lack of any information on habitat, recreation, or ecologically important areas. At our community meetings, community residents spoke about the importance of protecting the special places in the area (the head of the Metolius River, for example). However, we lacked the resources to accurately identify and analyze all of the special ecological, cultural, and recreational resources in Greater Sisters Country.

Another limitation is the difference in the 1½-mile buffer used to calculate our risk assessment and the wildland urban interface zone as revised in spring 2006. Ideally, those two areas would be the same. However, the buffer analysis was completed prior to the final determination of the wildland urban interface zone. With it now complete, identification of critical infrastructure and ecological values can be considered.

²⁵ G. E. P. Box. “Robustness in scientific model building,” in *Robustness in Statistics*, eds. R. L. Launer, & G. N. Wilkinson (New York: Academic Press, 1979), 202.

Chapter 5

Wildland Fire Risk Assessment Findings

This chapter describes the results from the risk assessment. The risk assessment resulted in a series of maps and tables that display the results of the analysis. A base map sets the boundary of the CWPP area, shows the at-risk communities, ownership, and the wildland urban interface. Six landscape maps show the five layers of the risk assessment and the summary calculation for the plan area. In addition, two other landscape maps show the perimeter of large fires over the last 10 years and display ecologically important areas in the plan boundary.

The 14 at-risk communities in Greater Sisters Country are also displayed on smaller-scaled “community” maps. These maps are intended as a tool for more specific project planning and implementation. They show the summary calculation (incorporating the five layers) from the risk assessment with the planned and completed hazardous fuel reduction treatments. While the five layers of the risk assessment identify and prioritize risk and hazard across the planning area, the communities maps help identify priority areas for treatment within and around the individual at-risk communities.

Landscape Risk Assessment

Greater Sisters Country CWPP Base Map

This map shows the boundary of the plan area, the 14 at-risk communities, land ownership, major roads, county boundaries, and the location of the wildland urban interface (WUI).

Risk

The risk map portrays the likelihood of fire starts by displaying the fire ignitions from 1994-2003. The map shows that large numbers of fires are concentrated in and around the populated areas. In general, all of the lands within the identified communities and directly adjacent are classified as high risk. Plainview Estates, Aspen Lakes, and Forked Horn Estates Area all show lower risk levels on their southern and eastern perimeters. The areas with the highest concentrations of fires are shown in red and those with the least are shown in yellow.

Hazard

The hazard map displays variations in the ability to control a wildland fire. The map is a compilation of weather, topography, and fuels (classified by fire regime and condition class). Since the model portrays weather as constant across the plan area and the plan area only contains minor variations in topography, the map mostly displays variations in fire regime and condition class. The areas with the highest hazard are displayed in red and those with the least in yellow.

The map classifies large portions of Greater Sisters Country as high hazard. Most of the high hazard lands are located to the west of the identified at-risk communities, toward the crest of the Cascade on Forest Service lands. Also, a several mile long band of high hazard land runs north

from the east side of Camp Sherman along Green Ridge to the northern boundary of the plan area.

Pockets of high/extreme and extreme hazard appear on the east side of Camp Sherman and immediately north of the community boundary. The western and southern perimeter of Black Butte Ranch is a checkerboard of red and orange, denoting high and extreme hazard. Similarly, pockets or “hot spots” of high/extreme and extreme hazard appear on the western and southern flanks of Tollgate, Crossroads, and the Sisters Area (including Remuda and Edgington Roads). The map displays another large pocket of high/extreme and extreme hazard directly north of Sage Meadows. The perimeter of the Plainview Estates Area is shown as a patchwork of high and extreme rating with the exception of the west side of the northern boundary, which is classified as low and medium.

In general, lands in the eastern part of the planning area are lower hazard than those to the west. A notable exception is the large block of contiguous high hazard lands northeast of Plainview Estates (basically bounded by Highway 126 to the north and Highway 20 to the south).

Values Protected

This map displays the location of structures valued over \$5,000 and is colored according to the density of structures. The areas with the highest density of structures are shown in red and those with the lowest are shown in yellow. Although the maps primarily shows the location of residences and businesses, the community meetings and steering committee discussions identified many other values (ecological, cultural, and recreational) that need to be protected from wildland fire.

Structural Vulnerability

Structural vulnerability is mapped according to the analysis completed by fire professionals. Areas of highest structural vulnerability are displayed in red, while areas of lower structural vulnerability are displayed in yellow. The map shows that Panoramic View Estates is rated extreme and Camp Sherman, City of Sisters Area, and Crossroads are all rated as high/extreme. Areas outside of the at-risk communities were not evaluated but are addressed in the action plan for structural vulnerability and in the general objectives for all lands within the plan boundary.

Protection Capability

The map of protection capability displays lands within the boundary of a fire protection district as yellow and lands outside a fire protection district as orange. All lands within the plan boundary have wildland fire protection, even those outside of the boundaries of the structural protection districts.

One of the three fire protection districts protects all of the 14 identified at-risk communities except the northern portion of Squaw Creek Canyon Estates. Over two dozen individual structures are also located outside the boundaries of the fire protection districts. These lands are rated as higher risk due to their lack of structural protection.

Final Calculation

The final calculation map is a sum of the five layers of the risk assessment (risk, hazard, values protected, structural vulnerability, and protection capability). The 14 at-risk communities emerge as the areas with the highest risk and hazard, due to the high density of structures and the structural vulnerability ratings. This map focuses attention on reducing hazardous fuels in and around the communities at risk.

Perimeter of Large Fires

Fourteen large fires have burned in Greater Sisters Country between 1994 and 2003. The largest fires have burned in the northwest quadrant of the plan area, west of the at-risk communities of Suttle Lake, Black Butte Ranch, and Camp Sherman.

The map shows hundreds of fire starts over the 10-year period. Clearly, fuel reduction efforts and fire prevention efforts have to respond to two types of fire: the large scale event, such as the B & B Complex, and the dozens of small fires that start each year from lightning and human causes.

Ecological and Special Areas

Greater Sisters Country contains numerous identified ecological and special areas. Community residents also noted many additional special and important places during the community meetings hosted. The Greater Sisters Country Ecological and Special Areas map comes from the Forest Plan of the Deschutes National Forest and does not contain information on private land or lands managed by the BLM.

The map of the ecological and special areas would be useful when considering hazardous fuel reduction activities and how to protect other important resource values.

Risk Assessment Rankings

The Greater Sisters Country CWPP Risk Assessment used five factors (risk, hazard, protection capability, structural vulnerability, and values protected) to calculate the relative risk of wildland fire to the 14 communities at risk in the plan area. This section provides results for structural vulnerability and protection capability, and then discusses five layer aggregate scores for the at-risk communities.

Structural Vulnerability

The Structural Vulnerability Working Group noted that the rankings would change as level of education and awareness, structure density, growth of ladder fuels and forested areas, and vegetation treatments changed.

Current structural vulnerability rankings are shown below in Table 6. The working group ranked one community as extreme (Panoramic View Estates), several communities as high/extreme, and six additional communities as highly vulnerable to structure loss in the event of a wildland fire.

**Table 6
Greater Sisters Country Communities at Risk
Community Structural Vulnerability Ratings**

Community Name	Score	Rating
1. Panoramic View Estates	90	Extreme
2. Camp Sherman	79	High/Extreme
3. City of Sisters	79	High/Extreme
4. Crossroads	79	High/Extreme
5. Black Butte Ranch	68	High
6. Forked Horn Estates	68	High
7. Indian Ford Meadows	68	High
8. Sage Meadows	68	High
9. Squaw Creek Canyon Estates	68	High
10. Tollgate	68	High
11. Plainview Estates	56	Medium/High
12. Suttle Lake	45	Medium
13. Cascade Meadow Ranch	34	Medium/Low
14. Aspen Lakes	34	Medium/Low
Average rating for plan area	65	High

Source: Greater Sisters Country CWPP Risk Assessment

Protection Capability

The steering committee assumed that all lands within the boundary of the plan were effectively covered by a wildland response. No communities were awarded 40 points for “no organized response.” All areas within the boundaries of the three fire protection districts received five points. All areas outside of the boundaries of the three fire protection districts were awarded 15 points.

At-Risk Community Rankings

It is important to note that the minimum and maximum scores within each community varied considerably. This is important when considering potential hazardous fuel reduction treatments as it signals that not all acres within the community boundary are equally at risk.

**Table 7
Greater Sisters Country Communities At Risk
Risk Assessment Community Rankings**

Community Name	Acres	Minimum Score	Maximum Score	Mean Score (average)	Assessment Rating
Tollgate	423	103	216	193	Extreme
Crossroads	241	96	216	191	Extreme
Panoramic View Estates	1138	88	211	187	Extreme
Camp Sherman	1694	65	214	183	Extreme
Sage Meadows	817	88	203	179	Extreme
Sisters Area	3533	58	214	178	Extreme
Indian Ford Meadows	810	100	197	172	Extreme
Squaw Creek	2288	69	204	169	High
Black Butte	1842	67	223	168	High
Cascade Meadows	365	88	176	154	High
Forked Horn Estates	334	52	186	137	High
Suttle Lake	933	71	168	133	Medium-High
Plainview Estates and Area	5711	50	196	132	Medium-High
Aspen Lakes	417	53	201	116	Medium-High

Source: Greater Sisters Country CWPP

In addition to a score for each community, we developed a score for a 1½-mile buffer around each community to better illustrate the risk and hazard bordering the community. The calculation of the buffer was completed in the same method as the communities; the score for each of the five layers were summed up to produce a final score (Table 8). However, only the mapped communities have scores for values protected and structural vulnerability. Consequently, the buffer scores are lower than the scores of the at-risk communities. The buffers include the relative risk of a fire starting in an adjacent subdivision and community.

**Table 8
Greater Sisters Country Communities At Risk
Community 1½ Mile Buffer Rankings**

Buffer Name	Acres	Minimum Score	Maximum Score	Mean Score (average)	Assessment Ranking
Indian Ford Meadows	9351	61	214	135	Medium-High
Sage Meadows	10318	50	214	120	Medium-High
Tollgate	8257	60	216	118	Medium-High
Cascade Meadows	8109	50	216	117	Medium-High
Crossroads	7378	60	216	110	Medium-High
Sisters Area	21004	50	216	107	Medium-High
Panoramic View Estates	9809	50	212	106	Medium-High
Squaw Creek Estates	14076	50	212	106	Medium-High
Aspen Lakes	7734	50	212	102	Medium

Buffer Name	Acres	Minimum Score	Maximum Score	Mean (average) Score	Assessment Ranking
Black Butte Ranch	13824	50	223	98	Medium
Plainview Estates and Area	21802	50	214	89	Medium
Forked Horn Estates	7568	50	186	87	Low-Medium
Camp Sherman	11520	50	197	85	Low-Medium
Suttle Lake	10777	50	160	80	Low-Medium

Source: Greater Sisters Country CWPP Risk Assessment

To those familiar with the Camp Sherman and Greater Sisters Country, it may seem illogical for the lands around Camp Sherman to receive one of the lowest scores for the 1½-mile buffer area. There are several reasons why the score for the buffer for Camp Sherman is lower than, for example, Indian Ford Meadows. The low score of Camp Sherman can be explained by lack of adjacent communities. The buffer of Camp Sherman does not include any other communities. The buffer of Indian Ford includes parts of Cascade Meadows, Tollgate, Sage Meadows, Sisters Area, and Squaw Creek. More than half of the area within the 1½-mile buffer around Indian Ford Meadows is made up of other communities that have much higher scores. As described above, communities have higher scores because of the inclusion of structural vulnerability and values protected scores.

When contemplating the priority for hazardous fuel reduction treatments, the risk assessment is not the only information available. The Environmental Impact Statement completed for the Metolius Fuel Reduction Project reveals that over 90 percent of the lands outside of Camp Sherman are capable of producing uncharacteristic wildland fire. Also, as noted in the limitations section of the risk assessment, the analysis does not account for the outstanding ecological values outside of Camp Sherman.

Community Risk Assessment

The 14 at-risk community maps show the final calculation (five-layer) layer from the risk assessment at a smaller scale. The maps include an “inner score” for the lands inside the boundary of the community and a “buffer score” for the lands in the 1½-mile buffer around each at-risk community.

Although every effort has been made to capture fuel reduction treatments on these maps, little data exist on private land treatments, particularly in regard to defensible space. Many homeowners and communities in Greater Sisters Country have been actively reducing the fuels around their homes and communities. Those actions are not represented on the community maps. These maps are intended as planning tools to identify and address the “hot spots” in and around communities.

The maps include the completed and planned fuel reduction treatments by the Forest Service, BLM, and Oregon Department of Forestry as of Spring, 2005. Black crosshatch and the labels *thin*, *mow*, and *burn* identify areas with completed fuel reduction treatments. Purple perimeters and white interiors indicate planned treatments (one to three years out). Often, the maps show planned treatments on top of completed treatments to indicate ongoing maintenance activities.

The green vertical lines indicate lands managed by the US Forest Service and diagonal yellow-colored lines demarcate BLM managed lands. Private lands have no lines over the risk assessment final calculation. Small black dots indicate the approximate location of structures valued over \$5,000.

Aspen Lakes

The risk assessment rates Aspen Lakes as having a medium level of risk. There are no completed treatments or planned treatments within the community's wildland urban interface.

Black Butte Ranch

Black Butte Ranch has an average assessment rating of high; it also contains areas of extreme risk. The Forest Service manages much of the land surrounding Black Butte Ranch. The agency has completed numerous treatments along Highway 20, which borders the community to the northeast. The agency has also completed hazardous fuel reduction treatments along the western and southern perimeter of the community and more are planned along the southern part of the western boundary. A mosaic of thinning and burning is planned for the area to the south of the community.

Camp Sherman

The risk assessment ranks Camp Sherman as an area of extreme risk. Camp Sherman contains small blocks of private lands surrounded by lands managed by the US Forest Service. The agency has completed several small treatments on the northwest boundary. As a part of the Metolius Basin Forest Management Project, the agency plans to complete an array of treatments in and around the community's wildland urban interface and beyond.

Cascade Meadows

Cascade Meadows is rated as high risk. The Forest Service manages the lands outside of the Cascade Meadows. The agency has completed numerous treatments in the wildland urban interface outside of the community and more are planned for the future.

Crossroads

Crossroads, rated as extreme, is an island surrounded by land managed by the Forest Service. The agency has completed a series of treatments that nearly encircle the community. Mowing and burning are planned in northwest flank of the community's wildland urban interface.

Forked Horn Estates

The risk assessment rated Forked Horn Estates as having a high risk. Most of the lands directly adjacent to the community are privately owned. The Forest Service manages land about two miles to the west and the BLM manages a large block of land about one mile to the south and east. The risk assessment shows that most of the lands in the wildland urban interface around Forked Horn Estates are at a lower risk than many of the other communities in Greater Sisters Country. However, the assessment shows the BLM lands to the east of the community as a mix of medium and high risk.

Although the map shows no completed or planned treatments on federal land in the community's wildland urban interface, the Cloverdale Rural Fire Protection District has been actively working with homeowners on clearing defensible space, improving access, and improving emergency evacuation routes. In addition, the district has been actively educating residents using Firewise materials.

Indian Ford Meadows

Indian Ford Meadows is a community at extreme risk. The community map shows numerous completed and planned treatments on the western border of Indian Ford Meadows and on either side of US Highway 20. Burning and thinning treatments are also planned along the east side of Highway 20 and on the southwestern border of the community. According to the map, the lands to the south and east in the wildland urban interface have not been treated for fuel reduction.

Panoramic View Estates

Panoramic Estates is an extreme risk area. Private individuals own all but a small sliver of land outside of the community. The BLM manages a small parcel of land on the community's northeast border. The map shows no completed or planned treatments on federal land in the wildland urban interface. Due to the extreme rating, the Prineville BLM is now considering fuel reduction projects in the community's wildland urban interface.

In addition, increasing the fire-safe conditions in Panoramic View Estates has been a high priority for the Cloverdale Rural Fire Protection District. The district has implemented a program of homeowner education that focuses on meeting the standards set by Senate Bill 360, including clearing defensible space and improving access, egress, and emergency evacuation routes.

Plainview Estates and Area

This community is a medium-high risk. The BLM manages much of the land to the north, east, and south of Plainview Estates and the surrounding areas. The risk assessment classifies the lands outside of the community as a mix of low, medium, and high risk. The map shows no completed or planned treatments directly surrounding the Plainview Estates Area. However, some burning treatments have been accomplished in the northwest portion of the 1½ mile buffer and a few are planned for the same vicinity.

Sage Meadows

Sage Meadows is also rated as an area of medium – high risk. The Forest Service manages the lands adjacent to Sage Meadows and has completed several fuel treatments on the western border of the community. The completed treatments will be maintained or continued with a mix of thinning, mowing, and prescribed burning in the area between Sage Meadows and Cascade Meadows. No treatments are completed or planned on the northern and eastern boundaries of the community's wildland urban interface.

Sisters Area (including the Edgington and Remuda Road areas)

The risk assessment indicates that the Sisters Area is a community at extreme risk. Forest Service lands border the City of Sisters to the west and to the south. The agency has completed numerous fuels reduction treatments in Sisters' wildland urban interface along both sides of Highway 20 northwest of Sisters. The agency has also completed numerous prescribed burns south of the community. More treatments are planned along the east side of Highway 20 northwest of Sisters and a mosaic of mowing and burning is planned for an area several miles to the south.

The agency is also in the planning phase for the Sisters Area Fuels Reduction project (SAFR). Planning is expected to be completed by 2006. The project contains approximately 30,000 acres and stretches from the Black Butte Ranch (northwest of Sisters) to the south and west of the City of Sisters. The project would reduce hazardous fuels on national forest lands near the communities of Black Butte Ranch, Tollgate, Crossroads, Sisters, and the Edgington Road area. Proposed treatments include a combination of thinning, mowing, and burning. The steering committee considers the project a high priority and offered their support in writing to the Deschutes National Forest.

Squaw Creek Canyon Estates

Squaw Creek is classified as an area of high risk. The land around Squaw Creek is a mix of Forest Service, BLM, and private ownership. Although the map shows no completed or planned treatments within the wildland urban interface of the community, the Forest Service expects to plan fuel treatments in the area in the next two to three years. The Forest Service had planned to implement the Garrison Fuel Reduction by 2010. However, due to the area's high risk ranking, the agency has moved the Garrison project timeline up to occur in the next two to three years.

Suttle Lake Recreation Area

Suttle Lake Recreation Area was rated as medium – high according to the risk assessment. Forest Service land encircles Suttle Lake and the entire area burned in the B & B complex in 2003. The map shows one small completed prescribed burn at the bend in Highway 20. No planned treatments are shown on the map. The Forest Service has completed salvage logging of insect-killed trees and thinning around Suttle Lake and Camp Tamarack areas, but these treatments are not shown on the map. The agency completed forest restoration treatments from Corbet Snow Park to Suttle Lake in the late 1990s.

Tollgate

According to the risk assessment, Tollgate is a community at extreme risk. It is also one of the most densely populated communities in Greater Sisters Country. The Forest Service has completed numerous treatments along Highway 20 directly east and north of Tollgate. The Forest Service plans additional treatments on the northern perimeter of the community. To the west of the community, the agency is planning a thin and a series of prescribed burns. The map does not show any treatments for the southern boundary of the wildland urban interface.

Chapter 6

Identification of Community Values

In fall and winter of 2004, the Greater Sisters Country CWPP steering committee hosted four community meetings to introduce the idea of a community fire plan to the local public and to solicit their feedback. Below is a brief summary of the community meetings (a more in-depth summary appears in Appendix B).

The objectives of the meetings were to:

- Inform the community about the purpose of the wildfire protection plan
- Identify the community values that residents most want protected from wildland fire
- Identify local residents' most pressing concerns about wildland fire
- Identify potential emergency response improvements
- Invite local leaders to participate in the planning process

Each meeting included an overview of the wildfire plan and a discussion of key issues. We also invited participants to identify on a map the values that they most wanted protected and the places that they considered at high risk to wildland fire.

The meetings revealed a high level of support for the development and implementation of a community wildfire protection plan. Many residents expressed excitement that all of the agencies and organizations were working together to reduce the threat of wildland fire.

The meetings:

- Directly informed over 60 people about the community fire plan
- Increased interest and support from community for the fire plan
- Identified community members willing to participate in additional planning efforts
- Gathered general and specific information about community values and concerns
- Identified potential emergency response and preparedness improvements
- Identified community priorities for federal land fuel reduction
- Identified future educational opportunities (such as prescribed burning and the location of evacuation routes)

Community Meetings Summary

Several common themes emerged from the community meetings:

- ***Treating federal lands adjacent to communities is a high priority.*** Most of the participants supported the idea of reducing fuels on federal land adjacent to their communities. Specifically, residents requested that “fire-safe buffers” be developed around the perimeters of communities on adjacent public land.
- ***Maintain a balance of fire resilience and ecosystem health.*** The feedback from meeting participants and written comments did not place an exclusive priority on hazardous fuel reduction. Respondents wanted to maintain the many ecological and recreation resources in and around their communities. Opinions on where this balance lies varied.
- ***Improve emergency response infrastructure*** by treating road access to emergency exit routes, improving signage on emergency evacuation routes, and developing new evacuation routes in key places.
- ***Improve communication to residents about upcoming fuels reduction activities,*** especially prescribed burning. Inform residents when prescribed burning is likely to occur (for both health and convenience).

Chapter 7

Action Plan Goals and Objectives

The purpose of the action plan is to guide implementation based on the results of the risk assessment, community meetings, and planning process. The steering committee and the structural vulnerability working group developed goals and objectives for action in seven key areas: education, structural vulnerability, hazardous fuel reduction, biomass utilization, emergency preparedness, social and ecological values to be protected, and plan monitoring and evaluation. The group then developed an implementation strategy to achieve these goals and objectives.

Education

Education and outreach are primary goals for the Greater Sisters Country CWPP. There are many ongoing efforts in Greater Sisters Country that educate and inform residents about fire safety and life in a fire adapted ecosystem. The steering committee focused its attention on developing an educational strategy that brings together many of the ongoing education efforts for greater effect. The two main themes of education and outreach are to create an understanding of living in a fire adapted environment and increasing personal responsibility for creating defensible space. The education efforts are intended to help homeowners and communities take care of their lands and structures.

Education around fire and life safety needs to be an ongoing activity in the communities of Greater Sisters Country because of the rapid influx of new residents. Many new residents may be unfamiliar with wildland fire and have limited experience with issues like defensible space. Residents and visitors alike need to see clear examples of what a fire resilient forest and community look like and have easy access to resources that help them take action.

Resources

The Central Oregon Fire Chiefs Association formed the Central Oregon Fire Prevention Cooperative (COFPC) in 1979 to promote an interagency exchange of ideas and resources around education and outreach. The COFPC coordinates resources around prevention and education in Crook, Deschutes, Jefferson, Grant, and portions of Klamath counties.

Individually, public fire and life safety agencies and departments pool scarce resources, such as people and funding, to educate the public. By working together, the COFPC allows the participating agencies to accomplish more than they could separately. The COFPC also ensures that all agencies provide a consistent message to the public. The COFPC is made up of all the wildland fire and structural fire agencies in central Oregon including: Forest Service, BLM, Oregon Department of Forestry, Walker Range Fire Patrol Association, the Bureau of Indian Affairs, the Confederated Tribes of Warm Springs, the Oregon State Fire Marshal, and all city and rural fire departments.

Ongoing Education and Outreach Activities

There are many ongoing education and outreach efforts underway in Greater Sisters Country. Such efforts include guided tours for the public and special interest groups of recent large wildland fires in the area, guided tours of the Metolius Heritage Demonstration Project, an interactive web site,²⁶ and tours of the ongoing Hwy 20 Fuels Reduction Project located along Hwy 20 west of Sisters and east of Black Butte Ranch. These existing initiatives have received high attendance and continue to be utilized to convey the key messages of the Greater Sisters Country CWPP.

Goals

- Increase residents' understanding of living in a fire prone environment and acceptance personal responsibility for taking preventative actions to reduce the risk and hazard of wildland fire.
- Develop an overall education campaign that has one clear message, image, and material. Ensure that all education and outreach efforts convey a *consistent* message to the public.
- Target the education campaign at children, residents, and visitors in a wide variety of settings including:
 - Hunter education classes and booths
 - FireFree debris drop off days
 - Homeowner association meetings and newsletters (such as Friends of Black Butte Ranch)
 - Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) mailings and outreach
 - Central Oregon Fire Prevention Cooperative simulator for escaping house fires
 - Fire Station Tours, especially during community events that draw large number of people (e.g. the rodeo and quilt show)
 - Home assessment and door to door contacts
 - Fire Safety Fair and Fire Prevention Week
 - Implement Firebusters to educate children grade K-5
 - Post Fire Danger Ratings in local newspapers and signs (such as at Ranger Station)
 - Public Service announcements and teachable moments
- Utilize any and every opportunity, such as a fire, to educate the public about fire safety.
- Increase residents' compliance in meeting the standards set by the Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) and Fire Wise/Fire Free.
- Train local residents as assessors for SB 360.

²⁶ <http://www.metoliusfriends.org/programs.html>

- Provide incentives for landowners to comply with SB 360.
- Coordinate education activities around ongoing fuels reduction projects.
 - Develop education materials that explain the purpose and methods fuel reduction projects.
 - Have education staff on hand to talk to the public about projects that are likely to attract Sisters area visitors and recreation enthusiasts.
- Identify neighborhood champions in key communities that serve as examples of defensible space for their neighbors.
- Utilize both active and passive forms of outreach including hands-on and face-to-face, as well as mailings, fliers, web sites, community meetings, etc. Distribute the Defensible Space Checklist at appropriate opportunities.

Defensible Space Checklist

What can I do to help prevent losses to my property and my neighborhood?

- Post easy-to-read address signs so emergency crews can find your home.
- Reduce flammable vegetation and brush around your home.
- Reduce the density of nearby trees.
- Clear wood piles and building materials away from your home.
- Remove low tree branches and shrubs.
- Keep grass and weeds cut low.
- Remove overhanging branches and limbs.
- Remove leaves & needles from gutters, roofs and decks.
- Remove dead plants and brush.
- Maintain a minimum of 30 feet of defensible space around your home.
- Screen vents and areas under decks with 1/8" metal mesh.
- Keep decks free of flammable lawn furniture, doormats, etc.
- Choose fire-resistant roofing materials.
- Trim vegetation along driveways a minimum distance of 14' x 14' for fire trucks.
- Use alternatives to burning debris.

Structural Vulnerability

In recent years, many communities in Greater Sisters Country have been taking steps to decrease the vulnerability of structures to wildland fire. Some of the more active communities include (but is not limited to) Black Butte Ranch, Crossroads, and Tollgate. The Crossroads Property Owners Association, for example, has been implementing an aggressive fire prevention education program since 1975. The Black Butte Ranch Fire District has been actively working with homeowners to meet the standards set by their Wildfire Fuels Modification Program ²⁷

This section of the action plan identifies those gaps and the steps that remain to make the structures and communities in Greater Sisters Country safer from wildland fire.

Goals

- Make all structures within the plan area as fire safe as possible.
- Make all communities and structures survivable in the event of a wildland fire.

Table 9 identifies the main threats and risks to structures and communities at risk in Greater Sisters Country. For each threat or risk listed, an action is recommended to address the threat or decrease the risk.

**Table 9
Structural Vulnerability Threats and Actions**

Community Name (rating)	Primary Threat/Risk	Recommended Action/Resolution
Panoramic View Estates (Extreme)	Vegetation: structure and composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient access/egress	Identify and upgrade
	Insufficient water supply	Identify and upgrade
Camp Sherman (High/Extreme)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Density around structural buildings	Fire Free/Fire Wise compliance/education
	Infrastructure (water sources, access & egress, private bridges)	Identify and upgrade
	Condition of structures/ignitability	Education and enforcement
City of Sisters Including Edgington & Remuda Rd. areas- (High/Extreme)	Potential for structure conflagration due to structural density and sub-standard water system.	Ensure code compliance, improve water system, address access & setback issues
	Construction: combustible shake roofs	SB 360 and code compliance/education

²⁷ Black Butte Ranch Rural Fire Protection District, http://www.blackbutteranchfire.com/fuels_program.htm (accessed June 16, 2005).

	Insufficient access/egress	Improve & maintain existing ford over Squaw Crk. as emergency access escape route for the Remuda Rd area
	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise
Crossroads (High/Extreme)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient water supply	Identify and upgrade
	Construction: combustible shake roofs	Code compliance/education
Black Butte Ranch (High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient access/egress and evacuation routes	Identify, upgrade & create evacuation routes
	High structural density	Implement Fire & Fuels Management Plan
Forked Horn Estates (High)	Insufficient access/egress	Identify and upgrade
	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient water supply—wells only	Develop sufficient water sources
Indian Ford Meadows (High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Water supply	Identify and upgrade
Sage Meadow (High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient access/egress	Identify and upgrade
	Insufficient water supply	Identify and upgrade
Squaw Creek Canyon Estates (High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Insufficient water supply	Identify and upgrade
	Construction: combustible shake roofs	Code compliance/education
Tollgate (High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	High structural density	Fire Free/Fire Wise compliance/education
	Insufficient access: ingress/egress	Identify and upgrade
Plainview Estates (Medium/High)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
Suttle Lake (Medium)	Vegetation: structure & composition	SB 360, Fire Free, Fire Wise compliance/education
	Construction: combustible shake roofs	Code compliance and education
	Insufficient access/egress and evacuation routes	Identify, upgrade and create evacuation routes

Cascade Meadow Ranch (Medium/Low)	No significant issues but continue maintenance and education	Continued maintenance and education
Aspen Lakes (Medium/Low)	No significant issues but continue maintenance and education	Continued maintenance and education
All other structures not included in at-risk communities	Absence of formal fire protection and extended response times	Improve response capabilities
	Vegetation: Structure & composition	SB 360, Fire Free, Fire Wise compliance and education
	Insufficient water supply and access/egress	Identify and upgrade
	Construction: combustible shake roofs	Code compliance and education

Hazardous Fuel Reduction

The Hazardous Fuel Reduction section is divided by land ownership (private residential, private forestland, and federal land).

Private Residential Land Goals

- Protect the safety of people, property, and natural resources from wildland fire.
- Increase the ability to suppress a wildland fire in the wildland urban interface by treating hazardous fuels.
- Protect and restore watersheds.
- Meet landowners' objectives for forest health and restoration.
- Maintain a balance of hazardous fuel reduction, aesthetics, wildlife habitat, and property values.
- Hazardous fuel reduction treatment objectives in the wildland urban interface include:
 - Maintain defensible space around homes and structures
 - Treat vegetation along roadside of evacuation routes
 - Treat vegetation along roadsides of main transportation corridors
 - Meet or exceed the standards set by the Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360)
 - Establish fuel breaks around structures
 - Improve driveway access for fire equipment
 - Remove tree branches near chimneys
 - Remove dead branches overhanging roofs
 - Move firewood away from structures or cover it
 - Remove flammables from under decks and stairways

Create fuel breaks along roadsides and property lines.²⁸

- Meet or exceed Deschutes County standards for vacant lots and defensible space

Private Forest Lands Goals

- Focus treatments around WUI, including developed home sites and access routes.
- Expand treatments to adjacent subdivisions and communities identified as high priority in the risk assessment.
- Decrease the risk of uncharacteristic wildland fire behavior.
 - Decrease hazardous fuels to create flame lengths less than four feet
- Treat dense seedlings, saplings and pole stands and contiguous bush to a condition that can be maintained mechanically.
- Meet existing standards for multiple objectives (e.g. Oregon Forest Practices Act and federal requirements under grant payments).
- Protect people's property, tribal and natural resources.
- Meet landowner's objectives for forest health and restoration.

Federal Land Priorities

- Focus hazardous fuel reduction treatments in the wildland urban interface, particularly around communities identified as high risk by the risk assessment.
- Treat hazardous fuels in Condition Class 2 and 3 with the goal of achieving condition class 1 while protecting and enhancing key ecological and social values associated with the areas.
 - Address on a landscape, not acre by acre
 - Decrease the risk of uncharacteristic wildland fire behavior
 - Decrease flame lengths to less than four feet in the wildland urban interface
- Continue to meet existing standards for multiple objectives (Wild and Scenic Rivers, Endangered Species Act, National Environmental Policy Act, etc.).
- Protect people's property, tribal, and natural resources.
- Protect and restore watersheds.

Social and Ecological Values to be Protected

Goals

- Protect life and property while maintaining and enhancing the communities' sense of place.

²⁸ Oregon Forestland-Urban Interface Fire Protection Act, Property Evaluation and Self-Certification Guide for Deschutes County, August 2004.

- Preserve the areas and locations that are important to the community and visitors (historic, cultural, ecological, and economic values).
- Meet existing standards for natural resource protection.
- Treat landscapes in addition to land adjacent to homes.
- Protect the social, ecological, and cultural values beyond the wildland urban interface (see Appendix B for specifics).

Community Preparedness

Goals

- Improve local management of wildland fire emergencies.
- Meet or exceed Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) and Deschutes County vacant lot ordinance standards.
- Improve Sisters City water system to meet recognized standards, growth, and conflagration threat.
- Increase cooperative training and emergency response.
- Develop and improve ingress/egress and evacuation routes.
- Educate residents and visitors about appropriate actions to take during a wildland fire.
- Coordinate actions with the Deschutes County Natural Hazard Mitigation Plan.
- Improve access to water sources for fire suppression.
- Expand community and firefighter safety zones.
- Explore expansion of “plug and play” fire camps.

Biomass Utilization

Goals

- Use woody biomass utilization as an incentive to increase the amount of hazardous fuel reduction completed by offsetting the costs of treatments.
- Increase local and regional manufacturing capacity to utilize and add economic value to woody biomass.
- Develop markets for small diameter timber and biomass products.
- Provide funding and technical assistance to assist businesses in developing feasible and economically viable methods of using the raw materials from fuel reduction projects.
- Stabilize the supply of small diameter timber and biomass to provide incentives for investment in local and regional small diameter and biomass utilization.

- Support the implementation of the Coordinated Resource Offering Protocol (CROP) in Central Oregon especially by:
 - Collecting, analyzing, and delivering data
 - Developing and implementing planning protocols
 - Monitoring for supply equalization and environmental performance
 - Supporting the development and implementation of the Business Alliance for Sustainable Energy (BASE), a partnership with Central Oregon Intergovernmental Council and 3E Strategies

Monitoring and Evaluation

The purpose of this monitoring strategy is to track implementation of activities and evaluate how the goals of the Greater Sisters Country CWPP are being met over time. The data gathered will help to determine if key milestones have been met and if the plan is being implemented as envisioned. The monitoring strategy also provides a means for those who developed the plan to be accountable to the community for outcomes.

What are the benefits of monitoring?

Monitoring is a critical component of all natural resource management programs. Monitoring provides information on whether a program is meeting its goals and objectives. Beyond these benefits, there are also monitoring requirements related to contracting and to federal and state statutes.

Adaptive Management

Adaptive management is the process of learning from management actions. As applied to the Greater Sisters Country CWPP, it involves implementing an approach to current projects, monitoring and analyzing the effects of that approach, and then incorporating these findings into the next round of projects.

Table 10
Summary of Monitoring Tasks

Objective	Monitoring Tasks	Timeline
Risk Assessment	Continue to use reliable and viable data that are compatible among the various partner agencies	Annually
	Update risk assessment with new data as conditions change	Annually
	Continue to reflect community input from meetings in risk assessment	Annually
Fuels Reduction	Track the number of acres changed from Fire Regime/Condition Class from 2 or 3 to 1	Annually
	Track the total acres treated through fuel reduction measures	Annually
	Track grants	Annually

	Document number of residents that meet the requirements of Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360)	Every 3 years
	Monitor number of evacuation routes and roads treated for fire protection on county, private, state and federal roads	Annually
	Track education programs and document how well they integrate fuels objectives.	Annually
	Evaluate opportunities for biomass marketing and utilization	Annually
Emergency Management	Track education efforts around emergency management	Annually
	Track progress on water source improvements	Annually
	Track progress on evacuation route improvements	Annually
	Track progress on access/egress improvements	Annually

Implementation of the Greater Sisters Country CWPP

Development of the Greater Sisters Country CWPP has been a complex undertaking. Implementing and sustaining these efforts will require a significant commitment. Building a collaborative and cooperative environment between community-based organizations, fire districts, local government and the public land management agencies has been the first step in reducing the risk of wildland fire. Maintaining this cooperation with the public is a long-term effort that requires commitment of all partners involved.

Goals

- Ensure that the Greater Sisters Country CWPP is implemented and maintained through continued coordination with partners in the planning area.
- Review and update the Greater Sisters Country CWPP annually.
- Develop an annual action plan that lists priorities.
- Establish an ongoing group to guide the implementation, coordination, and monitoring of the Greater Sisters Country CWPP. Membership on this group would include: Fire Chiefs (or designates) from Sisters/Camp Sherman, Black Butte Ranch, and Cloverdale, Oregon Department of Forestry (Asst. Unit Forester), Forest Service, BLM, Central Oregon Fire Management Service, and Deschutes County. The group will also serve as a forum for project specific planning, such as the upcoming City of Sisters' Fuel Reduction Project.
- Convene and produce an annual update of the plan in within one year of its completion.

Appendix A: Fire Policies and Programs

Local, state, and federal agencies have enacted many policies and programs related to community wildfire protection planning and fire protection. This appendix briefly describes these policies, as well as related county, state and federal programs.

National Fire Plan and 10-Year Comprehensive Strategy

After the disastrous 2000 fire season, Congress directed the federal land management agencies to develop the National Fire Plan (NFP). The intent of the NFP is to actively respond to severe wildland fires and reduce their impacts to communities while assuring sufficient firefighting capacity for future suppression. The NFP aims to help protect lives, communities and natural resources, while fostering cooperation and communication among federal and state agencies, local governments, tribes and interested citizens.

The NFP focuses on 1) fire suppression and protection, 2) restoration/rehabilitation, 3) hazardous fuels reduction, 4) community assistance, and 5) accountability. Most NFP funding in Oregon goes to wildland fire preparedness and hazardous fuel treatment. The National Fire Plan calls for the development of community fire plans to aid in effectively implementing NFP goals.²⁹

Federal Emergency Management Agency Disaster Mitigation Act of 2000

Federal Emergency Management Agency (FEMA), Title 44 CFR Part 201 of the Disaster Mitigation Act of 2000 requires that local and Indian tribal governments applying for pre-disaster mitigation (PDM) funds to have an approved local mitigation plan. Activities eligible for funding include management costs, information dissemination, planning, technical assistance, and mitigation projects for all types of natural disasters, including wildland fires.

Healthy Forest Initiative and the Healthy Forest Restoration Act

In 2002, President Bush announced the Healthy Forest Initiative (HFI). HFI is designed to identify and remove barriers to the implementation of projects aimed at restoring the health of the nation's forests. HFI focuses on creating more effective and efficient forest restoration projects. In addition to other provisions, HFI authorizes new categorical exclusions that allow the federal agencies to move more quickly through the required environmental analysis and streamlined consultation for National Fire Plan projects.

Congress enacted the Healthy Forest Restoration Act (HFRA) in November 2003. It provides new tools and authorities to expedite fuel reduction projects on federal land. Title I of the HFRA addresses vegetation treatments on certain types of National Forest System and Bureau of Land Management lands that are at risk of wildland fire or insect and disease epidemics. This title:

- Encourages streamlined environmental analysis of HFRA projects,

²⁹ Western Governors Association, *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-year Comprehensive Strategy*, August 2001, <http://www.fireplan.gov/reports/7-19-en.pdf> (accessed June 15, 2005).

- Encourages collaboration between federal agencies and local communities in preparing community wildland fire protection plans,
- Requires using at least 50% of the funding allocated to HFRA projects to protect communities at risk of wildland fire, and
- Encourages courts that consider a request for an injunction on an HFRA-authorized project to balance environmental effects of undertaking the project against the effects of failing to do so.

Title III of the Act also encourages communities to develop the community wildfire protection plans that identify their wildland urban interface (WUI), where HFRA projects may take place.

2004 Deschutes County Natural Hazards Mitigation Plan

The Deschutes Natural Hazards Mitigation Action Plan identifies wildland fire as the primary natural hazard in Deschutes County. The plan includes resources and information to assist county residents, public and private sector organizations, agencies, businesses, and others interested in preparing for natural hazards. The plan provides a prioritized list of activities designed to assist Deschutes County reducing risk and preventing loss from future natural hazard events.³⁰

The Oregon Forestland Urban Interface Fire Protection Act of 1997:

The Oregon Forestland Urban Interface Fire Protection Act (SB 360) was designed to reduce fire risk to homes located in fire prone interface areas that are protected by the Oregon Department of Forestry. The law establishes a basis for reducing the ignitability of structures by:

- Establishing a hazard rating for each community protected by the Oregon Department of Forestry,
- Offering treatment standards for home sites,
- Providing educational and professional fire prevention guidance for landowners,
- Requiring landowners to conduct a fire prevention assessment of their land and then certify that their interface property meets or exceeds the state of Oregon standards,
- Establishing a statewide data system to track community compliance, and
- Requiring landowners to recertify their property every five years.

The treatment standards found in the Oregon Forestland Urban Fire Protection Act of 1997 address the immediate area adjacent to a structure. These treatment standards are a result of over thirty years of research conducted by the USDA Fire Research Facility in Missoula, Montana, and directly reduce radiant heat and flame impingement, which are the leading causes of structure loss during an interface fire event. Deschutes and Jackson County are the first two counties in Oregon to implement SB 360.

³⁰ Deschutes County Emergency Management, Oregon Emergency Management, Federal Emergency Management. *Deschutes Natural Hazard Mitigation Plan* (Oregon, 2004).

Central Oregon Fire Management Service Fire Management Plan 2004

The Central Oregon Fire Management Service (COFMS) Fire Management Plan 2004 discusses all aspects of fire and fuels management in the COFMS area. COFMS includes the Deschutes and Ochoco National Forests and the Prineville District BLM. The purpose of Fire Management Plan is to identify and integrate all wildland fire management, guidance, direction, and activities required to implement national fire policy and fire management direction.

Deschutes County Community Wildfire Planning Resolution #2004-093

In August 2004, the Deschutes County Board of Commissioners passed a resolution requiring that all current and future community wildfire protection plans conform to the standards set out in the *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities*.³¹ The resolution requires that all CWPPs to which Deschutes County is a signatory shall follow this document. The purpose of the resolution was to ensure that CWPPs meet a certain level of quality and are consistent across the county.

³¹ Prepared by the Society of American Foresters, Communities Committee, National Association of Counties, Western Governors' Association and National Association of State Foresters, 2004.

Appendix B

Community Meetings Summary

In fall and winter of 2004, the Greater Sisters Country Community Wildfire Protection Plan steering committee hosted four community meetings about the Greater Sisters Country Community Wildfire Protection Plan. The objectives of the meetings were to:

- Inform the community about the purpose of the wildfire protection plan
- Identify the community values that local residents most want protected from wildland fire
- Identify local residents' most pressing concerns about wildland fire
- Identify potential emergency response improvements
- Invite local leaders to participate in the planning process

Each meeting included an overview of the wildfire plan and a discussion of key issues. The meetings also had a mapping exercise where participants identified on a map the values that they most wanted protected and the places around their community that they considered wildland fire threats. Below is a summary of the common themes and key findings that emerged at the community meetings. Also included is a summary of the issues and mapping exercise that was completed at each community meeting.

Outcomes

- Directly informed over 60 people about the community fire plan
- Developed more community interest and support for fire plan
- Identified some community members willing to participate in planning
- Gathered general and specific information about community values and concerns
- Identified potential emergency response and preparedness improvements
- Identified community priorities for federal land fuel reduction
- Identified future educational opportunities regarding prescribed burning and evacuation routes

Common Themes

- Develop buffers around the perimeters of communities on public land
- Treat road access to emergency exit routes
- Inform residents when prescribed burning is likely to occur

- Maintain a balance of fire resilience and ecosystem health (opinions on where this balance lies are varied)
- Improve signage on emergency evacuation routes
- Develop new evacuation routes in key places
- Protect key recreation and habitat resources

Community-Specific Themes

The following are summaries of the comments, suggestions, and questions that participants voiced at the community meetings about the Greater Sisters Country CWPP. The comments are presented as a means to capture the issues and concerns that were raised. The summary does not present a comprehensive list of all comments and all comments could not be incorporated into the community fire plan.

Sisters Community Meetings and Written Comments

Values

Protect important natural areas including—but not limited to:

- Metolius Wild and Scenic corridor
- Three Creeks Area
- McKenzie Pass
- Black Butte as important local landmark
- Squaw Creek Falls, Cow Camp, Whispering Pines, Jack Creek
- Head of the Metolius
- North of Dugout Lake-Meadows
- The health and safety of the people in the Camp Sherman area
- The cabins and Camp Sherman store along the Metolius—historic significance
- Black Butte School
- Community hall, Fire Hall

Areas to treat

- Pole Creek Trailhead, Three Creek Lakes and Tam MacCarthur Rim
- 200 ft perimeter buffer around Crossroads
- Approach and descent into Sisters from Hwy 20 is special and should be protected

Emergency Response

- Improve and protect evacuation routes and egress

- Protect water tank southwest corner of Crossroads
- Find more water sources for suppression

Communication

- Communication right at the beginning of a fire is difficult—nothing is on T.V. or radio
 - Need better communication to residents
- The B & B Fire was a breakthrough for communication
 - Good website updates
 - Bulletin boards in town
 - Good daily meetings at the schools

Economic Development

- Personal use firewood-can more areas be opened up?
- Look at economic opportunities to:
- Promote utilization of small diameter material
- Find markets for by-products of fuel reduction and restoration

Education

- Look at educational opportunities to encourage people do their share
- Get water back in Trout Creek
- Return water to watersheds, use natural fuel breaks in meadows and riparian area
- Explore alternative options to prescribed burning
 - Need to protect air quality
- Need more prescribed burning behind Crossroads

Discussion and Responses

- Can we treat in wilderness areas? Is this a threat?
- Forest Service can do limited treatments in wilderness areas.
- Forest Service is focusing on areas closer to the communities and are monitoring the insect infestation
- Forest Service has offered and will continue to offer firewood permits

Note: the Greater Sisters Country CWPP does not propose hazardous fuels reduction treatments in wilderness areas.

Mapping Results

At the Sisters community meetings, there were maps of City of Sisters, Crossroads, Tollgate, and Camp Sherman.

Sisters City Limits

- Treat Forest Service land directly adjoining the community
- Need treatment on Forest Service land, the southern of the southern end of Black Crater Rd., and immediately south of the southern end of Creekside Rd.
- City wastewater treatment site
- Treat Forest Service land west of Adams Rd.
- Clean up junipers off of southern end of Brooks Camp Rd.
- Provide sense of security for homeowners and businesses owners
- Provide reassurance for businesses considering relocating or setting up in Sisters that it is safe location
- Treat land near Sisters Park Rd.
- Treat Forest Service land west of Adams Rd.
- Treat perimeter lots at Panoramic View Estates
- Buffer on the north west side of Cloverdale is a high priority
- Wind direction is primarily northwesterly
- Protect the evacuation routes, especially one near the golf course
- Develop fuel breaks on Forest Service land off the southern end of McKinney Butte
- Treat U.S. Forest Service land outside of Crossroads
- Protect walking and horseback riding resources outside of Crossroads on Forest Service land

Crossroads

- Develop buffer on Forest Service land around the community of Crossroads, area of concern
- Treat common areas and main roads
- Improve emergency exit road to Forest Service Road 15; no access for fire truck
- Return water to tank on Forest Service land
- Thin around the southern border of Crossroads on Forest Service land

- Thin around the western border of Crossroads on Forest Service land
- Protect emergency exits
 - Western end of Sage Rd.
 - South western emergency exit
 - Western end of Bluegrass Loop
 - McKenzie Rd. and Crossroads
- Maintain the park-like conditions on Forest Service land on southern border of community
- Put in directions/signs through forest to get to main roads (signs exist but are not up due to concerns over vandalism)

Camp Sherman

- Develop 600 ft buffer on Forest Service land around Camp Sherman
- Develop 1500 ft buffer on Forest Service land around Camp Sherman
- Treat federal lands around head of the Metolius and Metolius River Rd.
- Protect Metolius headwaters
- Protect summer homes along the Metolius
- 1,500 ft. buffer would be even better. Was discussed at town hall meeting held at Black Butte School

Black Butte Ranch Community Meetings and Written Comments

- Protect the big trees
- Protect/maintain views
- Protect waterways and riparian areas: Paulina Spring, Metolius, etc.
- Protect recreation opportunities, such as trails
- Metolius and Camp Sherman are highly prized areas
- Protect Jack Creek
- Provide visibility and safety along roadways (like Hwy 20 project); keep Hwy 20 open
- Concern over adverse impacts from recreation-resource damage, fire starts
- Financial loss from roads being closed, esp. Hwy 20.
- Concerns over fuel load on Black Butte, Black Crater
- Concern over large and fast moving fires coming out of wilderness
- Address beetle-kill A.S.A.P-clean out/thin before it gets worse

- Slash pile controls—concern over escape and what’s being burned; also alternatives like chipping
- Air quality—during prescribed burns bad for tourism and health
- Public education about burning, fuels, risk. Help people understand what we are doing and why
- Use a preventative, not reactive approach
- Emergency exit routes-are there enough?
- Add/have temporary emergency exit when time is too short to get everyone out through one exit
- Use Black Butte Ranch newsletter as outreach

Mapping Results

- Avoid high intensity crown fire that send embers into the Ranch
- Protect important habitat:
 - Fish spawning habitat in creeks
 - Protect spring and riparian areas
- Protect Glaze Meadows
- Protect
 - Paulina Springs
 - Protect Graham Corral and Horse Camp
 - Protect Black Butte
- Thin on Forest Service land:
 - Due west of Fiddleneck Rd.
 - East of McAllister Rd. and north of Monita Rd.
 - West of Pinedrop Rd.
- Treat roadside on evacuation routes
- Protect gates and emergency exits
 - Power line gate emergency exit route .2 miles north of Hellbore Rd.
 - Gate and escape route north of Galium Rd.
 - Gate and escape route near Linnaea Borealis Rd
 - Gate and escape route near .2 miles east of the eastern end of Eoin-Follette Rd.
 - Protect gate and escape route near Fiddleneck and Hawks Beard
- Burn hand piles near Atherium, No Name 01 Rd., and Hawks Beard

- Thin on western end of Anapholis Rd. and western end of Trillium Rd.

Cloverdale Community Meetings and Written Comments

- Fire district priorities are:
 - Panoramic View Estates
 - Forked Horn Estates
 - Kent and Ivy
- Aspen Lakes Golf Course is at lower risk but site is being considered for 100+ home sites and destination resort.

Values

- Protect district and subdivision perimeters against the big fires coming in (like the Delicious Fire, 1991).
- Protect wildlife habitat
 - Golden eagle nesting habitat
 - Protect elk and migration route
 - Wildlife corridors
- Maintain some fuels for wildlife habitat (brush, grass, trees).
- Protect historic canals
- Need to establish escape route on Panoramic View Estates
- Develop new evacuation routes-maybe on Camp Polk Rd.
- Do not close off Hurtley Rd
- Kent/Ivy also priority; access, Egress and federal lands
- Concern with use of commercial timber sale as a method of removing trees
- Predominant winds from the Northwest
- Lots of absentee homeowners
- Squaw Creek area, northwest of Panoramic View Estates could be next priority
- Strive to achieve a balance between wilderness values and “defensible space”—concern over destroying natural landscape

Mapping Results

- Protect perimeter of subdivisions; on both Forest Service and BLM land
- Need fuel reduction near western end of Ponderosa Subdivision
- Need to treat the area in the Canal planning area, near southern end of Casica Rd.
- Protect the elk habitat near Delicious Rd and toward the northern end of Hinkle Butte Rd.

- Protect old stagecoach stop near eastern end of Farthing Rd.
- Protect county dump east of George Cyrus Rd.
- Protect Dry Canyon—has cougar habitat and petroglyphs
- Reduce fuel in and around ponderosa stand, about .2 mi. north of Sisters View Rd.
- Delicious Fire—Forest Service land, 1991
- Protect wildlife and riparian corridor on creek near No Name 10 Rd.
- Protect fish and riparian habitat near western end of Suntree Rd.
- Protect emergency exit off northern end of Hurtlely Ranch
- Protect wildlife and riparian habitat owned by Deschutes Basin Land Trust immediately east of Pintoway Rd.

Appendix C: GIS Data Sources

Risk Assessment Methods

Data Sources

File Name	Date	Source	Treatment
FNLSISHISTFIRE	Fires from 1993-2003	Central Oregon Fire Atlas	Fire Density – State and Fed fires were combined and condensed to include only human and lightning caused. This was clipped to the Sisters Country CWPP boundary and run through Spatial Analyst >density with the following parameters: Kernel, search radius=3724ft (The radius of a 1000ac circle), 30ft cell size, Area Units=acres. Reclassified to the state standard and assigned points as follows: Low or 0-.1 per 1000 acres per 10 years = 5pts; Moderate or .1-1.1 PER 1000 acres per 10 years = 20pts and High or 1.1+ per 1000 acres per 10years = 40pts. "FNLSISTHISTFIRE" is the final fire density raster.
FNLSISHAZDRAS	Obtained Nov 2004	Central Oregon Fire Atlas and DEMs Fire Regime/Condition Class data obtained from Fire Atlas is from 1996 remote sensed satellite imagery	DEMs use 10-meter resolution downloaded from GIS data library. Each DEM was run trough Spatial Analyst for Slope and Aspect. I used Arc View's default for determining North, Northeast, etc. Slope was calculated in % and then reclassified to 0-25%=0; 26-40%=1 and >40%=2. Aspect was reclassified: N, NW, NE=0; W,E=3; and S,SW,SE=5. The DEM was reclassified into 3 classes: 0-1133.8m (3500ft.) =2; to 1524m (5000ft.) =1 and above 5000=0.These 3 grids were added together in Raster calculator to produce "FNLSISTOPOG", a 1-10 breakdown of Topographic Hazard. A 4th raster was created form the CWPP boundary with all cells = 40pts (Weather). Reclassifying the Fire Regime/ Condition Class raster obtained from the Central Oregon Fire Atlas created a 5th raster. 30 points maximum was assigned and the three rasters were combined in Raster Calculator to produce "FNLSISHAZDRAZ"(80PTS)
SISRFPDRCLS	Obtained Jan 2005	ODF	Convert to grid, reclass according to fire managers. All areas within a fire district were given 5pts and all areas not in were given 15 pts.
FNLCWPPSTRDEN	Obtained Dec 2004	Deschutes and Jefferson Co	Jefferson Co. tax records were mined for tax lots with improvements (No value is supplied). These were assigned a point feature. A shape file "Structures" was obtained from ODF off of Deschutes County's GEOMEDIA disk. Stu Otto (ODF) believed the county used \$5000 and above as their criteria. "Structures" was then unioned to the Jefferson Co file. The points were then run through Spatial Analyst>Density with the following parameters: Kernel, 372ft (113.386m) search radius (The radius of a 10ac circle), 30ft cell size (To maintain the 10m cell size of the rest of the data), Area Units = acres. Reclassified to the Homes per 10 acres density standard with 0-.9 =2pts;1-5 = 15pts and 5.1+ = 30pts "FNLCWPPSTRDEN" is the final structural density raster and comprises 30 pts of the "Values Protected" category's 50 pts.

Risk Assessment Methods

Data Sources

File Name	Date	Source	Treatment
FNLSISAOIRAS	Developed Jan 2005	Areas identified by fire managers	Converted to grid and reclassified according to fire managers. 14 Areas were identified and assigned up to 90 pts depending on their "Structural Vulnerability"
FNLSISTCALC	Developed Jan 2005	Developed by COIC GIS	Mosaic (adding all rasters together) was then performed on these rasters in Spatial Analyst>Raster Calculator. Each cell now has a risk value.
Individual Subdivision or Area of Interest Average Value	Developed Jan 2005	Developed by COIC GIS	Each Subdivision or Area of Interest was buffered by 1½ miles and run through Spatial Analyst>Zonal Statistics to obtain average values for the area within the Subdivision or AOI and the area within the 1½ mile buffer.