Beaverhead County Montana

2025

Community Wildfire

Protection Plan

Prepared by Vigilante Wildland Fire Consulting, LLC

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The Beaverhead County Community Wildfire Protection Plan (CWPP) is a living document that is periodically updated as new information becomes available. Updated versions of the 2025 CWPP and associated maps can be found at the Beaverhead County CWPP Online Story Map, which is a central location to find the most updated version of all CWPP material. The online story map can be accessed by going to the URL listed below or scanning the QR code below.

Online Story Map Beaverhead County Community Wildfire Protection Plan

Link
https://storymaps.arcgis.com/stories/8018d20f7cdd45c8879329752eab6ecd

Beaverhead CWPP Story Map

1. Executive Summary

The Beaverhead County Community Wildfire Protection Plan (CWPP) represents a vital commitment to the safety and well-being of our community. Beaverhead County boasts a rich natural landscape, a thriving rural community, and a vibrant history in the heart of Southwest Montana's scenic beauty. However, these attributes make us vulnerable to the increasing threat of wildfires, which can have devastating impacts on our lives, property, and environment.

This CWPP aims to address these challenges head-on and create a resilient, fire-adaptive community. This plan aligns with the principles of the National Cohesive Strategy, emphasizing collaboration, preparedness, and a shared responsibility for wildfire management.

Key Objectives of the Beaverhead County CWPP:

Assessing Our Risks: We begin by comprehensively assessing the wildfire hazards specific to our region, considering factors such as fire history, fuel types, topography, and weather patterns. Through this analysis, we identify high-risk areas that demand our immediate attention.

Protecting Our Community: We prioritize the protection of our residents, homes, and critical infrastructure. Strategies include fuel reduction efforts, land use planning, building and home hardening, and extensive public education and outreach initiatives.

Being Prepared to Respond: A timely and effective response to wildfires is paramount. We outline early warning systems, evacuation planning, establishing community firebreaks and safe zones, and strengthen our fire response capabilities, including local fire departments and access to essential equipment and resources.

Ensuring Resilience: Recognizing that recovery and long-term resilience are equally important, we address post-fire assessment, community recovery planning, ecosystem restoration, and sustainable strategies that promote resilience in the face of future fire events.

Implementation and Collaboration: The success of this plan relies on the active participation of our community, local agencies, organizations, and government bodies. We delineate priority actions and projects, resource allocation, roles and responsibilities, and ongoing monitoring and evaluation mechanisms to ensure our collective efforts are effective and adaptive.

Message from the CWPP Team

Beaverhead County's Community Wildfire Protection Plan (CWPP) embodies our unwavering commitment to preserving our community's values, heritage, and natural resources. We understand that successful wildfire preparedness and resilience hinge on collaboration and partnerships with local, state, and federal agencies, as well as the active involvement of our residents and stakeholders.

As we embark on this journey toward improved wildfire preparedness, we extend our heartfelt gratitude to everyone who contributed to the creation of this plan. Your dedication and hard work have laid the foundation for a safer and more resilient Beaverhead County. Together, we will not only face the challenges posed by wildfires but also emerge stronger, better prepared, and more unified as a community.

By implementing the strategies outlined in this CWPP, we ensure that Beaverhead County remains a place of beauty, safety, and vitality, even in the face of the ever-present wildfire threat.

Thank you,

The CWPP Team

1.1 purpose

This Community Wildfire Protection Plan (CWPP) aims to safeguard our community against the ever-present threat of wildfire while promoting the principles and strategies outlined in the National Cohesive Strategy and the Wildfire Commission Report. This plan serves as a comprehensive roadmap for our community to proactively address wildfire hazards, enhance our preparedness and response capabilities, and foster a resilient environment that sustains life, property, and the natural landscape. Through collaborative efforts, informed decision-making, and the engagement of all stakeholders, our CWPP aims to reduce the risks associated with wildfires, protect our residents, and preserve the unique character and values of our community for generations to come.

1.2 Existing Strategies

1.2.1 Existing Strategies: the national cohesive strategy

In 2009, Congress passed the Federal Land Assistance, Management, and Enhancement Act (FLAME Act), which directs the U.S. Department of Agriculture (USDA) and the Department of the Interior (DOI) to develop a national cohesive wildland fire management strategy to comprehensively address wildland fire management across all lands in the United States. Under the direction of the intergovernmental Wildland Fire Leadership Council (WFLC), the National Cohesive Wildland Fire Management Strategy effort (Cohesive Strategy) was initiated in 2010 through a three-phased approach to planning, risk analysis, and collaboration by Federal, state, local, and tribal governments and non-governmental partners and public stakeholders. The phased approach allowed systematic and thorough engagement by stakeholders throughout the effort. Each phase included milestones that serve as the building blocks for subsequent steps. This report, The National Strategy, The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy (National Strategy), and the companion National Action Plan culminate the third phase of the Cohesive Strategy effort. The National Strategy recognizes and accepts fire as a natural process necessary for the maintenance of many ecosystems, and strives to reduce conflicts between fire- prone landscapes and people. By simultaneously considering the role of fire in the landscape, the ability of humans to plan for and adapt to living with fire, and the need to be prepared to respond to fire when it occurs, the Cohesive Strategy takes a holistic approach to the future of wildland fire management.

1.2.2 Existing Strategies: The Wildfire Commission Report

For decades, the wildland fire crisis has been growing, along with more severe, catastrophic wildfires that devastate communities and ecosystems and threaten lives and livelihoods across the country. In response, President Biden's Bipartisan Infrastructure Law created the federal Wildland Fire Mitigation and Management Commission in 2021 and charged it with recommending improvements to how federal agencies manage wildfire across the landscape. Co-chaired by the Departments of Agriculture, the Interior, and the Federal Emergency Management Agency, the commission brought together a rare diversity of backgrounds, experiences, and expertise to address the wildfire crisis. The commission also solicited, considered, and integrated public input in its discussions and recommendations in the reports. Throughout its deliberations, the Commission sought to address the wildfire system holistically, to create communities and landscapes that are resilient to wildfire as a natural and integral part of the nation's future.

The 50 commission members were selected from more than 500 applicants, representing federal agencies, state, local, and Tribal governments, as well as the private sector. The commission submitted its first report to Congress in February 2023, which recommended strategies to improve aerial firefighting efforts and meet equipment needs through 2030.

The report makes 148 recommendations covering seven key themes:

Urgent New Approaches to address the wildfire crisis

Supporting Collaboration to improve partner involvement at every scale Shifting from Reactive to Proactive in planning for, mitigating, and recovering from fire

Enabling Beneficial Fire to reduce the risk of catastrophic wildfire

Supporting and Expanding the Workforce to hire and retain the wildland firefighting staff needed to address the crisis

Modernizing Tools for Informed Decision-making to better leverage available technology and information

Investing in Resilience through increased spending now to reduce costs in the long run (Source: USDA)

Many of the recommendations in this CWPP align with the recommendations put forth by the commission

2. Introduction

The basis for Community Wildfire Protection Plans began with the National Fire Plan, which was developed in 2000 following a significant national wildfire season. Community- based wildland urban interface planning was then more formally encouraged through the Healthy Forests Restoration Act (HFRA) of 2003. The 2010 version of this plan was prepared in accordance with the guidelines set forth in the "Preparing a Community Wildfire Protection Plan, A Handbook for Wildland-Urban Interface Communities" publication dated March 2004. "The 10-Year Strategy Implementation Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment," dated December 2006, provides additional authority and guidance for these plans. The need for community wildfire risk assessments and prioritization of hazardous fuels funding has been further highlighted in Section 503 of the Federal Land Assistance, Management and Enhancement (FLAME) Act of 2009. The FLAME Act has resulted in "A National Cohesive Wildland Fire Management Strategy," dated March 2011 and updated in 2023, that again calls for engaging the public for community-based wildfire planning and mitigation. In Montana, 2009 Senate Bill 131 requires local governments to include analyses and regulations for wildfire hazard areas in their growth policies and subdivision regulations. This plan is designed to assist Beaverhead County in meeting these requirements.

2.1 Plan Development

The Community Wildfire Protection Plan for Beaverhead County, titled the 2005 Beaverhead County Community Wildfire Protection Plan, was developed in 2005 with the assistance of a contractor: Basic Biological Services, LLC.

The Strategic Wildland Fire Plan was developed with consultation and input from the: Beaverhead County Local Emergency Planning Committee, Beaverhead County Planner, Beaverhead County Fire Warden, Beaverhead-Deerlodge National Forest, Montana Department of Natural Resources and Conservation, Dillon Unit, Southwest Montana Fire Council, and Local Fire Agencies within Beaverhead County.

Subdivision regulations are normally developed after completion and adoption of the Growth Policy. The existing Subdivision Regulations have not been updated since the adoption of Beaverhead County's Growth Policy. In Planning for Wildfires, six strategies are offered for dealing with development in the wildland-urban interface, they include:

Conduct Wildfire Planning in a comprehensive planning context. This CWPP accomplishes this strategy.

Conduct a program of regulation and enforcement that stresses continuous individual responsibility by homeowners and property owners including:

Subdivision regulations.

Zoning regulations, such as a wildland-urban interface overlay.

Building and fire codes

Conduct an effective ongoing program of education and outreach to affected residents and property owners.

The Community Wildfire Protection Plan was updated in 2010 through the Beaverhead County Department of Emergency Management with the assistance of a contractor, Fire Logistics, LLC and now, in 2025, the plan was updated again with the guidance of a local working group of similar stakeholders with the assistance of a contractor, Vigilante Wildland Fire Consulting, LLC.

2.2 Plan Maintenance/Monitoring

The Beaverhead County Department of Emergency Management in coordination with local fire cooperators is charged with maintaining the Beaverhead County Community Wildfire Protection Plan. The Emergency Management Director will collaborate with the Beaverhead County Fire Warden, Beaverhead County Local Emergency Planning Committee, and other community organizations and stakeholders. Ideally, a long-term committee consisting of local officials, wildfire experts, and citizens would work with the aforementioned entities to conduct and guide activities related to wildfire awareness and mitigation and future plan updates.

In order to accurately and consistently monitor progress towards the goals, objectives, and strategies outlined within the CWPP, an annual review of the action plan will be conducted during which any completed strategies will be updated, and any pending additions or revisions to the CWPP document or the associated CWPP story map will be implemented.

2.2.1 Action Plan

The 2025 CWPP is designed to function as a living document with updates occurring as needed, with an annual review and a full update every five years. It is anticipated that additional goals, objectives, and strategies will be added as conditions and needs for Beaverhead County, and that the format of the action plan will facilitate easy integration of these elements.

2.2.2 Monitoring Plan

In order to accurately and consistently monitor progress towards the goals, objectives, and strategies outlined within the CWPP, an annual review of the action plan will be conducted during which any completed strategies will be updated, and any pending additions or revisions to the CWPP document or the associated CWPP story map will be implemented. The annual review will also consider substantive changes to other plans, policies, and regulations identified in section 1 (e.g. updates to the Montana Forest Action Plan) and/or substantive changes to data used to develop the WUI and risk assessment for this CWPP. In order to remain relevant and useful, CWPPs should be fully updated once every five years; the next CWPP update would occur in 2030(DNRC 2022).

3. Community Profile

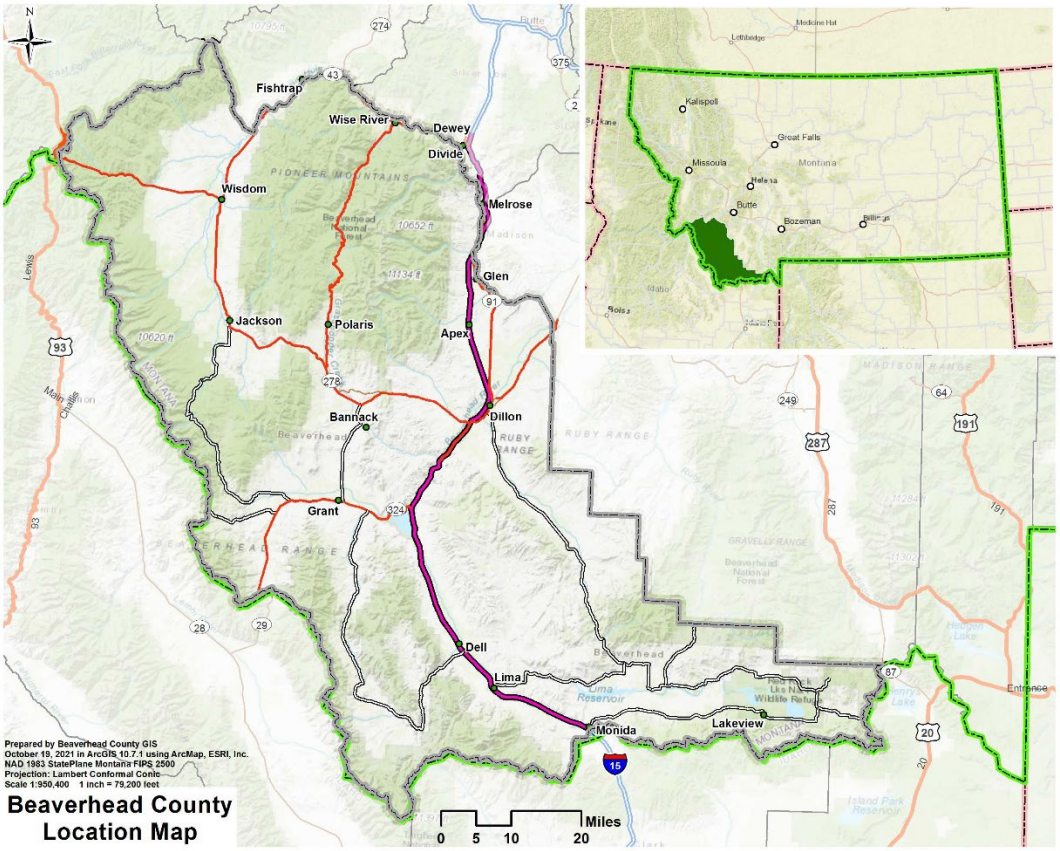
Beaverhead County is located in Southwestern Montana and has a land area of about 3.5 million acres or 5,572 square miles (Map 1 North and South). It is the largest county in Montana and is one of the largest counties in the United States. Beaverhead County, is comparable in size to the state of Connecticut. It is bordered by the state of Idaho on the south and west, Ravalli County, Montana, on the west; Madison County, Montana to the east and Silverbow and Deerlodge Counties, Montana, to the north. There are three major rivers that flow through Beaverhead County: the Red Rock River, the Beaverhead River, and the Big Hole River. Each river runs through a very large mountainous valley.

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

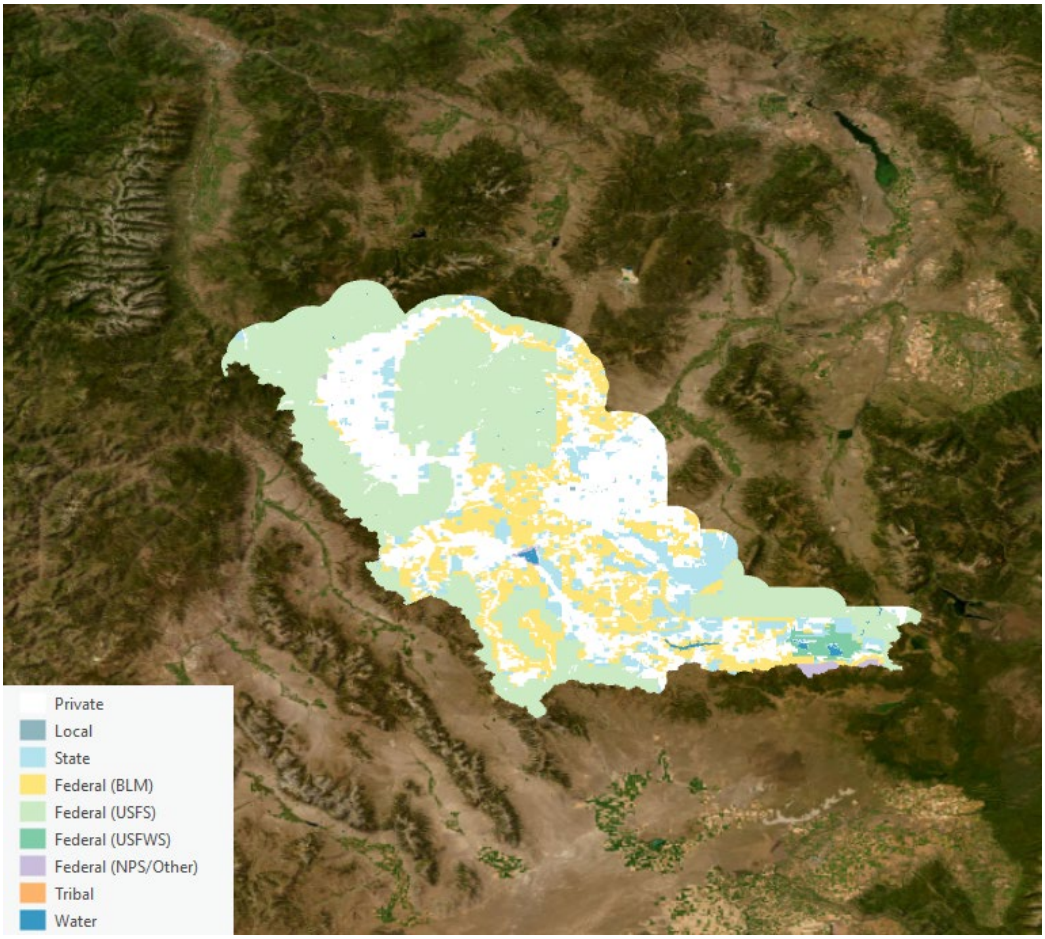
Elevation in Beaverhead County ranges from 4,770 feet above mean sea level along the Big Hole River near the northeast border of the county, to 11,154 feet at Tweedy Mountain in the East Pioneer Mountains, 21 miles northeast of Dillon. The Beaverhead County landscape is diverse and consists of glaciated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

3.1 Geographic Profile

Map 3.1 Area Description



Map 3.2 Beaverhead Public Lands



3.2 Wildland Urban Interface

The term "wildland-urban interface" refers to the space where structures and other forms of human development merge with wildland or vegetative fuels. Beaverhead County, like many other areas, faces a growing wildfire problem due to the development of residential lots of varying sizes. This poses several complex issues that need to be addressed by local authorities and firefighting agencies.

Some of the challenges presented by the wildland-urban interface in Beaverhead County include:

Subdivision Development

Defensible Space Requirements

Building Construction Requirements

Fuel Reduction on all ownerships

Fire Protection of structures outside of existing fire protection agencies

It is crucial to identify and prioritize high-hazard areas where significant wildfires are likely to occur. These regions are characterized by significant fuel buildup, including timber and other materials, and human development, such as structures or infrastructure. Identifying wildland areas that could see development in the future is also essential. Therefore, a vast majority of the county is defined as the wildland-urban interface based on the concentration of structures, infrastructure, and critical values at risk that are exposed to the risk of ignition from wildland fire.

By recognizing the complexities of the wildland-urban interface and working to address the issues, Beaverhead County can reduce the risk of wildfires and protect both human life and property.

3.2.1 Identifying the Wildland Urban Interface

The wildland-urban interface (WUI) is where human development meets or intermingles with wildland vegetation, such as forests, grasslands, or other natural areas. This zone is characterized by the proximity of homes, structures, and communities to potentially wildfire-prone landscapes. The WUI presents unique challenges for fire management and emergency response, combining the risks associated with wildland fires and urban development.

The CWPP team explored various methodologies while identifying the Wildland-Urban Interface (WUI). After months of utilizing GIS models and conducting ground checks, the team finalized the WUI map and methodology Map 3.2.1a.

This method employs Geographic Information Systems (GIS) and high- resolution aerial imagery to detect structures and evaluate population density in the designated study region. Emphasis is placed on generating Wildland- Urban Interface (WUI) polygon layers by pinpointing structure locations and recognizing the significance of population density in delineating WUI boundaries. Furthermore, it underscores the involvement of mitigation planning committees in enhancing population density maps by identifying vital infrastructure. The techniques and resources outlined serve as the groundwork for our extensive examination of the WUI and its impact on wildfire management and community well-being.

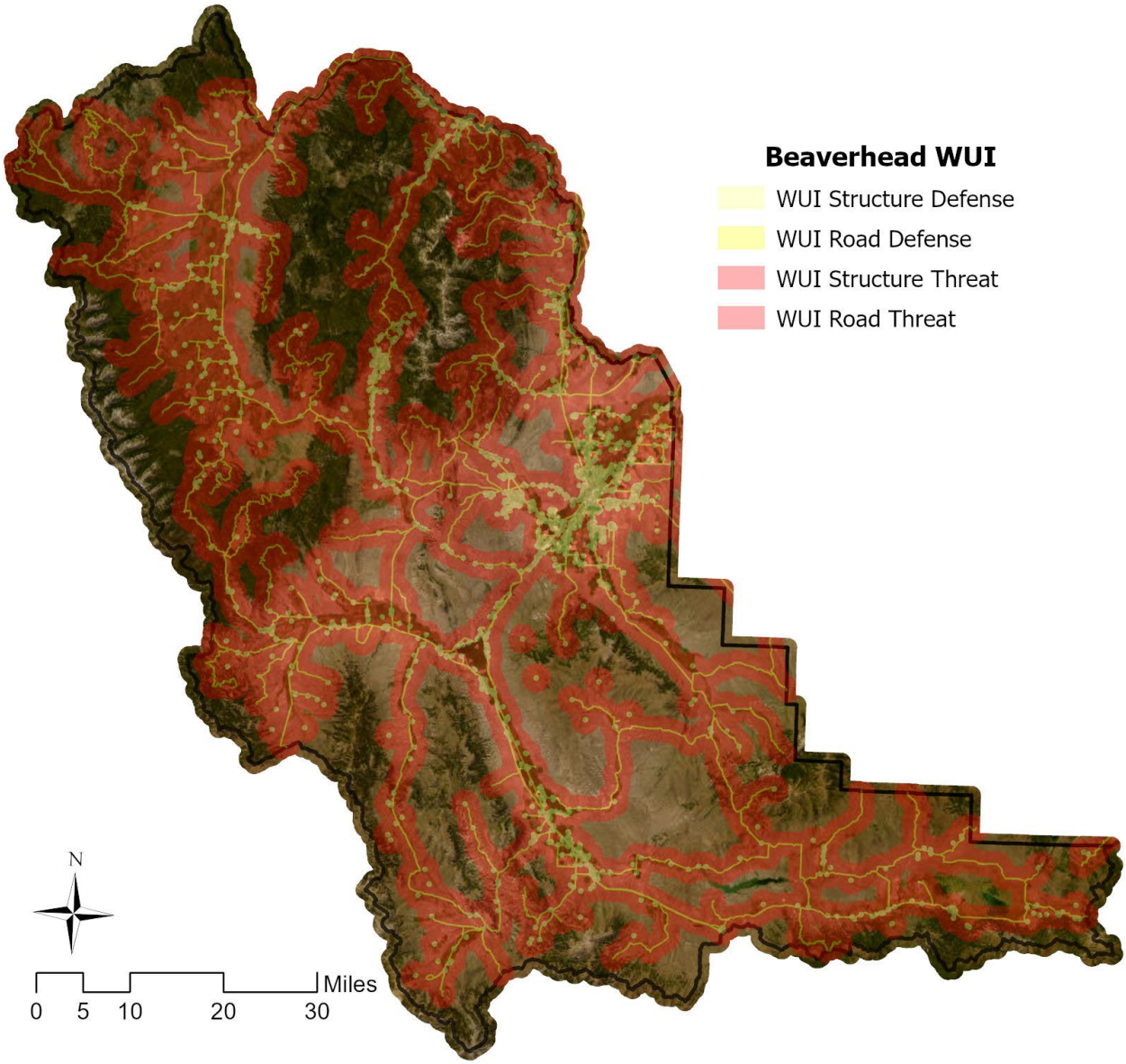
The model is built upon the following GIS parameters

WUI Intermix was created utilizing a map of all County structures from 2023 and buffering the structures by 250 feet with manual correction within subdivision boundaries.

WUI Defense is a ¼ mile buffer from WUI intermix, and 500 feet buffer off major roadways.

The **WUI Threat** area is a 1¼ mile buffer from the WUI Defense buffer.

Map 3.2.1a Beaverhead Wildland Urban Interface



3.3 Demographics

Understanding the demographic profile of Beaverhead County is crucial for effective wildfire protection planning. This section provides an overview of the county's population characteristics, which help to identify the community's needs and resources for wildfire preparedness, response, and recovery.

Current Population and Growth

As of 2024, Beaverhead County, Montana, has an estimated population of 10,161. This reflects a growth rate of 1.38% over the past year, demonstrating a steady increase in residents since the 2010 census, which recorded a population of 9,300 (USAFacts) (World Population Review).

Age Distribution

The median age in Beaverhead County is 43.4 years old. With a substantial 28.6% categorized as seniors (65 years and older). This demographic detail is essential for planning evacuation strategies and communication during wildfire events, as older adults may require additional assistance (Montana Demographics).

Racial and Ethnic Composition

Beaverhead County's population is predominantly White, comprising 92.3% of the total population. Other racial groups include those identifying as two or more races (4.84%), Asian (0.85%), and Native American (1.69%). Other race 0.27%, Native Hawaiian or Pacific Islander (0.01%)(Montana Demographics).

Household and Family Dynamics

The county has 4,121 households, with an average household size of 2.21 persons. Of these households, 67.3% are owner-occupied, indicating a high rate of homeownership which is relevant for assessing property risks and preparedness levels. Family households make up a significant portion, with married couples representing 82.1% of the total families (World Population Review, US Census Bureau).

Education and Economic Factors

Education levels in Beaverhead County show that 22.26% of residents hold a bachelor's degree, and 9.38% have a graduate degree. The median household income is $58,072, with 14.68% of families living below poverty line. Economic stability and educational attainment can influence the community's capacity to invest in fire-resistant infrastructure and participate in educational programs on wildfire risk reduction (Montana Demographics) (USAFacts).

Implications for Wildfire Protection

Demographic data underscores the importance of tailored communication and support strategies, particularly for the elderly and economically disadvantaged residents. High homeownership rates suggest a vested interest in protecting properties, but also highlights the need for widespread community engagement in wildfire mitigation efforts. This demographic profile will guide the development of targeted initiatives to enhance wildfire resilience across Beaverhead County.

3.4 Vulnerable populations

Identifying and addressing the needs of vulnerable populations is a critical component of the Community Wildfire Protection Plan. Vulnerable populations in Beaverhead County include older adults, individuals with disabilities, children, economically disadvantaged families, and non-English speakers. These groups may face unique challenges during wildfire events, including evacuation difficulties, limited access to emergency information, and barriers to recovery resources.

Older Adults

Beaverhead County has a significant proportion of older adults, with 28.6% of the population being 65 years or older. This demographic is particularly vulnerable during wildfires due to potential mobility issues, reliance on medical equipment, and the need for regular medication. Emergency plans must include specific provisions for assisting older residents with evacuation and ensuring their medical needs are met during an emergency (USAFacts) (World Population Review).

Individuals with Disabilities

People with disabilities often require additional support during emergencies. This includes those with physical disabilities, sensory impairments, cognitive disabilities, and chronic health conditions. Ensuring that evacuation plans, emergency shelters, and communication methods are accessible to individuals with disabilities is vital. This may involve providing transportation assistance, accessible shelters, and clear, understandable emergency information (USAFacts).

Children

Children represent a vulnerable group due to their dependence on adults for care and their limited ability to understand and respond to emergency situations. In Beaverhead County, the dependency ratio indicates that children and seniors together form a significant portion of the population. Special attention is needed to ensure that children are safe, receive timely evacuation, and have access to necessary resources and support systems during and after wildfire events (Montana Demographics) (World Population Review).

Economically Disadvantaged Families

Families living below the poverty line, which constitute about 14.68% of Beaverhead County's population, often lack the financial resources to prepare for and recover from wildfires. These households may struggle to afford fire-resistant modifications to their homes, emergency supplies, and post-disaster repairs. Providing financial assistance, affordable housing options, and economic recovery programs is crucial for these vulnerable families (Montana Demographics) (USAFacts).

Non-English Speakers

Non-English speakers may face language barriers that hinder their access to emergency information and services. While the vast majority of Beaverhead County residents speak only English, a small percentage (4.77%) speak other languages, primarily Spanish. Ensuring that emergency communications are available in multiple languages and that translation services are accessible during emergencies is essential for protecting this population (World Population Review).

4. Community Wildfire Risk Assessment

Fire has historically played a vital role in the ecosystem of Beaverhead County.

Before the implementation of aggressive fire suppression strategies, wildfires

occurred naturally, periodically burning through vegetation and reducing fuel loads. These fires not only helped to prevent the accumulation of hazardous fuels but also contributed to the health of the ecosystem by returning nutrients to the soil and removing dead and diseased plants.

Changes Due to Fire Suppression

Approximately a century ago, fire suppression activities began to be widely practiced. This marked a significant shift in the natural fire regime, particularly in forested areas. Historically, the ecosystem experienced frequent, low- intensity surface fires, which maintained a balance by preventing the excessive build-up of fuels. However, with the advent of fire suppression, these low- intensity fires have been largely excluded from the landscape, leading to an unnatural accumulation of fuels. Consequently, the same areas that once experienced manageable surface fires are now prone to high-intensity, stand-replacing wildfires.

Impact of Livestock Grazing and Fire Exclusion

Fire exclusion has been further exacerbated by livestock grazing, which began in the 1860s. Livestock grazing has significantly reduced the fine fuels that are necessary for carrying low-intensity fires. This reduction in fine fuels has altered the structure, density, and composition of plant species within the Beaverhead Watersheds, making the area more susceptible to severe wildfires.

Historical Harvesting and Forest Management

The need for forest products to support mining and agricultural activities in the late 1800s and early 1900s also played a role in altering the landscape. Extensive harvesting of forests, particularly on the lower slopes of the Pioneer Mountains, changed forest distribution and species composition, contributing to the restriction of natural fires. This historical harvesting, combined with fire suppression policies like the "10am policy" of the late 19th and early 20th centuries, which mandated that all wildland fires be extinguished by 10am the following day, significantly reduced the occurrence of large fires. This reduction in fire frequency has had long-term effects on forest health and resilience.

Changes in Forest Successional Stages and Implications

Most forests in Beaverhead County have experienced a significant reduction in early and mid-seral successional stage forested habitats. This loss of successional variety across the landscape has critical ecological implications. A diverse range of successional stages is essential for maintaining biodiversity, as different species rely on various stages for habitat and food resources. The homogenization of forest stages increases vulnerability to widespread insect infestations and disease outbreaks, as these disturbances often thrive in less diverse ecosystems (Montana Demographics).

The information provided from the U.S. Bureau of Land Management's (BLM)

Beaverhead Watershed Drought Resiliency Plan, 2016) focuses on BLM lands in Beaverhead County. It is important to note that different habitats within the county have varying natural fire frequencies and intensities. However, much of Beaverhead County has not experienced wildfires at the frequency or severity that would be expected under natural conditions. This deviation suggests a significant build-up of fuels in many areas, potentially leading to larger, more intense, and more severe wildfires in the future than historically observed (USAFacts) (World Population Review).

Forest Structure Changes and Wildfire Risk in the 21st Century

In the 21st century, Beaverhead County faces a significant challenge with stands of mature and over-mature Douglas fir and lodgepole pine. These changes in forest structure, combined with increased insect and disease activity, have raised the likelihood of high-intensity fires in areas that historically experienced more mixed-severity fires. The continuity of fuels has increased, making it more probable that future fires will be significantly larger and more severe than those that occurred historically. Large-scale, high-severity fires pose considerable risks to human life, property, watershed stability, and fish and wildlife habitats.

Impact of Land Use Changes

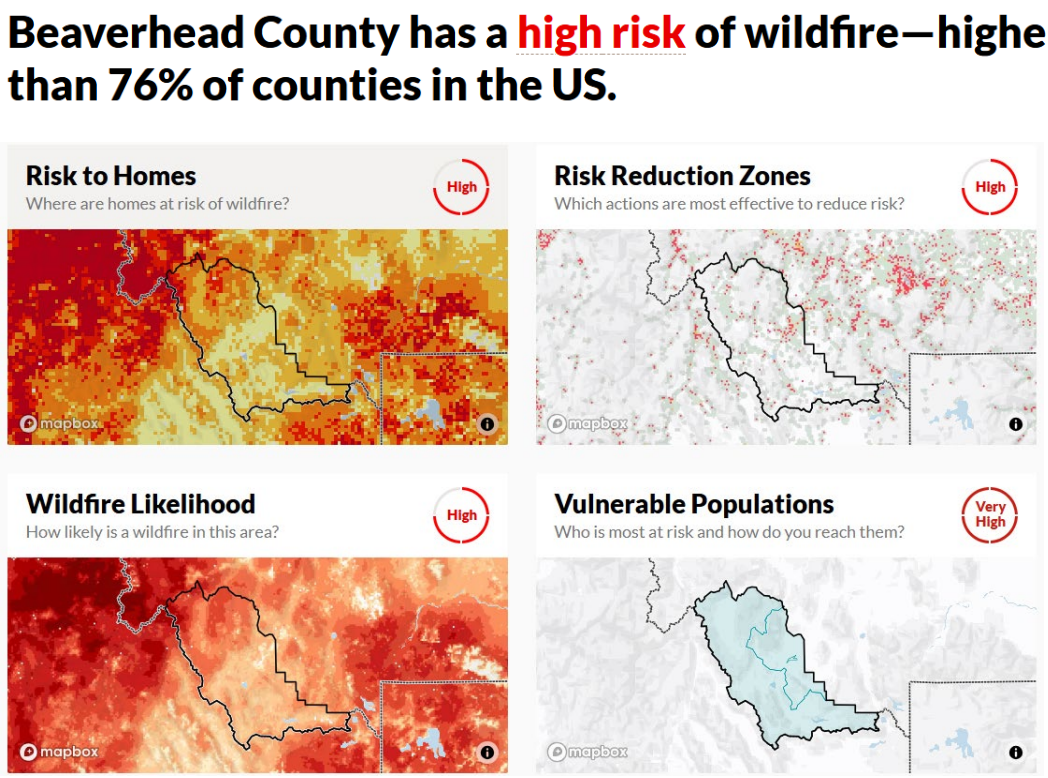
Over the last half-century, land use patterns in Beaverhead County have transformed significantly. The county has seen extensive development of rural areas, shifting from primarily agricultural uses to home sites for both permanent and seasonal residents. This development presents significant challenges for fire protection agencies tasked with wildland fire suppression. Poor land use planning and a lack of regulations in previous years have placed homes and, in some cases, entire subdivisions in vulnerable positions. This increased risk affects not only the structures and homeowners but also the firefighters

who protect these areas, often requiring them to make critical safety assessments under pressure.

Historical Fire Regimes and Future Fire Behavior

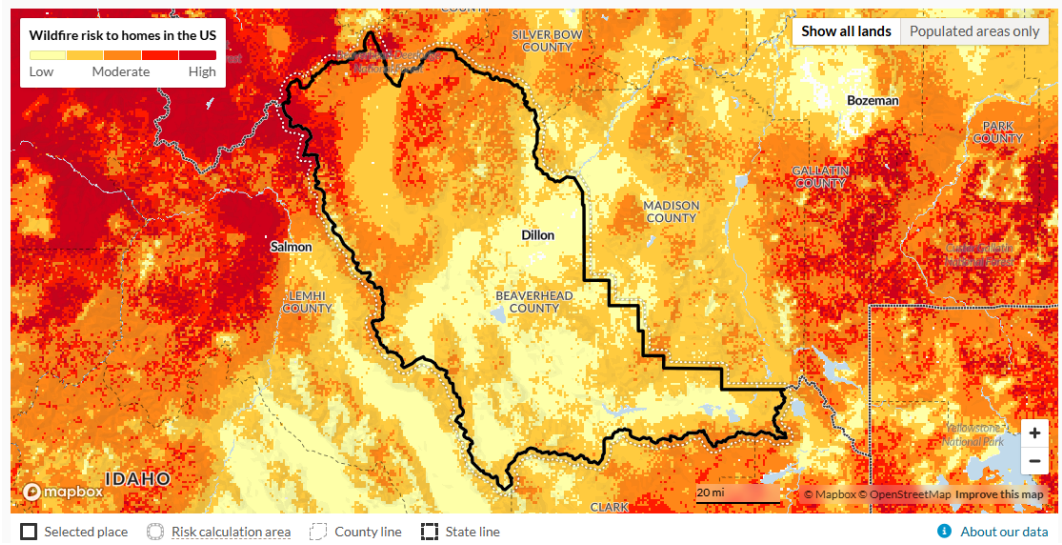
All historical fire regimes in the Beaverhead Watershed have exceeded their fire return intervals, except for higher-elevation forested habitats. This alteration in the fire return interval has changed the structure of these habitats and will consequently alter future fire behavior from what was observed under historical fire regimes. As a result, the region is likely to experience fire behaviors that differ significantly from those in the past, further complicating wildfire management and mitigation efforts.

4.1 Risk Analysis



(Source: www.wildfirerisk.org)

4.1.1 Wildfire Risk to Homes



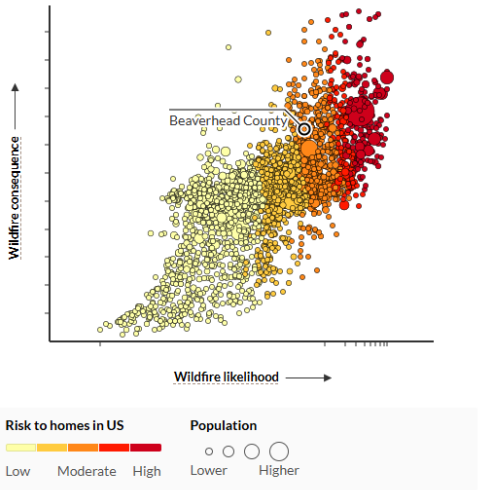
About risk to homes

Risk to homes measures the relative consequence of wildfire to residential structures everywhere on the landscape, whether a home actually exists there or not.

It poses the hypothetical question, "What would be the relative risk to a house if one existed here?" It asks that question regardless of whether a home actually exists at that location or not. Risk to homes integrates modeled data about wildfire likelihood and intensity with a generalized concept of susceptibility for homes.

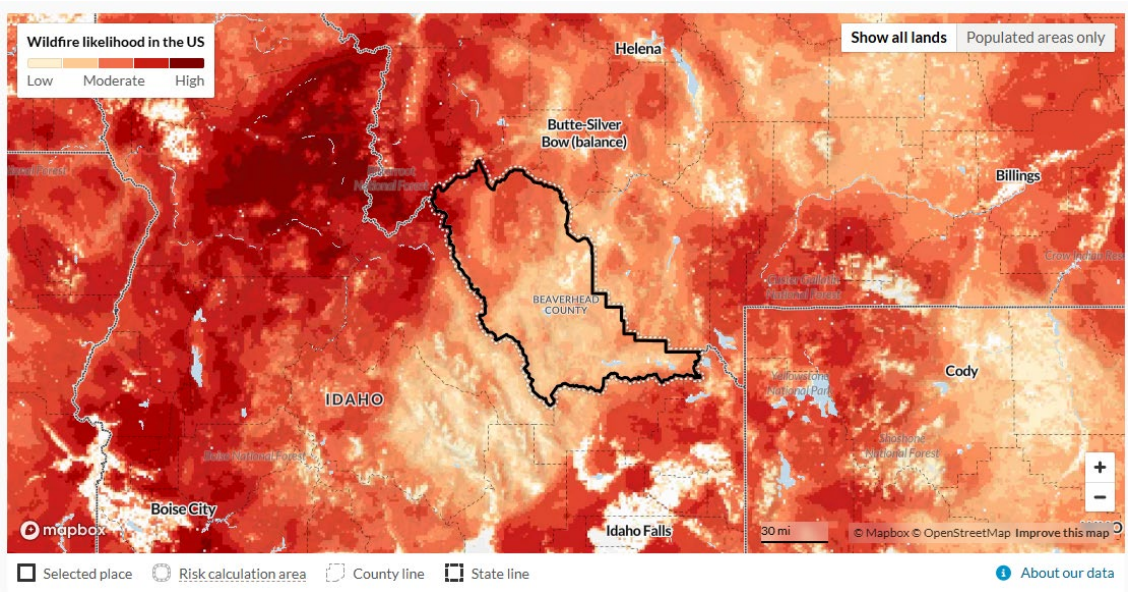
Risk to homes allows us to consider wildfire risk in places with homes in addition to places where new construction is proposed.

Compare risk to homes



Source:www.wildfirerisk.org

4.1.2 Wildfire Likelihood

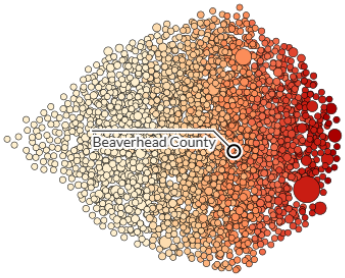


About wildfire likelihood

Wildfire likelihood is the probability of wildfire burning in any given year. It does not say anything about the intensity of fire if it occurs. At the community level, wildfire likelihood is averaged where housing units occur.

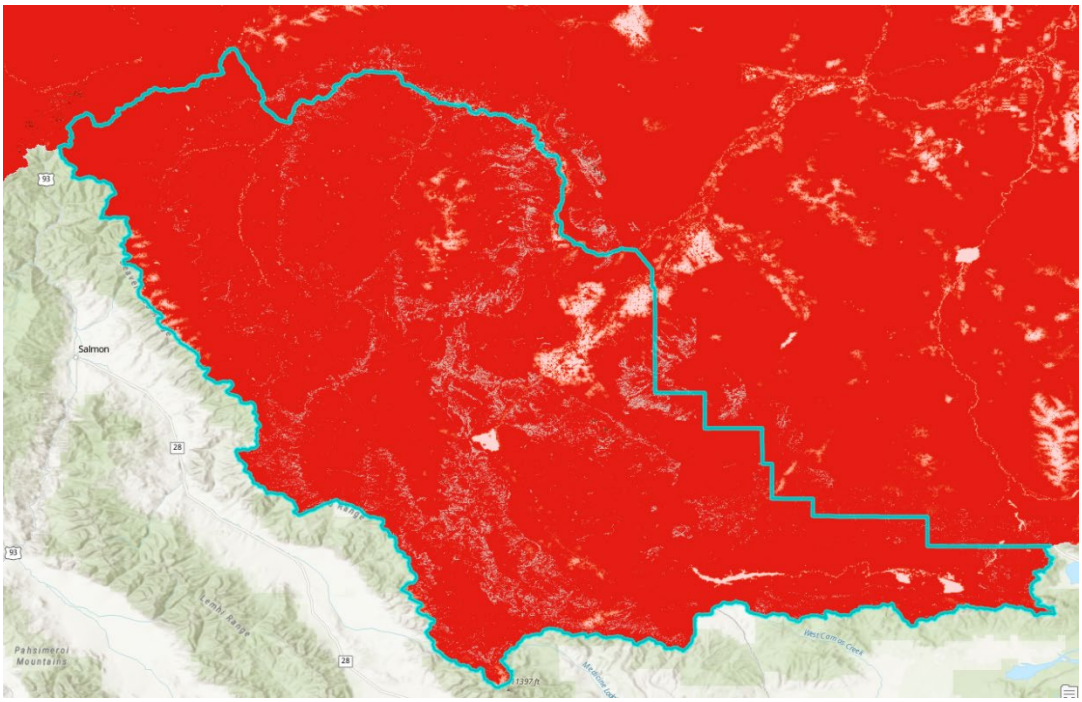
Communities in all but the lowest classes need to be prepared for wildfire. Wildfire likelihood can be difficult to modify, but preventing ignitions and managing fuels can help.

Compare wildfire likelihood



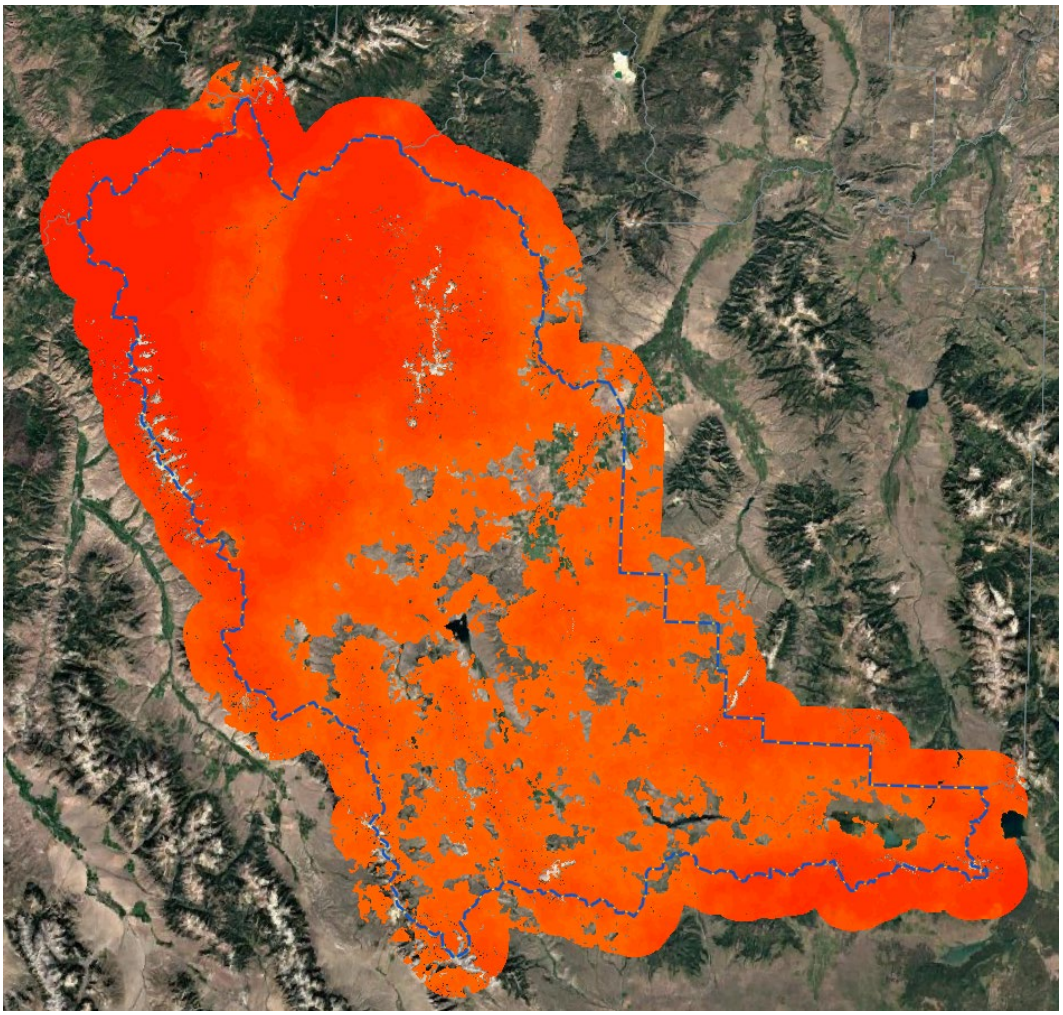
Source:www.wildfirerisk.org

4.1.3 Wildfire Exposure Type

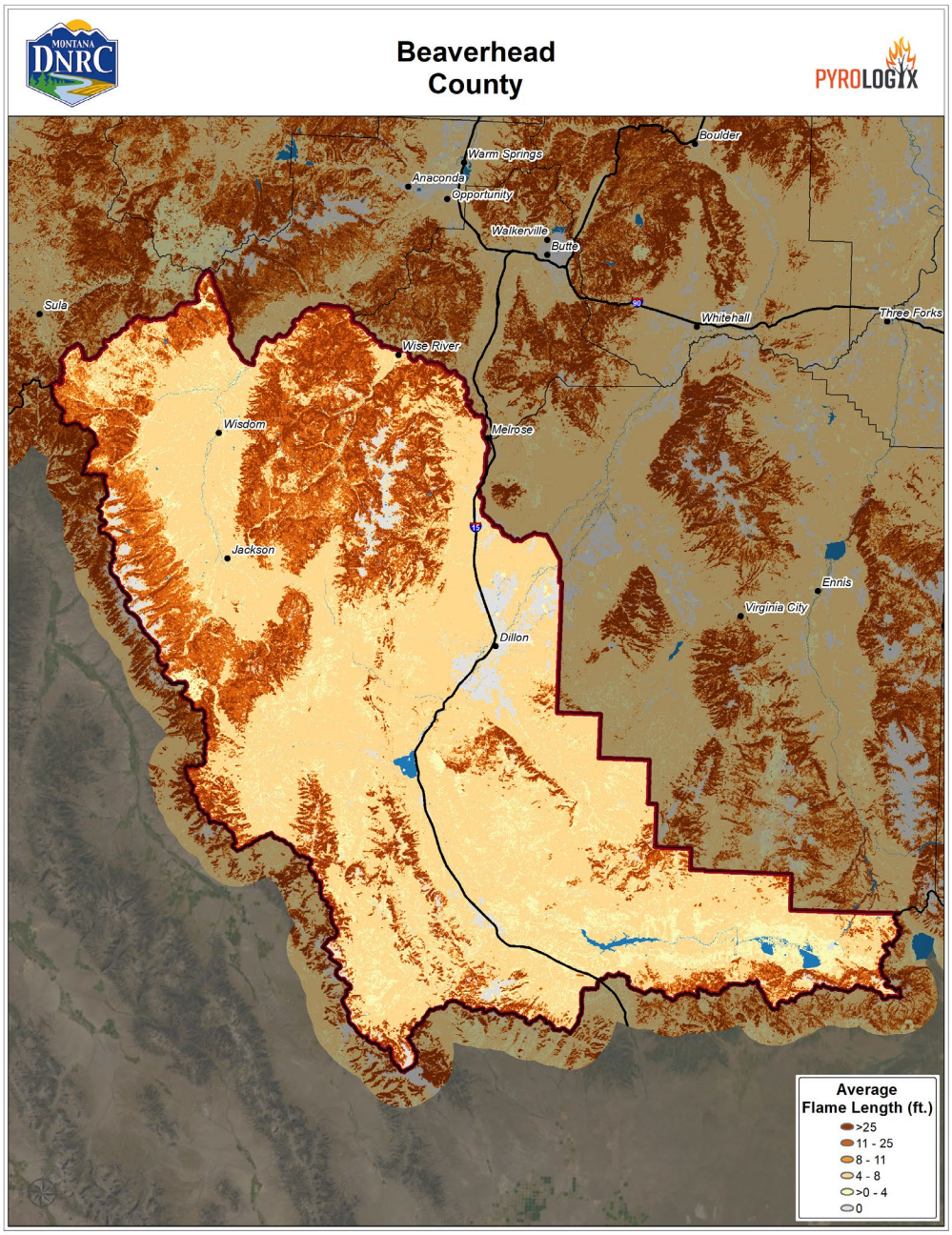


Source:www.wildfirerisk.org

4.1.4 Burn Probability

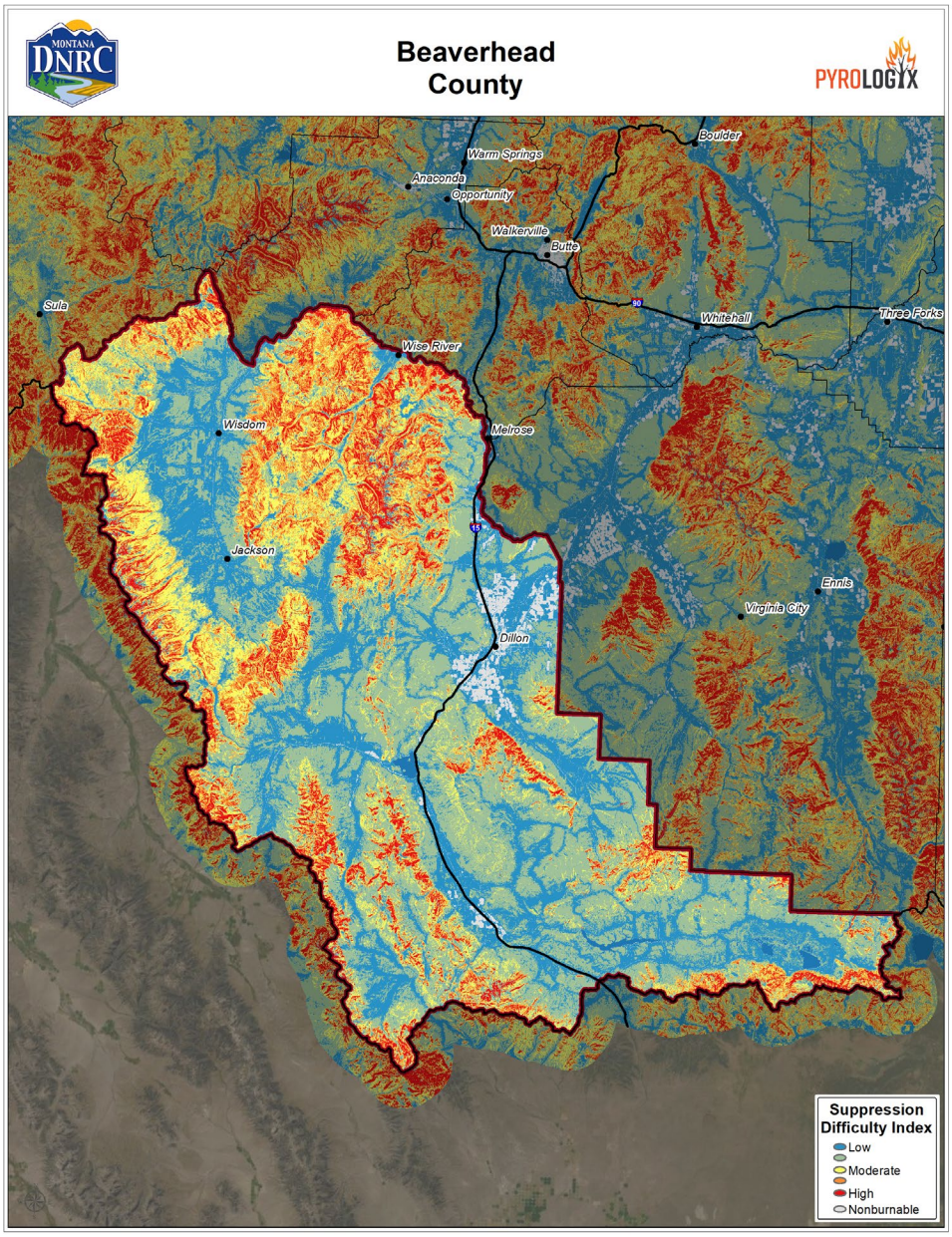


4.1.5 Fire Behavior



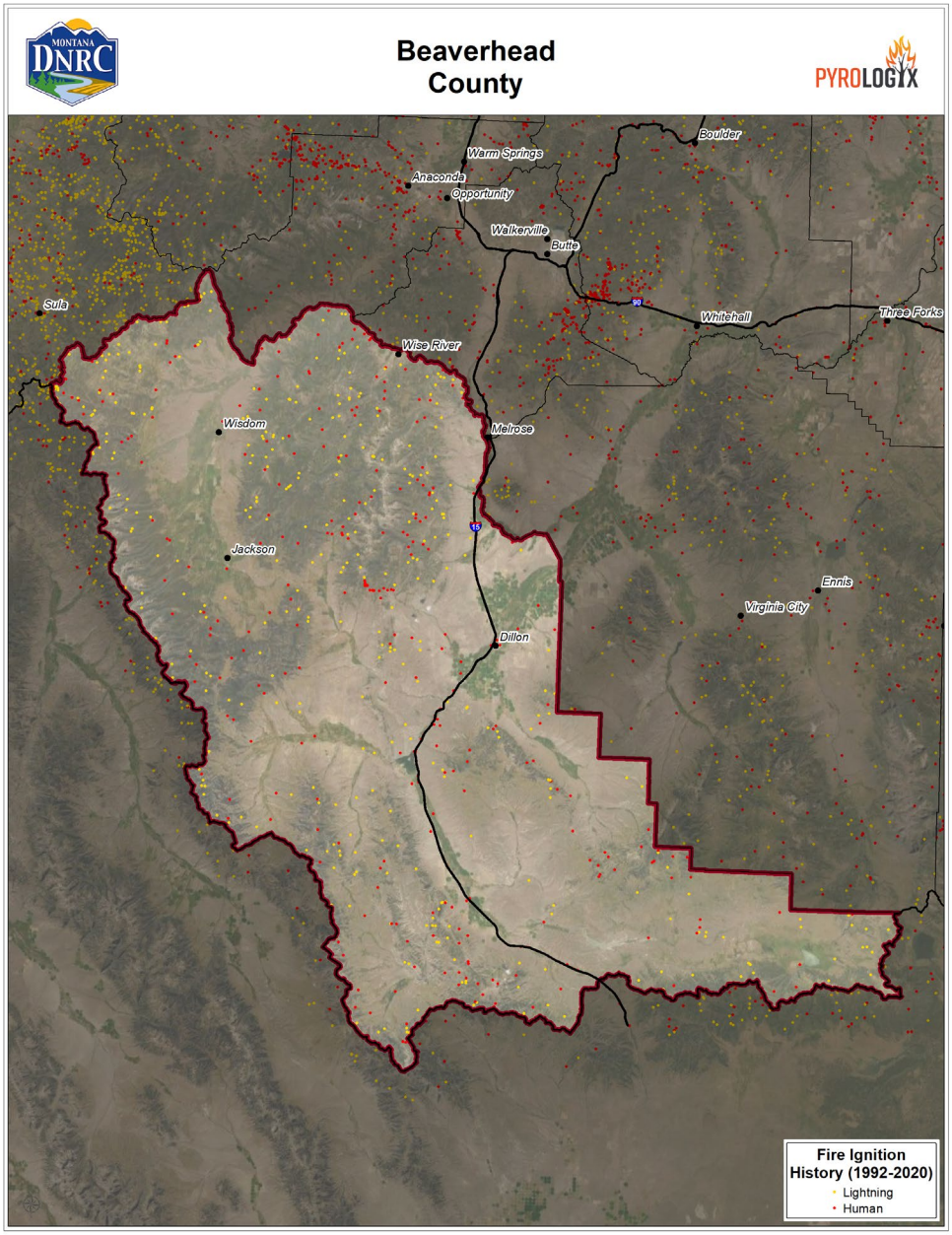
Average Flame Length

4.1.6 Suppression Difficulty



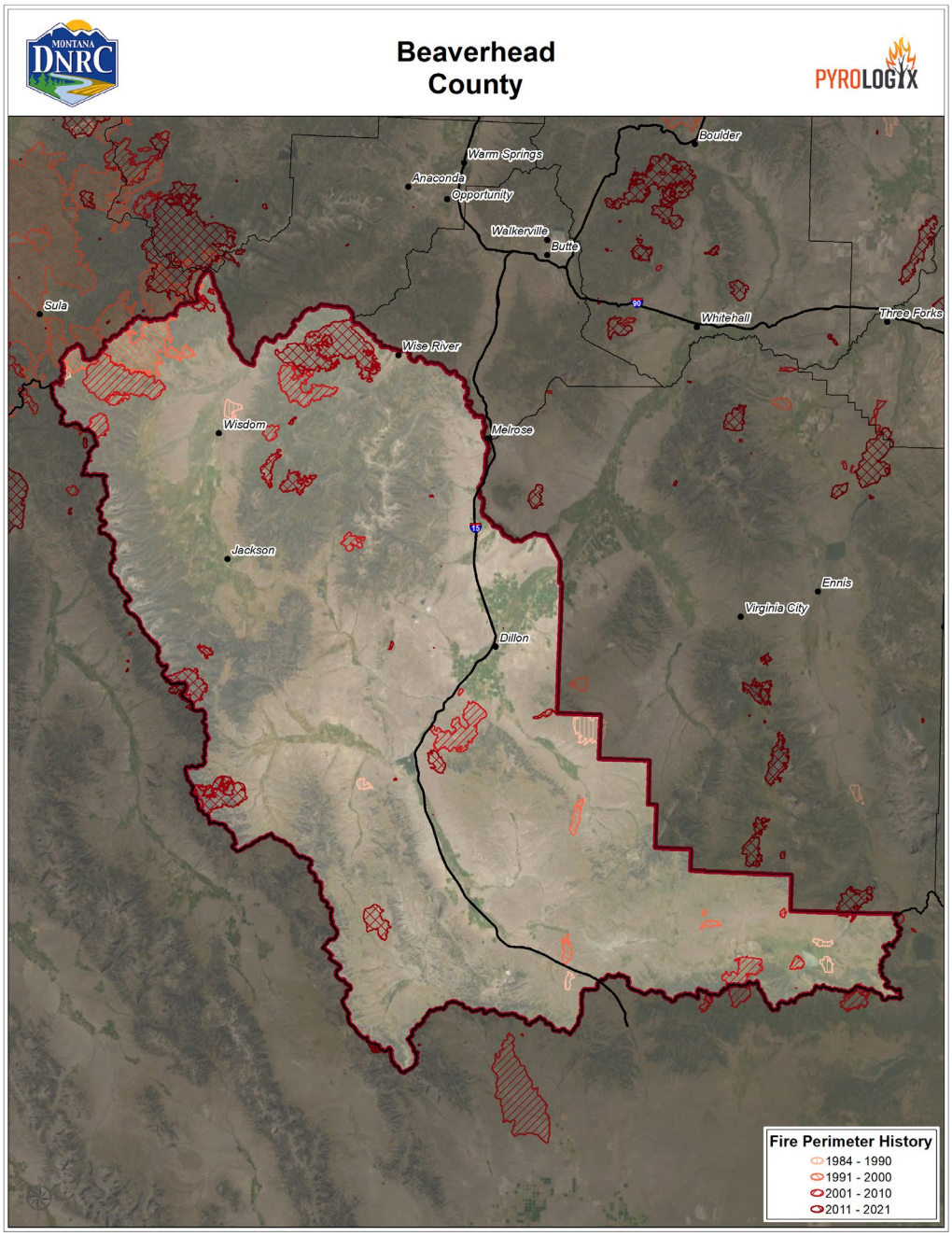
Suppression Difficulty

4.1.7 Fire History



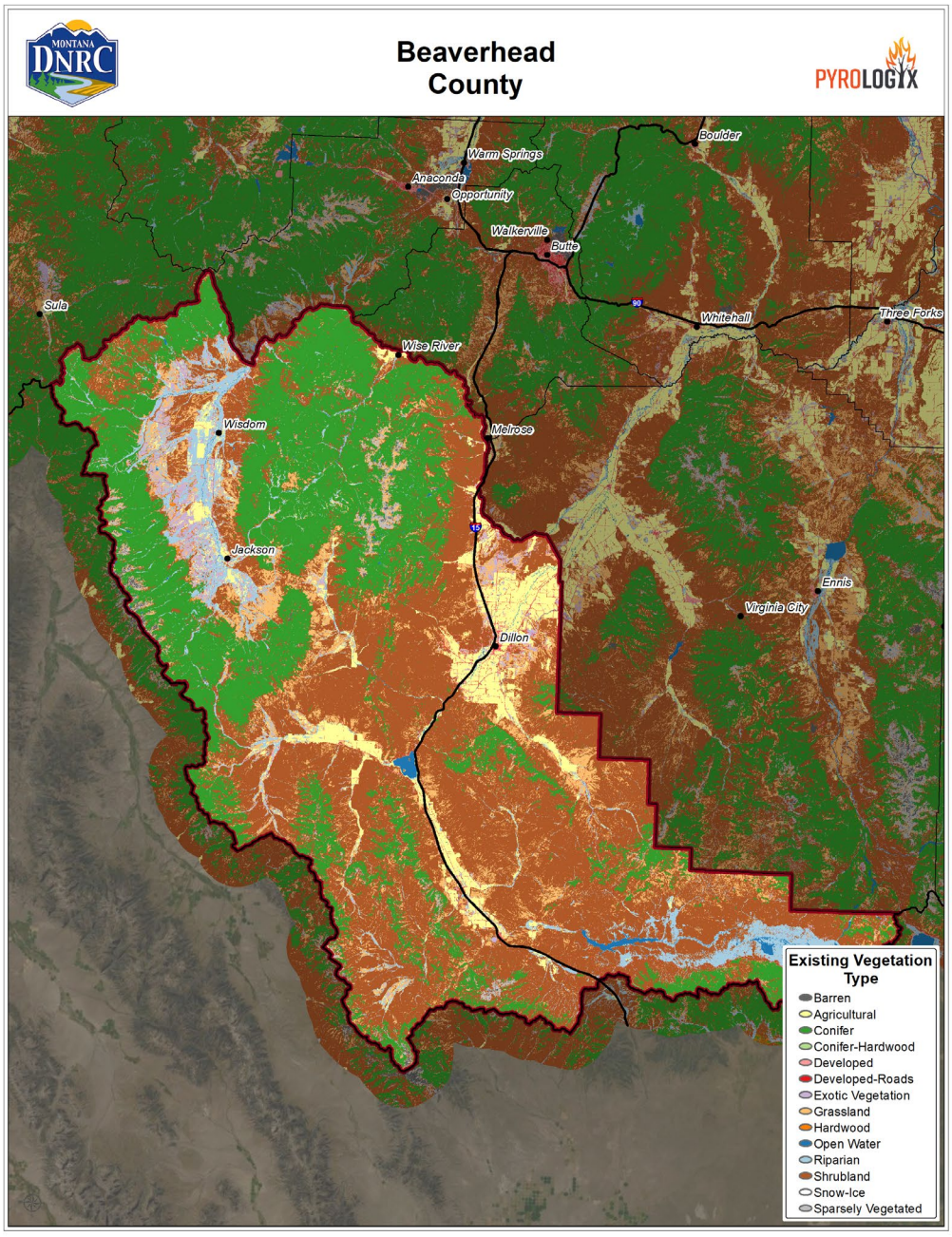
Fire Ignition History

4.1.8 Large Fire Perimeters

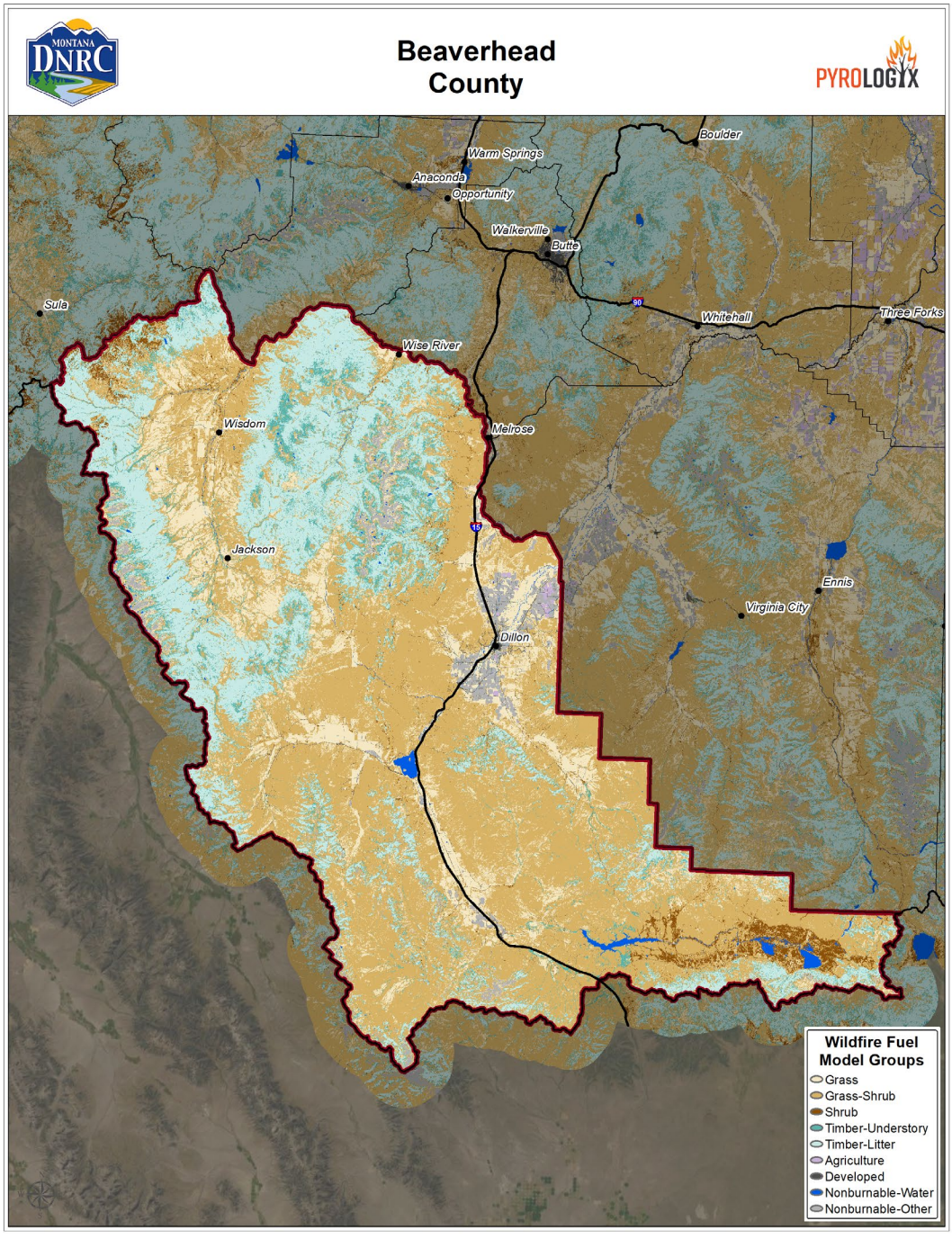


Large Fire Perimeters

4.2 Existing Fuels



Map 4.2.1 Existing Vegetation



Map 4.2.2 Fuel Groups

4.3 Weather and Climate

Weather conditions play a crucial role in influencing fire behavior, with wind being the primary factor. In Beaverhead County, prevailing winds generally come from the southwest, ranging from moderate to strong depending on the elevation and aspect of the terrain. South and west-facing slopes are more exposed to these prevailing winds, leading to increased fire activity on these slopes. Typically, fires in this area spread from the southwest to the northeast due to the wind direction. During calm days, fire spread is mainly determined by the topography and local upslope-downslope wind patterns. However, during strong wind events, the wind direction becomes the dominant factor, overriding the effects of topographic features. This makes it crucial to monitor wind conditions closely during fire season.

Fire Season Weather Patterns and Fire Behavior

As summer progresses in Beaverhead County, the live fuel moisture in grasses and shrubs decreases, and downed fuels dry out, leading to peak fire conditions by August. During this time, the risk of wildfires increases significantly due to the dry conditions and availability of ignitable materials

In autumn, despite cooling temperatures, dry, cold frontal passages become common. These conditions can lead to extreme fire behavior, as the dry air and winds increase the likelihood and intensity of wildfires. By late fall, as November approaches, the transition to winter begins. However, dry, cold frontal passages and the absence of snowpack can still create conditions conducive to rapid fire growth and high-intensity fire behavior.

Influence of Wind on Fire Behavior

Wind is a major factor in fire behavior. In Beaverhead County, prevailing winds typically come from the southwest and can be moderate to strong, depending on the elevation and aspect. South—and west-facing slopes are more exposed to these prevailing winds, which can increase fire activity. Due to wind direction, fires generally spread from the southwest to the northeast.

On calm days, fire spread is primarily determined by the topography and local upslope-downslope wind patterns. During strong wind events, however, the wind direction dominates, overriding the effects of topographic features and dictating the fire spread.

Thunderstorm and Moisture Patterns

The fire season's moisture regimes are heavily influenced by thunderstorm tracks, which generally move across the county from southwest to northeast. Typically, significant moisture from these storms is depleted before reaching the northern half of the county. Despite this, lightning associated with these storms can start numerous fires along their path. Dry lightning events, which occur without accompanying rain, increase as the sun's angle rises, drying the atmosphere and creating cumulus clouds that produce strong downdrafts and lightning. The moisture associated with these clouds usually falls as virga and evaporates before reaching the ground.

Seasonal Climatic Changes

Climatic seasonal changes significantly impact fire behavior. During the winter months (December through February), fire activity is generally minimal due to snowpack accumulation, which is an element for determining fire potential in the upcoming summer. The spring months (April through June) are typically moist, resulting in low fire frequencies and usually low-intensity fires when ignitions occur.

As the season transitions to summer, grasses and shrubs begin to lose their live fuel moisture, and downed fuels dry out, leading to peak fire conditions by August. In autumn, while temperatures cool, the presence of dry, cold frontal passages becomes common and can promote extreme fire behavior. Late fall (November) marks the transition into winter, but dry, cold frontal passages and the lack of snowpack can still create conditions conducive to rapid fire growth and high-intensity fire behavior.

Drought

Beaverhead County, Montana, has experienced several significant drought periods over the past decades, which have contributed to increased wildfire risks. Historical data indicates that drought conditions have become more frequent and severe, particularly during the early 2000s and the mid-2020s. These periods were marked by below-average precipitation, reduced snowpack, and prolonged heatwaves, leading to heightened fire danger throughout the region. The prolonged dry conditions have not only stressed local vegetation but also depleted water resources, affecting both agricultural and natural ecosystems. As a result, the community has faced challenges in wildfire management and response, highlighting the need for comprehensive drought mitigation strategies. Understanding the historical context of drought in Beaverhead County underscores the importance of developing adaptive management practices, such as improving water conservation, enhancing forest health, and strengthening community awareness and preparedness to minimize the impact of future drought-induced wildfires.

Historical Drought Conditions for Beaverhead County

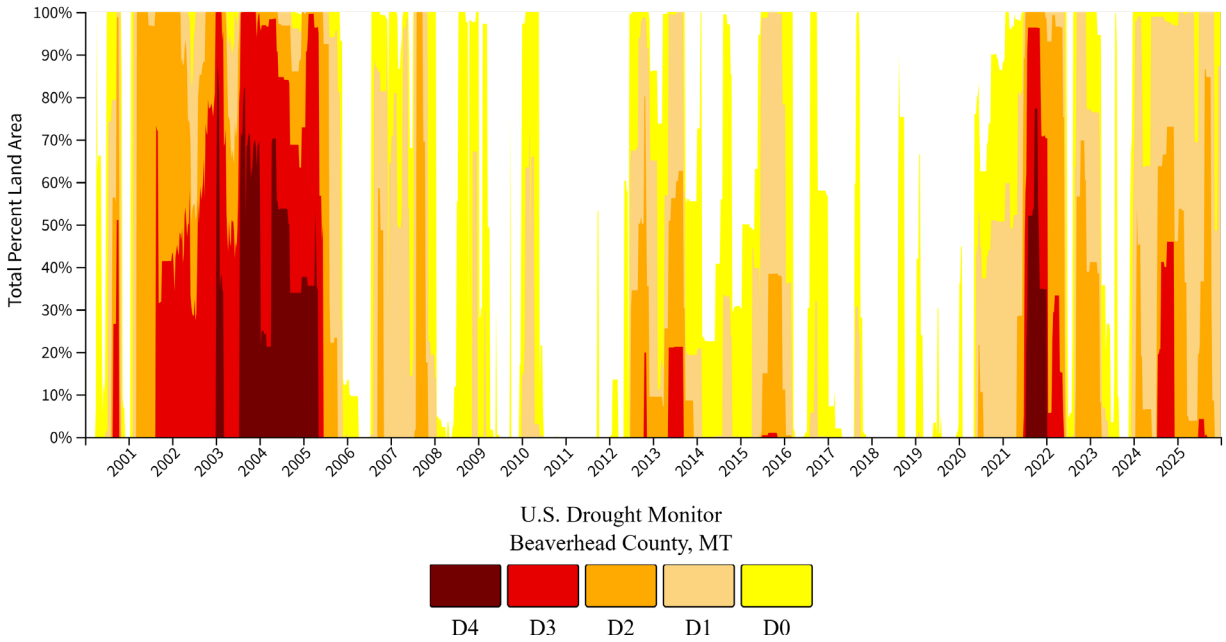
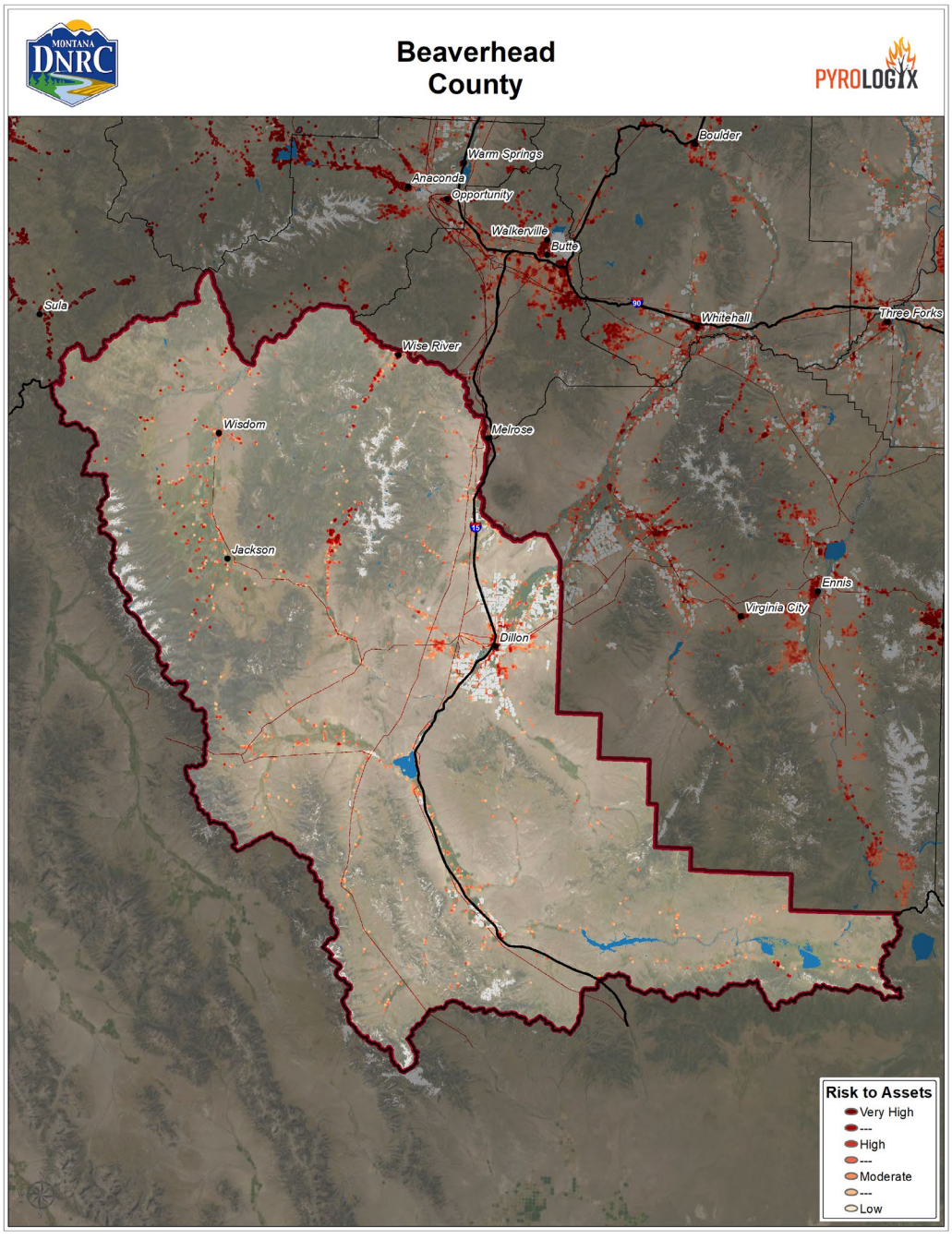


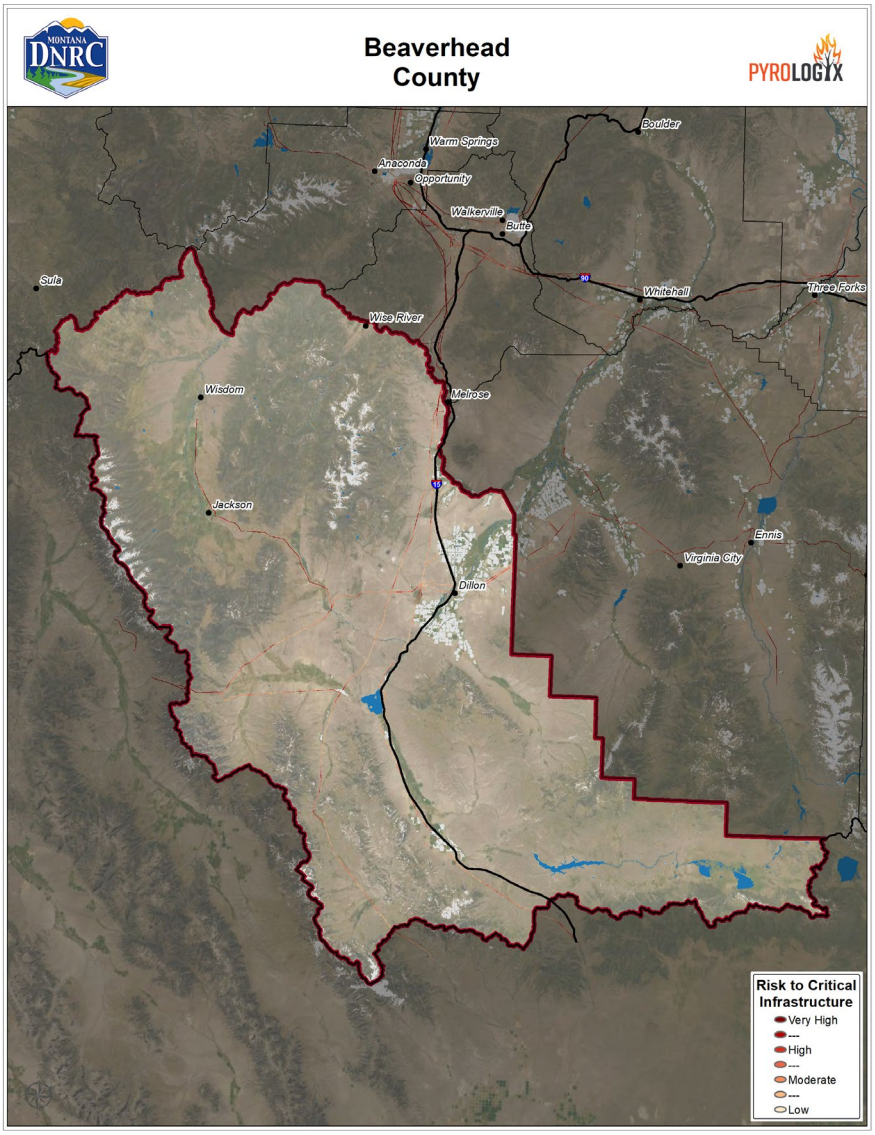
Figure 1 Drought.gov

5. Fire Adapted Communities

5.1 Values at Risk



5.2 Critical infrastructure



5.3 Land Use Planning

Land use planning can reduce wildfire risk by helping communities grow and develop with wildfire in mind. Tools such as zoning, plan reviews, regulations, and building codes can influence the design, layout, and placement of homes built in wildfire-prone areas.

Land use planning measures are diverse and can be customized to fit the needs of the neighborhood, community, or county. For example, land use planning regulations can require defensible space in the home ignition zone, adequate water supply, road widths and access, and home hardening materials for homes built in high wildfire hazard areas. Land use planning tools can also restrict development in areas with the highest hazards.

Beaverhead County has a mixture of federal, state, and private lands that include forested areas, prime agricultural lands, open spaces, riparian corridors, developed communities, rural subdivisions, and interspersed ranch and residential buildings. Managing these varied land uses requires a delicate balance between protecting private property rights, promoting public safety, and preserving natural resources. In many cases, smart development is an inexpensive and effective way to reduce the impact of wildfires on communities.

Growth policy - https://beaverheadcountymt.gov/wp-content/uploads/2022/11/Beaverhead-Co-Growth-Policy-FINAL.pdf

https://beaverheadcountymt.gov/wp-content/uploads/2019/07/Subdivision-Weed-and-Revegetation-Plan-Approved-June-17-2019.pdf

Subdivision regs - https://beaverheadcountymt.gov/wp-content/uploads/2024/05/BeaverheadCountySubReg_Rev2024-1a.pdf

5.3.1 WUI Development Risk Area

For ease of definition and consistency, this plan recommends changing the term “High Fire Risk Area” in subdivision regulations and any other county plans to “WUI Development Risk Area,” further defined as areas where development would be at risk of wildfire exposure. The methodology used to define the geospatial location of this area utilized the existing WUI-defined map from 2013 and Federal LandFIRE Data to create areas that could experience an increased potential for fire exposure.

5.4 Home Hardening and Defensible Space

Defensible space and home hardening are recognized as the most effective strategies to enhance the survivability of structures during a wildfire. Extensive research from the Insurance Institute for Business & Home Safety (IBHS), the National Institute of Standards and Technology (NIST), and wildfire scientist Jack Cohen supports the finding that the primary cause of home ignition during wildfires is ember cast and low-intensity surface fires within the home ignition zone.

Embers, also known as firebrands, are small, burning materials that can travel over a mile ahead of the main wildfire. These embers can accumulate on various parts of a property such as the roof, deck, landscaping, porch, and other areas. They can ignite plants, mulch, leaves, fencing, or furniture. Furthermore, embers can enter homes through openings like attic vents or broken windows, potentially causing the home to burn from the inside out. This internal ignition can occur with minimal damage to the surrounding vegetation, often leaving the cause of the home fire unclear.

By creating a defensible space and hardening homes against ember intrusion, the risk of ignition can be significantly reduced, thereby increasing the chances of a structure surviving a wildfire.

source: IBHS Lab

Ignition-resistant construction is arguably the most effective strategy for

reducing the risk of home wildfire vulnerability. Components of the home that are important to address and best practices are outlined in the following pages.

Roof

The roof is the most vulnerable part of your home. Homes with wood or shingle

roofs are at high risk of being destroyed during a wildfire.

Build your roof or re-roof with materials such as composition, metal, clay or

tile. Block any spaces between roof decking and covering to prevent

embers from catching.

Remove accumulated vegetative debris from the roof.

Vents

Vents on homes create openings for flying embers.

Cover all vent openings with 1/16-inch to 1/8-inch metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Use Ember and flame-resistant vents (WUI vents).

Eaves and Soffits - Eaves should be boxed in (soffited-eave design) and protected with ignition-resistant* or noncombustible materials.

Windows

Heat from a wildfire can cause windows to break even before the home is on fire. This allows burning embers to enter and start fires inside. Single-paned and large windows are particularly vulnerable.

Install dual-paned windows with one pane of tempered glass to reduce the chance of breakage in a fire.

Consider limiting the size and number of windows that face large areas of vegetation.

Install screens in all usable windows to increase ember resistance and decrease radiant heat exposure

Walls

Wood products, such as boards, panels or shingles, are common siding materials. However, they are flammable and not good choices for fire-prone areas.

Build or remodel your walls with ignition resistant* building materials, such as stucco, fiber cement wall siding, fire retardant, treated wood, or other approved materials. This is especially important when neighboring homes are within 30-feet of the home.

Be sure to extend materials from the foundation to the roof.

Smaller spaces, such as the roof-to-wall area, should have their siding replaced with noncombustible material.

Decks

Surfaces within 10 feet of the building should be built with ignition-resistant*, noncombustible, or other approved materials.

Create an ember-resistant zone around and under all decks and make sure that all combustible items are removed from underneath your deck.

If a deck overhangs a slope, create and maintain defensible space downslope from the deck to reduce the chances of flames reaching the underside of the deck

Rain Gutters

Keep rain gutters clear or enclose rain gutters to prevent accumulation of plant debris.

Install a corrosion-resistant and noncombustible metal drip edge for additional protection of the combustible components on your roof's edge.

Use a noncombustible gutter cover to prevent buildup of debris and vegetation in the gutter

Patio Cover

Use the same ignition-resistant* materials for patio coverings as a roof.

Chimney

Cover your chimney and stovepipe outlets with a non-flammable screen. Use metal screen material with openings no smaller than 3/8-inch and no larger than 1/2-inch to prevent embers from escaping and igniting a fire.

Close the fireplace flue during fire season when the chimney is not being used.

Garage

Have a fire extinguisher and tools such as a shovel, rake, bucket, and hose available for fire emergencies.

Add a battery back-up to the garage door motor so that the garage can easily be operated if power is out.

Install weather stripping around and under the garage door to prevent embers from blowing in.

Store all combustible and flammable liquids away from ignition sources. Treat windows and vents in the garage the same way as if it was a part of the house.

Fences

The best practice is to separate your fence from your house or upgrade the last 5 feet of the fence to a noncombustible material to reduce the chance of the fence from bringing fire to your home.

Driveways and Access Roads

Driveways should be built and maintained in accordance with state and local codes to allow fire and emergency vehicles to reach your home. Consider maintaining access roads with a minimum of 10 feet of clearance on either side, allowing for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to allow emergency vehicles to pass.

Address

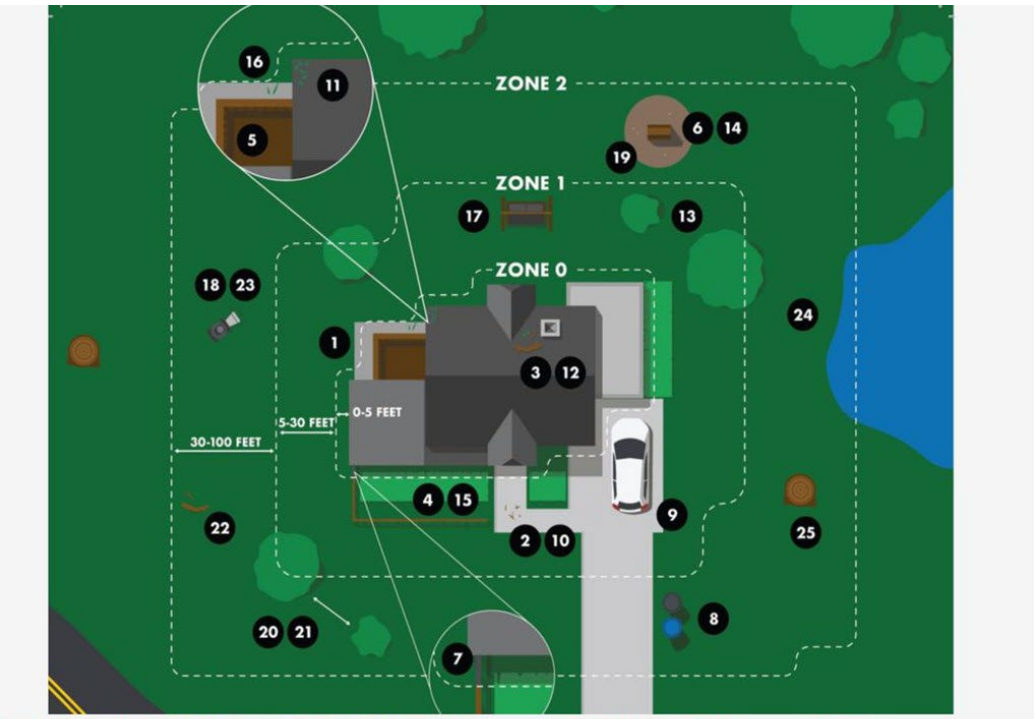
Make sure your address is clearly visible from the road with reflective letters at least 4" tall with a 1" stroke and made of non-combustible material.

Water Supply

Consider having multiple garden hoses that are long enough to reach all areas of your home and other structures on your property. If you have a pool or well, consider getting a pump.

Source EVStudio

Defensible space is the buffer you create between a building on your property and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and it helps protect your home from catching fire—either from embers, direct flame contact or radiant heat. Proper defensible space also provides firefighters a safe area to work in, to defend your home.



Zone 0 extends from zero to five feet from buildings, structures, decks, etc.

1. Use hardscape like gravel, pavers, concrete, and other noncombustible mulch materials. No combustible bark or mulch.
2. Remove all dead and dying weeds, grass, branches, and vegetative debris. Check your roofs, gutters, decks, porches, stairways, etc.
3. Remove all branches within 10 feet of any chimney or stovepipe outlet.
4. Limit combustible items (outdoor furniture, planters, etc.) on top of decks.
5. Relocate firewood and lumber to Zone 2.
6. Replace combustible fencing, gates, and arbors attached to the home with noncombustible alternatives.
7. Consider relocating garbage and recycling containers outside this zone.
8. Consider relocating boats, RVs, vehicles, and other combustible items outside this zone.

Zone 1 extends five to 30 feet from buildings, decks, and other structures.

9. Remove all dead plants, grass, and weeds (vegetation).
10. Remove dead or dry leaves and pine needles from your yard, roof, and rain gutters.
11. Remove branches that hang over your roof and keep dead branches 10 feet away from your chimney or stovepipe outlet.
12. Trim trees regularly to keep branches a minimum of 10 feet from other trees.
13. Relocate exposed wood piles outside of Zone 1.
14. Remove or prune flammable plants and shrubs near windows.
15. Remove vegetation and items that could catch fire from around and under decks.
16. Create a separation between trees, shrubs, and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

Zone 2 extends from 30 feet to 100 feet from buildings, structures, decks, etc.

17. Cut or mow annual grasses to a maximum height of four inches.
18. All exposed wood piles must have a minimum of 10 feet clearance around them, down to bare mineral soil, in all directions.
19. Create horizontal space between shrubs and trees. (See diagram on page 9)
20. Create vertical space between grass, shrubs, and trees. (See diagram on page 9)
21. Remove fallen leaves, needles, twigs, bark, cones, and small branches. However, they may be permitted to a depth of three inches.

All zones

22. Mow before 10 a.m., but never when it's windy or excessively dry.
23. Protect water quality. Do not clear vegetation near waterways to bare soil. Vegetation removal can cause soil erosion—especially on steep slopes.
24. Logs or stumps embedded in the soil must be removed in Zone 0. In Zones1and 2 they need to be removed or isolated from other vegetation.

Zone 0

Zone 0 extends 5 feet from buildings, structures, decks, etc.

This zone includes the area under and around all attached decks, and requires the most stringent wildfire fuel reduction. The ember-resistant zone is designed to keep fire or embers from igniting materials that can spread the fire to your home.

Use hardscape like gravel, pavers, concrete and other noncombustible mulch materials. No combustible bark or mulch

Remove all dead and dying weeds, grass, plants, shrubs, trees, branches and vegetative debris (leaves, needles, cones, bark, etc.); Check your roofs, gutters, decks, porches, stairways, etc.

Remove all branches within 10 feet of any chimney or stovepipe outlet Limit combustible items (outdoor furniture, planters, etc.) on top of decks Relocate firewood and lumber to Zone 2.

Replace combustible fencing, gates, and arbors attach to the home with noncombustible alternatives

Consider relocating garbage and recycling containers outside this zone Consider relocating boats, RVs, vehicles and other combustible items outside this zone

Zone 1 – Lean, Clean and Green Zone

Zone 1 extends 30 feet from buildings, structures, decks, etc. or to your property

line, whichever is closer.

Remove all dead plants, grass and weeds (vegetation).

Remove dead or dry leaves and pine needles from your yard, roof and rain

gutters.

Remove branches that hang over your roof and keep dead branches 10 feet

away from your chimney.

Trim trees regularly to keep branches a minimum of 10 feet from other trees.

Relocate wood piles to Zone 2.

Remove or prune flammable plants and shrubs near windows.

Remove vegetation and items that could catch fire from around and under

decks, balconies and stairs.

Create a separation between trees, shrubs and items that could catch fire,

such as patio furniture, wood piles, swing sets, etc.

Zone 2 – Reduce Fuel Zone

Zone 2 extends from 30 feet to 100 feet out from buildings, structures, decks,

etc. or to your property line, whichever is closer.

Cut or mow annual grass down to a maximum height of 4 inches.

Create horizontal space between shrubs and trees. (See diagram)

Create vertical space between grass, shrubs and trees. (See diagram)

Remove fallen leaves, needles, twigs, bark, cones, and small branches.

All exposed wood piles must have a minimum of 10 feet of clearance,

down to bare mineral soil, in all directions.

Zone 1 and 2

“Outbuildings” and Liquid Propane Gas (LPG) storage tanks shall have 10 feet of clearance to bare mineral soil and no flammable vegetation for an additional 10 feet around their exterior.

Plant and Tree Spacing

The spacing between grass, shrubs, and trees is crucial to reduce the spread of wildfires. The spacing needed is determined by the type and size of brush and trees, as well as the slope of the land. For example, a property on a steep slope with larger vegetation requires greater spacing between trees and shrubs than a level property that has small, sparse vegetation.

Home Landscapes

Keeping weeds down, utilizing fire-resistant building materials and planting fire-resistant plant material around a home are a few of the important steps to help protect your home and family from wildfires.

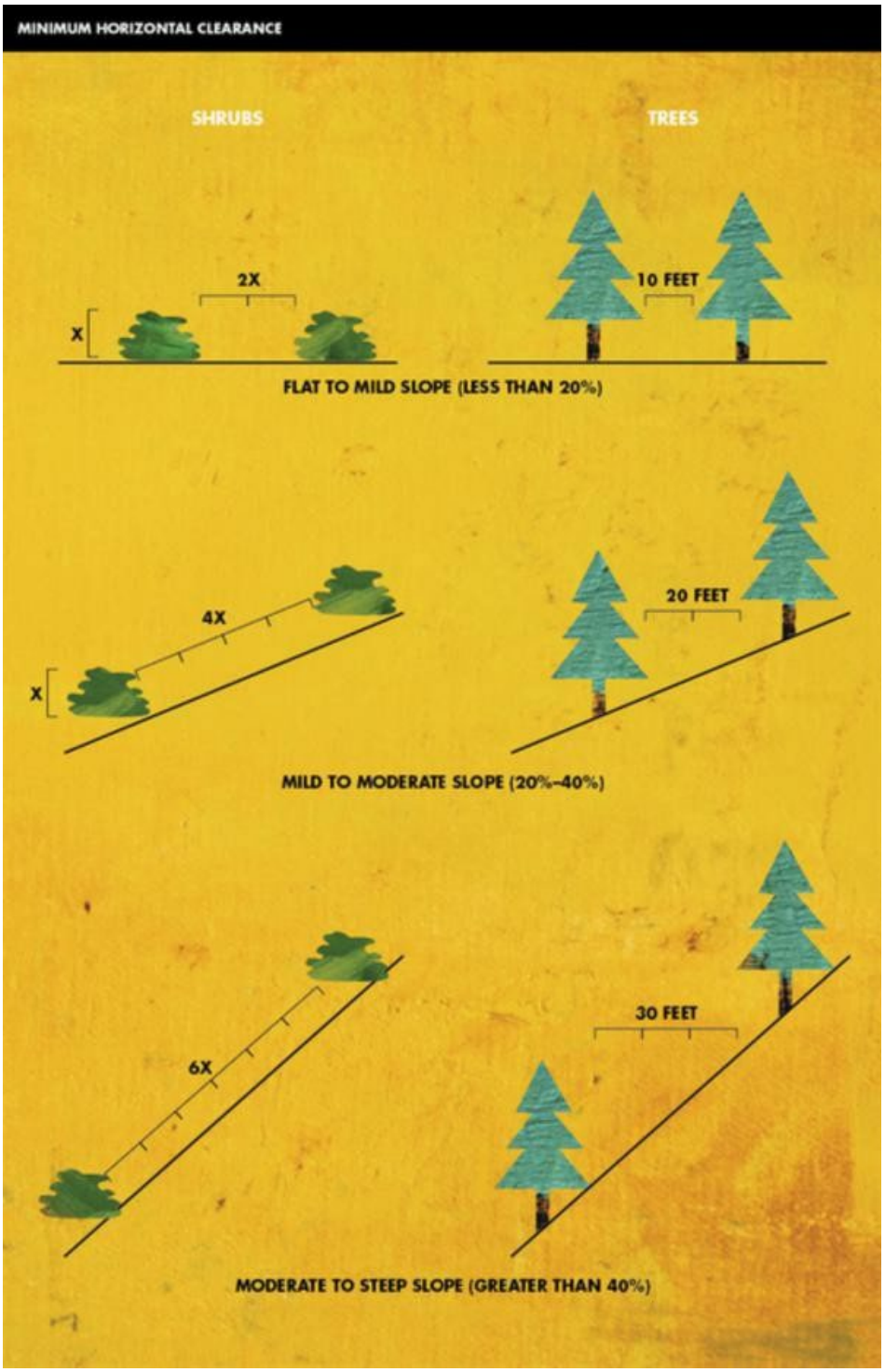
As previously mentioned, some plants are highly flammable while others are fire-resistant. Fire-resistant plants have supple, moist leaves and water-like sap.

The sap content is low, and it doesn't have a strong odor when leaves are crushed. Flammable plants generally have aromatic leaves, with gummy or resinous sap. Junipers are a good example of a highly flammable plant that should not be used as a foundation plant in the urban-wildland interface. Juniper foliage contains volatile oils, and beds around the plant accumulate old, dead material.

Most deciduous shrubs are fire-resistant and should be considered when planning a foundation planting. Wildfire experts recommend to create what they call a "defensible space" around a home. This is an area, not necessarily bare of vegetation, but where the vegetation has been carefully planned or cleared to slow the spread of a wildfire toward a

home. Firefighters also appreciate this defensible space as it gives them room to do their jobs.

Sparks and firebrands from a wildfire can ignite bark mulch, endangering a home. If there is a wildfire in your area, keep wood mulch moist, or consider replacing it now with rock mulch. To keep the temperature of the environment around plants moderated, use wood mulch around the base of the plants.


MINIMUM HORIZONTAL CLEARANCE
SHRUBS
TREES
2X
X
10 FEET
FLAT TO MILD SLOPE (LESS THAN 20%)
4X
X
20 FEET
MILD TO MODERATE SLOPE (20%–40%)
6X
30 FEET
MODERATE TO STEEP SLOPE (GREATER THAN 40%)

Fire Resistant Plant Species Adapted to Montana

Groundcovers and Herbaceous Plants

COMMON NAME	GENUS AND
Alfalfa	Medicago sativa
Bergenia	Bergenia spp.
Blanket Flower	Gailiardia x
Bluegrass. Kentucky	Poa pratensis
Buffalograss	Buchloe
Bugleweed	Ajuga reptans
Calliopsis (Tickseed)	Coreopsis spp.
Candytuft. Evergreen	!beds
Cinquefoil	Potentilla spp.
Cinquefoil. Spring	P. tabemaemontani,
Columbine	Aquilegia spp.
Coral Bells	Heuchera
Cotoneaster, Rock	Cotoneaster
Cotoneaster. Bearberry	Cotoneaster
Cottage Pink	Dianthus
Daylily	Hemerocallis spp.
Dusty Miller	Artemisia
Fescue	Festuca spp.
Fescue, Blue	Festuca ovina var.
Fescue, Tall	Festuca
Fescue, Creeping Red	Festuca rubra
Flax	Linum spp.
Fleabane	Erigeron spp.
Four O'clock	Mirabilis spp.
Geranium	Geranium spp.
Geranium. Bloody	Geranium
Ginger, Wild	Asarum caudatum
Hen and Chicks	Sempervivum
Iris	Iris spp.
Kinnickinnick	Arctostaphylos
Lamb's Ear	Stachys byzantina
Lavender	Lavandula spp.
Lupine	Lupinus spp.

Groundcovers and Herbaceous Plants

COMMON NAME	GENUS AND SPECIES
Mahonia. Creeping	Mahonia repens
Oceanspray	Holodiscus spp.
Orchardgrass	Dactylisgbnierata ad.
Periwinkle, Common	Ifinca minor
Poppy	Papater spp.
Poppy, California	Eschscholzia
Primrose	Oenothera spp.
Pussytoes	Antennaria spp.
Red Hot Poker	Kniphofia uvaria
Ryegrass	Lofium spp.
Sage	SaWia spp.
Shasta Daisy	Leucanthemum x
Silver Spreader	Artemisia caucasica
Snow-in-Summer	Cerastium
Stonecrop	Sedum spp.
Stonecrop. Broadleaf	Sedum spathulifolium
Stonecrop, Goldmoss	Sedum acre
Stonecrop. Green	Sedum album
Strawberry, Beach	Fragaria chibensis
Strawberry. Mock	Duchesnea indica
Thrift. Common	Armeria maritima
Thyme. Wooly	Thymus praecox ssp. britannicus
Valerian, Red	Centranthus ruber
Violet. Canadian	Viola canadensis
Virginia Creeper	Parthenocissus
Wheatgrass.	Agropyron cristatum
Winterfat	Eurotia lanata
Yarrow	Achillea spp.
Yarrow, Common	Achillea millefolium
Yarrow. Fernleaf	Achillea filipendulina
Yarrow, Woolly	Achillea tornentosa
Yucca	Yucca filamentosa

Table 1 Firewise Ground Cover and Plants

Fire Resistant Plant Species Adapted to Montana

Trees

COMMON NAME	GENUS AND SPECIES
Alder, White	*Alnus rhombifolia*
Ash	*Fraxinus* spp.
Ash, Green	*Fraxinus pennsylvanica*
Aspen, Quaking	*Populus tremuloides*
Birch	*Betula* spp.
Cherry	*Prunus* spp.
Cottonwood	*Populus* spp.
Cottonwood, Narrowleaf	*Populus angustifolia*
Hackberry	*Celtis occidentalis*
Locust, Black	*Robinia pseudoacacia*
Maple	*Acer* spp.
Maple, Boxelder	*Acer negundo*
Maple, Rocky Mountain	*Acer glabrum*
Poplar	*Populus* spp.

Shrubs

COMMON NAME	GENUS AND SPECIES
Buffaloberry	*Shepherdia* spp.
Buffaloberry, russet	*Shepherdia argentea*
Cherry	*Prunus* spp.
Cherry, Nanking	*P. tomentosa*
Chokecherry	*P. virginiana*
Cinquefoil, Shrubby	*Potentilla fruiticosa* *Pentaphylloides floribunda*
Currant	*Ribes* spp.
Dogwood, Redosier	*Cornus sericea* *C. stolonifera*
Gooseberry	*Ribes* spp.
Honeysuckle	*Lonicera* spp.
Lilac, Common	*Syringa vulgaris*
Mahogany, Mountain	*Cercocarpus* spp.
Mock Orange	*Philadelphus* spp.
Mock Orange, False	*Fendlera rupicola*
Plum, Native	*Prunus Americana*
Raspberry	*Rubus* spp.
Rose, most members of this family	*Rosaceae*
Sumac, Skunkbush	*Rhus trilobata*

source: MSU Extension

5.5 Public Education and Outreach

In the Beaverhead County Montana Community Wildfire Protection Plan, public outreach and education play a pivotal role in building a resilient and well-informed community. Our comprehensive outreach efforts extend to multiple facets, including educating residents on creating defensible space and adopting non-combustible construction practices. Workshops, community meetings, and informative materials offer practical guidance on vegetation management, proper tree spacing, and the use of fire-resistant landscaping to reduce the risk of wildfire impact on homes.

Additionally, our plan emphasizes smoke education to raise awareness about the health impacts of wildfire smoke. Through collaborative efforts with healthcare professionals and community-based initiatives, we provide residents, especially those with respiratory conditions, with resources to protect themselves during smoke events.

Recognizing the ecological benefits of controlled burns, our plan promotes good ecological fire practices and prescribed burning. Community engagement programs led by local fire experts highlight the positive impact of prescribed fires in reducing excess vegetation, promoting biodiversity, and mitigating the risk of catastrophic wildfires.

By combining efforts in defensible space, non-combustible construction, smoke education, and embracing good ecological and prescribed fire practices, our community aims to enhance overall wildfire preparedness, foster environmental stewardship, and build a safer and more resilient living environment. Together, we work towards creating a community that is well-equipped to address the challenges posed by wildfires.

5.6 Smoke Impacts

Addressing the hazards of wildfire smoke is a crucial component of our community wildfire protection plan. Wildfire smoke is a complex mixture of pollutants, including particulate matter, carbon monoxide, volatile organic compounds, and hazardous air pollutants. The composition of smoke can vary based on factors such as the type of vegetation burned and combustion conditions, leading to different levels of respiratory risk. Our plan prioritizes proactive measures to mitigate these risks, including early warning systems, public education campaigns on indoor air quality, and the establishment of clean air shelters

during wildfire events. Additionally, we emphasize collaboration with local health agencies and the integration of air quality monitoring technology to provide timely information to residents. Understanding the diverse nature of wildfire smoke enables us to tailor response strategies, deploying the appropriate respiratory protection and disseminating targeted public health advisories for a more comprehensive and effective approach to safeguarding our community.

Smoke Exposure

Smoke exposure (measured as smoke density in the Air Quality Index) can cause symptoms such as irritated sinuses, coughing, and asthma attacks. Smoke transforms in chemical structure as it travels and may be transformed by water bodies. We do not know how smoke transformations change their health impacts, but we do know that smoke particles can carry bacteria and fungi, which are potential irritants.

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

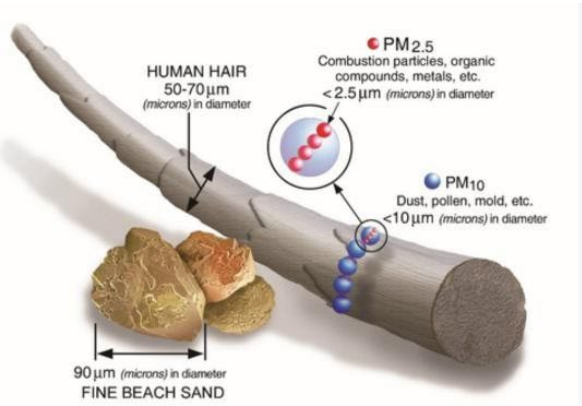
What are small particles (PM 2.5), and how do they affect me?

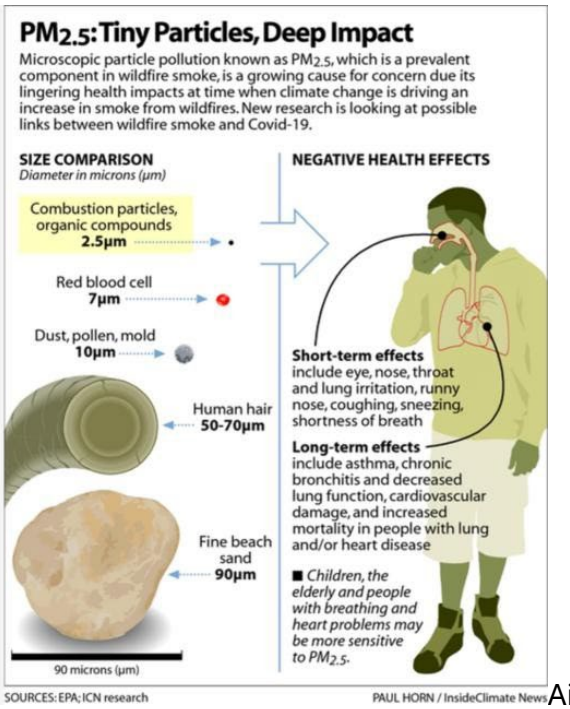
Microscopic particles (solids, liquids, and chemicals) in the air, including prescribed fire and wildfire smoke, reduce visibility. When larger particles (PM 10) are inhaled, they generally irritate the eyes, nose, and throat. Smaller particles (PM 2.5) can travel deeper into the body, irritating the lungs and even entering the bloodstream. Both particle sizes are found in smoke.

Who is considered more at risk of wildfire and prescribed fire smoke? Children who are in a critical developmental period should limit their time in areas with poor air quality and are best kept in indoor spaces with good air filtration during smoke events.

If possible, pregnant or nursing mothers should stock up on medications and food in case they need to stay indoors.

Older adults and people with pre-existing conditions (such as those with asthma, heart disease, or a history of strokes), should wear masks and stay indoors with high efficiency (HEPA) filters.





Air

Quality Information

AirNow.gov allows you to observe air quality across the USA by collecting information from public air monitors and private air sensors. The private air sensors are the same as those used by Purple Air. However, AirNow.gov tracks all air quality by averaging it over a 24-hour period, weighting the most recent three hours (thereby collecting less hour-by-hour nuance in air quality).

Fire.airnow.gov is Air Now's fire-specific site and allows for detailed air quality and smoke maps and forecasts.

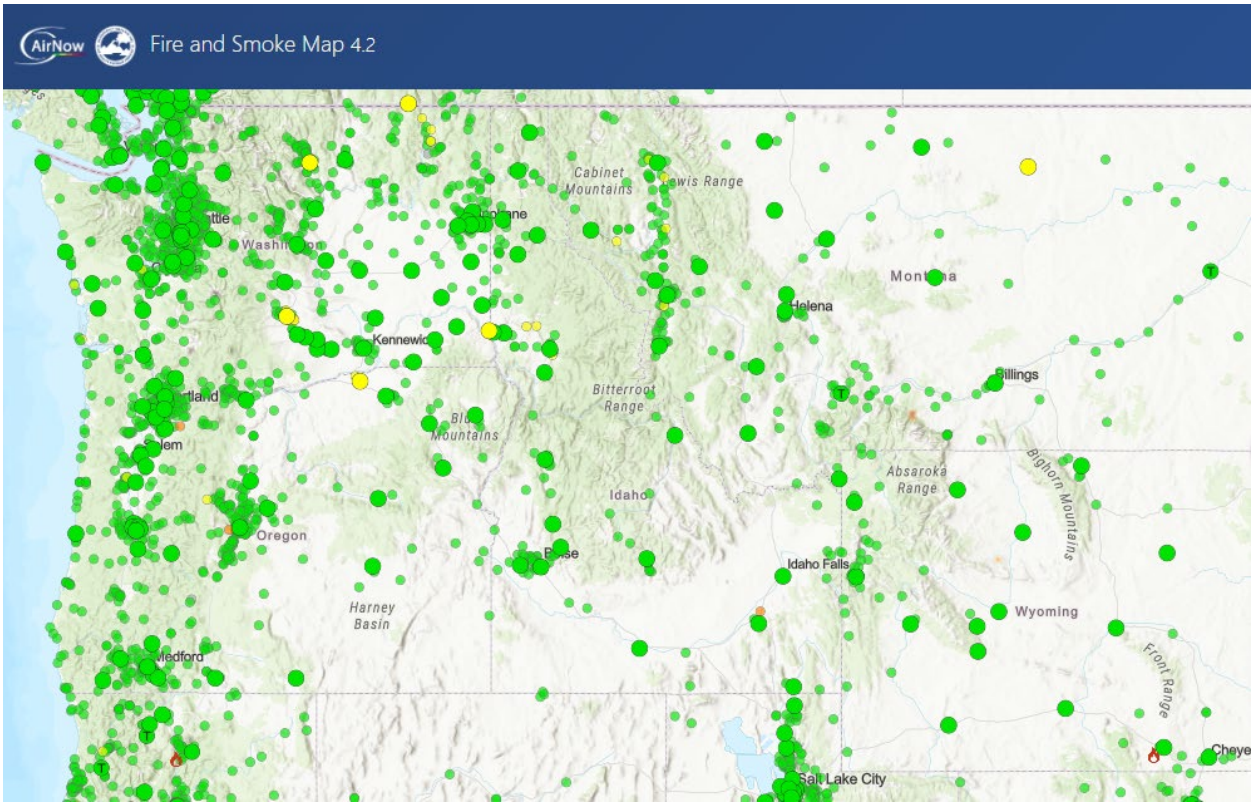
*Note that private air sensors are less accurate because plenty of public air filters are placed inside rather than outside.

Inciweb describes and shows the location of large prescribed fires and wildfires nationwide.

Interagency Wildland Fire Air Quality Response Program (IWFAQRP) Current Smoke Outlooks

Montana DEQ smoke forecasts

Local public access Purple Air Sensors



Map 5.6.1 Air quality monitoring sites

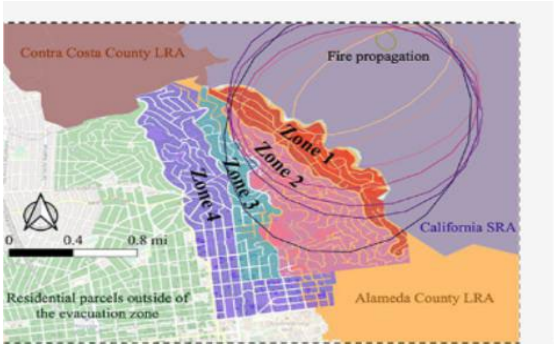
5.7 Early Warning Systems

Emergency Alerts serve as the cornerstone for disseminating critical information to the public in various situations within an area. The evolution of these alerts has been rapid, progressing from traditional radio and TV broadcasts to the sophisticated geospatially driven multi-modal alerting platforms available today. In line with these advancements, Beaverhead County currently engages with a third-party company to facilitate notifications through a web or app-based program.

The county's notification system is robust, enabling alerts to be delivered through multiple channels such as home phones, cell phones, text messages, emails, radio/TV broadcasts, and app push notifications. Furthermore, the system accommodates the upload of pre-loaded shape files, allowing for swift notifications tailored to specific geographical areas. This feature proves especially valuable during wildfire scenarios, as it not only notifies residents of impending danger but also provides crucial instructions, including evacuation procedures, shelter-in-place directives, or guidance on moving to safety zones.

While these alerting programs are highly effective, a notable challenge lies in encouraging homeowners and visitors to register in the system to receive general notifications. To address this, in cases of imminent life safety, alerting officials possess the capability to override registration requirements and broadcast alerts to all users within a specified cell phone tower buffer.

Recognizing the evolving landscape of emergency preparedness, many communities have taken proactive measures by establishing pre-determined evacuation zones. They have also pre-loaded these areas into alerting software, streamlining the notification process through a simplified "one-button" activation. Considering the heightened wildfire risk in certain areas, Beaverhead County should strategically plan and implement a similar initiative. This entails defining high-risk wildfire areas, establishing pre-determined evacuation zones, and integrating this data into the alerting software. By doing so, the county can enhance its emergency response capabilities and further safeguard the well-being of its residents and visitors during wildfire incidents

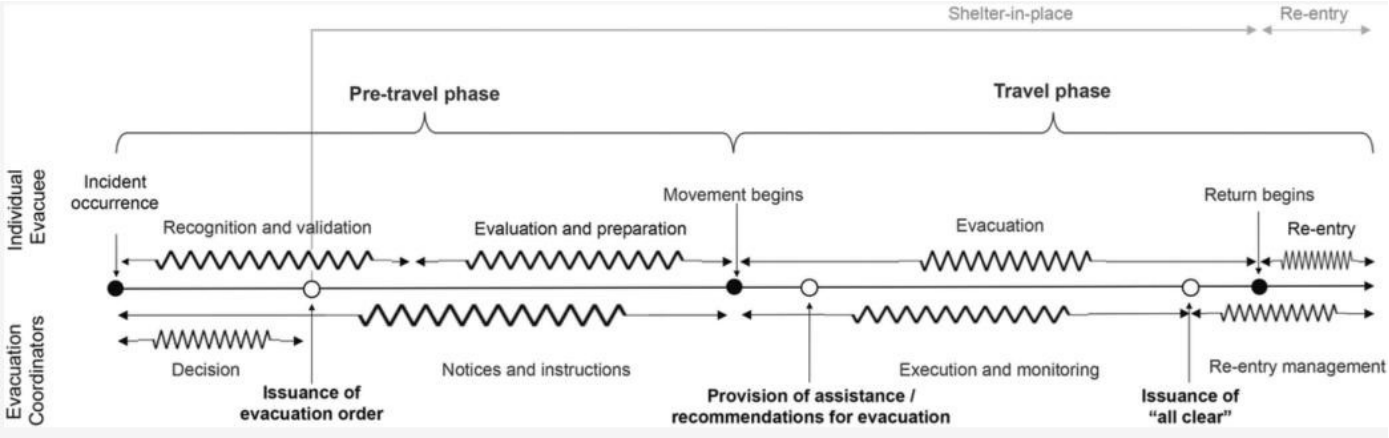


5.8 Evacuation Planning

In response to escalating wildfire threats, Beaverhead County, Montana, is committed to prioritizing community safety through a robust evacuation plan outlined in the County Emergency Operations Plan and the Community Wildfire Protection Plan (CWPP). The county should also consider adopting a phased evacuation methodology that divides the high-risk areas into zones, enabling an organized and timely response based on the location of the fire and its potential trajectory. By informing residents well in advance and establishing priorities for evacuation, we minimize panic, optimize resource allocation, and ensure an orderly process.

Integral to our CWPP is identifying areas of refuge strategically positioned for residents' refuge during evacuations. These areas, selected for reduced fire risk and accessibility, provide crucial shelter options while facilitating efficient coordination among emergency responders. Additionally, our plan emphasizes optimizing traffic flows with clearly defined evacuation routes, updated signage, and real-time communication channels. Collaborative efforts with law enforcement and emergency services enable controlled traffic movements, reducing congestion risks and enhancing overall evacuation efficiency. Beaverhead County remains committed to continuous refinement and community engagement, ensuring our evacuation plan evolves to meet the unique needs of our community and fortify resilience against wildfire threats.

Understanding the human dynamics of evacuation is crucial during a wildfire event. The following timeline outlines the human decision-making process for evacuation and highlights potential delays and challenges that alerting officials should consider.



source:Wang, et al 2021

6. Safe and Effective Wildfire Response

Safe and Effective Wildfire Response is a critical aspect of our strategy to protect Montana from the increasing threat of wildfires. Aligned with the National Cohesive Wildfire Strategy, our approach is tailored to Montana's distinct ecosystems and characterized by a solid commitment to collaboration. Here, we'll go into the details of our response efforts, emphasizing the essential role of interagency cooperation. Local, state, and federal partners join forces seamlessly to form a robust response network. Our focus extends beyond rhetoric, equipping our firefighting teams with essential tools and training while intensifying community preparedness initiatives. As we navigate the unique challenges presented by Montana's landscape, we celebrate our residents' self-reliance while fostering a collaborative spirit to collectively address the shared wildfire threat. This section provides an in-depth exploration of our strategic planning, community engagement, and cooperative efforts with local, state, and federal entities to ensure a Safe and Effective Wildfire Response that safeguards both our cherished landscapes and the well-being of Montana's residents.

Beaverhead County is comprised of five fire departments and three USFS stations. All of the fire departments are volunteer. The USFS stations are staffed with year-round overhead staffing and seasonal firefighters. In many ways, the County departments operate independently, but when a wildfire starts, they have robust mutual aid response profiles for the initial attack. The Montana DNRC staffs two seasonal engines and overhead out of their Dillon Unit Station, which supports the districts on wildland fires on private property. Successful wildland fire protection is created well before smoke and fire are in the air. Prior relationships, collaboration, and communication have the most significant impact on a successful outcome. Beaverhead County has one of the best collaborative response groups in the region, and these relationships are why the coordinated initial and extended attacks in the county are generally successful.

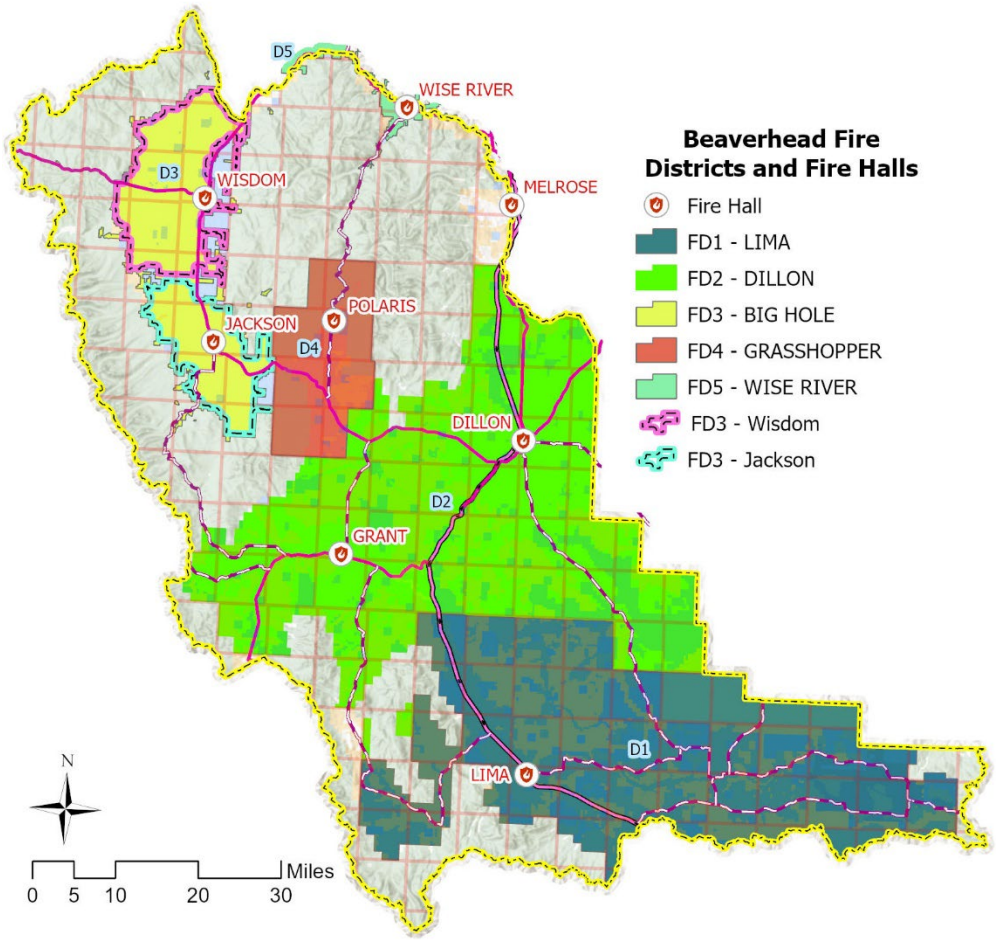
The following section profiles the different departments and includes information on staffing, station locations, apparatus, and general district information.

6.1 Fire Response Capabilities

Beaverhead County Fire Protection consists of five fire protection districts, a fire warden, multiple USFS ranger districts with initial attack resources, and the Montana DNRC Dillon Unit fire personnel also respond. Generally speaking, when a wildland fire occurs on private property, in Beaverhead County, the appropriate volunteer fire department responds and mutual aid agreements are honored as needed.

	Wildland Engines	Structure Engines	Command Units	Water Tenders	Ladder Trucks	UTV w/tank	Employment Type	Size Sq/Miles
Lima	3	1	1	2			Volunteer	
Dillon	6	5	1	6	1	2	Paid/Volunteer	
Wisdom	1	2		1			Volunteer	
Grasshopper Valley	3	1	1	2			Volunteer	
Jackson	1	1		2			Volunteer	
Wise River	2	1	1	1			Volunteer	

Table 2 Beaverhead County Fire Resources



Map 6.1a Beaverhead County Fire Districts and Fire Stations

The following state and federal agencies provide direct wildland fire protection in Beaverhead County and assist with suppression efforts on private lands when requested:

Montana Department of Natural Resources and Conservation (DNRC)

Dillon Unit (Initial/extended attack resources and overhead)

US Forest Service

Dillon Ranger District (Initial/extended attack resources and overhead)

Wise River/Wisdom Ranger District (Initial/extended attack resources and overhead)

Beaverhead County Fire Protection Resource Groups

Beaverhead County Automatic Aid

Montana DNRC County Assistance

When a County in Montana surpasses its abilities to respond and suppress a wildland fire during an initial attack, the Montana DNRC can be activated to assist with staffing, funding, and managing wildland fires. The Montana DNRC also has a County Assist Type 3 Incident Management Team that can be activated to manage more complex extended attack fires.

Limitations

As in most rural areas, volunteers are hard to find and keep motivated. Recruitment is a problem due to the limited number of people available for community service organizations, the commitment to jobs limiting the time available for training, and the increasing training and documentation requirements overloading most volunteer fire chiefs. This leads to difficulty in recruiting and filling the fire chief position with skills and experience. Currently, no impact fee process is available to the rural fire districts in Beaverhead County to assist in funding capital improvements directly related to subdivision development growth and service delivery requirements.

Beaverhead County Disaster and Emergency Services is currently working on this issue.

Response times are difficult to quantify due to the variability of volunteer response times and road conditions. The following maps show approximate response times to areas within the county.

Water sources: Outside of incorporated areas, water supplies that are adequate for firefighting are few and far between. This creates prolonged tender shuttle operations in most areas of the county.

Community Awareness

Community awareness of the wildfire hazard can greatly influence individuals' preparedness and mitigation activities. The local fire districts should regularly publish an awareness section in Dillon Tribune and the Dillonite newspapers.

Improvements can always be made, particularly with large landowners and new homeowners in the wildland-urban interface. Education is an ongoing process that must continue to maintain and improve awareness of wildland fire hazards.

Expectations

People moving into the county may have a preconceived expectation of service levels they were accustomed to in their previous community. These service levels may include but are not limited to the following:

Full-service all-hazard emergency service organizations.

Rapid response times.

Professional, well-trained personnel with adequate equipment and apparatus.

The ability to acquire fire insurance at a reasonable rate.

6.2 Water Supplies

In Beaverhead County, the availability and accessibility of firefighting water supply play a critical role in effectively combating wildfires. While urban areas often benefit from a well-developed network of hydrants and reservoirs, our rural communities face significant challenges due to limited water sources.

Current Limitations:

Sparse Hydrant Networks: Many rural areas need more viable firefighting water supply.

Distant Water Sources: Existing water sources are sparsely located, leading to delays in water procurement.

Limited Capacity of Water Tenders: Firefighting water tenders, though essential, have limited capacity and require frequent refilling, which can hinder continuous firefighting efforts and extend tender shuttle operations. Seasonal Variability: Water availability can fluctuate with seasons, particularly during droughts, further limiting the firefighting capacity.

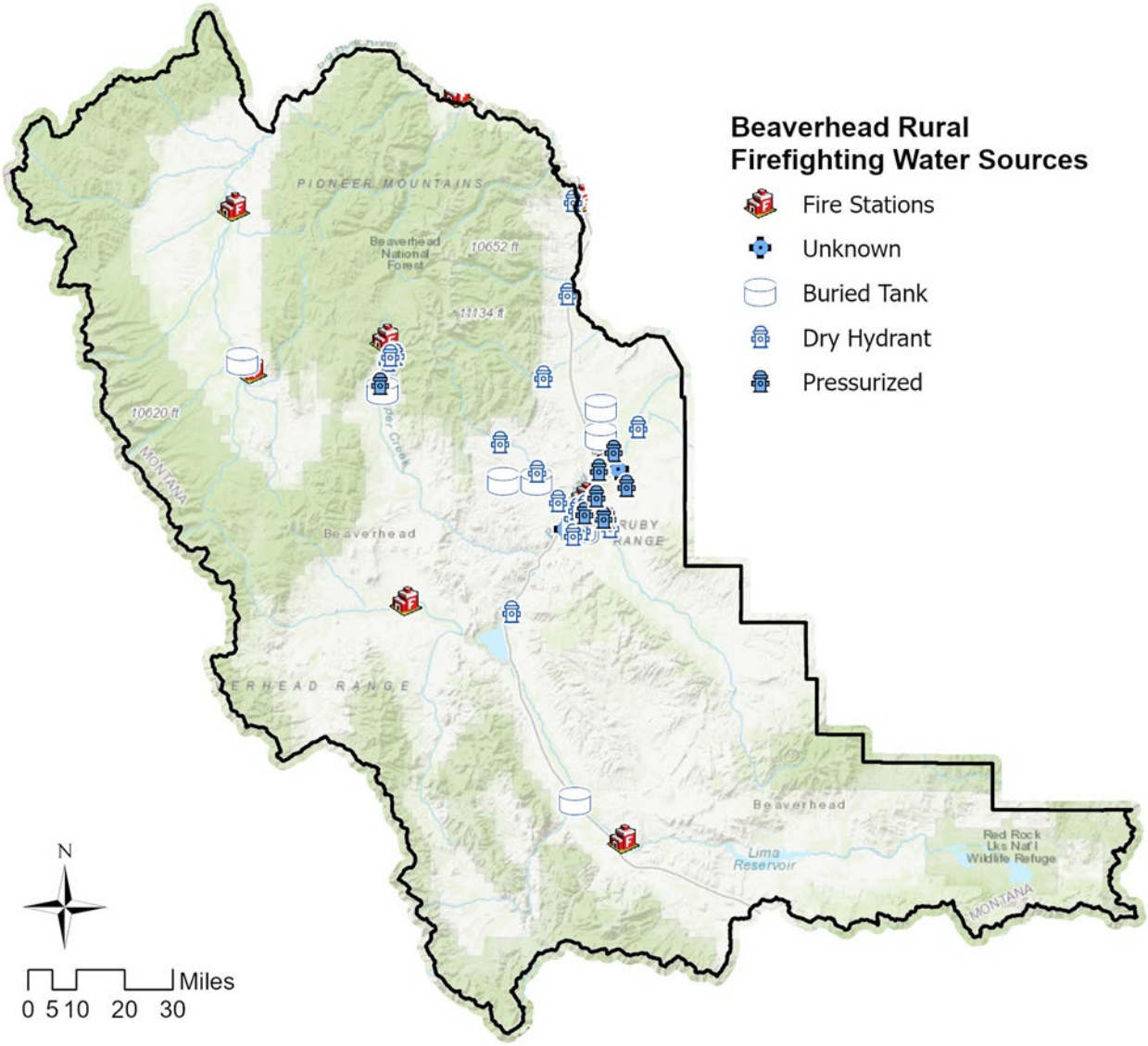
Need for Additional Draft and Water Sites:

To address these limitations and enhance our community's wildfire preparedness, developing additional rural draft and water sites is imperative. These sites can significantly improve the efficiency and effectiveness of firefighting operations by: Increasing Water Access Points: Establishing more draft sites ensures that firefighting units have multiple water access points, reducing travel time and allowing for quicker response.

Enhancing Water Storage: Creating strategically placed water storage facilities in rural areas can provide a reliable water source during emergencies. Improving Refilling Efficiency: Additional draft sites can expedite the refilling process for water tenders, enabling continuous firefighting operations without significant interruptions.

Insurance Protection Class Ratings: To achieve certain insurance protection class ratings, properties must be within 1,000 feet of a reliable water source. Additional draft and water sites can help more properties meet this requirement, potentially lowering insurance premiums and improving overall community safety.

Map 6.2 Rural Firefighting Water Sources



6.3 Potential Operational Delineations (PODS)

Potential Operational Delineations (PODs) were developed by the USFS to help pre-plan for fire by using a risk management approach, and to give land managers a formal process for developing landscape-scale wildfire response options before fires start. PODs are spatial units or containers defined by potential control features, such as roads and ridge tops, within which relevant information on forest conditions, ecology, and fire potential can be summarized. PODs combine local fire knowledge with advanced spatial analytics to help managers develop a shared understanding of risks, management opportunities, and desired outcomes to determine fire management objectives. The PODs pre-planning framework has been applied on over 40 national forests and counting, often including adjacent landowners and jurisdictions for cross-boundary planning.

What are PODs?

PODs are fire management and planning units.

PODs have boundaries defined by potential control features that can be leveraged for fire containment during a wildfire or prescribed fire. Typical POD boundaries are a combination of roads, rivers, major ridges, barren areas, waterbodies, major fuel changes, or other locations that facilitate control.

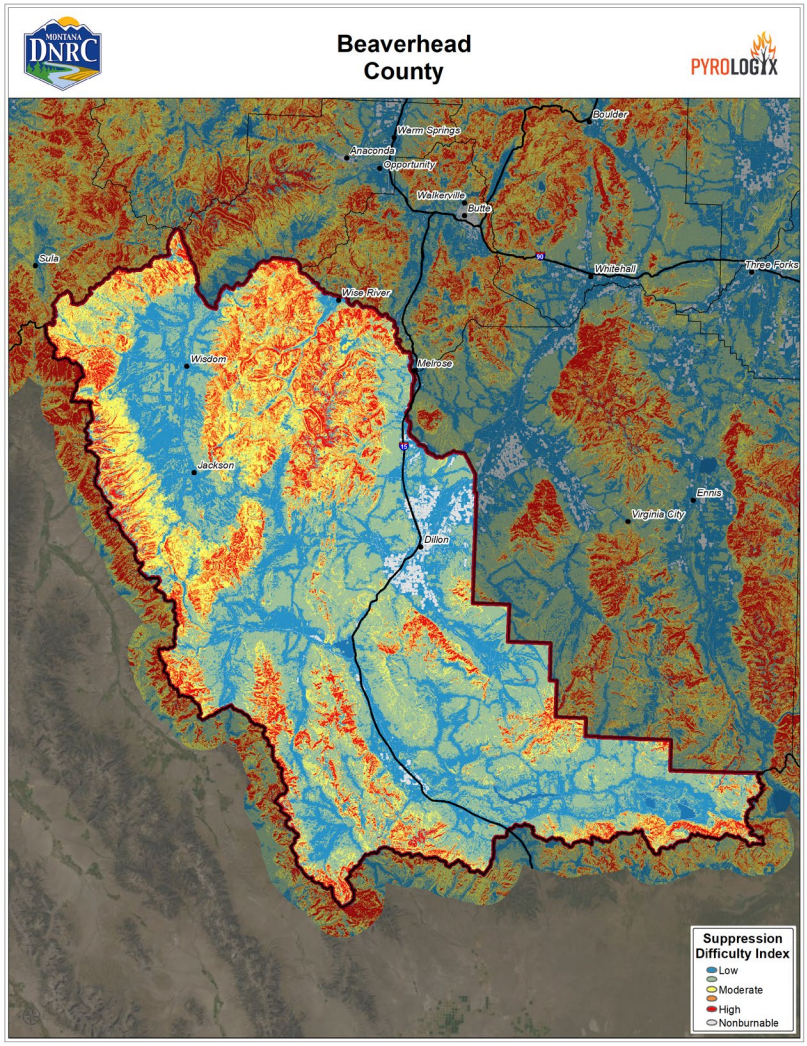
The process of developing PODs is done collaboratively by local wildland fire managers, stakeholders, and scientists.

Collaborators identify a network of best available control features, often using analytical tools to assess the feature's quality and suitability.

When paired with a wildfire risk assessment, PODs can be used to quantify and summarize risk into strategic response zones that provide the starting point for strategic planning of incident response.

Map 6.3a Beaverhead County Potential Operational Delineation (POD) Lines

Map 6.3b Suppression Difficulty



7. Resilient Landscapes

Resilient Landscapes, as outlined in the Cohesive Strategy, refers to the vision of landscapes that are better able to withstand, respond to, and recover from wildfires. The goal is to create ecosystems that are adapted to fire, reducing the negative impacts of uncontrolled wildfires on communities, natural resources, and ecosystems. This concept recognizes that fire is a natural and necessary ecological process in many landscapes and aims to integrate fire management practices to enhance ecosystem health and reduce the risk of catastrophic wildfires.

Critical components of Resilient Landscapes:

Ecological Restoration: Implementing practices to restore and maintain healthy ecosystems by promoting natural processes, such as fire, to play their ecological roles. This may involve controlled burns, vegetation management, and habitat restoration.

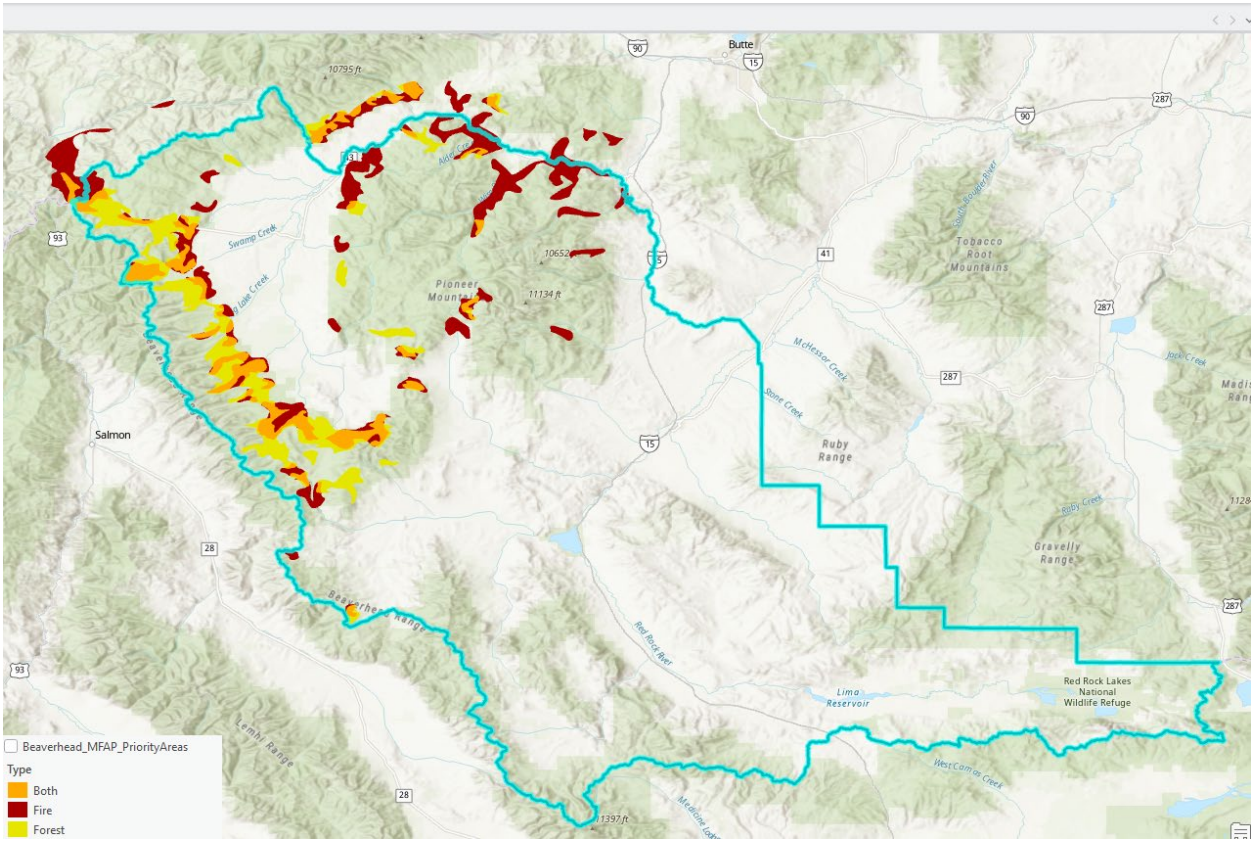
Community Protection: Designing landscapes and land use plans that create defensible space around communities, reducing the vulnerability of homes and infrastructure to wildfire. This includes strategic land use planning, zoning regulations, and creating fuel breaks.

Collaborative Planning: Engaging stakeholders, including federal, state, tribal, and local agencies, as well as communities and non-governmental organizations, in collaborative planning processes. This ensures a coordinated and cohesive approach to wildfire management that considers diverse perspectives and priorities.

Adaptive Management: Embracing adaptive management practices that allow for continuously adjusting strategies based on new information, changing conditions, and lessons learned from past wildfire events. Cross-Boundary Cooperation: Promoting cooperation and coordination across jurisdictional boundaries to address wildfires comprehensively. Wildfires often cross multiple jurisdictions, and a collaborative approach is essential for effective prevention, response, and recovery.

7.1 Resilient Landscape Priority Areas

Map 7.1 Classified Forest Lands & MT Forest Action Plan Priority Areas



7.2 Watershed Protection

Watersheds are crucial geographical and ecological units that collect precipitation and channel it through streams, rivers, and lakes into a common outlet. In Beaverhead County, the health of our watersheds is vital for sustaining drinking water supplies, agricultural irrigation, wildlife habitats, and recreational activities. Protecting these watersheds from the adverse effects of wildfires is essential for maintaining our community's ecological balance and overall well-being.

Ecological Significance

Watersheds play a critical role in maintaining ecological integrity. They support diverse plant and animal life by providing necessary resources and habitats. Healthy watersheds contribute to clean water by filtering pollutants, reducing sediment loads, and maintaining water quality. Forested watersheds, in particular, effectively absorb rainfall and reduce the

speed and volume of surface runoff, which helps prevent soil erosion and sedimentation in water bodies.

Impact of Wildfires on Watersheds

Wildfire poses a significant threat to watershed health. The immediate impacts include the loss of vegetation, which normally stabilizes soil and reduces erosion. Without this vegetative cover, rainwater can wash away topsoil, leading to increased sediment in streams and rivers. This sediment can degrade water quality, harm aquatic habitats, and increase the cost of water treatment for human consumption.

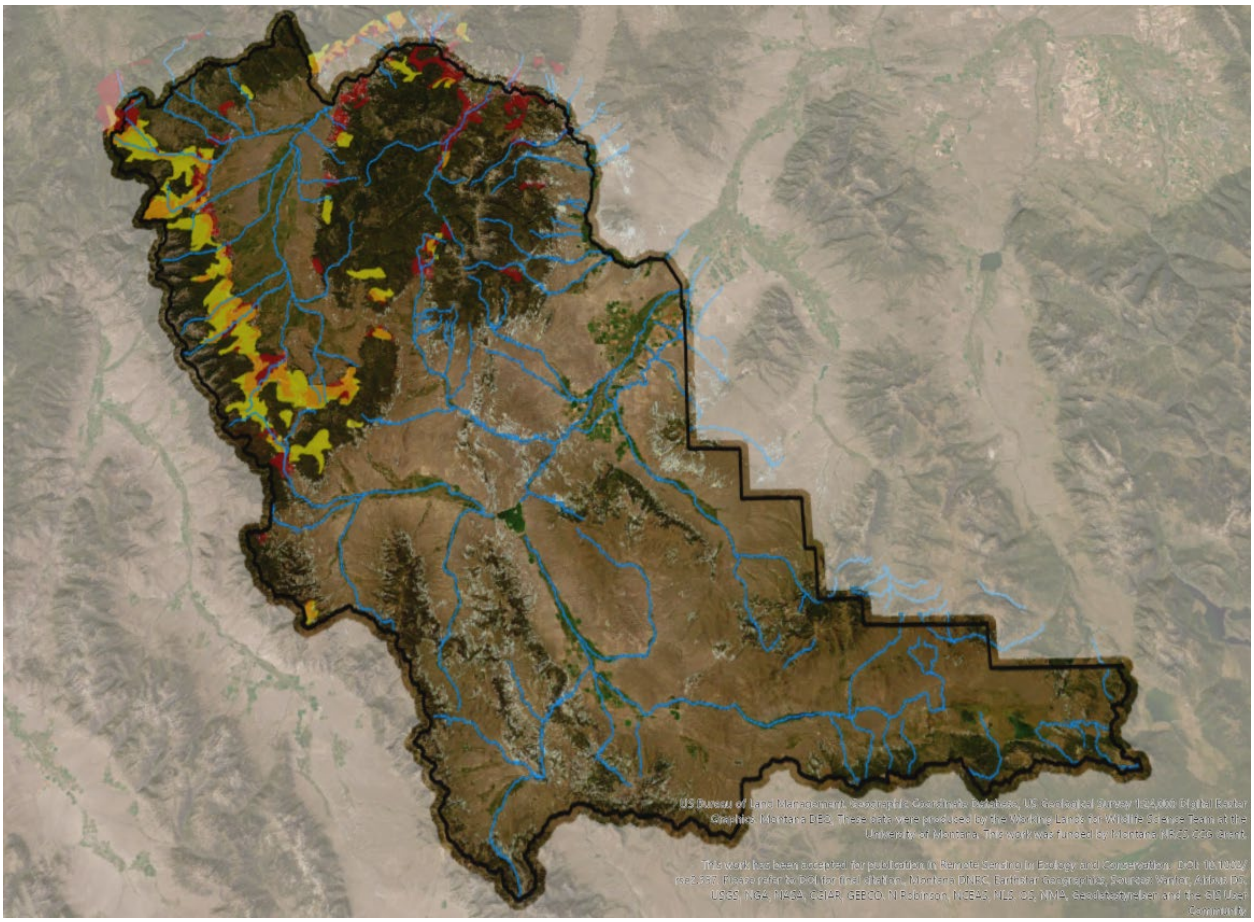
Post-fire effects often lead to changes in the hydrological cycle. Burned areas can become hydrophobic, where soils repel water rather than absorb it. This can exacerbate runoff, flooding, and debris flows during rainstorms. Additionally, wildfires can release pollutants stored in the soil and vegetation, such as nitrates and heavy metals, which can contaminate water supplies.

Socioeconomic Impacts

Watershed degradation due to wildfires can have severe socioeconomic repercussions for Beaverhead County. The increased sedimentation and pollutant load can affect water treatment facilities, leading to higher operational costs and potential water shortages. Agricultural activities that depend on clean, reliable water sources may suffer, impacting local food production and the economy.

Recreational areas reliant on healthy watersheds may also experience water quality and aesthetic value declines, reducing tourism and associated economic benefits. Furthermore, the degradation of watersheds can negatively impact property values and residents' overall quality of life.

Map 7.2 Beaverhead County Rivers, Streams, and Mitigation Areas



7.3 Conifer Encroachment

Conifer encroachment refers to the gradual invasion and spread of coniferous trees into ecosystems where they were previously sparse or absent, such as grasslands, shrublands, and open woodlands. This phenomenon poses a significant challenge to land management and wildfire prevention in Beaverhead County. Managing conifer encroachment is crucial for maintaining ecosystem health, reducing wildfire risks, and preserving biodiversity.

Ecological Significance

The native ecosystems of Beaverhead County, such as grasslands and shrublands, are adapted to specific fire regimes and ecological processes. These areas support diverse plant and animal species that rely on open habitats. Conifer encroachment alters these

landscapes, leading to changes in species composition, reduced biodiversity, and disrupted ecological functions.

Healthy grasslands and shrublands play essential roles in water infiltration, soil stabilization, and nutrient cycling. They provide critical habitats for many species, including pollinators, birds, and small mammals. The encroachment of conifers can outcompete native vegetation, leading to the loss of these valuable habitats and the ecosystem services they provide.

Impact of Conifer Encroachment on Wildfires

Conifer encroachment significantly increases the risk and intensity of wildfires in several ways:

Increased Fuel Loads: Conifers, especially dense stands of young trees, contribute to higher fuel loads. This can lead to more intense and severe wildfires compared to fires in open grasslands or shrublands.

Vertical Fuel Continuity: The structure of coniferous forests creates vertical fuel continuity, where ground fuels, ladder fuels (such as small trees and shrubs), and canopy fuels are connected. This can facilitate the spread of fires from the ground to the canopy, resulting in crown fires that are more difficult to control.

Altered Fire Regimes: The presence of conifers changes an area's natural fire regime. Grasslands and shrublands typically experience frequent, low-intensity fires, while coniferous forests may burn less frequently but with greater intensity. This shift can lead to the accumulation of fuels and an increased likelihood of catastrophic fires.

Socioeconomic Impacts

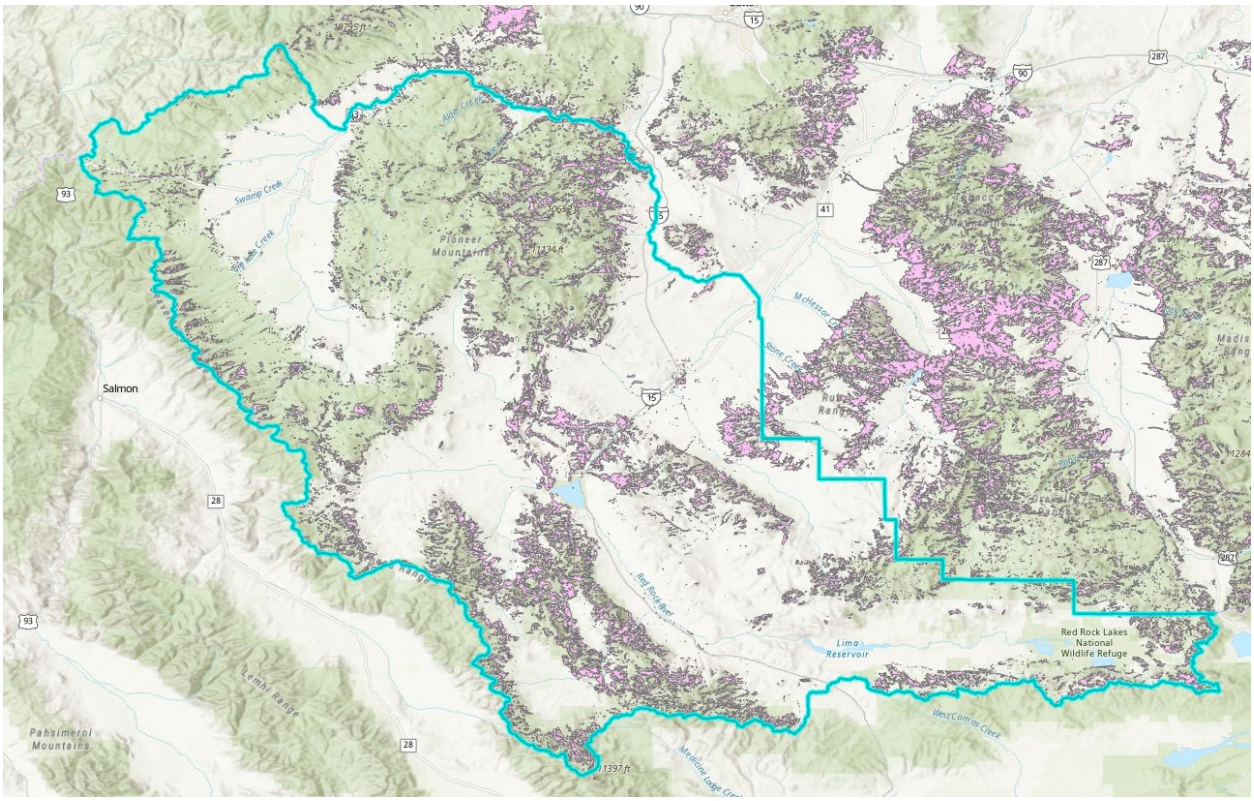
The encroachment of conifers into grasslands and shrublands has significant socioeconomic implications for Beaverhead County:

Increased Fire Suppression Costs: More intense and severe wildfires require greater resources for suppression efforts. This includes higher costs for firefighting personnel, equipment, and post-fire recovery. Impact on Agriculture: Conifer encroachment can reduce the availability of grazing lands for livestock, impacting the agricultural economy. Encroaching trees also compete with grasses and forbs for water and nutrients, reducing forage quality and quantity.

Property and Infrastructure Risks: Higher fuel loads and more intense wildfires pose greater risks to homes, infrastructure, and community assets. This can lead to increased insurance costs and potential losses for property owners.

Loss of Recreational Value: Changes in landscape character and increased fire risks can diminish the recreational value of natural areas. This affects tourism and the local economy, which benefits from outdoor activities such as hiking, birdwatching, and hunting.

Map 7.3 Conifer Encroachment Mitigation Areas



7.4 Prescribed Fire

Prescribed fire as a land management tool is crucial for maintaining ecosystem health, reducing wildfire risks, and supporting biodiversity. In Beaverhead County, prescribed fire is essential in achieving multiple land management objectives, ensuring the safety and resilience of our natural landscapes and communities.

Ecological Significance

Prescribed fire mimics natural fire regimes, which are integral to the health and functioning of many ecosystems. Fire-adapted landscapes, such as grasslands, savannas, and certain forest types, rely on periodic fires to maintain their ecological balance. The benefits of prescribed fire include:

Vegetation Management: Fire helps control invasive species and promotes the growth of native vegetation. It can reduce competition from non-native plants, allowing native grasses, forbs, and trees to thrive. Nutrient Cycling: Burning vegetation releases nutrients

back into the soil, enhancing soil fertility and promoting plant growth. This process supports the productivity and health of ecosystems.

Habitat Creation: Prescribed fire creates and maintains diverse habitats for wildlife. Many species depend on open habitats created by fire for foraging, nesting, and shelter. Fire can also enhance the structural diversity of vegetation, benefiting a wide range of wildlife.

Disease and Pest Control: Fire can reduce the prevalence of certain plant diseases and pests. By removing infected plants and reducing dense underbrush, fire helps maintain healthier plant communities.

Impact on Wildfire Risk Reduction

One of the primary benefits of prescribed fire is its role in reducing the risk and severity of wildfires. By managing fuel loads, prescribed burns can:

Reduce Accumulated Fuels: Regular prescribed burns remove excess vegetation, such as leaf litter, dead wood, and dense underbrush, which can serve as fuel for wildfires. This reduction in fuel load decreases the intensity and spread of potential wildfires.

Socioeconomic Impacts

Prescribed fire also provides significant socioeconomic benefits to Beaverhead County:

Cost-Effective Management: Prescribed burns are cost-effective for managing land and reducing wildfire risks. The costs of conducting prescribed burns are often much lower than the expenses associated with fighting uncontrolled wildfires and recovering from their damages. Support for Agriculture: Prescribed fire can benefit many agricultural systems by improving pasture quality and managing invasive species. Healthy grasslands and rangelands provide better forage for livestock, supporting local agricultural economies.

Enhanced Recreational Value: Prescribed fire helps maintain aesthetically pleasing and ecologically diverse landscapes, enhancing recreational opportunities. Healthy ecosystems attract tourists and outdoor enthusiasts, contributing to the local economy.

Community Safety: Prescribed fire enhances community safety and security by reducing wildfire risks. It protects homes, infrastructure, and valuable natural resources, reducing the potential for catastrophic wildfire events.

8. Goals and Objectives

Goal 1: Enhance community preparedness, resilience, and readiness

Objective 1.1: Develop and regularly update a comprehensive Community Wildfire Protection Plan (CWPP)

Timeline: Ongoing

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, USFS, Montana DNRC, local community councils.

Objective 1.2: Conduct community-wide wildfire risk assessments to identify vulnerable areas and prioritize mitigation efforts.

Timeline: Year 1 - Year 3 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Sheriff's Department, Beaverhead County Fire Departments.

Objective 1.3: Implement proactive measures such as defensible space initiatives, home hardening programs, evacuation route planning, Firewise, and smoke-ready community certifications to increase community resilience and reduce wildfire impacts.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, local homeowner associations, Beaverhead County Public Health Department, Beaverhead County Fire Departments, Montana DNRC.

Objective 1.4: Seek out and apply for grants and funding opportunities to support wildfire mitigation programs, community education, and preparedness efforts.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Montana DNRC.

Objective 1.5: Establish a wildfire detection program focused on wildfire prevention and early detection.

Timeline: Year 2 - Year 4

Responsible Organizations: Beaverhead County DES/Fire Warden, Montana DNRC, Beaverhead County Utility Companies.

Objective 1.6: Conduct regular drills and exercises simulating wildfire evacuation scenarios to ensure residents are familiar with evacuation procedures and routes.

Timeline: Year 1 - Year 4 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Sheriff's Office, local schools, and community organizations active in disaster (COAD).

Objective 1.7: Create preidentified evacuation zones and identify potential areas of refuge throughout the County. Create preloaded alerting areas that coincide with these areas and educate the public on these strategies.

Timeline: Year 1 - Year 5

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Sheriff's Office.

Objective 1.8: Implement a community-wide communication strategy to disseminate timely and accurate information during wildfire events, including a dedicated website, social media campaigns, emergency alerts, and community meetings.

Timeline: Year 2 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Sheriff's Office local media outlets, community leaders.

Objective 1.9: Develop and distribute wildfire preparedness kits to households, containing essential items such as emergency supplies, evacuation plans, and contact information.

Timeline: Year 1 - Year 5

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Sheriff's Office, local schools, and community organizations active in disaster (COAD).

Objective 1.10: Collaborate with schools and educational institutions to integrate wildfire education into the curriculum and engage students in wildfire preparedness.

Timeline: Year 2 - Year 4 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Sheriff's Office, and local schools

Objective 1.11: Establish partnerships with insurance companies, financial

institutions, and other stakeholders to promote wildfire-resistant building practices, incentivize mitigation efforts, and enhance community resilience to future wildfire events.

Timeline: Year 2 - Year 4 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Planning Dept, insurance providers, local banks, real estate agencies, and local wildfire mitigation specialists.

Objective 1.12: Apply for grant funding and implement fuels mitigation and home hardening projects in high-hazard areas throughout the County. These can be implemented through homeowner cost-share incentives, community-scale protection measures, or suppression improvement measures.

Timeline Year 1 - Year 4 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Conservation Districts.

Objective 1.13: Update Subdivision Regulations to include more stringent wildfire land use requirements in high-hazard wildfire development areas. Allow local Fire Protection Authorities Having Jurisdiction (FPAHJ) to require more stringent fire protection requirements.

Timeline Year 1 - 4 (and ongoing)

Responsible Organizations are the Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Planning Department, and Beaverhead County Commissioners.

- **Objective 1.14:** Update the Subdivision Wildfire Risk Assessment Scoring Tool to reflect current and future wildfire conditions more accurately.

Timeline Year 1 - 4 (and ongoing)

Responsible Organizations are the Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County Planning Department, and Beaverhead County Commissioners.

Objective 1.15: Develop Smoke-Ready Communities initiatives. This includes educational and outreach programs to inform residents about the health risks associated with wildfire smoke and steps they can take to protect themselves. An air filter loan program should also be established to provide high-efficiency particulate air (HEPA) filters to vulnerable populations.

Timeline: Year 1 - Year 3 (and ongoing)

Responsible Organizations: Beaverhead County Health Department, Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, public libraries, community senior centers, and local businesses.

Objective 1.16: Establish a Fire-Resilient Landscaping Initiative that promotes fire-resistant plants and landscaping techniques through workshops, demonstration gardens, and incentives for homeowners. Provide guidelines for creating defensible space around homes and offer consultations to residents on best practices for fire-resilient landscaping.

Timeline: Year 1 - Year 3 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, local nurseries, landscaping companies, homeowner associations, and wildfire mitigation specialists.

Objective 1.17: Create a Community-Based Wildfire Risk Assessment Program (WRAP) where community members can participate in assessing wildfire risks in their neighborhoods. Utilize GIS mapping and local knowledge to identify high-risk areas and develop targeted mitigation strategies. Regularly update assessments to reflect changing conditions and new data.

Timeline: Year 2 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County CERT, and Beaverhead County Fire departments

Goal 2: Restore and maintain fire-resilient landscapes across Beaverhead County

Objective 2.1: Implement landscape-scale fuel reduction projects, including mechanical thinning, prescribed burning, conifer encroachment mitigation, and watershed enhancement/protection in collaboration with land management agencies and private landowners.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, USFS, US BLM, Montana DNRC, Beaverhead Conservation Districts, and private landowners.

Objective 2.2: Enhance watershed health and resilience through riparian restoration projects, erosion control measures, watershed wildfire mitigation, and the promotion of sustainable land management practices.

Timeline: Year 2 - Year 4 (and ongoing)

Responsible Organizations: USFS, US BLM, Montana DNRC, Beaverhead Conservation Districts, and private landowners.

Objective 2.3: Develop and implement a forest health monitoring program to assess the impact of wildfires, insect infestations, and other disturbances on forest ecosystems.

Timeline: Year 2 - Year 4

Responsible Organizations: USFS, US BLM, Montana DNRC, local forestry experts, and academic institutions.

Objective 2.4: Encourage sustainable land use practices, including land conservation and easement programs, to protect critical wildlife habitats and corridors.

Timeline: Year 3 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Planning Dept, local conservation easement organizations, and private landowners.

Objective 2.5: Establish partnerships with local nurseries and landowners to promote using native and fire-resistant plant species in landscaping and revegetation efforts.

Timeline: Year 4 - Year 5

Responsible Organizations: Beaverhead County Fire Departments, Beaverhead County DES/Fire Warden, Beaverhead County Conservation Districts, local nurseries, and MSU Extension.

Objective 2.6: Explore innovative techniques for landscape restoration and wildfire mitigation, such as biochar production, wood biomass utilization, soil stabilization, and hydrological modeling.

Timeline: Year 2 - Year 4

Responsible Organizations: Beaverhead County Conservation Districts, USFS, US BLM, Montana DNRC, and academic institutions.

Objective 2.7: Develop and implement a community-based monitoring program to engage citizens in assessing landscape resilience and identifying areas of concern.

Timeline: Year 3 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Conservation Districts, USFS, BLM, and Montana DNRC.

Objective 2.8: Promote sustainable forestry practices and certification programs to incentivize responsible land management and timber harvesting practices.

Timeline: Year 2 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Conservation Districts, USFS, BLM, and Montana DNRC

Objective 2.9: Increase Prescribed Fire implementation throughout the County, emphasizing areas that protect communities and critical infrastructure.

Timeline Year: 1 - Year 4

Beaverhead County Conservation Districts, USFS, BLM, Beaverhead County DES/Fire Warden, Beaverhead County Conservation Districts, and Montana DNRC.

Objective 2.10: Prioritize cross-boundary fuel mitigation projects through programs like the Good Neighbor Authority.

Timeline: Year 1 - Year 5 (and ongoing)

Beaverhead County Conservation Districts, USFS, BLM, Beaverhead County DES/Fire Warden, Beaverhead County Conservation Districts, and Montana DNRC

Goal 3: Improve wildfire response capabilities and post-fire recovery efforts

Objective 3.1: Enhance coordination and communication among firefighting agencies, emergency responders, and community stakeholders through regular training exercises, joint planning sessions, and the establishment of communication protocols.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Fire Departments, Beaverhead County DES/Fire Warden, USFS, and Montana DNRC

Objective 3.2: Conduct a comprehensive study to explore the potential benefits and feasibility of consolidating fire departments within Beaverhead County. This study will assess how consolidation could improve response times, resource allocation, and overall efficiency. The goal is to enhance fire protection services by reducing duplication of efforts, sharing resources, and ensuring consistent training and operational standards across the county.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Commissioners, Beaverhead County Fire Departments, Beaverhead County DES/Fire Warden.

Objective 3.3: Develop and implement comprehensive evacuation education programs to ensure residents understand evacuation procedures, routes, and area of refuge locations during wildfire events.

Timeline: Year 2 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Fire Departments, Beaverhead County DES/Fire Warden, and Beaverhead County Sheriff's Department

Objective 3.4: Establish a volunteer firefighter recruitment and training program to bolster firefighting capabilities and ensure adequate personnel during wildfire events.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County Fire Departments, local school districts, and local non-profits

Objective 3.5: Develop partnerships with neighboring counties and jurisdictions to facilitate mutual aid agreements and resource sharing during large-scale wildfire incidents.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Neighboring Counties, Montana DNRC, and Montana DES,

Objective 3.6: Establish a wildfire recovery task force comprised of government agencies, nonprofits, and community leaders to coordinate post-fire recovery efforts, including debris removal, infrastructure repair, and community support services. Timeline: Year 3 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Commissioners, Montana DNRC, and USFS

Objective 3.7: Promote establishing community-based emergency response teams to provide immediate assistance and support to residents during wildfire events, including first aid, sheltering, and communication.

Timeline: Year 2 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Fire Departments, Beaverhead County CERT, and Beaverhead County LEPC.

Objective 3.9: Develop and implement a community recovery plan that addresses the physical, emotional, and economic needs of individuals and families affected by wildfires, including access to mental health services, financial assistance, and job retraining programs.

Timeline: Year 3 - Year 5

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County CERT, Beaverhead County CISM Team, local nonprofit organizations, faith-based groups, social service agencies, and community organizations active in disaster (COAD).

Objective 3.10: Improve and expand the County Fire Warden Program to provide more resources and overhead during local wildfire response. Identifying a larger team of Deputy Fire Wardens, dedicated fire suppression resources, and a dedicated funding mechanism to support activities.

Timeline Year 1 - Year 4

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Commissioners, and Beaverhead County Fire Departments

Objective 3.11: Develop and implement advanced training programs for firefighters to improve their wildfire suppression and emergency response skills. This includes specialized courses on wildland-urban interface (WUI) firefighting, the use of new technologies, and updated safety protocols.

Timeline: Year 1 - Year 3 (and ongoing)

Responsible Organizations: Beaverhead County Fire Departments, MT Fire Training School, and Montana DNRC

Objective 3.12: Upgrade communication systems to ensure seamless information flow between various agencies involved in wildfire response. This includes the establishment of an interoperable radio system, real-time data sharing platforms, and regular coordination meetings.

Timeline: Year 1 - Year 2 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Sheriff's Office, Beaverhead County Dispatch, and Beaverhead County Commissioners.

Objective 3.13: Enhance the availability of water supplies for firefighting in rural areas by constructing new water storage facilities, such as tanks and ponds, and improving access to existing water sources. This initiative aims to ensure that rural firefighters have adequate

water supplies during wildfire events, thereby increasing their effectiveness in controlling and extinguishing fires.

Timeline: Year 1 - Year 5 (and ongoing)

Responsible Organizations: Beaverhead County DES/Fire Warden, Beaverhead County Commissioners, and Beaverhead County Fire Departments

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Jay Lemon – Dillon Unit DNRC Fire Management Officer

B.J. Klose – Dillon Volunteer Fire Department Chief

Darrell Schulte – Vigilante Wildland Fire Consulting, LLC

Appendices

Appendix A: *Suggested* Model WUI subdivision Covenant

Model Wildfire Protection Subdivision Covenant for Beaverhead County

Subdivisions

Article I: Purpose

The purpose of this covenant is to enhance the safety of residents and protect properties within the subdivision from the threat of wildfires by implementing effective wildfire mitigation measures. These measures aim to reduce the risk of fire ignition and spread, thereby safeguarding lives, properties, and natural resources.

Article II: Definitions

Subdivision: The residential community governed by this covenant.

Homeowner: Any individual or entity owning a property within the subdivision. Defensible Space: A buffer zone around structures that reduces fire hazards by managing vegetation and other combustible materials.

Fire-Resistant Materials: Building materials that are less likely to ignite an contribute to fire spread.

Fuel Reduction: The process of removing or managing combustible materials to minimize fire risk.

Article III: General Requirements

Compliance: All homeowners must comply with the requirements outlined in this covenant to enhance wildfire protection.

Responsibility: Homeowners are responsible for maintaining their properties in accordance with these wildfire protection measures.

Article IV: Vegetation Management

Defensible Space: Homeowners must create and maintain a defensible space of at least 30 feet around all structures. This includes:

Removing dead or dying vegetation.

Thinning and spacing live trees and shrubs.

Pruning tree branches to at least 10 feet above the ground.

Fire-Resistant Landscaping: Homeowners are encouraged to use fire-resistant plants and landscaping materials.

Fuel Reduction: Homeowners must regularly remove accumulated leaves, needles, and other combustible debris from their properties.

Article V: Building and Construction Requirements

Roofing Materials: All new and replacement roofs must be constructed with fire- resistant materials such as metal, tile, or Class A shingles.

Siding Materials: Exterior siding must be made of non-combustible or fire- resistant materials, such as stucco, brick, or fiber-cement.

Decks and Porches: Decks and porches must be built with fire-resistant materials and must not have combustible materials stored underneath.

Vents and Eaves: Vents must be covered with non-combustible mesh with openings no larger than 1/8 inch to prevent embers from entering. Eaves must be enclosed with fire-resistant materials.

Article VI: Fire Safety Infrastructure

Access Roads: All roads within the subdivision must be maintained to ensure they are passable by emergency vehicles at all times.

Driveways: Individual driveways must be at least 12 feet wide with a vertical clearance of 14 feet to accommodate emergency vehicles. Driveways over 150' must have an approved turnaround at the structure.

Address Markers: Each property must have clearly visible and non-combustible address markers to aid emergency response.

Article VII: Water Supply

Water Sources: Homeowners must have access to a reliable water source for firefighting purposes, such as hydrants, ponds, or water storage tanks.

Water Storage: Where hydrants are not available, homeowners must install and maintain a water storage tank with a minimum capacity of 2,500 gallons dedicated to firefighting.

Article VIII: Community Preparedness and Education

Fire Safety Education: The subdivision will organize annual fire safety education sessions for residents, covering topics such as defensible space, evacuation plans, and

fire-resistant building practices.

Emergency Plans: Homeowners must develop and maintain an emergency plan, including evacuation routes and family communication strategies.

Article IX: Enforcement and Penalties

Inspections: The subdivision's governing body will conduct annual inspections to ensure compliance with this covenant.

Non-Compliance: Homeowners found to be non-compliant will be given notice to correct the violations within 30 days.

Penalties: Failure to comply with the corrective notice may result in fines, and continuous non-compliance may lead to legal action.

Article X: Amendments

Amendment Process: This covenant may be amended by a majority vote of the subdivision's homeowner’s association.

Notification: Homeowners will be notified of any proposed amendments at least 30 days prior to the vote.

Article XI: Severability

Severability Clause: If any provision of this covenant is found to be invalid or unenforceable, the remaining provisions will continue in full force and effect.

By implementing these wildfire protection measures, the subdivision aims to create a safer environment for all residents and reduce the risk of catastrophic wildfires.

Appendix B: Post Fire Recovery

Overview

Post-fire recovery is a critical phase following a wildfire event, focusing on restoring the affected environment, infrastructure, and community well -being. In Beaverhead County, Montana, a comprehensive post-fire recovery plan is essential to mitigate long-term impacts and support the resilience of local ecosystems and communities.

Goals and Objectives

Restore Natural Ecosystems: Promote the recovery of native vegetation and wildlife habitats to prevent soil erosion and maintain biodiversity.

Rebuild Infrastructure: Repair and reconstruct damaged infrastructure, including roads, bridges, and utilities, to restore essential services.

Support Community Recovery: Provide resources and support to residents affected by the wildfire, including housing, financial aid, and mental health services.

Mitigate Future Risks: Implement measures to reduce the risk of future wildfires and enhance community preparedness.

Key Actions

Environmental Restoration

Soil Stabilization: Apply erosion control measures such as mulching, seeding with native plants, and installing check dams to prevent soil loss and protect water quality.

Reforestation: Plant native trees and shrubs to restore forested areas and provide habitat for wildlife.

Invasive Species Management: Monitor and control the spread of invasive species that can outcompete native vegetation in

burned areas.

infrastructure Rehabilitation

Damage Assessment: Conduct thorough assessments of

infrastructure damage to prioritize repair and reconstruction

effort s.

Road and Bridge Repairs: Restore access routes to ensure safe

travel and efficient delivery of emergency services.

Utility Restoration: Coordinate with utility providers to repair or

replace damaged power lines, water systems, and

communication networks.

Community Support

Temporary Housing: Provide temporary housing solutions for residents displaced by the wild fire.

Financial Assistance : Offer grants and low-interest loans to help residents rebuild homes and businesses.

Mental Health Services: Establish support programs to address the emotional and psychological impacts of the wild fire on residents.

Future Risk Mitigation

Fuel Management : Implement fuel reduction projects in and around communities to create defensible space and reduce fire hazards.

Community Education: Conduct educational program s to raise awareness about fire prevention, emergency prepared ness, and recovery strategies.

Early Warning Systems: Enhance early warning systems and communication networks to improve emergency response times and community alerts.

Roles and Responsibilities

Beaverhead County Government: Lead coordination of recovery efforts, allocate resources, and engage with state and federal agencies for additional support.

Local Fire Departments: Assist in assessing fire damage, implementing fuel management projects, and supporting community education initiatives.

Community Organizations: Provide direct support to affected residents, including temporary housing, financial assistance, and mental health services.

State and Federal Agencies: Offer technical assistance, funding, and resources for environmental restoration, infrastructure rehabilitation, and community recovery

Funding and Resources

Recovery efforts will require a combination of local, state, and federal funding, as well as support from non-governmental organizations and private donors. Potential funding sources include :

Federal Emergency Management A gen cy (FEMA)

U.S. Department of Agriculture (USDA)

Natural Resource s Conservation Service (NRCS)

Montana Department of Natural Resources and Conservation (DNRC)

Private Foundations and Non-Profit Organizations

Monitoring and Evaluation

Post-fire recovery efforts will be monitored and evaluated regularly to ensure progress and effectiveness. Key performance indicators include:

Revegetation Success Rates: Percentage of native plant species successfully reestablished in burned areas.

Infrastructure Repair Milestones: Completion of critical infrastructure repairs and reconstruction.

Community Recovery Metrics include the number of residents

returning to rebuilt homes and businesses and the utilization of mental health services.

Risk Mitigation Achievements: Implementation of fuel management projects and community education programs.

By implementing a structured and comprehensive post-fire recovery plan, Beaverhead County can effectively restore its natural landscapes, rebuild critical infrastructure, support community resilience, and reduce the risk of future wild fires.

Appendix C: Implementation – Action Table

Project Name	Project Type	Responsible Entity	CWPP Strategy	Estimated Date of Completion	Notes
Ongoing/Future Projects					
Fuels Reduction	WUI Hazardous fuels reduction	Beaverhead County	5.5 3.2	Ongoing	Continue current group coordination that monitors consistency and supports cross boundary fuels work.
Multi-Agency Outreach Coordination	Public Education/ Wildfire Response	DNRC, USFS	5.5	Ongoing	Continued support of local area operating plan.
Private Lands Fuels Programs	Fuels Reduction	Beaverhead County NGO's	5.1	Ongoing	Funding assistance and increased capacity for private lands fuels programs