THE CITY AND COUNTY OF BUTTE SILVER BOW

COMMUNITY WILDFIRE PROTECTION PLAN

Prepared for:
The City and County of Butte Silver Bow
155 W Granite Street
Butte, MT 59701

Prepared by:
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2000 Maple St
Missoula, MT 59808

May 14, 2024

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RESOLUTION NO. 2024-15

A RESOLUTION TO ADOPT A DETAILED COMMUNITY WILDFIRE PROTECTION PLAN PREPARED BY DJ&A PC FOR THE BUTTE-SILVER BOW COMMUNITY WILDFIRE PROTECTION PLAN AND PROVIDING FOR AN EFFECTIVE DATE HEREIN.

WHEREAS, DJ&A PC, submitted a detailed Community Wildfire Protection Plan to the City and County of Butte-Silver Bow, Montana describing the plan, the response, and recovery from wildfire events.

WHEREAS, the plan was made available for public comment on the City-County of Butte-Silver Bow Montana's website, and the findings were reviewed at a public hearing conducted during a meeting of the Butte-Silver Bow Council of Commissioners on Wednesday, April 3, 2024.

WHEREAS, the public had several ways of commenting on the plan during the April 3, 2024 public hearing, specifically through a call-in line, 406-497-5009, for citizens to call in to comment; through submitting email comments to be read into the record by sending them to public-input@bsb.mt.gov; and through submitting written comments by mail or dropped off in the box located in the vestibule near the west entrance to the courthouse.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF COMMISSIONERS OF THE CITY AND COUNTY OF BUTTE-SILVER BOW, STATE OF MONTANA:

SECTION 1: The Council of Commissioners have reviewed the Community Wildfire Protection Plan and submitted change requests necessary to effectuate the acceptance of the Community

Wildfire Protection Plan.

SECTION 2: The Council of Commissioners hereby declares the Community Wildfire Protection Plan to be acceptable.

SECTION 3: That J.P. Gallagher, Chief Executive is authorized to submit the Community Wildfire Protection Plan to the appropriate governing agencies.

SECTION 4: That this Resolution shall be in full force and effect from and after its passage and approval.

PASSED this 1 day of May 2024.

SHAWN FREDRICKSON
CHAIRMAN OF THE COUNCIL OF COMMISSIONERS

APPROVED this 2 day of May, 2024.

J.P. GALLAGHER
CHIEF EXECUTIVE

ATTEST:

LINDA SAJOR-JOYCE
CLERK AND RECORDER

APPROVED AS TO FORM:

KELLI FIVEY
INTERIM COUNTY ATTORNEY

William Andersen

WILLIAM O. ANDERSEN
JUDICIARY COMMITTEE CHAIRMAN

In Partnership with:

Butte-Silver Bow County Fire Department

Zach Osborne 29/07
Zach Osborne (Jul 29, 2024 09:17 MDT)

ZACH OSBORNE, DIRECTOR OF FIRE SERVICES DATE

Montana Department of Natural Resources, Anaconda Unit Office

Craig Hansen 7-24-2024

CRAIG HANSEN, UNIT MANAGER DATE

U.S. Forest Service Beaverhead-Deerlodge National Forest, Butte Ranger District

Timothy Lahey 24/07
Timothy Lahey (Jul 18, 2024 11:59 MDT)

TIM LAHEY, DISTRICT RANGER DATE

Bureau of Land Management-Butte Field Office

Lindsey Babcock 24/07
Lindsey Babcock (Jul 23, 2024 13:48 MDT)

LINDSAY BABCOCK, FIELD MANAGER DATE

Document Version History

Issue Date	Version	Comments
December 7, 2023	1	Draft
February 6, 2024	2	Final

Data Product Disclaimer

The Butte-Silver Bow Community Wildfire Protection Plan (CWPP) is a living document that is regularly updated as new information becomes available. Updated versions of the 2023 CWPP and associated maps can be found at the Butte-Silver Bow 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 either by following the linked web address or scanning the QR Code below.

Online Story Map
The City and County of Butte Silver Bow Community Wildfire Protection Plan

Link

https://buttesilverbow.maps.arcgis.com/apps/MapSeries/index.html?appid=dd73453798684839bd08a315b7c86db9

Acknowledgments

The Butte-Silver Bow Community Wildfire Protection Plan Core Team members would like to thank all who contributed their time and expertise towards the development of this critical planning document, including individuals from Butte-Silver Bow County, the Montana Department of Natural Resources and Conservation, the USDA Forest Service, DOI Bureau of Land Management, and many other engaged stakeholders and members of the public. These contributions were invaluable throughout the process and have created a well-rounded and representative document that will serve the City and County of Butte Silver Bow for years to come.

List of Acronyms

Acronym	Definition
BDNF	Beaverhead-Deerlodge National Forest
BLM	Bureau of Land Management
BSB	Butte-Silver Bow
BSB CEMP	Butte-Silver Bow Comprehensive Emergency Management Plan
CWPP	Community Wildfire Protection Plan
DOI	Department of the Interior
E.O.	Executive Order
eNVC	Expected Net Value Change
EVT	Existing Vegetation Type
FEIS	Fire Effects Information System
FLAME	Federal Land Management, Assistance and Enhancement Act
GIS	Geospatial Information Services
HFRA	Healthy Forests Restoration Act of 2003
HIZ	Home Ignition Zone
HUC	Hydrologic Unit Code
HVRA	Highly Valued Resources and Assets
IWUIC	International Wildland Urban Interface Code
MT DNRC	Montana Department of Natural Resources and Conservation
MWRA	Montana Wildfire Risk Assessment
NFP	National Fire Plan
NLCD	National Land Cover Database
NWCG	National Wildfire Coordinating Group
RPS	Risk to Potential Structure
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
WUI	Wildland Urban Interface

The City and County of Butte Silver Bow Community Wildfire Protection Plan

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Executive Summary

This document constitutes the updated Community Wildfire Protection Plan (CWPP) for the City and County of Butte Silver Bow (BSB) (hereafter referred to as the 2023 CWPP). The Healthy Forests Restoration Act of 2003 (HFRA) encourages the development of CWPPs to help communities plan for, respond to, and recover from wildfire events. The 2023 CWPP builds upon the prior CWPP published in 2005, which has since become outdated and no longer serves the needs of BSB.

The 2023 CWPP is a community-based plan focused on identifying and addressing the local threat of wildfire. This living document is updated as needed to utilize the best available information to characterize current conditions, identify resources and assets susceptible to wildfire, and identify and interpret wildfire risk throughout BSB. An online BSB CWPP story map was created to function as a central location for all CWPP information, including subsequent updates and/or revisions.

The successful development of the 2023 CWPP is the result of collaborative effort by an interdisciplinary CWPP "Core Team", the public, and other stakeholders who submitted feedback during public meetings, public engagement opportunities, and a formal public comment process. This feedback has resulted in a comprehensive CWPP that encompasses a wide variety of perspectives and experience.

Notable updates developed for the 2023 CWPP include: an updated definition of the Wildland Urban Interface (WUI), identification of the WUI, prioritized areas within the County, a detailed implementation plan and action table, and recommendations to reduce structural ignitability. These elements of the 2023 CWPP meet HFRA requirements and provide decision-makers and stakeholders with a useful and current tool to address the local risk of wildfire. Updated WUI mapping is also necessary to facilitate streamlined environmental compliance processes, access grant funding for eligible projects that reduce wildfire risk, increase wildfire response capacity, and provide public education regarding wildfires and associated risk.

The 2023 CWPP also summarizes the regulatory environment surrounding the development of a CWPP along with a characterization of BSB including demographics, government structure, land use, and the fire environment. An overview of the WUI including detailed description of the methodology for defining and mapping the WUI is included along with discussion regarding the integration of wildfire risk into the WUI.

The implementation plan developed for the 2023 CWPP consists of goals, objectives, strategies, and projects that align with federal, state, and local goals while also meeting the unique needs of BSB. This implementation plan interfaces directly with a detailed action plan, consisting of individual projects collaboratively developed by the CWPP Core Team, the public, and stakeholders. The projects within the action plan are subject to prioritization processes that evaluate location, project type, wildfire risk, and other priority elements in order to assign a prioritization value and map priority areas within the WUI for future planning efforts.

The 2023 CWPP is a comprehensive resource that characterizes current conditions and available resources, identifies and interprets wildfire risk, and provides next steps intended to mitigate that risk and provide the public with recommendations to reduce structural ignitability. The updated elements developed throughout this process also facilitate access to a variety of funding opportunities to implement the goals, objectives, and strategies outlined within the 2023 CWPP.

How to Use this Plan

The 2023 CWPP is meant to be read and utilized by both technical and general audiences and is organized to allow intuitive navigation to sections of particular interest while also maintaining logical flow throughout the document. The following overview provides a brief summary of the three sections of the CWPP.

Section 1: Introduction and Background

This section provides relevant information characterizing Silver Bow County as it relates to topics addressed within Section 2 and Section 3 of the 2023 CWPP. Topics covered within this section relate to the purpose, need, and requirements of a CWPP document, the relationship of the 2023 CWPP to other active plans, policies, and regulations applicable to BSB, public engagement and collaboration, and a summary of updates compared to the previous 2005 CWPP.

Section 2: Wildland Urban Interface & Risk Assessment

Section 2 contains a summary of baseline information for Silver Bow County, including government, land use, and demographics. The fire environment is also characterized, including descriptions of topography, hydrology, climate, vegetation, fuels, fire history, and risk to municipal watersheds. This section also contains a detailed description of the WUI, consisting of the updated WUI definition and analysis methods as well as how wildfire risk was characterized and interpreted throughout BSB. At-risk and underserved communities are also characterized with respect to federal definitions as it relates to the CWPP process.

Section 3: Implementation

This section explains how the 2023 CWPP integrates with the National Cohesive Strategy, outlines various resources for homeowners to reduce structural ignitability, characterizes BSB ’s current capacity for wildfire response efforts, and provides a detailed action plan outlining applicable goals, objectives, strategies, and projects identified through the CWPP update process. This section also includes priority areas for wildfire risk reduction throughout the County.

Virtual CWPP Resources

In addition to the 2023 CWPP report document, BSB has developed an online story map resource, serving as a central location to find all information pertaining to the CWPP. On this website, you can access the most current versions of the CWPP document, maps, events, links to additional resources, contact information, and much more.

Online Story Map
The City and County of Butte Silver Bow Community Wildfire Protection Plan

https://buttesilverbow.maps.arcgis.com/apps/MapSeries/index.html?appid=dd73453798684839bd08a315b7c86db9

Section 1: Introduction and Background

1.1 Community Wildfire Protection Plans

Figure 1 Butte Silver Bow Fire Department firefighters and engine

Following decades of fire suppression, changing climate, and subsequently increasing frequency of catastrophic wildfire events, lawmakers identified the need to equip individual communities with tools and funding to address the growing risk of wildfire. In 2003, HFRA was enacted, outlining a basic process for at-risk communities to do this by creating a CWPP. A CWPP is a planning document that assists communities in preparing for, responding to, and recovering from wildfire. CWPPs can vary widely across communities based on unique local needs and priorities. HFRA further encourages hazardous fuel management and community participation to reduce the risk of large wildfires and directs federal land management agencies to prioritize authorized hazardous fuel reduction projects that provide for the protection of at-risk and/or underserved communities that implement CWPPs. Communities are encouraged to create CWPPs to plan for wildfire mitigation activities and tailor the plans to their unique environment.

In response to HFRA, BSB consolidated prepared a CWPP in 2005. This document served the County for several years but has since become outdated. In 2023, BSB published the 2023 CWPP. The 2023 CWPP will guide current planners, fire department, citizens, and other stakeholders in preventing, responding to, recovering from, and living with wildfire. Additionally, an updated CWPP (<10 years old) is required for BSB to be eligible for millions of dollars of federal funding to implement projects that mitigate wildfire risk.

At-Risk & Underserved Communities

At-Risk Communities

Low-income, minority, and rural communities have historically been excluded from wildfire planning processes and risk mitigation projects across the country and are often disproportionately affected by natural disaster events such as wildfire. Recognizing this, HFRA requires CWPPs to consider these communities in all essential aspects of the plan. Defined in the Act as “at-risk communities,” these communities have the following characteristics:

- A group of homes and other structures with basic infrastructure and services
- Located within or adjacent to federal lands with conditions conducive to large-scale wildfire
- Wildfire poses a significant threat to human life or property

Per HFRA, All CWPPs must engage at-risk communities throughout the planning process, prioritize fuel projects around these communities, and recommend measures to reduce structure ignitability in

these communities. The 2023 CWPP meets these requirements for the three at-risk communities identified in 65 FR 751, 'Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are At High Risk From Wildfire':

- Butte
- Melrose
- Ramsay[1]

Underserved Communities

Underserved communities are not explicitly defined within the HFRA, though federal and state guidance offers several metrics which can be implemented to determine if a community is underserved. E.O. 13985 refers to "underserved communities" as "…populations sharing particular characteristics as well as geographic communities, who have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life…". The Community Wildfire Defense Grant Program further highlights areas of "low income" or areas with a social vulnerability score of 0.75 or higher as being qualified for "underserved community" status (Wildfire Risk to Communities Project 2022), with the definition of "low income" in Montana being a household income that is 80% of the state median household income. Underserved communities within BSB were identified by identifying census blocks that qualified as "low income" using U.S. Census Bureau data (U.S. Census Bureau 2020). At the time of analysis, the state median household income was $50,331(Headwaters Economics 2023a)

Both at-risk and underserved communities were buffered by a minimum of 0.5 miles. Per HFRA, the buffer was expanded to include lands within 1.5 miles contingent upon the presence of the following characteristics:

- Sustained steep slope (≥ 25°) (Butler, Anderson, and Catchpole 2007) that creates the potential for wildfire behavior endangering the at-risk community
- Geographic feature that aids in creating an effective fire break, such as a road or ridge top

CWPP Requirements

An effective CWPP must meet the following requirements:

- Collaboration,
- Prioritized Fuel Reduction,
- Recommendations to Reduce Structural Ignitability.

CWPPs are also required to be approved by the local government, local fire department and the state entity responsible for forest management (DOI and USDA 2004). The 2023 CWPP has been prepared in compliance with HFRA requirements and recommendations for CWPPs.

Collaboration

CWPPs must be developed through a collaborative process involving local and state representatives, federal agencies, and other interested parties. Ideally, this collaboration will engage a broad diversity of stakeholders to ensure the CWPP reflects the best local knowledge, receives broad community buy-in, and accounts for ongoing and planned future projects. The 2023 CWPP was developed collaboratively by an interdisciplinary team of local representatives, fire chiefs and wildfire experts,

[1] 'Ramsay' is misspelled as 'Ransay' in 66 FR 751

state and federal agency representatives, and private consultants, hereafter referred to as the 'Core Team'.

The Core Team

The Core Team consists of a diverse group of individuals representing BSB, the Montana Department of Natural Resources and Conservation (MT DNRC), and the U.S. Forest Service (USFS), with support from DJ&A, P.C., an environmental consulting firm. Table 1 provides a list of all CWPP Core Team members and relevant affiliations. Throughout the course of the CWPP update, members of the Core Team met regularly to collaboratively discuss important elements of the plan via virtual and in-person meetings. In addition to consistent virtual Core Team meetings, an in-person meeting with the entire Core Team was held on April 25, 2023. Public meetings were held in person on June 27, 2023 to provide an overview of the CWPP update process and facilitate public discussion regarding the update as well as virtually on December 14,, 2023 to present the draft CWPP. The 45-day period of public review occurred between December 7, 2023 and January 21, 2024. Each public comment submitted during this period was evaluated by the Core Team and incorporated into the final document if found to be substantive. Throughout the CWPP update, the public were informed of opportunities for public engagement via mailings, press releases, social media posts, and consistent updates posted to the BSB public website[2] as well as the public CWPP story map[3].

Table 1 Core Team Members

Name	Role
Butte-Silver Bow County	
Angie Mullikin	Budget and Grants Manager with Public Works
Dan Janosko	GIS Coordinator; BSB
Elizabeth Lahey	GIS specialist; BSB- Public Works
Jim Keenan	Water Plant Superintendent
Jim Merrifield	Director, Office of Emergency Management
Lila Osborn	Senior Planner, BSB Planning Department
Lisa Carey	Office of Emergency Management
Lyndsay Alt	Project Specialist; Chief Executive's Office
Shelly Cleverly	Special Projects Developer/Grant Writer; BSB
Zach Osborne	Chief; Butte-Silver Bow Fire Department
Montana Department of Natural Resources and Conservation (MT DNRC)	
Jonathan Clark	Fire Management Officer; DNRC-Anaconda Unit
Kristin Mortenson	Community Preparedness & Fire Prevention Specialist; DNRC-Southwestern Land Office
Sarah Kleinhanzl	Wildfire Resilience Specialist
U.S. Forest Service	
Jesse Myers	Fire Mitigation Specialist/Fuels Planner

[2] https://co.Silver Bow.mt.us/

[3] https://butteSilverBow.maps.arcgis.com/apps/MapSeries/index.html?appid=dd73453798684839bd08a315b7c86db9

Name	Role
Shane Martin	Assistant Fire Management Officer
DJ&A, P.C.	
Allison Hendryx	Environmental Specialist
Gibson Hartwell	Project Manager/Environmental Specialist
Grant Flaming	Environmental Specialist
Myla Kelly	Project Manager/Environmental Specialist
Travis Benton	GIS Specialist

Prioritized Fuel Reduction

CWPPs must include prioritization of fuel reduction projects by identifying priority areas and treatment methods to protect at-risk communities and essential infrastructure. Often, CWPPs will consider recent, ongoing, and planned future projects and will serve as an implementation plan for years to come. The 2023 CWPP provides spatial priority mapping across the County; this process is summarized in the Prioritization Process section and a map showing spatial priority areas is available in Appendix F. Recommended treatment methods are incorporated into the CWPP via the inclusion of strategies (Appendix A) and proposed projects (Appendix B).

Reduce Structural Ignitability

CWPPs must recommend measures to reduce structural ignitability. These measures can be implemented by private citizens to prevent loss and damage to their property in the event of a wildfire (DNRC 2022). The 2023 CWPP provides an overview of the concepts and recommendations useful for reducing structural ignitability in the Fire Adapted Communities and Living with Fire sections.

Final Approval by Butte-Silver Bow County, Butte-Silver Bow Fire Department, and MT DNRC

The updated BSB CWPP must be approved and signed by the County commissioners, the chief of the Butte-Silver Bow Fire Department, and a representative from the Montana Department of Natural Resources and Conservation (MT DNRC). Additional signatories identified throughout the CWPP update process included representatives from federal land management agencies. The 2023 CWPP received signatures from all required parties as well as all additional signatories.

Timeline of the Community Wildfire Protection Plan Update Process

The update process was initiated in February of 2023 and concluded in February of 2024. The 2023 CWPP was signed into effect by all signatories in February of 2024.

Table 2 2023 Community Wildfire Protection Plan Update Timeline

Milestone/Event	Date
2023 CWPP Update Begins	February 2023
Public Engagement Plan Completed	March 2023
Community Base Map and Draft WUI Completed	May 2023
In-Person Public Meeting	June 27, 2023
Draft 2023 CWPP Completed	September 2023
Final Draft 2023 CWPP Completed	December 2023
Virtual Informational Public Meeting & Presentation of the Draft CWPP	December 14, 2023
Public Review Period for Draft CWPP	December 7, 2023-January 21, 2024
Public Input Incorporated into Final CWPP	January 21, 2023-February 2024
Final 2023 CWPP Completed	February 2024
2023 CWPP Signed into Effect	February 2024

1.2 Relationship to Other Plans, Policies, and Regulations

Conformance with relevant plans, policies, and regulations at federal, state, and local levels are important components of an effective CWPP. The 2023 CWPP conforms with the following plans, laws, and policies in order to maintain consistency and standardization.

National

National Fire Plan

The National Fire Plan (NFP), established in 2000, addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. In order to implement actions related to these five key points, the NFP seeks to ensure sufficient firefighting resources for the future; rehabilitate and restore fire damaged ecosystems; reduce the amount of flammable fuels in forests and established the Wildland Fire Leadership Council (DOI and USDA 2023). The National Fire Plan also encourages the creation of a CWPP. The 2023 CWPP aligns with the key points and actions of the NFP by enabling BSB to mitigate the risk of wildfire using resources available as a result of the NFP and in conformance with its key points. (DOI and USDA 2023).

Federal Land Assistance, Management, and Enhancement (FLAME) Act and The National Cohesive Strategy

The Federal Land Assistance, Management and Enhancement (FLAME) Act of 2009 establishes the need for hazardous fuel reduction funding and community wildfire risk assessments across the nation. The FLAME Act also created the National Cohesive Wildland Fire Management Strategy (National Cohesive Strategy) to manage wildland fire more effectively in the US. The National Cohesive Strategy outlines three goals to restore and maintain resilient landscapes, create fire adapted communities, and improve wildfire response (Wildland Fire Leadership Council 2023). The 2023 CWPP aligns with the three goals established by the National Cohesive Strategy (see Section 3) (Wildland Fire Leadership Council 2023).

Executive Order 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

Executive Order (E.O.) 13985 seeks to advance equity for communities which have been historically underserved (Biden 2021). This E.O. defined an 'underserved community' as "populations sharing particular characteristics, as well as geographic communities, who have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life." Within Butte-Silver Bow County, areas with low-income meet the definition of underserved communities (DOT 2023). Low-income, minority, and other underserved populations have historically been excluded from wildfire planning processes and risk mitigation projects across the country and are often disproportionately affected by natural disaster events such as wildfire. Recognizing this, HFRA requires CWPPs to consider these communities during plan development. At-Risk and Underserved Communities are present within Silver Bow County and are described in detail within Section 1 (At-Risk and Underserved Communities).

State

Montana Forest Action Plan

The Montana Forest Action Plan is a comprehensive plan for Montana's forests that is comprised of an assessment of forest conditions, priority areas for focused attention and goals and strategies for improving forests (Montana Forest Action Advisory Council 2020). The Montana Forest Action Plan prioritizes the revision of CWPPs through the "Foster Fire-Adapted Communities" strategy (Montana Forest Action Advisory Council 2020). Additionally, BSB has many highly valued water resources that could become impacted by wildfire. Protecting these community resources aligns with the "Support and Maintain Healthy and Functioning Hydrologic Systems" strategy defined within the plan (Montana Forest Action Advisory Council 2020). Priority areas delineated within the plan are also incorporated into spatial prioritization of projects within Silver Bow County (see Prioritization Process).

The City and County of Butte Silver Bow

Butte-Silver Bow Comprehensive Plan

Butte-Silver Bow County's comprehensive plan updated in 2020 establishes the framework for proactive planning, goals, and implementation strategies related to future growth (Butte-Silver Bow County 2020a). BSB 2023 CWPP furthers two of BSB's planning principles; maintaining access to recreation assets and ensuring a clean and healthful environment for all.

Comprehensive Emergency Management Plan

Butte-Silver Bow County's Comprehensive Emergency Management Plan updated in 2018 details emergency response protocols and management strategies for BSB. Firefighting operations are covered under Emergency Support Function #4 (Butte-Silver Bow County 2018). Firefighting in BSB County is a cooperative effort between local and federal entities consisting of the Butte-Silver Bow Fire Department, Volunteer Fire Departments, the USFS, and the BLM, with all groups providing mutual aid where possible (Butte-Silver Bow County 2018). Collaboratively developed CWPPs are required to be approved by the local fire department, ensuring that wildland fire planning aligns with the broader emergency management plan.

2016 Update to Pre-Disaster Mitigation Plan

The 2016 update to the Butte-Silver Bow County Pre-Disaster Mitigation Plan identifies wildfire as a significant hazard to BSB and communities within it (Butte-Silver Bow County 2016). The 2023 CWPP will support the goal to reduce wildfire impacts in the Pre-Disaster Mitigation Plan and support future wildfire risk mitigation through community preparedness and public education.

Butte-Silver Bow Master Water Plan

The Butte-Silver Bow County Master Water Plan describes areas of need for improving the water system throughout BSB. Butte-Silver Bow County relies primarily on surface water to meet the community's water needs due to limited potable groundwater supply as a result of historic land uses and environmental characteristics (Butte-Silver Bow County 2021). Surface water sources are particularly vulnerable to contamination from wildfires as organic materials such as ash and debris can enter the water source during and after a wildfire event. The Master Water Plan identifies watershed protection plans as an area of need, to protect against contamination from wildfire (Butte-Silver Bow County 2021). The 2023 CWPP supports watershed protection measures by prioritizing fuels treatments within municipal watersheds and by providing enhanced public education regarding wildfire risk and consequence as it relates to reliable sources of public drinking water supplies.

Butte-Silver Bow Municipal Building Code and The Subdivision Regulations of the Consolidated City-County of Butte-Silver-Bow

The Butte-Silver Bow municipal building code incorporates the 2021 International Wildland-Urban Interface Code (IWUIC), which establishes rules and regulations regarding fire spread, accessibility, defensible space, water supply, and more for all buildings near the WUI in BSB (Butte-Silver Bow County 2022; International Code Council 2021). The Butte-Silver Bow County Subdivision Regulations also include rules and regulations for home construction and defensible space in the WUI or other areas determined to have elevated risk of wildfire (Butte-Silver Bow County 2009). The rules and regulations in these documents align with homeowner risk mitigation techniques presented in the 2023 CWPP.

Butte-Silver Bow County Public Health Response for Wildfire Smoke Events

This document outlines specific strategies designed to facilitate effective communication with the Butte-Silver Bow community regarding the health risks associated with exposure to wildfire smoke and actions that can reduce those risks. The 2023 CWPP supports the implementation of this plan and has included several strategies related to wildfire smoke and the implementation of recommended actions.

1.3 Public Engagement and Collaboration

Throughout the development of the 2023 CWPP, proactive collaboration and public engagement has played a central role. Prior to the development of the CWPP, BSB staff also provided multiple engagement opportunities regarding the Basin Creek – Butte Watershed Project, a priority area within this 2023 CWPP due to elevated wildfire risk that poses an increased risk to human health and safety and threatens the natural resources within the watershed (USFS 2023a). Participants included representatives from Senator Tester and Daines' offices, USFS, Montana DNRC, Montana Tech, and other stakeholders. Television broadcasts and newspaper articles were also written detailing this project as well as the intent to update the CWPP in 2023.

The CWPP update process began in February 2023 and continued for one year, consisting of public engagement efforts such as building a representative CWPP Core Team, developing a public engagement plan, creating a central online platform for CWPP information, soliciting stakeholder feedback, and providing CWPP information and opportunities for engagement through social media, public meetings, and email and physical mailings. Public engagement efforts provided multiple opportunities for public engagement, both virtually and in-person, to ensure inclusivity of all interested stakeholders. Meeting notes and materials for public meetings were also made available to the public

following public events, along with iterative drafts of relevant CWPP materials such as maps, schedule, and content posted to the online story map.

1.4 Summary of Updates to the CWPP

Core updates included within the 2023 CWPP are an updated WUI delineation, consideration of new risk assessment data and current conditions throughout Silver Bow County, and spatial prioritization mapping to recommend areas for fuel reduction. Silver Bow County looks quite different today than it did 18 years ago during the previous update, and in that time, a plethora of tools and resources related to identifying, interpreting, and mitigating wildfire risk have become available. The 2023 CWPP accounts for these changes and opens new doors to access grant funding and implement risk reduction projects that protect lives, property, critical infrastructure, and other high value resources not accounted for in the 2005 WUI.

When updating the WUI and CWPP, the interdisciplinary team used newly available science to inform the decision-making process and prioritize future projects. In 2020, the MT DNRC released the Montana Wildfire Risk Assessment (MWRA) which uses the best available science to evaluate current wildfire risk across the entire state. Importantly, it accounts for developments and changing conditions that occurred since the original CWPP was published in 2005, including increasing residential development within wildland fuels and changing forest conditions in watersheds supplying municipal drinking water. The MWRA also provides information regarding potential wildfire risk for areas that may be developed in the future. The data products generated by the MWRA are an invaluable resource for identifying and interpreting wildfire risk, the susceptibility of resources to fire damage, and more. This tool was integral to the development of a modern and effective CWPP that protects local communities by accurately characterizing wildfire hazard and risk throughout Silver Bow County.

Together the updated WUI and MWRA were used to prioritize ongoing and proposed fuel reduction projects (see Prioritization Process). This prioritization framework helps unlock federal funding that is only available to counties with updated CWPPs and prioritized projects. By integrating the best available science, evaluating current conditions, and prioritizing projects, the 2023 CWPP is a user-friendly, informative, and effective planning document.

Section 2: Wildland Urban Interface & Risk Assessment

2.1. Wildland Fire and Silver Bow County

County Overview

Located in southwest Montana, Silver Bow County is bordered by Deer Lodge County to the northwest, Jefferson County to the northeast, Madison County to the southeast, and Beaverhead County to the southwest.

Totaling 718.6 square miles, Silver Bow County contains a mix of private and public land ownership, with private lands generally occurring in open valley bottoms and public lands occurring in higher elevation forests or shrubland environments. Privately-owned lands represent 42.5% of Silver Bow County's area, with the remainder consisting of federal lands (51.1%), state lands (6.3%), and lands owned by city, county, or other owner types (0.1%) (Headwaters Economics 2023b). Of federal lands within Silver Bow County, the vast majority are part of the Beaverhead-Deerlodge National Forest (BDNF) administered by the U.S. Forest Service. The Bureau of Land Management (BLM) Butte Field Office also administers a portion of federal lands in Silver Bow County.

The county seat and highest population density within Silver Bow County is in the city of Butte, with a population of 35,416 people as of July 1, 2022 (U.S. Census Bureau 2021b). Smaller towns include Melrose, Ramsay, Divide, Rocker and Nissler. The incorporated town of Walkerville is located adjacent to Butte's historical uptown district.

Government

The City and County of Butte-Silver Bow is a consolidated city-county government, first consolidated in 1977. A consolidated city-county government is given the status of a county as well as an incorporated municipality, becoming responsible for all governmental functions of the former municipalities and counties being consolidated (State of Montana 2021). The consolidated city-county government is led by a chief executive officer as well as a council of twelve elected commissioners representing each of the geographical districts in Silver Bow County. Within Silver Bow County, the town of Walkerville is an independent entity from the consolidated city-county government, maintaining municipal powers and separate census records (U.S. Census Bureau 2021a).

Land Use

Much of Silver Bow County is characterized by rural landscapes, with urban areas located primarily within and around Butte. Transportation corridors intersect BSB, consisting of Interstate 15 (I-15), Interstate 90 (1-90), and Highway 2. Rural areas support extensive cattle ranching on both public and private rangelands, as well as associated hay production in lowland areas with access to irrigation water. In addition to agricultural uses, the County supports several mining operations, most notably in the hills north of Butte where some of the world's largest copper deposits are located. Mining has shaped the area for over 150 years and substantial portions of Silver Bow County lands are still engaged in active mining operations. Recreation opportunities including backpacking, camping, hiking, fishing, rock climbing, and more are plentiful throughout BSB, which is host to numerous campgrounds, the Humbug Spires Wilderness Study Area, the Thompson Park Recreation Area, and a wide variety of publicly-accessible lands.

Demographics

As of 2021, the total population of Silver Bow County was 35,017 (Headwaters Economics 2023a), making it the eighth most populous county in the state (World Population Review 2023). Most of this population, however, is concentrated within Butte's metro area with the remaining population generally concentrated around the fringes of the metro area, Interstate 15, and Interstate 90. As shown in Table 3, Silver Bow County has experienced modest growth in recent years, increasing 3.6% from 2010 to 2021 (Headwaters Economics 2023a). Much of this new growth and development has encroached into areas with extensive wildland fuels.

Table 3 Demographic Overview of Silver Bow County

Metric	Value
Total Population (2021)	35,017
Percent Hispanic or Latino (of any race)	4.7%
Percent Not Hispanic or Latino	95.3%
Percent White Alone	89.9%
Percent Native American	2.5%
Population Percent Change (2010-2021)	3.6% (+1,220 people)
Population Density (2021)	48.7 people/sq mi[1]
Total Number of Housing Units	17,209
Median Household Income	$50,331
Poverty Rate	16%
Civilian Employees >16 years of age	16,194

Fire Environment

Evaluating factors that influence fire behavior and activity is an important component of an effective CWPP and serves to provide a characterization of the fire environment within Silver Bow County. Fire behavior is influenced by physical characteristics that vary across the landscape such as topography, hydrology, climate, and vegetation. These characteristics, combined with ignition sources, constitute the fire environment.

Topography & Hydrology

Physical characteristics such as elevation, geological features, and slope angle influence fire behavior on the landscape, and a thorough understanding of these components informs effective and proactive fire management and fire suppression. Straddling the continental divide, Silver Bow County encompasses portions of the Highland Mountains, Pioneer Mountains, and Boulder Mountains. Elevations range from over 10,000 ft in these mountain ranges to approximately 5,000–6,000 ft in the valley bottoms.

Slope angle is a topographic characteristic that influences fire behavior, with steeper slopes generally encouraging faster rates of spread by bridging the gap between fuels and flame. Research indicates that a slope of 25° or steeper can significantly increase rates of fire spread, and this value has been adopted as criteria for 'steep slopes' in the BSB 2023 CWPP. Steeper slopes can also increase risk to firefighting personnel and reduce options for fuels treatments due to difficulty accessing and operating in rugged terrain. Ridgelines associated with steep slopes can also facilitate the spread of fire via wind-driven embers and firebrands (NWCG 2021). Most of Silver Bow County (89%) has a slope angle between 10 and 40 percent (USGS 2023a).

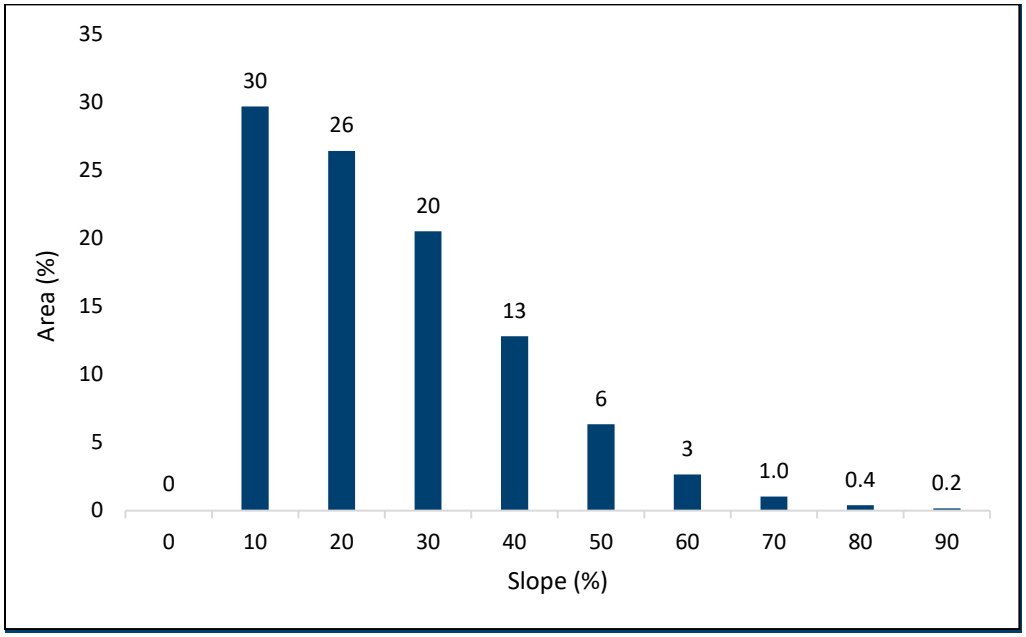

Figure 2 Slope distribution in Silver Bow County

Due to elevation and climate, the County is relatively water-limited, with few large perennial waterways or waterbodies. Silver Bow County falls within the Upper Clark Fork (HUC 17010201), Big Hole (HUC 10020004), and Jefferson (HUC 10020005) subbasins (USGS 2023b, 2020). Prominent drainages include the Big Hole River, Silver Bow Creek, and Divide Creek.

Climate

Annual precipitation at the Bert Mooney Airport weather station located in Butte averaged 11.13 inches over the past decade, with May and June being the wettest months (AgACIS, 2023). Weather systems follow prevailing winds which blow generally from the west. Silver Bow County is best characterized as a continental weather regime because of its cold winters and warm summers (U.S. Climate Data 2022). The warmest month of the year is July, with an average high of 86 degrees Fahrenheit and the coldest is January with a high of 32 degrees Fahrenheit. Weather in Silver Bow County is influenced by the nearby Continental Divide, trapping low pressure systems to the east, leading to colder temperatures east of the Divide (U.S. Climate Data 2022). Summers are typically clear and warm, with peak fire season occurring between April and October (USDA 2019; DOI and USDA 2020, 2022a, 2022b).

Vegetation

In the context of fire management, vegetation is often referred to as fuels and is influential regarding fire behavior, intensity, and severity. Vegetation in Silver Bow County can be characterized using the Existing Vegetation Type (EVT) dataset developed by the LANDFIRE project, which classifies groups of vegetation communities based on field data, modelling, and satellite imagery (LANDFIRE 2023).

Silver Bow County is represented by 63 different EVT communities, but is primarily made up of ‘Middle Rocky Mountain Montane Douglas-fir Forest’, ‘Woodland and Inter-Mountain Basins Big Sagebrush Steppe’, and ‘Rocky Mountain Lodgepole Pine Forest’ (DOI and USDA 2020, 2022a, 2022b). Existing Vegetation Type models that cover less than 10% of Silver Bow County’s land area or represent non-burnable fuels such as urban pavement or scree are included as “other”. The

models described in detail below in Table 4 represent the majority of land cover and burnable fuels within Silver Bow County.

Table 4 Existing Vegetation Type in Silver Bow County

Existing Vegetation Type (EVT)	Area (acres)	Percentage of Silver Bow County
Middle Rocky Mountain Douglas-fir Forest and Woodland	142,148	31
Inter-Mountain Basins Big Sagebrush Steppe	67,092	15
Rocky Mountain Lodgepole Pine Forest	63,860	14
Inter-Mountain Basins Montane Sagebrush Steppe	60,606	13
Other[1]	125,792	27
Total	459,498	100

[1] Models representing less than 10% of land area or non-burnable fuels are classified as 'Other'.

Middle Rocky Mountain Montane Douglas-fir Forest and Woodland

The Middle Rocky Mountain Montane Douglas-fir Forest and Woodland EVT is the most common EVT within Silver Bow County, comprising 31% of the landscape (Table 4). This EVT consists of Douglas fir (*Pseudotsuga menziesii)* forests with a woody understory. Common understory vegetation includes common ninebark (*Physocarpus malvaceus),* Rocky Mountain juniper (*Juniperus scopulorum),* and creeping Oregon grape (*Mahonia repens)* (L.K. Vance 2017a). Historically, Douglas-fir dominated systems have been characterized by a low-severity, high frequency fire regime with a fire return interval of 25-45 years (L.K. Vance 2017a). Today, human influences such as climate change, and fire suppression have modified the fire regime to a more variable and often higher severity regime. The woody understory present in this system also contributes to high-severity, stand-replacing fires by acting as a ladder to carry flames into the canopy, increasing fire severity.

Inter-Mountain Basins Big Sagebrush Steppe

Inter-Mountain Basins Big Sagebrush Steppe is the second largest EVT present in Silver Bow County, representing 15% of the total County area (Table 4). It is made up of mostly grasses, forbs and shrubs. Big sagebrush (*Artemisia tridentata* spp.*)* and western wheatgrass (*Pascopyrum smithii)* are dominant species in this EVT (Kittel and Reid 2015). Thread-leaf sedge (*Carex filifolia)* and needleleaf sedge (*Carex duriuscula)* are also present (Kittel and Reid 2015). This EVT has historically had high severity, stand replacement fires with a fire return interval of 0-35 years (Kittel and Reid 2015). Fire frequency in this EVT is highly variable due to its wide range in topography, climate, and available fuel. The contemporary fire regime suggests that the overall frequency of fire is reduced, but the frequency of large, high severity fires has increased (Kittel and Reid 2015). Human activities such as grazing and land development, along with the prolific increase in invasive species such as cheatgrass (*Bromus tectorum)* have resulted in a shift from the historical fire regime. Woody encroachment is also a concern in Mountain Big sagebrush systems due to fire exclusion, as fire historically killed encroaching conifers (Kittel and Reid 2015). Woody encroachment increases the size, continuity, and abundance of surface fuels, contributing to larger wildfires.

Rocky Mountain Lodgepole Pine Forest

Rocky Mountain Lodgepole pine forest makes up 14% of Silver Bow County, making it the third largest EVT in BSB County (Table 4). Rocky Mountain Lodgepole Pine Forest is primarily made up of lodgepole pine (*Pinus contorta)* with shrub or grass understories. Common shrubs include bearberry (*Arctostaphylos uva-ursi)* and snowbrush ceanothus (*Ceanothus velutinus)* (L.K. Vance 2017b). Lodgepole pine forests have adapted to a historic fire regime of infrequent, stand-replacing fires by bearing serotinous cones containing seeds that release only when subjected to extreme heat. This adaptation facilitates the establishment of large even-aged stands soon after a wildfire event (L.K. Vance 2017b). Contemporary changes in climate and fire exclusion in the Northern Rockies has created homogeny throughout lodgepole pine forests, increasing susceptibility to mountain pine beetle outbreaks and lodgepole pine dwarf mistletoe infestations (L.K. Vance 2017b).

Inter-Mountain Basins Montane Sagebrush Steppe

Inter-Mountain Basins Montane Sagebrush Steppe covers 13% of land area in Silver Bow County (Table 4). This EVT is similar to the Basins Big Sagebrush Steppe EVT, although it occurs at higher elevations with cooler temperatures and more moisture, common at subalpine elevations where winter snowpack provides moisture. Primary vegetation species include big sagebrush (*Artemisia tridentata ssp.*), common snowberry (*Symphoricarpos albus*) and Idaho fescue (*Festuca idahoensis*) (NatureServe 2022). Low sagebrush (*Artemisia arbuscula*) and sage grouse are also present in this system. Low sagebrush is not common in the lower elevation, drier Basins Big Sagebrush Steppe EVT (NatureServe 2022). Historically, Montane Sagebrush Steppe had an infrequent, mixed severity fire regime that resulted in a complex age and species structure (NatureServe 2022). Fire maintained Montane Sagebrush Steppe often has diverse populations of grasses and other herbs, providing high quality forage for livestock (NatureServe 2022). Fire exclusion has led to more severe, larger fires and increased invasive species presence. Woody encroachment is present in this system, mostly by lodgepole pine.

Fuels

In the context of fire, fuels are defined as any combustible wildland vegetative material, and are a primary driver of fire behavior. Fuel models are a tool used to predict fire behavior based on specific fuelbed characteristics such as size, quantity, density, moisture content, and composition (Scott and Burgan 2005). The USDA Standard Fire Behavior Fuel Models are a comprehensive set of models used to define and quantify fuel types and their impact on fire behavior (Scott and Burgan 2005). These fuel models correspond to predicted fire behavior and effects through variables such as spread rate or Rate of Spread (ROS) and flame length, which influence the resulting fire intensity.

Silver Bow County is represented by 26 fuel models, with the TU5 and GS2 fuel models covering 58% of the total acreage of Silver Bow County (LANDFIRE 2023). The TU5 fuel model represents a very high load, dry climate timber-shrub environment. Fire behavior in the TU5 model is described as having moderate flame length and spread rate (Scott and Burgan 2005). The main carrier of fire in the TU5 model is woody understory or brush, characteristic of the Middle Rocky Mountain Montane Douglas-fir Forest and Woodland EVT**.** The GS2 fuel model is defined by a moderate fuel load, dry climate grass-shrub environment. Fire spread rate is high due to the presence of fine, easily ignitable fuels. Flame length is moderate (Scott and Burgan 2005). The TL3 model is defined by “moderate load conifer litter” present on forest floors (Scott and Burgan 2005). The ROS for the TL3 model is very low, with low flame lengths.

Table 5 Fuel Model Acreage in Silver Bow County

Fuel Model (Scott and Burgan 2005)	Area (acres)	Percentage of Silver Bow County
TU5	139,002	30
GS2	128,613	28
TL3	65,141	14
Other[1]	126,742	28
Total	459,498	100

[1] Models representing less than 10% of land area or non-burnable fuels are classified as other.

Fire History

Understanding fire history is an important component to understanding current fire activity and preparing for future wildfires. There have been 10 recorded wildfires in Silver Bow County history, burning a total of 370 acres (NIFC 2023a, 2023b). The two largest fires were the Pigion Creek and Girard fires (NIFC 2023a, 2023b). The Pigion Creek fire burned 120 acres, and the Girard fire burned 119 acres. (NIFC 2023a, 2023b). The primary source of wildfire ignition in Silver Bow County is lightning, but human ignitions have occurred in urban areas and the WUI (NIFC 2023a, 2023b). Of the 10 recorded wildfires in Silver Bow County, three have been confirmed human-caused ignitions (NIFC 2023a, 2023b). Several large fires have also ignited in neighboring counties and impacted Silver Bow County, such as the Alder Creek fire, which ignited in July 2021 and quickly became a national priority wildfire, burning 36,930 acres (DNRC 2020b; West and Depping 2021). During the Alder Creek fire, residents of Silver Bow County were faced with heavy smoke and evacuations as the fire approached Highway 43 (West and Depping 2021). Changing climatic conditions and fire suppression policies have interrupted the natural fire regime across the western United States, leading to longer fire seasons, more intense fires and a build-up of fuels. These factors present new challenges for communities living with wildfire.

Watersheds and Wildfire

A watershed is an area of land where rainfall and snowmelt all drain to the same place. The Butte-Silver Bow municipal water supply depends on five watersheds made up of over 67,000 acres of forested land that are the source of the water on which the community depends. A healthy forest is essential to provide a reliable and high-quality water supply. Each component of a forest, from the tree canopy to the soil, functions in the storage and filtration of the water that passes through it.

As early as the 1860s, drought, water shortages, and mining related contamination of the limited local surface and groundwater supplies threatened the viability of what was then a fledging mining camp on the banks of Silver Bow Creek. Situated in an arid alpine valley, the city of Butte eventually became dependent on water sourced from watersheds distant from the city's urban limits.

Wildfires can have devastating effects on watersheds and have potential to severely contaminate the drinking water supply (Clark 2017). The forests in the community's watersheds have become overgrown and severely impacted by the mountain pine beetle which could lead to catastrophic wildfires. Suppression of natural fires as well as a lack of vegetation treatments in the watersheds have led to lodgepole pine mortality that has created substantial hazardous fuels build-up that poses a real risk to the community's water sources should a wildland fire occur. Fuel loading of this nature can lead to high severity fire, which in turn can result in loss of soil stability and ultimately significant levels of soil erosion and run-off (Bladon et al. 2014). A single storm event could introduce large

amounts of soil, woody debris, and contaminates from fire-affected areas of the watersheds and deliver large sediment loads and contamination to the reservoirs and other waterbodies that supply the water system (Clark 2017). Based on experiences shared by municipalities with similar wildland urban interface-sourced water supplies, water treatment operators estimate that a high severity wildland fire event could lead to tens of millions of dollars in infrastructure damage and ultimately render critical components of the drinking water supply system inoperable for a up to a decade or more. The risk to municipal watersheds within the County is a high priority issue that requires coordinated and spatially extensive management involving all stakeholders. As a result, various projects are being developed and implemented to address this risk, such as the Basin Creek Butte Watershed Project (USFS 2023a).

2.2. The Wildland Urban Interface

The concept of the WUI has a variety of definitions ranging widely in detail and extent according to federal, state, and local sources. At its simplest, the WUI has been described as the area where wildland fuels meet human development, representing an area of increased risk to life, property, and infrastructure. However, the definition of the WUI has evolved in various ways to encompass local community characteristics and values. In recent years, the definition of the WUI has been at the forefront of various legal challenges as it relates to Federal agencies use of the streamlined NEPA processes permitted through HFRA. The precedent set by such cases suggests that communities define the WUI according to HFRA requirements, with deviations from this definition clearly justified within the CWPP. These cases have also acknowledged the right of a community to extend the boundaries of the WUI beyond the HFRA WUI requirements in order to meet their needs, though such deviations must be clearly justified.

Figure 3 Thompson Park Trestle, Silver Bow County

Defining and delineating the WUI serves to ensure that areas with increased risk to life, property, and infrastructure, are appropriately accounted for during decision-making processes. The delineation of the WUI also facilitates access to funding for projects intended to reduce that risk. Per HFRA recommendations, BSB has updated the WUI to encompass the unique needs of the community and meet the definition of the WUI as defined by HFRA.

WUI Components

The updated WUI is comprised of the ‘Functional WUI’ data layer developed by MT DNRC and Pyrologix, LLC. as well as the five municipal watersheds present within the County (MT DNRC and Pyrologix 2022) (Appendix F). **Error! Reference source not found.** provides a map detailing the e xtent of the updated WUI.

MT DNRC Functional WUI

The MT DNRC Functional WUI is a 30-meter resolution raster dataset that maps the WUI where structures meet, or intermingle with, undeveloped wildland vegetation (i.e., burnable land cover greater than 200 meters from a building centroid). This data layer provides a starting point for WUI designation within a county. Per state statute MCA 76-13-145, the official WUI designation for each county is determined through the completion and/or update of a CWPP. This layer consists of data obtained from the "Structures & Addresses Framework" dataset from the Montana State Library GIS Clearinghouse and fuels information from the calibrated LANDFIRE 2016 Remap (LF 2.0.0) FM40 layer. Land with structures within 200 meters of a building centroid was classified as Direct, Indirect, or Limited Exposure WUI.

- "**Direct Exposure**" WUI is burnable[4] wildland that contains or is near a structure located on or surrounded by burnable land cover. Directly exposed structures could benefit from both the hardening of the structure to resist ignition and the reduction of fuel in the home ignition zone to reduce the structure's exposure to heat and embers.
- "**Indirect Exposure**" WUI is nonburnable land that contains or is near a structure and is within 900 m of burnable land cover (Caggiano et al. 2020). Indirectly exposed structures could benefit from the hardening of the structure to resist ignition from embers and nearby structures.
- "**Limited Exposure**" WUI is nonburnable land that contains a structure but is greater than 900 m from burnable land cover.
- "**Critical Fireshed"** is the Burnable Land Area within about 1,500 m (1 mile) of a group of structures, dependent on structure density, but does not itself contain structures.
- "**Nonburnable Fireshed**" is the nonburnable land cover within 1,500 m (1 mile) of a group of structures but does not itself contain structures.
- "**Non-WUI**" is all land more than 1,500 m (1 mile) from a group of structures
- "**Water**" is the portion of the landscape covered by open water

The Functional WUI map provides a broad overview of where structures are located, what their relative level of exposure is, and the burnable lands around those structures.

Municipal Watersheds

All municipal watersheds within BSB were included within the WUI. These watersheds represent areas of increased wildfire risk and high consequence, warranting additional protections to ensure that BSB maintains a consistent source of drinking water in a water-limited landscape. Appendix F includes maps delineating this risk across municipal watersheds in Silver Bow County. The following five municipal watersheds in BSB were included within the WUI. Municipal watersheds are also included as a priority element (see Municipal Watersheds).

1. Big Hole River Watershed
2. Divide Creek Watershed
3. Basin Creek Watershed
4. Mammoth Creek Watershed
5. Moulton Watershed

[4] Nonburnable land cover as defined for the MT DNRC Function WUI data layer is where the mapped fire-behavior fuel model is 91-99; burnable is all other fuel models.

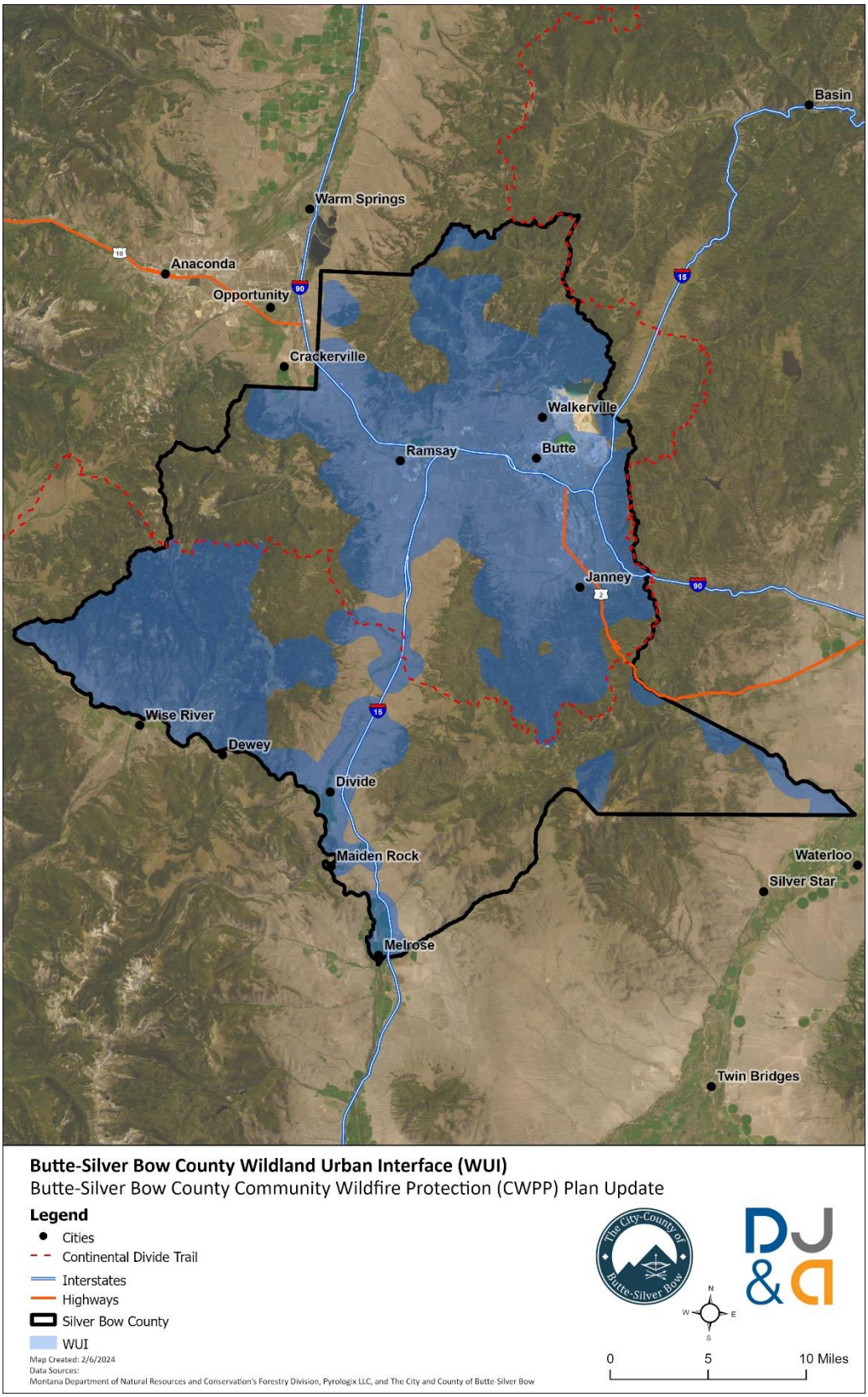

Figure 4 Updated WUI Map

2.3. Wildfire Risk

Wildfire risk is made up of several components that together characterize the total risk posed to a structure, community, or resource. According to MT DNRC, wildfire risk is "the combination of likelihood and intensity (together called "hazard") and exposure and susceptibility (together called "vulnerability")" (DNRC 2023b)." The relationships of these interrelated concepts are illustrated by Figure 5 below.

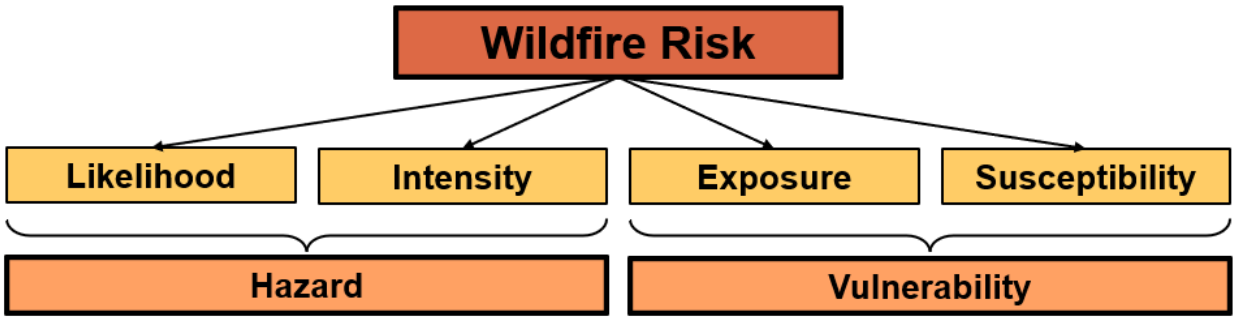

Figure 5 Components of Wildfire Risk

The concept of wildfire hazard is focused on wildlands themselves. Wildfire likelihood is driven by factors such as topography, weather conditions, and potential ignition sources. Wildfire intensity is a measure of the energy expected from a wildfire and is predicted based on total fuel types, fuel load, and topography. Together, likelihood and intensity represent wildfire hazard.

The concept of wildfire vulnerability, meanwhile, is focused on the communities and structures located within or adjacent to wildlands. Homes, communities, and located in areas where direct or indirect wildfire impacts may occur are considered to have wildfire exposure. The characteristics and materials of the structures themselves, however, determine the likelihood of damage when exposed to wildfire, known as wildfire susceptibility. Together, wildfire exposure and susceptibility characterize the total vulnerability of communities and associated life and property when a wildfire does occur (DNRC 2023b).

As a composite of several discrete but interrelated concepts, wildfire risk provides a single key metric for understanding the real-world threat of wildfire to homes, communities, and resources. The Montana Wildfire Risk Assessment (DNRC 2020a) used recent LANDFIRE data, historical wildfire occurrence and weather patterns, and wildfire simulations to provide an updated picture of wildfire risk across the state (DNRC 2020a). Since its completion, this assessment has been instrumental for counties updating their CWPPs.

Risk Assessment & Community Base Map

Using the best available data, local knowledge, and input, the CWPP Core Team developed a community base map including the boundaries of Silver Bow County representing the extent of the landscape to which the CWPP applies. Wildfire risk within the community base map was evaluated using data and findings from the Montana Wildfire Risk Assessment (DNRC 2020a). See WUI Components within this plan for additional discussion regarding the updated WUI within BSB.

Risk Assessment

The Montana Wildfire Risk Assessment (MWRA) was completed in 2020 by Pyrologix for the MT DNRC (Gilbertson-Day et al. 2020). This detailed quantitative analysis of wildfire risk across the state of Montana serves as an integral resource for understanding and interpreting wildfire risk throughout Silver Bow County. The MWRA considers various components that contribute to wildfire risk including: likelihood of a fire burning, the intensity of a fire if one should occur, exposure of assets and resources based on their locations, and the susceptibility of those assets and resources to wildfire. Data outputs related to the MWRA consists of spatially-explicit maps and data layers including: risk to homes, wildfire threat, wildfire risk, wildfire potential impacts, and fire model inputs and fuelscape, along with numerous supporting data layers. For the purposes of the 2023 CWPP, the CWPP Core Team identified two data sources most relevant and appropriate for characterizing and interpreting wildfire risk within BSB. These data sources include total wildfire risk summarized as expected net value change (eNVC) and risk to potential structures. These data layers serve to characterize wildfire risk of both current and potential assets and resources throughout BSB. More information regarding the MWRA along with online maps and resources can be found at the MT DNRC website[5].

Wildfire Risk (eNVC)

Total wildfire risk within the MWRA was evaluated through an effects analysis that quantifies wildfire risk as the expected value of net response or eNVC. To evaluate wildfire risk, the MWRA characterized anticipated response of identified, mapped highly valued resources and assets (HVRAs), consisting of people and property, critical infrastructure, and surface drinking water intakes. This layer considers the likelihood of a fire larger than 250 acres occurring on the landscape, the likelihood of associated fire intensities, and the susceptibility of mapped assets and resources to wildfire of different intensities. The anticipated response of these assets and resources was then translated into a measure of total wildfire risk across BSB as it relates to these identified HVRAs.

Conditional Risk (cNVC)

Conditional Risk, also referred to as ‘Wildfire Potential Impacts (cNVC)’ within the MWRA, represents the consequence of wildfire, if it were to occur, as it relates to mapped assets and resources throughout a given area. These assets and resources include people and property, critical infrastructure, and surface drinking water intakes. This layer serves to characterize the exposure of a given asset or resource by integrating the predicted response to wildfire, which can range from negative or detrimental to neutral.

Risk to Potential Structures (RPS)

Risk to potential structures is also referred to as ‘Hazard in Context’ or ‘Risk to Homes’ within the MWRA and represents an integration of wildfire likelihood and intensity with generalized consequences or responses to a home everywhere on the landscape should a fire occur. This metric is useful as it can “predict” the risk of both future and current homes by evaluating the wildfire risk if a home were to occur at any point across the landscape. Response of these hypothetical homes to wildfire is assumed to be negative with the degree of damage correlated with increasing wildfire intensity.

[5] https://mwra-mtdnrc.hub.arcgis.com/

Section 3: Implementation

3.1. Integrating the National Cohesive Strategy

The Federal Land Assistance, Management, and Enhancement Act of 2009 (FLAME Act) aimed to provide improved resources and funding opportunities for wildfire suppression on federal lands (43 USC § 1748). As part of this effort, Congress required the development of a cohesive strategy to ensure nationwide consistency of wildfire management on federal, state, local, and tribal lands. Known simply as the National Strategy, it was developed cooperatively by a wide variety of governments and land management agencies, wildfire experts, and public stakeholders. The National Strategy guides wildfire planning efforts by establishing core guidelines to be used when developing CWPPs and emergency responses, prioritizing projects, and educating and equipping the public to protect their property from wildfire (DOI and USDA 2014).

The National Cohesive Strategy focuses on three goals, listed below:

- Restoring and Maintaining Resilient Landscapes
- Fire Adapted Communities
- Safe and Effective Wildfire Response

The interdisciplinary team incorporated each of these national priorities when preparing the 2023 CWPP, thereby ensuring consistency with the National Strategy. The result is a CWPP which prioritizes healthy and functional ecosystems through treatment activities, equips property owners with the knowledge and resources to protect their homes against wildfire, and identifies wildfire response capacity.

Restore and Maintain Resilient Landscapes

Though a natural and essential component of the ecosystem, the role of wildland fire has been altered through fire suppression, changing climatic conditions, declining forest health, increasing human activity, and human development and alteration of the landscape. These changes have resulted in conditions that have reduced landscape resiliency to changes, as well as increasing the potential for increased wildfire activity and severity. Landscape restoration through proactive management serves to reinstate resiliency and promote natural fire activity across the landscape in order to maintain the beneficial impacts of wildfire while mitigating risk. Once restored, ongoing maintenance through management is essential to perpetuate healthy, resilient landscapes.

Restoration and maintenance on the landscape can be achieved through various management actions related to vegetation and fuels, including: prescribed fire, managing wildfire for resource objectives, and mechanical, biological, and chemical fuels treatments. Mechanical, biological, and chemical fuels treatments include: thinning, commercial harvest, slash and underburning, slash and pile burning, herbicide application, reseeding, replanting, and more. Given the scale of fuels treatments needed to restore resilient landscapes, prioritization is critical to allocate resources effectively. These various treatment types can be implemented in priority areas where feasible and sustainable in order to reduce wildfire risk, improve ecological conditions, and achieve fire adapted and resilient landscapes.

Fire Adapted Communities

The National Wildfire Coordinating Group (NWCG) defines a fire adapted community as a community that “takes mitigation actions so they can live with wildfire without harm and without extensive wildfire suppression efforts” (USFS 2023b). Promoting fire adapted communities focuses on adaptation through fire mitigation strategies, public education and applicable policies

and regulations. Fire mitigation strategies may include using fuel treatments and individual homeowner action to help protect life and property during a wildfire event. Public education and outreach about wildfire preparedness can help the public understand their role in promoting fire adapted communities and protecting private property. Updating policies and regulations like building and subdivision codes can ensure fire resilience for future development.

Living with Fire

Building fire adapted communities is a constantly evolving process that includes taking actions to reduce the risk of wildfire, educating residents about becoming fire adapted, and designing tools that support the community. Fire is a natural part of the ecosystem, but communities at risk can take steps to reduce negative impacts when a wildfire does occur.

Steps that homeowners can take to become more fire adapted include reducing the ignition potential of their home and the 100-200 feet of area surrounding it, called the Home Ignition Zone (HIZ). This involves home hardening (using ignition resistant construction materials and techniques) and maintaining adequate defensible space within the HIZ through management of vegetation and other combustible materials on the property. An ignition resistant HIZ reduces the risk of loss by creating a home and property that is better able to defend itself from wildfire. The National Fire Protection Association's Firewise Program provides guidelines that help inform homeowners about specific actions for home hardening and HIZ treatments. The MT DNRC provides free wildfire risk home assessments to all Montana homeowners that include a wildfire risk rating as well as recommendations for specific actions homeowners can take to reduce their vulnerability to wildfire.

Recommendations to Reduce Structural Ignitibility

Resource managers reduce the risk of wildfire damage to private property through fuel reduction projects on state and federal lands, establishing fuel breaks and buffers, and wildfire suppression. However, property owners are responsible for helping create fire adapted communities by reducing the structural ignitability of their own property. In many cases, these efforts incorporate the same techniques used by local, state, and federal resource managers.

Measures to reduce structural ignitability vary from property to property depending on parcel size, the location of structures within the parcel, building age, construction, and materials, existing vegetation and fuel loads, access to water, and more. Despite property-level variation, the same basic concepts apply in all cases.

Fire propagation requires fuel. Reducing the ignition potential within the HIZ, with priority given to the home/structure and the first five feet surrounding it, is the most effective way for structures to withstand a wildfire. One of the most common ways that homes catch fire is by wind-driven embers which can travel up to a mile away from active wildfires and ignite buildings by landing on flammable exterior materials, or indirectly by igniting flammable vegetation or materials located close to the home, resulting in direct flame contact or radiant heat exposure to the home (Restiano et al. 2020). As such, property owners can reduce structural ignitibility by preventing flames and embers from accessing fuels within the building itself, a technique known as “hardening.” Implementing hardening and creating ignition resistant homes and properties, collectively, saves homes and creates fire adapted communities. Common techniques for reducing structural ignitability include:

- Building or retrofitting structures with ignition resistant materials and techniques (i.e., Class A roofing, ignition resistant siding, boxed eaves, covered gutters, metal gutters kept clear of debris, screened vents, etc.)

- Maintaining a non-combustible zone within the five feet surrounding the home by removing all flammable materials and vegetation, using ignition resistant ground cover (e.g., decorative rock instead of wood mulch), and sparsely placed fire adapted plants if vegetation is desired.
- Keep the area 5-30 feet from the home lean, clean, and green by providing adequate spacing between trees, removing ladder fuels and ground litter, keeping vegetation healthy and hydrated, and using walkways, patios, or driveways to create fuel breaks.
- Pruning trees 6-10 feet up from the base of the tree and keeping lawns well-watered and mowed.
- Clearing flammable materials away from propane tanks and firewood stacks and ensuring that both are located at least 30 feet away from the home.

Homeowner Resources

Because each property is unique, organizations such as Firewise/USA[6], Ready, Set, Go![7], Keep Montana Green[8], and the Fire Adapted Montana Learning Network[9] offer resources to help residents determine the best options for reducing structural ignitibility. These resources include further reading and recommendations, illustrations, step-by-step guides, evacuation checklists, and more that can be used when planning, completing projects, or discussing wildfire preparedness within a community.

Property owners can also receive professional assessments regarding wildfire risk and forest health from the USFS and MT DNRC foresters as well as wildfire mitigation specialists. MT DNRC provides free wildfire risk assessments and site visits to provide tailored recommendations for property owners to better prepare for wildfire[10]. The MT DNRC also provides guidance for homeowners interested in mitigating wildfire risk within their communities including suggestions for home hardening, evacuation planning, and reducing ignition potential. More information can be found on MT DNRC webpages[11,12].

Grants and Funding

There are several opportunities for grants and funding opportunities available to communities and organizations to promote fire adapted communities. Although there is not currently a grant program available to assist individual homeowners with home hardening, local governments can utilize grant funds to support the development of programs that serve this purpose in addition to providing funding for projects that mitigate wildfire risk in adjacent federal and state lands. Grant funding is available to private landowners for fuels reduction through the DNRC Hazardous Fuels Reduction Grant[13]. Additionally, there are several grants available through the MT DNRC to local governments to increase fire response capacity, such as the Cooperative Fire Protection Capacity grant and the Rural Fire Capacity Grant. Having an updated CWPP allows the City and County of Butte Silver Bow to access more funding sources, including the Community Wildfire Defense Grant, to increase wildfire preparedness and mitigate wildfire risk (DNRC 2023a).

[6] https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA
[7] https://www.wildlandfirersg.org/s/?language=en_US
[8] https://www.keepmontanagreen.com/
[9] https://fireadaptedmontana.org/
[10] https://dnrc.mt.gov/Forestry/Resources/request-a-site-visit
[11] https://dnrc.mt.gov/Forestry/Wildfire/fire-prevention-and-preparedness
[12] https://www.mtfireinfo.org/pages/prevention
[13] https://dnrc.mt.gov/Grants-and-Loans/

Education and Outreach

Wildfire mitigation strategies are most effective when there is robust participation from all stakeholders. It is important to engage the community through education and outreach to mitigate the human hazards of wildfire. Public education campaigns such as Ready, Set, Go! and Firewise/USA bring communities together to prepare for wildfire. Becoming a Firewise/USA community gives residents access to resources, funding, and community support (Firewise USA 2022). There are currently no Firewise/USA communities in BSB, but residents can take action to organize a Firewise community at any time (Firewise USA 2022). Many education and outreach efforts are already underway in BSB. The City and County of Butte Silver Bow is currently working to implement a comprehensive smoke plan that helps educate residents about the danger of wildfire smoke to human health and mitigate impacts of wildfire smoke on the community (Butte-Silver Bow County 2023). Local fire districts also host events where a range of educational materials are available, and officials can provide additional outreach. Statewide, the MT DNRC works to promote education and outreach through the MT Fire Information Dashboard.

Wildfire Response

One of the most important roles of a CWPP is to identify wildfire response capacity and processes. The interdisciplinary team that developed the 2023 CWPP included members of the Butte-Silver Bow Office of Emergency Management, community preparedness and wildfire prevention specialists, and both federal and local fire department representatives. As a result, the 2023 CWPP has identified specific strategies to increase wildfire response capacity and improve communication across various resource groups.

Figure 6 A Butte-Silver Bow Fire Department engine

Resources & Capacity

The City and County of Butte Silver Bow is served by one paid fire department, the Butte-Silver Bow Fire Department and 11 volunteer fire departments (VFD):

- Big Butte VFD
- Boulevard VFD
- Centerville VFD
- Floral Park VFD
- Home Atherton VFD
- Little Basin Creek VFD
- Melrose VFD
- Racetrack VFD
- Rocker VFD
- Terra Verde VFD
- Walkerville VFD

These local firefighting resources are skilled, trained, and equipped to respond to WUI wildfire incidents and often work closely with federal wildland firefighting resources supplied by the USFS, BLM, and MT DNRC. Mutual aid agreements are also in place among local fire departments and

federal agencies throughout BSB as well as adjacent counties. Fire resources in BSB are currently meeting suppression needs but increased capacity is essential to ensure that wildfire response can effectively respond to, confine, and manage wildfire incidents. The 2023 CWPP includes detailed strategies and projects that support increased fire response capacity in BSB.

Preparation & Prevention

In BSB, wildfire preparation and prevention activities are a cooperative effort between city-county, state, and federal agencies. Fire preparedness actions may include: public education, home hardening, clearing of the home ignition zone, or planning for evacuation. Fire prevention actions include campaigns to educate the public about the dangers of human-caused fires and risk reduction measures, such as fire restrictions or burn bans. Although fire is a natural part of the ecosystem, some fires may pose a threat to human life or property. The 2023 CWPP facilitates the development of new programs to support wildfire preparedness and prevention throughout BSB.

Mobilization

When a wildfire occurs in BSB, a response crew is mobilized. Response crews are mobilized based on several factors, including the location of the fire and availability of resources. The Butte-Silver Bow fire department and volunteer fire departments are mobilized through the Butte-Silver Bow County 911 Center. Wildfires occurring on federal lands are led by the Dillon Interagency Dispatch Center (MT-DDC). Both dispatch centers are committed to interagency cooperation and communication during a wildfire. Mutual aid agreements are in place with surrounding counties and the Montana Fire Service Mutual Aid Organization.

Emergency Management

The BSB Comprehensive Emergency Management Plan (CEMP) provides a detailed overview of how BSB has planned to respond to emergencies ranging from flood to wildfire (The City and County of Butte-Silver Bow Montana 2018a). Within the CEMP, an evacuation strategy is outlined which can include both sheltering in-place or evacuations from a defined area, such as would apply in the case of a wildfire event (The City and County of Butte-Silver Bow Montana 2018c). Coordination of firefighting, emergency medical services, and technical rescue activities in the event of an emergency such as wildfire is also outlined within the CEMP(The City and County of Butte-Silver Bow Montana 2018b). The BSB Office of Emergency Management's website also provides extensive resources to help individuals throughout BSB learn more about available resources and proactively plan for emergency events.[14]

Post-Fire

Recovering from a wildfire is a difficult task for the community. Homes, businesses and other community assets may have been lost or damaged during the fire. Residents returning to their homes may face significant property damage, even if the home did not burn. Soil in burned areas is unstable, often causing flash flooding and slides. Post-fire recovery planning helps mitigate safety hazards to the community and identifies resources to help residents recover from wildfire. Although the City and County of Butte Silver Bow does not currently have a post-fire recovery plan, the 2023 CWPP promotes the development of a plan, along with other public education and wildfire response strategies. Resources useful after a disaster can be found via the BSB Office of Emergency

[14] https://www.co.silverbow.mt.us/195/Emergency-Management

Management website[15], and Montana Disaster and Emergency Services has compiled a list of resources to assist individual dealing with the aftermath of a disaster event[16].

3.2. Implementation

The 2023 CWPP implementation plan (Appendix A) and associated action table (Appendix B) was developed to clearly outline roles, responsibilities, and timelines for various projects that will facilitate the implementation and achievement of the goals, objectives, and strategies outlined within the 2023 CWPP. The CWPP defines goals, objectives, and strategies as follows:

Goal: A broad, long-term desired result

> **Objective**: A measurable, specific action that serves to achieve a **Goal**
>
> > **Strategy**: A method to achieve specific **Objectives.** Multiple **Projects** can be related to a given Strategy.

The action plan consists of various projects with assigned types, responsibilities, and timeframes. Each strategy involves at least one stakeholder but often requires the collaborative efforts of multiple interested stakeholders from BSB, the Butte-Silver Bow Fire Department, the U.S. Forest Service, and the DOI Bureau of Land Management. Other stakeholder groups may be integrated into the action plan as new strategies are developed in the coming years and roles are further defined. Wherever possible, timelines to complete each strategy are included within the action table in order to best capture the overarching timeline to facilitate achievement of larger goals and objectives set forth within the CWPP.

Prioritization Process

Within the County, areas with varying prioritization were mapped to provide a visual representation of areas within BSB that would benefit from prioritized action or projects in order to reduce wildfire risk. To map prioritization across BSB, the CWPP Core Team identified 'priority elements' consisting of spatially explicit data layers related to wildfire risk, response, management, and planning. The following Priority Elements and Priority Sub-elements were incorporated into the prioritization process:

Table 6 Priority Element and Sub-element Summary Table

Priority Element	Priority Sub-element
At-risk & Underserved Communities	At-risk & Underserved Communities
BSB County Planning-Place Types	Working Lands, Rural Residential
Critical Infrastructure	Critical Infrastructure
Highly Valued Resources and Assets (HVRAs)	HVRAs
Land Management	Federal Lands
	State Lands
	County Lands
Locally-identified Priority Buffers	West Butte
MT Forest Action Plan-Priority Areas for Focused Attention	Priority Area: Wildfire Risk
	Priority Area: Forest Health
Municipal Watersheds	Basin Creek Watershed
	Big Hole River Watershed (portion within BSB)
	Mammoth Creek Watershed

[15] https://www.co.silverbow.mt.us/686/After-a-Disaster
[16] https://des.mt.gov/Recovery/Recovery-Program

Priority Element	Priority Sub-element
	Moulton Watershed
	Divide Creek Watershed
Response-Drive Time	15 min
	10 min
	5 min
Roads	Egress
	Primary, Secondary, and Other
Structure Density	Structure Density
Utilities	High-voltage Transmission Lines
Vegetation Condition Class (VCC)	VCC III: High Departure, VDep 67-100
	VCC II: Moderate Departure, VDep 34-66
Wildfire Risk	Wildfire Risk (eNVC) & Risk to Potential Structures
Wildland Fuels	Burnable
Wildland Fuels x Structure Density	Interface
	Intermix
Zones (1-3)	Zone 3
	Zone 2
	Zone 1

At-Risk & Underserved Communities

At-Risk Communities

The three at-risk communities identified within Silver Bow County in 65 FR 751, 'Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are At High Risk From Wildfire' are:

- Butte
- Melrose
- Ramsay[17]

When available, these at-risk communities were mapped to the extent of the defined limits of the community.

Underserved Communities

Underserved communities within BSB were identified as census blocks qualified as "low income" according to U.S. Census Bureau data (U.S. Census Bureau 2020). This designation aligns with supplemental recommendations for identifying underserved communities from the Community Wildfire Defense Grant Program, which highlights areas of "low income" or areas with a social vulnerability score of 0.75 or higher as being qualified for "underserved community" status (Wildfire Risk to Communities Project 2022).

Both at-risk and underserved communities were buffered by a minimum of 0.5 miles. Per HFRA, the buffer was expanded to include lands within 1.5 miles contingent upon the presence of the following characteristics:

- Sustained steep slope (≥ 25°) (Butler, Anderson, and Catchpole 2007) that creates the potential for wildfire behavior endangering the at-risk community
- Geographic feature that aids in creating an effective fire break, such as a road or ridge top

[17] 'Ramsay' is misspelled as 'Ransay' in 66 FR 751

BSB County Planning Place Types

The Butte-Silver Bow County Comprehensive Plan utilizes a 'placetype' framework to characterize and reflect existing conditions and future needs of urban and rural environments throughout BSB (Butte-Silver Bow County 2020b). Of the 16 different placetypes identified, the 'working lands' and 'rural residential' placetypes were identified as areas within BSB that are most likely to see future developments interspersed throughout existing wildland fuels, representing areas with increased potential risk to values and assets. By accounting for areas of future development, this prioritization process provides managers with tools to be proactive and responsive to changing conditions.

Critical Infrastructure & Utilities

Critical infrastructure was identified through coordination with the Core Team and includes communication sites, electrical substations, transmission lines, fire stations, schools, nursing homes, post offices, hospitals, fire stations, and facilities related to the municipal water supply. All high-voltage power lines were included and buffered by 0.5 miles. Additional high priority transmission lines identified by Northwestern Energy are also included within this priority element layer.

Highly Valued Resources and Assets

Highly Valued Resources and Assets represent spatially distinct resources or assets of particular value to BSB. BSB HVRAs include a refined list of airports, cemeteries, trailheads, campgrounds, recreation areas, industrial infrastructure, historical and/or cultural sites, weather stations, and locally significant areas. Trailheads with high-value infrastructure such as vault toilets were included as HVRAs, whereas undeveloped trailheads and campgrounds were excluded. Each identified HVRA was buffered by 0.5 miles. The following HVRAs were included within this iteration of the prioritization process.

- Alice Mine Area (Pit, Mine, and Overlook)
- Basin Canyon Campground (Vault Toilets)
- Basin Creek Snotel
- Beal Mountain Mine
- Beaverdam Campground/Picnic Area (Vault Toilet)
- Big Butte Open Space Recreation Area
- Blacktail Trestle (Milwaukee Road)
- Butte, Anaconda and Pacific Railway Historic District
- Butte-Anaconda Historic District
- CDNST Highland Trailhead (Vault Toilet)
- Columbia Gardens Arch
- Eagles Nest Trailhead/Kirby Day Use Area (Vault Toilet)
- Fleecer Cabin (USFS)
- High Rye Cabin (USFS)
- Highland City
- Highland Mine
- Historic Stratton Mill
- Holy Cross Cemetery
- Lexington Gardens
- Lions Den Trailhead and Picnic Area (Vault Toilet)
- Lower Eagles Nest Trailhead and Picnic Area (Vault Toilet)
- Maud S Canyon – BNSF Train Trestle
- Maud S Canyon Trailhead (Vault Toilet)
- Montana Tech Campus
- Moose Creek Trailhead (Vault Toilet)
- Mt Moriah, B'Nai Isreal, and St Patrick Cemeteries
- Mtn View Cemetery

- Nine Mile Park Picnic Area (Vault Toilet)
- Our Lady of the Rockies
- Pigeon Creek Campground (Vault Toilets)
- Ramsay Historic District
- Sagebrush Flats Trailhead and Picnic Area (Vault Toilet)
- Sunset Cemetery
- World Museum of Mining

Land Management

Land management was included in the process to identify areas of the County that should be prioritized for CWPP projects based on funding availability and capacity. By prioritizing areas administered by federal, state, and county, in that order, the 2023 CWPP recognizes the opportunity to collaboratively address the risk of wildfire while also prioritizing landscape-level management.

Locally-identified Priority Buffers

Through CWPP discussions, the Core Team identified the western edge of the city of Butte as an area warranting additional protection. Given the predominant westerly winds around the Butte area and supply of fine fuels in surrounding lands west of town, fire managers identified this area as having high consequence if a fire were to occur. By identifying an area of increased priority at the west edge of Butte, projects within this area would address this risk. This priority element could be expanded to include multiple sub-elements contingent upon input from the Core Team and considering current conditions.

MT Forest Action Plan-Priority Areas for Focused Attention

The Montana Forest Action Plan identifies 'priority areas for focused attention', which includes landscapes in need of forest restoration and management (The Montana Forest Action Advisory Council and MT DNRC 2020). The two types of priority areas include: forest health and wildfire risk. Both types are included in the prioritization matrix to ensure consistency with the Montana Forest Action Plan and to promote effective management at the landscape-level.

Municipal Watersheds

Municipal watersheds are included as a component of the updated WUI as well as a priority element, including the five watersheds listed below with an additional 1.5 mile buffer that is applied only for the prioritization process.

1. Big Hole River Watershed
2. Divide Creek Watershed
3. Basin Creek Watershed
4. Mammoth Creek Watershed
5. Moulton Watershed

Response-Drive Time

Wildfire response time was included in order to map areas within close proximity to local resources (i.e., volunteer and city fire stations) as warranting additional priority, with the assumption that such areas represent areas of relatively concentrated development and concurrent need for additional projects to reduce wildfire risk, increase wildfire response capacity, and provide public education regarding the risk of wildfire. Areas within close proximity to fire departments, that is, 15 minutes response drive time or less, also have high consequence were a wildfire to occur, given the concentration of assets and resources within such areas.

Roads

Roads included within this priority element later consist of primary, secondary, and egress roads. Primary roads were identified by selecting interstates, highways, and major arterial roads. Secondary roads consisted of all roads within the database that were not designated as 'primary' or 'egress', with these roads often connecting structures and associated 'egress' roads to 'primary' roads. Egress roads were identified by locating any roads connecting structures with address points to the nearest primary or secondary roads. Egress roads represent the most likely route in the event of evacuation or access for fire suppression resources. All eligible roads were buffered by 0.5 miles.

Structure Density

Any structure with an address point was included within the priority element layer and assigned a standard buffer. This is a lower structure density threshold than that used to define the WUI at the national level, however, inclusion of all structures within BSB serves to capture areas where future development may occur and areas which are likely to be subject to fire response efforts in the event of wildfire. Any structure with an address point listed within the Montana Structures and Addresses geodatabase (Montana State Library 2023) located within Silver Bow County was included within this WUI Component. For consistency with the Federal Register definition of the WUI (65 FR 751) and concurrent nationwide mapping efforts (Radeloff et al. 2023), each structure was buffered by 40 acres. An additional buffer of 0.5 mile was applied to provide additional protection to structures and adjacent lands within.

Vegetation Condition Class (VCC)

Vegetation Condition Class (VCC) is a spatial metric that describes how different current vegetation is to estimated historic vegetation within a given area. This metric is based on changes to vegetation composition, structural stage, and canopy closure. Increasing departure from estimated historic vegetation represents areas with subsequent deviations from historical fire regimes. Identifying these areas within the prioritization process serves to highlight areas in need of ecological restoration or mitigating treatments in order to address changing conditions that can result in increased wildfire risk. Areas with 'moderate' and 'high' VCC were included within the prioritization mapping.

Wildfire Risk & Structure Density

For all structures with an address point within BSB, additional buffers were applied if the structure was located within an area with elevated wildfire risk. An analysis buffer of 1.5 miles per each 40 acre parcel containing a structure was intersected with two distinct geospatial layers sourced from the Montana Wildfire Risk Assessment project, each indicating a component of wildfire risk: 1) Wildfire Risk (eNVC) and 2) Risk to Potential Structures. If the analysis buffer intersected an area with 'high', 'very high', or 'extreme' risk, the corresponding buffer was applied to the entirety of the analysis buffer. By expanding the buffer of structures contingent upon proximity to areas with elevated wildfire risk, this priority element facilitates potentially increased response time for areas with elevated risk.

Wildland Fuels

Using National Land Cover Data (NLCD), BSB identified wildland fuels as any vegetation with potential to ignite, including forests, grasslands, shrubs, wetlands, pastures, agricultural lands, and any undeveloped lands without a structure (Multi-Resolution Land Characteristics Consortium 2021). These vegetation types were considered to be 'burnable' vegetation, whereas all other 'non-burnable' land cover was excluded. No additional buffers were applied for these areas. The following NLCD land cover types represent 'wildland fuels' for the 2023 CWPP:

- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

Wildland Fuels

Wildland fuels consist of any vegetation with potential to ignite, referred to as 'burnable' areas within BSB . Identifying burnable areas throughout BSB provides context for wildfire hazard, or the likelihood that a given area would burn.

Wildland Fuels & Structure Density (Interface and Intermix)

In order to interpret the distribution and density of structures throughout wildland fuels, this priority layer conforms to the definitions of 'interface' and 'intermix' used in 65 FR 751. Interface is defined as areas where dense urban development abuts wildland fuels, whereas intermix is defined as areas where structures are interspersed among wildland fuels. Interface areas consist of areas with a minimum of 1 structure per 40 acres with 50% continuous wildland fuels. Intermix areas also consist of areas with a minimum of 1 structure per 40 acres, less than 50% continuous wildland fuels, and are within 1.5 miles of an area with greater than 1,325 acres having more than 75% wildland vegetation. Within BSB , the majority of structures fall within the intermix category, with the only interface portion located surrounding Butte. No additional buffers were applied for interface or intermix areas as the interconnected 'structure density' priority element included additional buffers.

Zones (1-3)

Zones are delineated by the Butte-Silver Bow Fire Department (BSFD) and relate to wildfire response capacity, with Zones 1-3 corresponding to increasing distance from the BSFD center of operations. As distance increases from BSFD, wildfire response capacity and type varies.

Application of the Prioritization Process

Each priority element and sub-element was then relatively ranked in order of decreasing relative priority (e.g., the highest priority receives the highest number ranking) to build a heat map of increasing prioritization weight across Silver Bow County (see formula below).

Priority Element Rank + ((Priority Element Rank) / (Number of Sub-elements))

× Priority Sub-element Rank)

For example, if the 'Municipal Watersheds' Priority Element is ranked 16th out of 17 Priority Elements, and there are five (5) Priority Sub-elements, the highest ranked Priority Sub-element (i.e., Basin Creek Watershed), would receive a Prioritization Weight of 32.

Example: 16 + ((16/5) x 5) = 32

Any location within the County received a different prioritization weight based on the number and type of priority elements present within a specified area. These prioritization weights were then categorized as ‘low’, ‘moderate’, and ‘high’:

- Low (0-10)
- Moderate (11-20)
- High (21-30+)

This approach allows managers to identify high priority areas within the County while also assigning priority to proposed projects in a reproducible and intuitive manner. A detailed summary of the prioritization process, including priority elements, rank, and prioritization category can be found in Appendix E. Mapped priority areas are shown in **Error! Reference source not found.** and Appendix F .

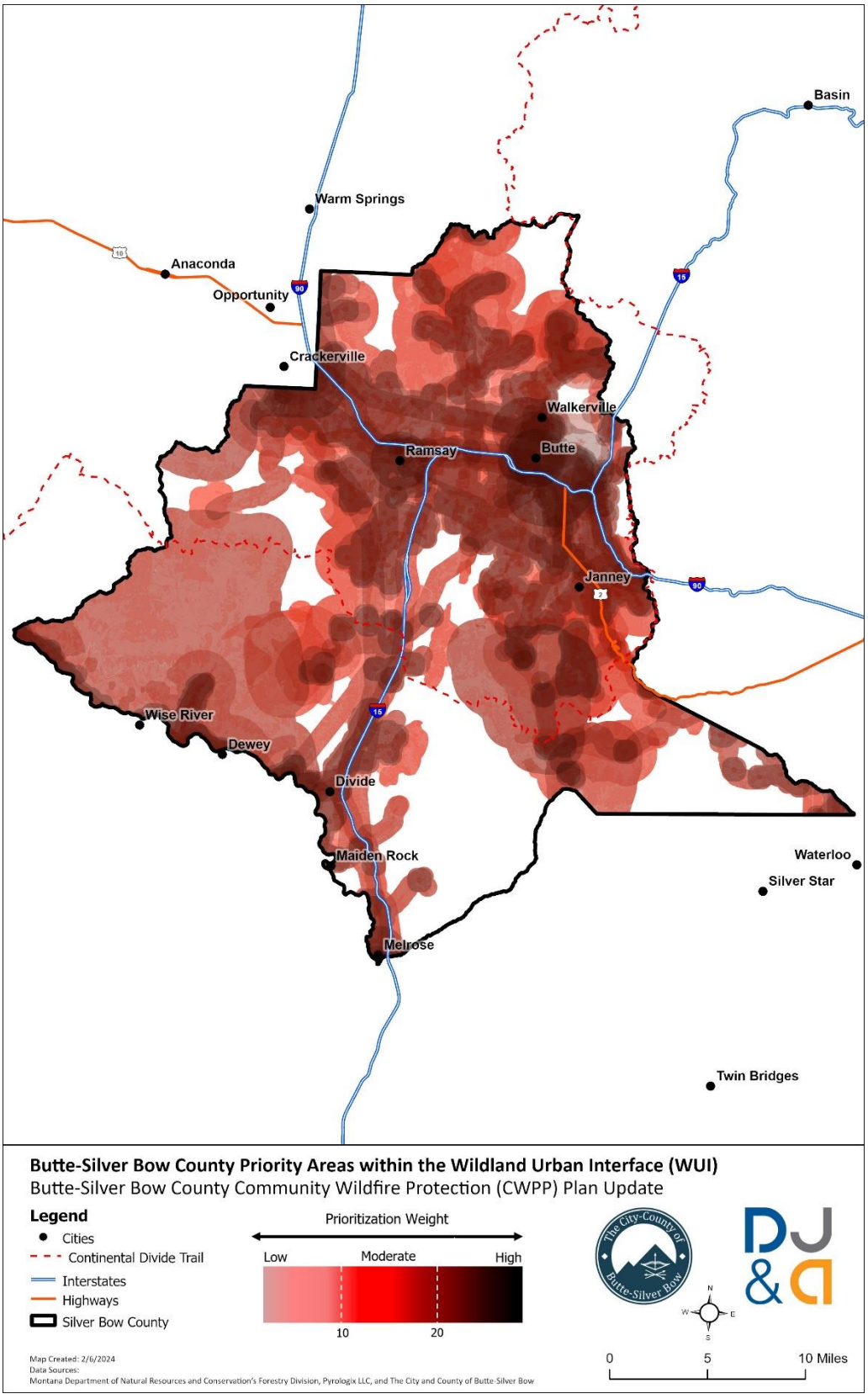

Figure 7 Priority Areas: Prioritization Heat Map

3.3. Future Actions

The 2023 CWPP is designed to function as a living document with needed updates occurring as-needed. It is anticipated that additional goals, objectives, and strategies will be added as conditions and needs change for the City and County of Butte Silver Bow, and that the format of the action plan will facilitate easy integration of these elements.

CWPP Monitoring Progress

In order to monitor progress accurately and consistently 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. In order to remain relevant and useful, CWPPs should be fully updated once every five years; the next CWPP update would occur in 2028 (DNRC 2022).

Appendices

Appendix A: Implementation – Goals, Objectives, and Strategies

Goal 1: Restore and Maintain Landscapes

Objective 1.1 Reduce fuel loading by supporting and implementing fuels treatments

Strategy 1.1.1 Implement the following fuels treatments to accomplish resource objectives: thinning, prescribed fire, commercial harvest, slashing, underburning, pile burning, chipping, thinning, prescribed/targeted grazing

Objective 1.2 Promote characteristic wildfire activity appropriate to natural fire regimes and resource objectives

Strategy 1.2.1 Identify strategic locations for new fuel breaks and buffers

Strategy 1.2.2 Improve and maintain existing fuel breaks and buffers

Strategy 1.2.3 Identify, improve, and maintain road buffers

Strategy 1.2.4 Facilitate and maintain cross-boundary collaboration to implement fuels reduction projects across multiple jurisdictions including privately-held lands

Strategy 1.2.5 Implement prescribed fire and other treatments that promote characteristic wildfire activity on the landscape

Objective 1.3 Implement post-fire recovery activities

Strategy 1.3.1 Support the implementation of reseeding and replanting following wildfire events

Strategy 1.3.2 Support the development and implementation of a Butte-Silver Bow County Post-Fire Recovery Plan that provides a framework for efficient and effective allocation of resources after a wildfire event

Strategy 1.3.3 Increase local capacity for post-fire response personnel and resources

Objective 1.4 Reduce insect and disease outbreaks and spread

Strategy 1.4.1 Support and implement projects that use approved methods to control insect and disease such as: micronutrients, pesticides, attractants, aggregants, anti-aggregants, and pheromones

Objective 1.5 Use the best available science to inform CWPP goals, objectives, and strategies

Strategy 1.5.1 Facilitate the collection and/or analysis of updated data such as aerial imagery, surveys, etc. that would improve the implementation of projects associated with this CWPP

Goal 2: Fire Adapted Communities

Objective 2.1 Improve and maintain public education to reduce wildfire risk and structural ignitability

Strategy 2.1.1 Improve public access to existing educational resources

Strategy 2.1.2 Develop new educational opportunities/programs for residents

Strategy 2.1.3 Support and implement efforts to increase capacity for additional personnel, groups, or programs to implement and coordinate services that support fire adapted communities within BSB .

Strategy 2.1.4 Provide an updated platform for public access to CWPP resources that integrates with existing resources

Strategy 2.1.5 Establish a CWPP Monitoring Committee to ensure that the CWPP remains updated, relevant, and is communicated effectively among stakeholders

Objective 2.2 Support and implement mitigation treatments within priority areas within the County

Strategy 2.2.1 Continue to develop projects within the WUI and priority areas within the County

Objective 2.3 Support and implement county policies, land use planning, and regulations that reduce wildfire risk

Strategy 2.3.1 Incorporate the BSB CWPP and associated recommendations to reduce structural ignitability into Butte Silver Bow County Subdivision Regulations

Strategy 2.3.2 Integrate the CWPP with developing land use planning documents

Objective 2.4 Reduce human-caused ignitions.

Strategy 2.4.1 Work with utility companies to reduce ignition risk and identify opportunities for mitigation

Strategy 2.4.2 Improve and maintain public communication to reduce human-caused ignitions

Strategy 2.4.3 Provide training and resources for utilizing prescribed fire on private lands

Goal 3: Wildfire Response

Objective 3.1 Increase/improve water supply for fire suppression

Strategy 3.1.1 Identify alternate water resources

Strategy 3.1.2 Support the implementation of design alternatives that improve fire suppression and response capabilities within subdivision planning documents

Strategy 3.1.3 Construct additional water resources for fire suppression

Objective 3.3 Improve emergency notification and information communications

Strategy 3.3.1 Identify methods to increase communication efficacy and accessibility in the event of a wildfire

Strategy 3.3.2 Ensure communication and notification methods are inclusive of vulnerable populations

Strategy 3.3.3 Support the development of mitigation actions and planning related to wildfire smoke public health issues

Strategy 3.3.4 Support the development of the BSB Public Health Response for Wildfire Smoke Events Plan and

Strategy 3.3.5 Consider wildfire smoke responses in future planning efforts

Strategy 3.3.6 Support the procurement and designation of funding to mitigate public health risks and issues related to wildfire smoke

Objective 3.4 Facilitate and maintain cross-boundary collaboration to improve wildfire response efforts.

Strategy 3.4.1 Coordinate with neighboring agencies and landowners to identify potential opportunities for collaboration

Strategy 3.4.2 Establish a BSB Wildfire Response Working Group to improve communications and collaborative response efforts across groups and jurisdictions

Objective 3.5 Improve emergency response and mobilization efforts

Strategy 3.5.1 Develop an evacuation plan that identifies evacuation routes, reception/distribution areas, shelter locations, staging areas, and access control points.

Objective 3.6 Increase response capacity

Strategy 3.6.1 Obtain funding for additional personnel, training, and equipment to improve wildfire response capacity and efficacy

Appendix B: Implementation – Action Table

Table 7 Action Plan

Project Name	Project Type	Responsible Entity[1]	CWPP Strategy	Estimated Date of Completion	Notes
Ongoing Projects					
Basin Creek Aspen	Aspen Enhancement	USFS	1.1.1, 1.2.5	2028	
Blacktail Headwaters	Fuels Reduction	USFS	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.5	2027	Vegetation treatments to reduce wildfire risk and improve riparian and sagebrush meadow habitat.
BSB CWPP Online Story Map	Public Education	BSB	2.1.1, 2.1.4	Summer 2023	Updates and maintenance of this resource will continue indefinitely
Fleecer Mountains Watershed	Conifer Encroachment Thinning	USFS	1.1.1, 1.2.1, 1.2.2, 1.2.5	2029	
Update Zoning Ordinance for Silver Bow County	Zoning Update	BSB Planning Department/ Planning Board/ Council	2.3.1, 2.3.2	Winter 2023/2024	
Proposed Projects					
Acquisition of Communication Equipment	Wildfire Response, Equipment	BSB Fire	3.3.1, 3.6.1	ASAP/TBD	Acquisitions of additional radios, pagers, and a cell phone pager app would improve wildfire response capacity and efficacy. Additional dual band pagers are needed for county volunteer firefighters. All departments need additional 800MH radios. A cell phone pager app would improve department-wide communications.
Acquisition of Wildland Firefighting Equipment and Apparatus	Wildfire Response, Equipment	BSB Fire	3.6.1	ASAP/TBD	Outdated equipment requires significant funds and time to remain in operations.

Project Name	Project Type	Responsible Entity[1]	CWPP Strategy	Estimated Date of Completion	Notes
					Acquisition of type 6, 5, and 3 engines would reduce these operating expenses and enhance wildfire response efficacy and capacity.
Aerial Photography Acquisition	Public outreach, planning, wildfire response	BSB GIS	1.2.1, 1.5.1 2.1.1, 2.1.4,	TBD	Updating current low-resolution imagery with high-resolution aerial imagery would improve public outreach and planning efforts by providing an accurate depiction of current conditions across BSB County.
Basin Creek Hazardous Fuels Reduction Project	Fuels Reduction	USFS, BSB	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.5	TBD	Vegetation management, fuels reduction, and transportation management activities to improve forest composition and structure to reduce the risk of uncharacteristic wildfire effects.
Big Hole River Municipal Watershed—Fuels Reduction Projects	Fuels Reduction	USFS, BLM, private landowners, BSB, and surrounding counties.	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.4 1.2.5, 2.1.3, 3.4.1	TBD	
Big Hole West Forest health/Old Growth Protection/WUI Project	Fuels Reduction	BLM	1.1.1, 1.2.1, 1.2.2, 1.2.5	2036	Potential treatments would reduce the risk of uncharacteristic wildfire by creating a mosaic of vegetation age classes and structures. Public education and outreach will occur throughout project implementation, and opportunities for cross-boundary treatment will be pursued where possible.
Jerry Creek Forest Health Treatments	Forest Health Treatment	BLM	1.1.1, 1.2.1, 1.2.2, 1.2.5	TBD	
Create a BSB Wildfire Council or Task Force	Public Education, Wildfire Response	BSB, MT DNRC, USFS, BSB Fire, volunteer fire departments, and	2.1.3	TBD	Collaborative group of local, state, federal agency members as well as stakeholders with interest in reducing wildfire risk throughout BSB County.

Project Name	Project Type	Responsible Entity[1]	CWPP Strategy	Estimated Date of Completion	Notes
		other stakeholders (TBD)			Coordinated by the BSB Wildfire Preparedness Coordinator.
Create a CWPP Monitoring Committee	Public Education, Wildfire Response	BSB, MT DNRC, USFS, BSB Fire, other stakeholders (TBD)	2.1.3, 2.1.5	TBD	This group would ensure that the CWPP remains updated and would facilitate annual reviews, reporting, and communication among stakeholders regarding the CWPP.
Develop an Evacuation Plan including Evacuation Routes, Reception and Distribution Areas, Shelter Locations, Staging Areas, and Access Control Points	Public Education, Wildfire Response	Silver Bow County Sherriff, BSB Office of Emergency Management	3.5.1, 3.3.2	TBD	
Support the development of the Butte-Silver Bow County Public Health Response for Wildfire Smoke Events	Public Education	BSB, BSB Health Department	3.3.3	TBD	
Establish a BSB Wildfire Response Cooperative Group	Public Education, Wildfire Response	BSB, BSB Fire, Silver Bow Volunteer Fire Departments, MT DNRC, USFS	3.4.1, 3.4.2	TBD	Addresses communication and cooperation difficulties between groups, establishes mutual agreements and standards of practice in wildfire response, and works to fulfill needs for both groups. Coordinated by Wildfire Prep Coordinator? Addresses RX on private property.
Establish a Home & Property Owner Mitigation Cost-Share Program	Public Education, Wildfire Response	BSB, Local non-profit (TBD)	2.1.1, 2.1.2, 2.1.3, 2.1.4, 3.4.1	TBD	Cost-share program providing funding to home/property owners that would like to mitigate risk on the property. Priority given to Home Ignition Zone work and fuels mitigation.
Establish a Home & Property Wildfire Preparedness Program	Public Education, Wildfire Response	BSB County, MT DNRC, volunteer fire departments, and USFS	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.4.2, 2.4.3, 3.4.1	TBD	Partnership between local, federal, and state partners to provide outreach and wildfire risk assessments to home and property owners. Could be housed under Wildfire Council.
Establish a Wildfire Preparedness Coordinator for Butte-Silver Bow County	Public Education, Wildfire Response	BSB	2.1.3	TBD	This position could coordinate and track CWPP project and work with federal, state, and local partners to provide

Project Name	Project Type	Responsible Entity[1]	CWPP Strategy	Estimated Date of Completion	Notes
					homeowners to provide public education, manage mitigation cost-share programs or similar, and promote the creation of fire adapted communities.
Establish and Fund a Wildland Fire Coordinator Position for BSB	Public Education, Wildfire Response	BSB Fire	2.1.3	TBD	This position could conduct public education, perform property assessments, maintain and coordinate wildland fire equipment, PPE, and training, and serve as a point of contact for state, federal, and utility partners.
Establish BSB Wildfire Recovery Team & Plan	Wildfire Response	BSB, BSB Fire, VFDs, USFS, BLM, MT DNRC, other stakeholders (TBD)	1.3.1, 1.3.2, 1.3.3,	TBD	Identifies needs, roles and responsibilities for the after-wildfire response w/in BSB County. Provides guidelines on response and aid available.
Homestake Fuel Break	Fuels Reduction	USFS	1.1.1, 1.2.1, 1.2.2, 1.2.5	2025	
Improved Emergency Notification/Communications Methods	Public Education	BSB Office of Emergency Management	3.3.1	TBD	
K-12 Wildfire Preparedness and Prevention Educational Program	Public Education	BSB Fire, MT DNRC, USFS, VFDs, other stakeholders (TBD)	2.1.1, 2.1.2, 2.1.3, 2.1.4	TBD	Develop in-school programs emphasizing wildfire safety and preparedness. Can weave in life & fire safety as well.
Mammoth Creek Municipal Watershed Fuels Reduction	Fuels Reduction	USFS	1.1.1, 1.2.1, 1.2.2, 1.2.5	TBD	
Moulton/Yankee Doodle Creek Municipal Watershed Fuels Reduction	Fuels Reduction	USFS, BSB, and landowners	1.1.1, 1.2.1, 1.2.2, 1.2.5	TBD	
Provide a Wildfire Preparedness Webpage that interfaces with the CWPP Online Story Map	Public Education	BSB County	2.1.1, 2.1.2, 2.1.4	TBD	Website for wildfire preparedness info specific to BSB
Provide Wildland Fire Training	Wildfire Response	BSB Fire	3.6.1	ASAP/TBD	
South Fork of Divide Creek Municipal Watershed Fuels Reduction	Fuels Reduction	USFS, BSB	1.1.1, 1.2.1, 1.2.2, 1.2.5	TBD	

Project Name	Project Type	Responsible Entity[1]	CWPP Strategy	Estimated Date of Completion	Notes
Update Butte-Silver Bow County Subdivision Regulations	Regulation Update	BSB Planning Department./ Planning Board/ Council	2.3.1, 2.3.2, 3.1.2	TBD	Subdivision regulations would be updated after zoning regulations have been updated.

Appendix C: Glossary of Terms

Table 8 Glossary of Relevant Terms and Definitions

Term	Definition	Source
Asset (Wildfire)	Human-made features, such as commercial structures, critical facilities, housing, etc., that have a specific importance or value	(Gilbertson-Day et al. 2020)
At-risk community	The term "at-risk community" means an area— (A) that is comprised of— (i) an interface community as defined in the notice entitled "Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire" issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001); or (ii) a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) within or adjacent to Federal land; (B) in which conditions are conducive to a large-scale wildland fire disturbance event; and (C) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.	Healthy Forest Restoration Act of 2003 (P.L. 108-148)
Community Wildfire Protection Plan	(3) COMMUNITY WILDFIRE PROTECTION PLAN.—The term ''community wildfire protection plan'' means a plan for an at risk community that— (A) is developed within the context of the collaborative agreements and the guidance established by the Wildland Fire Leadership Council and agreed to by the applicable local government, local fire department, and State agency responsible for forest management, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community; (B) identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment on Federal and non-Federal land that will protect 1 or more at-risk communities and essential infrastructure; and (C) recommends measures to reduce structural ignitability throughout the at-risk community.	Healthy Forest Restoration Act of 2003 (P.L. 108-148)
Condition Class (Vegetation)	Depiction of the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).	(NWCG 2023a)
Exposure (Wildfire)	The placement or coincidental location of an asset or resource within a hazardous environment	(Gilbertson-Day et al. 2020)
Fire Behavior	The manner in which a fire reacts to the influences of fuel, weather, and topography.	(NWCG 2023b)
Fire Intensity	A general term relating to the heat energy released in a fire.	(USDA 2023)
Fire Management	All activities related to the management of wildland fires, including fire prevention, fire suppression, and use of prescribed fire.	(NWCG 2023b)

Term	Definition	Source
Fire Regime	Fire regimes describe and categorize patterns of fire ignition, seasonality, frequency, type (crown, surface, or ground fire), severity, intensity, and spatial continuity (pattern and size) that occur in a particular area or ecosystem	(USDA 2023)
Fire Return Interval	Number of years between two successive fires in a specified area. Often used to designate an average of intervals (i.e., mean fire interval).	(USDA 2023)
Fire Severity	Degree to which a site has been altered or disrupted by fire; loosely, a product of fire intensity and residence time.	(NWCG 2021)
Flame Length	The length of flames in a fire front measure along the slant of a flame, from the midpoint of its base to its tip. Flame length is mathematically related to fireline intensity and tree crown scorch height.	(USDA 2023)
Fuel	Any combustible material, especially petroleum-based products and wildland fuels	(NWCG 2021)
Fuel Loading	The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight.	(NWCG 2021)
Fuel Model	Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.	(NWCG 2021)
Fuel Reduction	Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.	(NWCG 2021)
Prescribed Fire	Any fire intentionally ignited by management in accordance with applicable laws, policies, and regulations to meet specific objectives. Also called a controlled burn or prescribed burn.	(USDA 2023)
Probability (Wildfire)	Likelihood that a wildfire will burn a given point or area during a specified period of time	(MT DNRC 2023)
Rate of Spread (ROS)	The rate of spread is in chains per hour (ch/h) and is defined as the speed with which the fire is moving away from the site of origin. Wind, moisture, and slope drive the fire. The flaming zone, or fire head, moves away from the origin quickly with great intensity.	(NWCG 2023a)
Resource (Wildfire)	Resources are natural features, such as wildlife habitat, vegetation type, or water, with specific importance or value	(Gilbertson-Day et al. 2020)
Susceptibility (Wildfire)	Propensity of an asset or resource to be damaged if a wildfire occurs	(Gilbertson-Day et al. 2020)
Vulnerability (Wildfire)	A function of exposure and susceptibility	(Gilbertson-Day et al. 2020)
Wildfire Hazard	A physical situation with potential for causing damage to vulnerable resources or assets. Quantitatively, wildfire hazard is measured by two main factors: 1) burn probability (or likelihood of burning), and 2) fire intensity (measured as flame length, fireline intensity, or other similar measure).	(Gilbertson-Day et al. 2020)
Wildfire Risk	A function of wildfire hazard (probability and intensity) and vulnerability (exposure and susceptibility) of assets and resources	(MT DNRC 2023)
Fuel Moisture	Expressed as a percent or fraction of oven-dry fuel weight. It is the most important fuel property controlling flammability. In living plants it is fluctuations vary considerably by species but are usually above 80% to 100%. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation.	(USDA 2023)
Fuel Class	A set of fuels with similar traits. Fuels are categorized as herbaceous or woody and live or dead. Dead fuels are classed as 1-, 10-, 100-, or 1,000-hour timelag fuels, based on the time needed for fuel moisture to come into equilibrium with the environment: • 1-hour timelag fuels: Dead fuels comprised of herbaceous plants or woody plants less than about 0.25 inch (6.4 mm) in diameter and the surface layer of litter on the forest floor. • 10-hour timelag fuels: Dead fuels comprised of wood from 0.25 to 1 inch (0.6-2.5 cm) in diameter and the litter from just beneath the surface to around 0.75 inch (1.9 cm) below ground.	(USDA 2023)

Term	Definition	Source
	• 100-hour timelag fuels: Dead fuels comprised of wood from 1 to 3 inches (2.5-7.6 cm) in diameter and litter from around 0.75 to about 4 inches (1.9-10 cm) below ground. • 1,000-hour timelag fuels: Dead fuels comprised of wood from 3 to 8 inches (7.6-20.3) in diameter and the forest floor layer >4 inches (10 cm) below ground.	
Fuel Continuity	A qualitative description of the distribution of fuels both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread.	(USDA 2023)

Appendix D: Wildland Urban Interface Summary Table

WUI Component	Definition
MT DNRC Functional WUI	The MT DNRC Functional WUI is a 30-meter resolution raster dataset that maps the WUI where structures meet, or intermingle with, undeveloped wildland vegetation (i.e., burnable land cover greater than 200 meters from a building centroid). This data layer provides a starting point for WUI designation within a county. Per state statute MCA 76-13-145, the official WUI designation for each county is determined through the completion and/or update of a CWPP. This layer consists of data obtained from the "Structures & Addresses Framework" dataset from the Montana State Library GIS Clearinghouse and fuels information from the calibrated LANDFIRE 2016 Remap (LF 2.0.0) FM40 layer. Land with structures within 200 meters of a building centroid was classified as Direct, Indirect, or Limited Exposure WUI. • "**Direct Exposure**" WUI is burnable[18] wildland that contains or is near a structure located on or surrounded by burnable land cover. Directly exposed structures could benefit from both the hardening of the structure to resist ignition and the reduction of fuel in the home ignition zone to reduce the structure's exposure to heat and embers. • "**Indirect Exposure**" WUI is nonburnable land that contains or is near a structure and is within 900 m of burnable land cover (Caggiano et al. 2020). Indirectly exposed structures could benefit from the hardening of the structure to resist ignition from embers and nearby structures. • "**Limited Exposure**" WUI is nonburnable land that contains a structure but is greater than 900 m from burnable land cover. • "Critical Fireshed" is the Burnable Land Area within about 1,500 m (1 mile) of a group of structures, dependent on structure density, but does not itself contain structures. • "**Nonburnable Fireshed**" is the nonburnable land cover within 1,500 m (1 mile) of a group of structures but does not itself contain structures. • "**Non-WUI**" is all land more than 1,500 m (1 mile) from a group of structures • "**Water**" is the portion of the landscape covered by open water The Functional WUI map provides a broad overview of where structures are located, what their relative level of exposure is, and the burnable lands around those structures.
Municipal Watersheds	All municipal watersheds within BSB were included within the WUI. These watersheds represent areas of increased wildfire risk and high consequence, warranting additional protections to ensure that BSB maintains a consistent source of drinking water in a water-limited landscape. The following five municipal watersheds in BSB were included within the WUI. • Big Hole River Watershed • Divide Creek Watershed • Basin Creek Watershed • Mammoth Creek Watershed • Moulton Watershed

[18] Nonburnable land cover as defined for the MT DNRC Function WUI data layer is where the mapped fire-behavior fuel model is 91-99; burnable is all other fuel models.

Appendix E: Priority Area Mapping Metadata

Spatial Priority Element	Buffer	Priority Sub-Element	Color Example	Hex Code	Transparency	Priority Element Rank	Priority Sub-Element Rank	Prioritization Weight	Prioritization Category[1]
Structure Density	0.5	Structure Density		#0f0200	75%	17	1	34.00	High
Municipal Watersheds	1.5	Basin Creek Watershed		#1f0400	75%	16	5	32.00	High
At-risk & Underserved Communities	0.5-1.5	At-risk & Underserved Communities		#2e0500	75%	15	1	30.00	High
Municipal Watersheds	1.5	Big Hole River Watershed (portion within BSB)		#3d0700	75%	16	4	28.80	High
Roads	0.5	Egress		#4d0900	75%	14	2	28.00	High
Critical Infrastructure	0.5	Critical Infrastructure		#5c0b00	75%	13	1	26.00	High
Municipal Watersheds	1.5	Mammoth Creek Watershed		#6b0c00	75%	16	3	25.60	Moderate
Utilities	0.5	High-voltage Transmission Lines		#7a0e00	75%	12	1	24.00	High
Municipal Watersheds	1.5	Moulton Watershed		#8a1000	75%	16	2	22.40	Moderate
Wildland Fuels x Structure Density	0	Interface		#991200	75%	11	2	22.00	Moderate
Roads	0.5	Primary, Secondary, and Other		#a81400	75%	14	1	21.00	Moderate
Wildfire Risk	0-1.5	Wildfire Risk (combined layers)		#b81500	75%	10	1	20.00	High
Municipal Watersheds	1.5	Divide Creek Watershed		#c71700	75%	16	1	19.20	Moderate
MT Forest Action Plan-Priority Areas for Focused Attention	n/a	Priority Area: Wildfire Risk		#d61900	75%	9	2	18.00	Moderate
Wildland Fuels x Structure Density	0	Intermix		#e61b00	75%	11	1	16.50	Moderate
Wildland Fuels	0	Burnable		#f51d00	75%	8	1	16.00	Moderate
HVRAs	0.5	HVRA		#ff2205	75%	7	1	14.00	Moderate
MT Forest Action Plan-Priority Areas	n/a	Priority Area: Forest Health		#ff3014	75%	9	1	13.50	Moderate

Spatial Priority Element	Buffer	Priority Sub-Element	Color Example	Hex Code	Transparency	Priority Element Rank	Priority Sub-Element Rank	Prioritization Weight	Prioritization Category[1]
for Focused Attention									
Vegetation Condition Class (VCC)	n/a	VCC III: High Departure, VDep 67-100		#ff3d24	75%	6	2	12.00	Moderate
Response-Drive Time	n/a	15 minutes		#ff4b33	75%	5	3	10.00	Low
Vegetation Condition Class (VCC)	n/a	VCC II: Moderate Departure, VDep 34-66		#ff5842	75%	6	1	9.00	Low
Response-Drive Time	n/a	10 minutes		#ff6652	75%	5	2	8.33	Low
Locally-identified Priority Buffers	n/a	West Butte		#ff7361	75%	4	1	8.00	Low
Response-Drive Time	n/a	5 minutes		#ff8170	75%	5	1	6.67	Low
BSB County Planning-Place Types	n/a	Working Lands, Rural Residential		#ff8e80	75%	3	1	6.00	Low
Land Management	n/a	Federal Lands		#ff9c8f	75%	2	3	4.00	Low
Land Management	n/a	State Lands		#ffa99e	75%	2	2	3.33	Low
Land Management	n/a	County Lands		#ffb7ad	75%	2	1	2.67	Low
Zones (1-3)	n/a	Zone 3		#ffc4bd	75%	1	3	2.00	Low
Zones (1-3)	n/a	Zone 2		#ffd2cc	75%	1	2	1.67	Low
Zones (1-3)	n/a	Zone 1		#ffdfdb	75%	1	1	1.33	Low

[1] High=21+, Moderate=11-20, Low=1-10

Appendix F: Maps

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