Powder River County

Community Wildfire Protection Plan

A Collaborative Approach for Reducing Wildland Fire Risks

2016 Update

Powder River County Commission

P. O. Box 200

Broadus, Montana 59317

Image: Southwestern Montana fire complex in 2012 (Billings Gazette)

RESOLUTION 2016-10

Resolution to Adopt County Wildfire Protection Plan Update

WHEREAS, Powder River County and the Broadus Volunteer Fire Department with the assistance of the Custer National Forest, completed a collaborative fire plan in 2004 that addressed opportunities to reduce the immediate and long-term risk from wildfire, and

WHEREAS, the 2004 fire plan was the first step in identifying hazard areas, establishing locations for infrastructure, seeking opportunities for fuel reduction projects, enhancing communication and coordination, and educating the public on fire issues.

WHEREAS, in the ensuing 12 years conditions, hazard areas, opportunities, communications, and capabilities have significantly changed,

NOW THEREFORE BE IT RESOLVED that this 2016 plan update entitled "Powder River County Community Wildfire Protection Plan: A collaborative Approach for Reducing Wildland Fire Risks 2016 Update" is hereby accepted and adopted by the Board of County Commissioners for Powder River County.

ADOPTED AND DATED this 8th day of August, 2016

Board of County Commissioners

Darold L. Zimmer, Chairman

Dave Richards, Board Member

Rod Schaffer, Board Member

Powder River County Community Wildfire Protection Plan:
A collaborative Approach for Reducing Wildland Fire Risks
2016 Update

Prepared by the Broadus Volunteer Fire Department and Residents of the Community with the cooperation of the Following Agencies. Sincere appreciation and gratitude is given to these agencies and individuals for their participation.

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Bureau of Land Management, Miles City Office, MT

Montana Department of Natural Resources and Conservation, Eastern Montana/Dakotas District, Miles City, MT

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I. Forward

The purpose of a plan is to understand a situation as much as to list potential solutions. In this day and age a multiplicity of issues, situations, problems, and lists of solutions face all of us, and more so in County government. It is often said that understanding the problem is the biggest key to solving it. Hence, this plan includes not only "What are the solutions?", but more importantly addresses "What is the problem?".

II. Executive Summary

The incentive for communities to engage in comprehensive forest planning and prioritization was given unprecedented impetus with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. Powder River County took the initiative in 2004, and with financial assistance from the Montana Department of Commerce Community Planning, crafted a Community Wildfire Protection Plan (CWPP) aimed at meeting the HFRA objectives of collaboration, fuel reduction, and reducing structural ignitability.

The following 12 years brought significant change to the issues facing the County, including an increase in wildfires, further resource concerns (e. g. the Sage Grouse), changes in technology and communications, dramatic increases in available information for decision makers, changes in resource usage, and increased cooperative efforts between landowners. Therefore, in January of 2016 Powder River County Commissioners began the revision of the 2004 Plan.

The planning process followed the CWPP planning steps. First, we engaged interested parties (Forest Service, County Commissioners, Bureau of Land Management, Montana Dept. of Natural Resources and Conservation, and local Fire officials). We held meetings with these parties and developed issues and objectives. We then developed a set of community base maps focused on values in the County, current wildfire risks, resources, and structural ignitability. This analysis of the situation helped us establish priority recommendations addressing values at risk. Finally, we developed an action plan. The entire plan was reviewed by collaborators and given final approval by the County Commissioners.

We identified 18 action items, including addressing the significant chance of another catastrophic fire in the northwest part of the County; coal seam fires and their effects on values; response enhancements in the rural parts of the County (volunteer response, water supply, communications and fire reporting); homeowner preparedness and structural ignitability; County-oriented fuels reduction suggestions; pipeline locations; Sage Grouse concerns; establishment of a burn permit system; and an update of spatial data for the County.

III. Acronyms and Abbreviations Used

BAER- Burned Area Emergency Rehabilitation

BLM- U. S. Bureau of Land Management

CWPP- Community Wildfire Protection Plan

DNRC- Montana Department of Natural Resources

GIS- Geographic Information Systems

HFRA- Healthy Forests Restoration Act

NWCG- National Wildfire Coordinating Group

PRC- Powder River County

USDA- U. S. Department of Agriculture

USFS- U.S. Forest Service

WUI- Wildland Urban Interface

IV. Introduction

A. Background and History

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

In order for a community to take full advantage of this opportunity, it must first prepare a Community Wildfire Protection Plan (CWPP). Local wildfire protection plans can take a variety of forms, based on the needs of the people involved in their development. Community Wildfire Protection Plans may address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection—or all of the above. The process of developing a CWPP can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland–urban interface. It also can lead community members through valuable discussions regarding management options and implications for the surrounding watershed. The *minimum requirements* for a CWPP as described in the HFRA are:

- **Collaboration:** A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.
- **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.
- **Treatment of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

Powder River County (PRC) took the initiative in 2002, and with financial assistance from the Montana Department of Commerce Community Planning, crafted a plan aimed at meeting those objectives. This Fire Plan was intended to meet the objectives of "A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Plan" as well as the community planning requirements called for in the HFRA.

The following 12 years brought significant change to the issues facing the County, including an increase in wildfires, further resource concerns (e. g. the Sage Grouse), changes in technology and communications, dramatic increases in available information for decision makers, changes in resource usage, and increased cooperative efforts between landowners.

Therefore, in January of 2016 Powder River County (PRC) Commissioners began the revision of the 2004 Plan. The update is scheduled to be completed in August 2016.
The 2004 plan's objectives were:

1. Improve Prevention and Suppression

- Identify roles and responsibilities of participating Federal, State, and
- County agencies.
- Enhance the level of coordination between the Powder River County Volunteer Fire Department and cooperating partners.
- Identify effective fire suppression strategies, prevention needs, and evacuation plans for wildland fires in and around the wildland/urban interface.
- Enhance levels of fire protection provided to Powder River County

2. Reduce Hazardous Fuels/Restore Fire Adapted Ecosystems

- Identify and rate the risk of a significant wildland/urban interface fire in Powder River County.
- Identify strategies and location for fuel treatments which will mitigate or reduce the risk to the homes and businesses during a wildland/urban interface fire.
- Development and implementation of planning requirements to reduce fire hazards within the wildland interface - particularly with anticipated "boom" growth from Coal Bed Methane (CBM) and coal development. Perform site assessments of local residences and evaluations of fire hazards.

3. Promote Community Education and Assistance

- Identify structural protection weaknesses and propose solutions.
- Focus fire agency response activities on the safety of the public and fire fighters during all emergency incidents.
- Develop and implement a local fire web page that will provide information on weather, lightning strikes, fire activity, etc. and also provide education updates and "FIREWISE" information.

The present project was commissioned to review and assist in clarifying and updating those Fire Plan objectives in light of current National, State, and County needs and requirements; and stakeholders' interests including:

- Utilizing new information and modeling to update County-wide wildfire hazards (including recent FIRESAFE structure condition data and updated vegetation data; develop updated WUI (Wildland/Urban Interface)).
- Clarify communications and resource availability (through interviews, inventory, and further development and deployment of the 2014 Powder River County Multi-Purpose Resource map.).
- Explore new technologies in incident management that may be relevant and practical in the County (e.g. SAM (Situation Analysis Montana)).
- Rewrite and update the Fire Plan document, including recommendations and action plans.

B. Relevant Current Fire Policies and Documents

The PRC land use plan 2012 update includes the following:

> "Goal: Improve wildfire suppression activities
> Objective: Include wildfire suppression standards in the development standards of the local subdivision regulations. Development of all-weather water sources and countywide fire plan would be included as part of the subdivision review process.
> Objective: Enhance local, state, and federal dialogue regarding fire suppression policies and opportunities." (PRC, 2012)

And from the County disaster mitigation plan completed in 2006:

> "Objective 2.1: Reduce human-caused fire starts. Project 2.1.1: Wildfire Prevention Program § Coordinate with the Montana Department of Natural Resources and Conservation and the US Forest Service on wildfire prevention and education opportunities. § Enlist local and area businesses to provide space for educational materials and literature. § Use schools to educate the youth in fire prevention issues and cooperation.
>
> Objective 2.2: Reduce structural losses during wildfires. Project 2.2.1: Defensible Space § Encourage and provide funding for homeowners to create defensible space from wildfires around their homes and outbuildings using FireWise principles." (PRC, 2006)

Both these plans were used in creating the present one.

V. The Planning Process

The planning process followed the CWPP planning steps outlined in Forest Guild, et.al, 2008, which was based on CWPP requirements. First, plans must meet the requirements for HFRA:

- Collaboration
- Prioritized Fuel Reduction
- Measures to Reduce Structural Ignitability

Furthermore, the HFRA requires that three entities mutually agree to the final contents of a CWPP:

- The applicable city or county government;
- The local fire department(s); and
- The state entity responsible for forest management.

We followed the steps of a CWPP plan as outlined in the CWPP handbook (Communities Committee, et. al., 2004), modified as appropriate for PRC's population, values, and wildfire risks.

A. Engage Interested Parties

We first met with the Chief of the Broadus Volunteer Fire Department and PRC Fire Warden to determine directions and initial issues. There are also three Fire Districts in the County, but the Broadus Department is the largest response organization, covering the largest part of the County. The three Districts are administered by the County Commissioners and the Fire Warden.

Many other individuals contributed to this effort via providing data and helpful documents.

B. Convene Decision Makers and Involve Federal Agencies

Because of the rural nature of the County, we decided informal interviews with the Broadus Fire Chief coupled with County Commissioner input would adequately represent the issues important to County residents. We involved the PRC Commissioners via interviews and a formal meeting. We also held a meeting and interviews with the BLM, USFS, and DNRC as interested Federal agencies. Appendix One contains the list of attendees and notes from those meetings.

C. Establish a Community Base Map

We did extensive research for data (spatial and tabular) relevant to the objectives of this plan and to the County. This included data from the BLM, DNRC, USFS, Census, Montana State Library, legacy documents, and local PRC GIS sources. Though a surprisingly comprehensive data set is available for PRC, we supplemented that with locally derived data (e.g. cell phone coverage, radio repeaters, satellite fire units, lookouts, addressing, un-marked roads, and recent fire history). We created maps and tables that clearly showed County resources, geography, relationships of fire risk to landowners, jurisdictions, and concerns. With only a few exceptions, all maps are at the County level of detail. More detailed maps could be made for individual project areas or areas of special concern.

D. Develop a Community Risk Assessment

As defined here, wildfire risk is a combination of the chances of occurrence (as discussed above) combined with the values that may be impacted. High wildfire potential may engender little risk if there are few or no values in the area. Therefore, in order to best reflect wildfire risk, it is necessary not only to evaluate wildfire probability (the chances of a wildfire and its extent), but also what values may be affected by wildfire.

We used historical fires to establish the potential for the nature of future fires. Values were defined and mapped using a variety of sources, including existing plans; census, County, and State data; and interviews. They were combined to develop “Values at Risk”.

Local preparedness and structural ignitability was determined using FIRESAFE data on structures in the County. We used on-the-ground reviews and interviews to determine local firefighting capability.

E. Establish Community Hazard Reduction Priorities and Recommendations

Values at risk to wildfire are where values intersect areas with wildfire potential. Where these values coincided with the issues and objectives of our plan determined our mitigation recommendations to reduce structural ignitability, protect values at risk, and improve community education.

F. Develop an Action Plan and Assessment Strategy

Action plans were created from the recommendations above, and approved by decision makers.

G. Finalize the Community Wildfire Protection Plan

This includes a final review by all cooperators, a presentation to the County Commissioners, a final approval, and distribution of the plan.

VI. Current Issues

These current issues were developed and addressed in a series of meetings and interviews (See Appendix One for notes and results of meetings) with the community as represented by County Commissioners, Federal and State agencies, and the Broadus Fire Chief.

1. Changes in the Wildland Urban Interface (WUI) and the Effects of the 2012 Fires should be addressed.
    a. Improvements in technology and changes in conditions may change the WUI. The 2012 fires' effects on the risks to these areas should be reviewed. There could be Forest Service lands in the PRC WUI. There is a 2014 review available of effects of the 2012 fires that should be incorporated in planning.
    b. Prescribed Burning may be a method of reducing risks.
        i. FS: There is a prescribed burning program of 4,000 acres. They have been cooperating with adjacent landowners in this program. Because of the fire environment (Ponderosa Pine and grassy understory), prescribed burns are more dominant than thinning projects.
        ii. BLM lands: No prescribed burning planned. Mechanical treatment of junipers is emphasized in the southwest part of the County.
2. There may be future catastrophic fires. How do we address pre-planning and preparation?
    a. Burnt timber from the previous large fires of 2011 and 2012: blowdown and jackstrawed remaining trunks may bring another catastrophic fire. Where are these areas?
    b. Potential for Post-Fire Cleanup is large with larger fires. Costs will be high: homesteads, powerlines, cattle deaths, new or modified cattle range, stock tanks, waterlines, fences, power outages.
    c. Some other Concerns include potential emergency refugees in the event of a large, widespread, and threatening fire. Where and how do we accommodate them?

3. Some fires come back after initial control. Coal seam fires are the worst. There are many potentials for wildfire ignitions. There are safety issues for fire fighters. How should this be addressed?
4. Coal Seam Fires- There are special hazards associated with these fires. These appear to be a significant cause that is just now being analyzed. DNRC estimates 500 active coal seam fire locations now. These generally resulted from the large 2012 fires. Up to 70% of wildfires ignite a coal seam. There may be up to 1000 in the entire County. This ignition potential should influence the PRC fire plan. There are ongoing studies to identify where they are (in Rosebud County). They require significant resources to monitor and suppress.
    a. They are also significant firefighter hazards, in terms of ground subsidence and spot ignitions. Coal seams are generally on the west side of the County, in rough, inaccessible areas.
    b. We need locations of coal seams near residences.
5. Volunteer Fire Departments in the County have some concerns.
    a. Deployment of Fire Fighting Resources – possibly need more manned satellite stations, decrease response times to outlying, at risk areas. Response times are very long when responding from Broadus.
    b. Volunteer response lowers during heavy, repeating fire-fighting periods. Staffing fires may require a cultural change. Often wildfire response is limited (often to one person in one Engine, for multiple operational periods in remote areas).
    c. Though official volunteering is scattered, there is a good response from local landowners. They have sprayer units and other heavy equipment.
    d. DNRC has a concern that wildland engines are not distributed well around the County.
6. Burn Permits. Currently there is no formal burn permit system in the County. Currently, fire restrictions (burn bans, etc.) are discussed on an as-needed basis via conference calls. This coordinates 11 Montana Counties. The County is currently considering starting one. Advantages include
    a. prevention tool, monitoring, and enforcement mechanism.
    b. The system will also help in communicating burn bans and possibly help in Sage Grouse management.
7. Sage Grouse – core habitat and other habitat is in PRC. How to protect in light of BLM requirements and State of Montana Executive orders?
    a. There are landowner concerns about potential implications of Sage Grouse habitat preservation efforts. Those efforts may hamper management.
    b. BLM has three critical priorities in its Fire programs.
        i. These are Life, Property, and Sage Grouse. The latter is their third highest priority. They are concerned about preserving habitat in Core Areas. The State of Montana has also made this a priority. Landowners now burning off sage in those areas may be creating a future problem by reducing habitat. This, in turn, may result in listing under the Threatened and Endangered Species Act, which will significantly increase restrictions

on land use. Forest Service lands in the County have low potential for Sage Grouse.

c. There should be a Prescribed Burning Standard Operating Procedure (SOP) or Fire Departments to address the importance of Sage Grouse. There are established "core areas" available from the BLM and should be mapped for the County.
d. This should be addressed in the proposed Burn Permit system.

8. Communication Issues
    a. Communications during fire events is improving, but there are still common "dead spots". Fire paging communications are sometimes sporadic.
    b. DNRC is willing to participate in improving communications.
    c. Fire paging is improving.
    d. Phone system of Paging needs updating
    e. Cell coverage poor in some areas including Biddle.
9. There have been significant increases in PRC's ability to synthesize previously-unused spatial resource data into useful information. However, some gaps remain.
    a. There is some bias in fire history data. Data from PRC, DNRC, and BLM should be integrated.
    b. Lookouts, repeaters, and cell towers should be located.
    c. Forest Service Overstory vegetation is over-estimated. Most remaining vegetation is open stands of Ponderosa Pine.
10. The recent development of extensive structural defensibility information from the FIRESAFE program has significantly improved the County's ability to address structural ignitability and defensible space. Results should be used in this plan. Maintain privacy for FIRESAFE individual structure data.
11. Water Supply – PRC is an arid County with few formally-developed water supplies. Local landowner supplies are usually used for wildland fire fighting. The Broadus Volunteer Fire Dept. and the County Road Department can supply tenders, but they are limited to main roads, and often driving times are long.
12. Oil and Gas development in SE PRC – developments may alter the need for response in terms of training and equipment. Pipelines are unmapped. Locating may be needed to help determine values at risk. Additional pipelines may be constructed in the future, increasing fire suppression costs. Oil Companies have fire suppression equipment. What Is available?
13. The Otter Creek coal project – the economics of coal extraction have significantly changed over the last five years. The previously-projected large impacts from this project are unlikely.

VII. 2016 Plan Objectives

These objectives were developed using the identified issues above, the 2004 PRC plan goals; interviews with County officials; the Fire community; relevant current CWPP plans in rural Montana; Federal and State statutes; and State and Federal personnel through the planning process described above.

The 2004 Fire Plan goals are generally still valid for Powder River County. However, based on issues raised in the planning process and changes in economics and technology, they have been modified as follows, adding specific objectives where appropriate.

A. Improve Prevention and Suppression

In 2004 our goals included identifying roles and responsibilities of participating Federal, State, and County agencies; enhancing the level of coordination between the Powder River County Volunteer Fire Department and cooperating partners; identifying effective fire suppression strategies, prevention needs, and evacuation plans for wildland fires in and around the wildland/urban interface; and enhancing levels of fire protection provided to Powder River County.

Specific 2016 Objectives

1. Prepare for the potential of another large wildfire event, based on the previous large fires and their impacts on the County, in terms of impacts on emergency services, housing, and cleanup.
2. Emphasize impacts on firefighter safety, on emergency services, temporary housing, and cleanup. Review communications systems.
3. Address the effects, future potential, and effective suppression of coal seam fires.
4. Review local suppression resources. The size of the County and its rural nature makes it difficult to provide adequate resources in a timely manner.
5. Emphasize support of the Volunteer Fire Departments. Continue support of mutual aid programs. Emphasize limits in water supply.

B. Reduce Hazardous Fuels/Restore Fire Adapted Ecosystems

In 2004 our goals included identifying and rating the risk of a significant wildland/urban interface fire in Powder River County; identifying strategies and location for fuel treatments which will mitigate or reduce the risk to the homes and businesses during a wildland/urban interface fire; develop planning requirements to reduce fire hazards within the wildland interface - particularly with anticipated "boom" growth from Coal Bed Methane (CBM) and coal development; and performing site assessments of local residences and evaluations of fire hazards.

Specific 2016 Objectives

1. Review the effects of previous fires on the risks in the wildland urban interface (WUI).

2. Review Federal prescribed burning programs where appropriate for protection of County residents and resources.

3. Recognize oil and gas activities in suppression planning.

4. Recognize large coal bed methane projects are unlikely in the near future.

C. Promote Community Education and Assistance

In 2004 our goals included identifying structural protection weaknesses and proposing solutions; focusing fire agency response activities on the safety of the public and fire fighters during all emergency incidents; developing a local fire web page that will provide information on weather, lightning strikes, fire activity, etc. and also provide education updates and "FIREWISE" information.

Specific 2016 Objectives

1. Utilize the FIRESAFE home evaluation data to evaluate defensibility where appropriate. Use results to help focus education and assistance to home owners to improve their situation where appropriate.

2. Evaluate and educate the public on new Federal issues that may affect management and suppression (sage grouse concerns).

3. Establish a burn permit system for the County.

4. Update and integrate new spatial information to enhance suppression and preparedness. This includes an updated forest inventory, locating values at risk (for example, cell phone towers and radio repeaters), and fire history to update wildfire risk and impacts.

VIII. Situation Analysis– Community Base Maps

A. Geography, Climate and Geology.

The following material is partially taken from Heidel, B., C. Jean and S. Crispin, 2002. Other authors are cited in the text.

Powder River County lies in southeastern Montana, near the Wyoming border (Figure 1). It is bordered by rural Montana Counties: Big Horn and Rosebud County on the west, Custer County on the north, Carter County on the east, and Wyoming on the southern border.

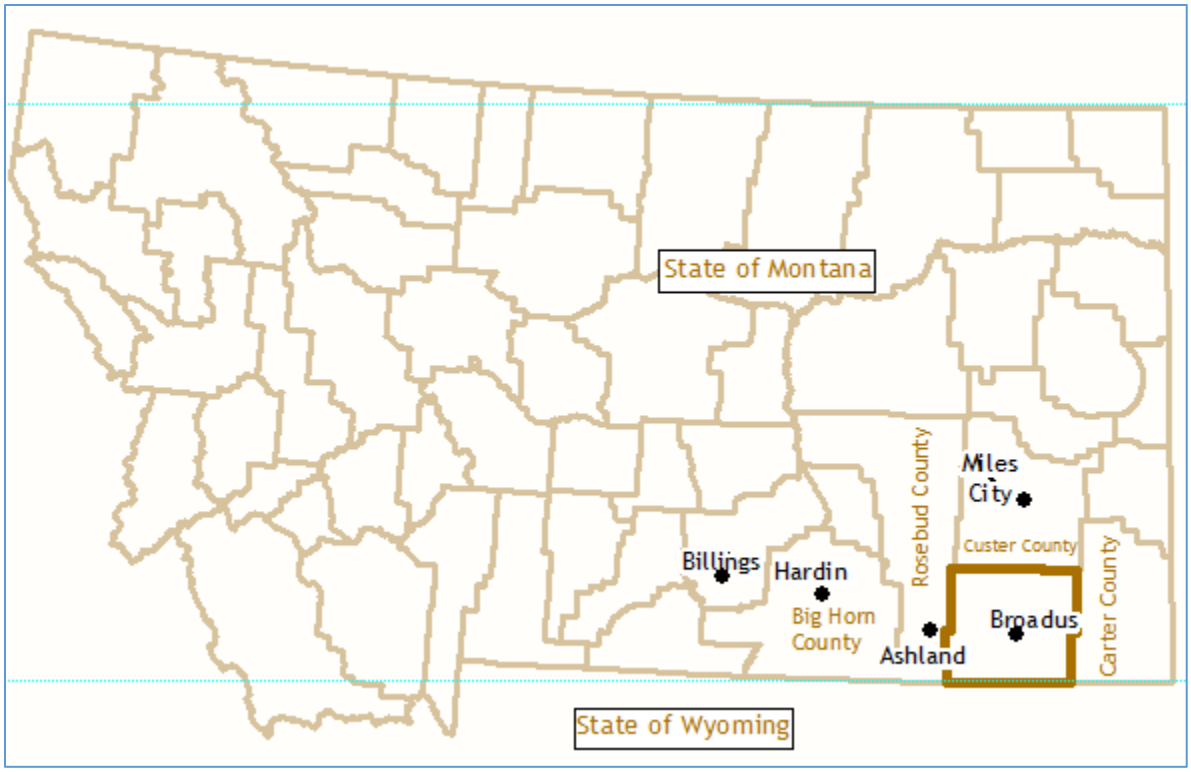


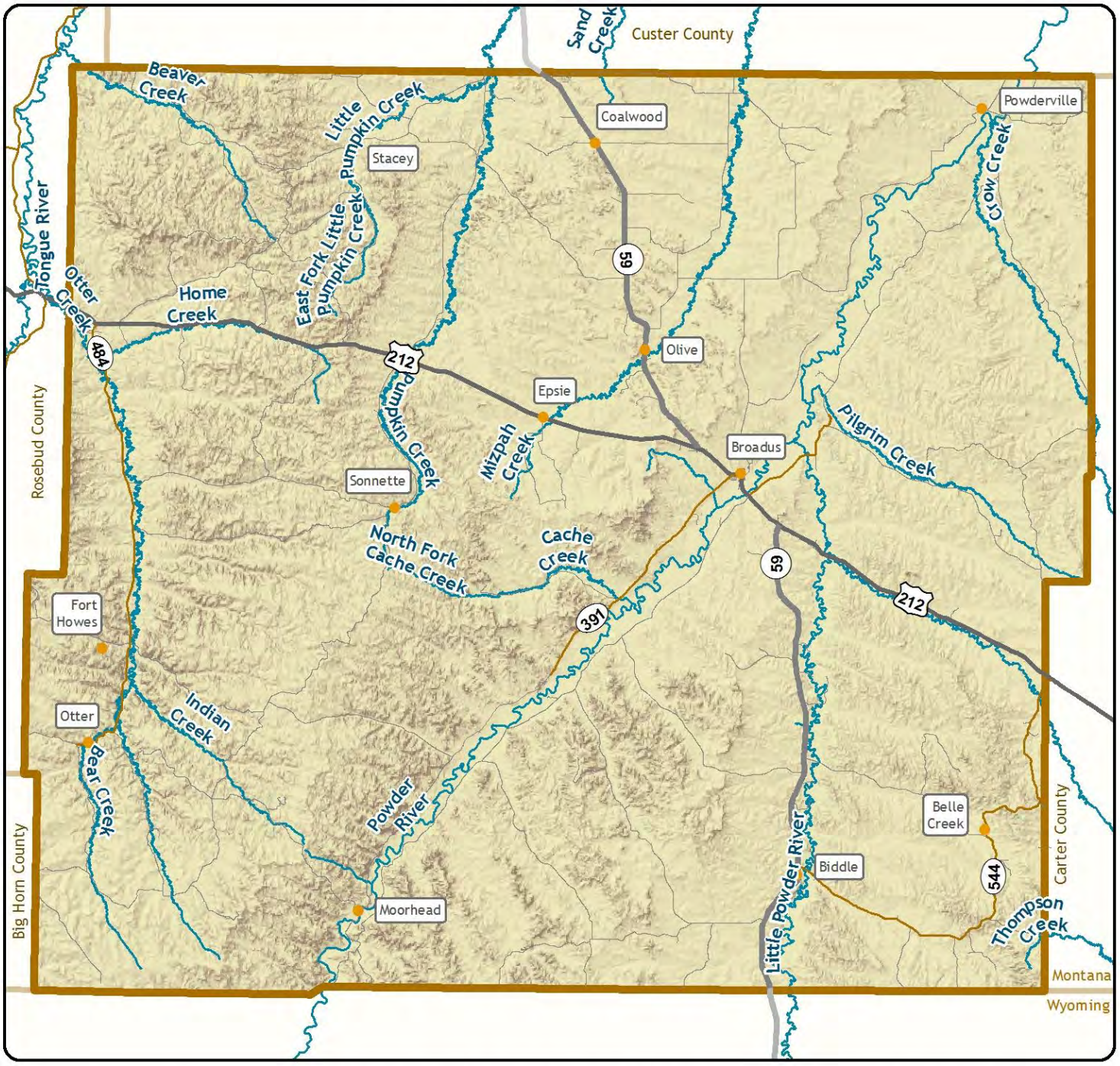
Figure 1. Map- Location of Powder River County (PRC).

The County covers 3,297 square miles (2,110,000 acres) of unglaciated Missouri Plateau in the Eastern Sedimentary Plains of southeast Montana. The Powder River and its tributaries, including Little Powder River, Mizpah Creek and Pumpkin Creek, drain most of the County, dissecting the uplands and underlying sedimentary bedrock layers (Figure 2). Otter Creek and Beaver Creek, tributaries of the Tongue River, drain the west end of the county. North-south valleys and intervening ridges form the prevalent landforms, spanning elevations from 2,768 feet in the county's northwest corner to 4,305 feet in the southwest corner.

Like other counties in this area, the prevailing land cover is rangeland (shrubland and grassland). In 2015, land cover in Powder River County is 63 % rangeland, 30% woodland, and 7% cropland. Though there is a relatively high woodland component, most of the woodland component is low density, and is also used as rangeland. Only 35,879 acres (discussed below) have high canopy cover, and this mostly in western portion of the County on USFS lands.

The highest ridge systems and the most extensive pine woodlands lie within the Ashland District of the Gallatin Custer National Forest at the western end of the County, though there are pine-covered escarpments and knolls in the southeastern corner and widely scattered throughout the County. Lands administered by the BLM are concentrated on, but not limited to, rough terrain along the Powder and Little Powder Rivers, and are intermingled with private and state lands.

Powder River County, Montana Community Wildfire Protection Plan 2016: Physiography and Streams



Legend

- Towns

Roads

- US
- MT
- Secondary
- County Roads
- Powder River County Boundary
- Other County Boundary
- Major Streams

Most of the County is rolling country with low hills to the west; gently-sloping river bottoms; gently-sloping plateaus to the north east; and broken, gullied country to the south.

Streams other than those delineated above are generally intermittent.

0 5 10 20 Miles

1:550,000

N

Shovic Associates, LLC

Figure 2. Map- Physiography and Streams

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Climate

The area's climate is continental and typical of the high plains, with cold winters, warm summers, and peak rainfall early in the growing season. Average annual precipitation at Broadus is 13.4 inches while across the county averages range from 11-19 inches. The average of mean monthly temperatures is 7.3° Celsius (45.1° Fahrenheit), with summer temperatures usually cooler than in the Yellowstone River valley to the north. Precipitation is typically concentrated in May and June, and maximum mean monthly temperatures occur later in July, resulting in a late summer water deficit. The climate varies from year-to-year, month to-month, and the great variations occur even in the span of weeks, days and hours.

Geology, Ecology, and Landforms

The County has two general ecological systems (Figure 3) (Mcnab, et. al. 2007; Nesser, et. Al. 1997). The first "Southern Powder River Basin-Scoria Hills" consists of gently rolling to steep dissected plains, flat-topped, steep sided buttes, and steeply sloping badlands; primarily developed in the Fort Union geological Formation (sandstone, shale, bentonite, lignite, and other materials). Vegetation includes open and closed stands of ponderosa pine, Great Plains grasslands, and sagebrush cover types. Coal seams and small coal outcrops are common in this area. "Scoria" refers to clinker-like remnants of subsurface coal seam fires (Beechie, unpublished, 2003). They often form hilltops and buttes and are indicators of potential coal seam fires.

The second system is "Central Grasslands". This consists of unglaciated plains with many small intermittent streams. Geologic formations are usually sedimentary shales and sandstones with a high clay content (primarily from the Pierre-Shale). Vegetation is primarily grassland with some woodland along streams and on steep breaks.

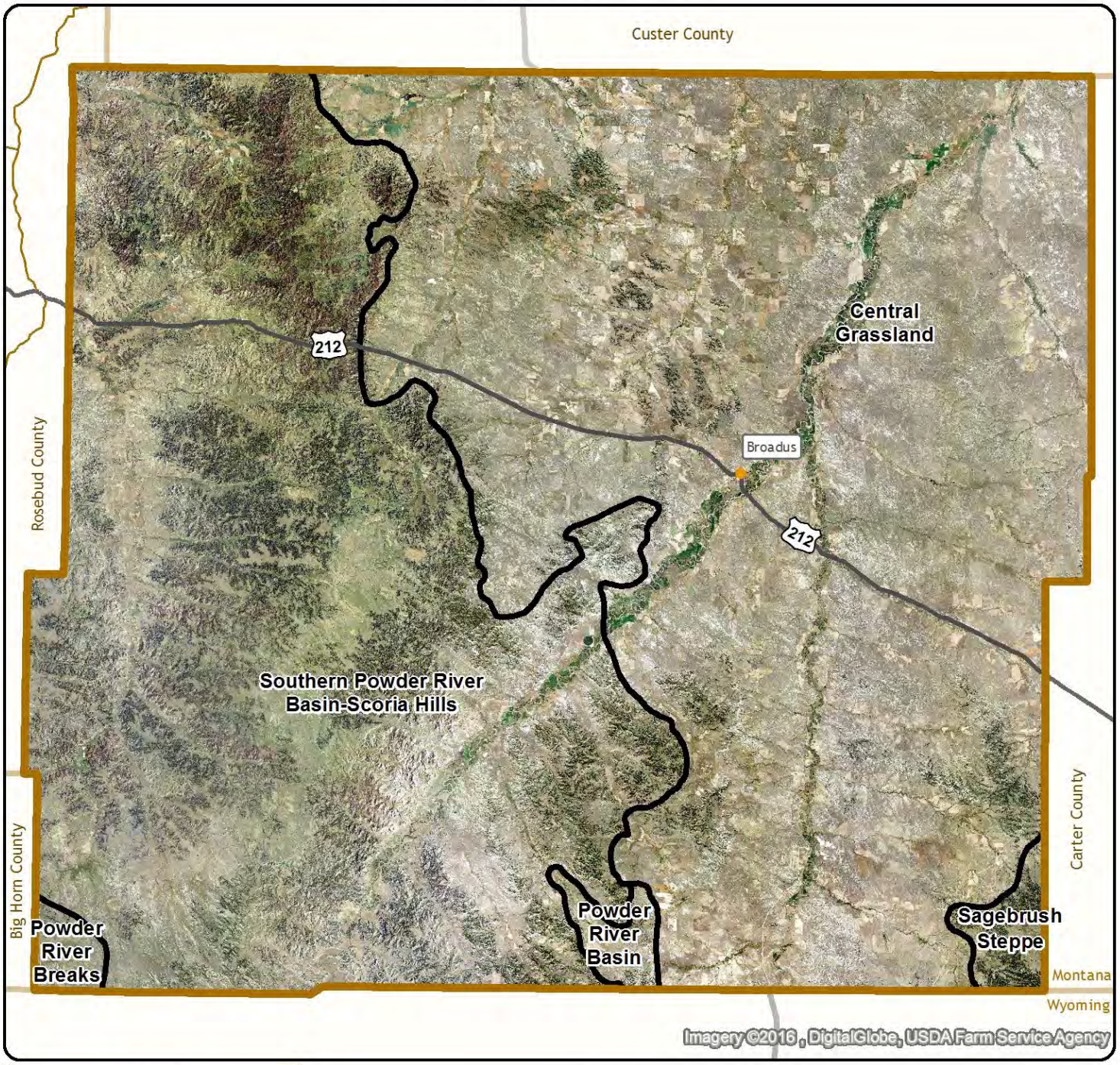
Soils throughout the county are Entisols and Aridisols (Torriorthents and Camborthids) of dissected to nearly level sedimentary bedrock plains and hills. In addition, Ustorthents and Argiborolls occur in the pinelands, and Torrifluvents, Torriorthents and Camborthids in the broadest river valleys. All these soils generally have moderate levels of clay, and are relatively infertile.

Demographics and Socioeconomics

The following material is taken from a land use plan update (Powder River County, 2012), and Federal Data (U. S. Census Bureau, 2016).

PRC had a population of 1,773 in 2015, representing a very low density (0.5/sq. mi. vs. Montana at 6.8). This is a 2.2% decrease from 2010, while Montana's population grew by 4%. Part of this reduction in population is due to the closing of oil fields. Broadus, the County seat has a population of about 586 (http://www.usa.com/powder-river-county-mt.htm), with the

Powder River County, Montana Community Wildfire Protection Plan
2016: Ecosystem Overview



Legend

- Powder River County Boundary

Roads

- US
- Other County Boundary
- Ecological Units

Ecosystem Overview

These Units are from the Ecological Subsection Map of the U. S.
The satellite image shows vegetation and general landforms.

Figure 3. Map- Ecosystem Overview

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remainder primarily on rural ranchsteads or farmsteads. The small, unincorporated towns are generally either abandoned or have only a few structures.

Land Use and Ownership

PRC lands are primarily in private ownership (65%) (Table 1), with less in Federal ownership (28%) and some scattered State lands (6.6%). Federal lands under the Forest Service are primarily within the Ashland District of the Custer Gallatin National Forest (Figure 8, Page 28). BLM lands make up 12% of the County and are primarily scattered in the southwest of the County. State lands are scattered sections throughout the County. Private lands are generally agricultural.

Table 1. Land Ownership in Powder River County

Acreage	**Owner**	**% of County**
256,023	US Bureau of Land Management (BLM)	12.1
340,356	US Forest Service (USFS)	16.1
142,988	Montana State Trust Lands	6.6
16	Other (Local, County, City)	0.1
1,367,136	Private	65.1
2,106,519		**100.0**

The average size of single-owner land is 1,299 acres, with ranching being the primary land use. Though only 57% of the County is shown as having an agricultural use, the actual proportion is probably higher, as Federal land use (for grazing and other ranching purposes) is not counted here. Farming is also a common land use with most occurring north of Highway 212.

Relative land values are shown in Figure 4. Higher-valued lands are scattered in the County, primarily as farmsteads and feeding facilities. Most of the private lands are relatively low valued ranchland or farmland. Higher-valued lands are also concentrated along the main transportation routes of highway 59 and 391.

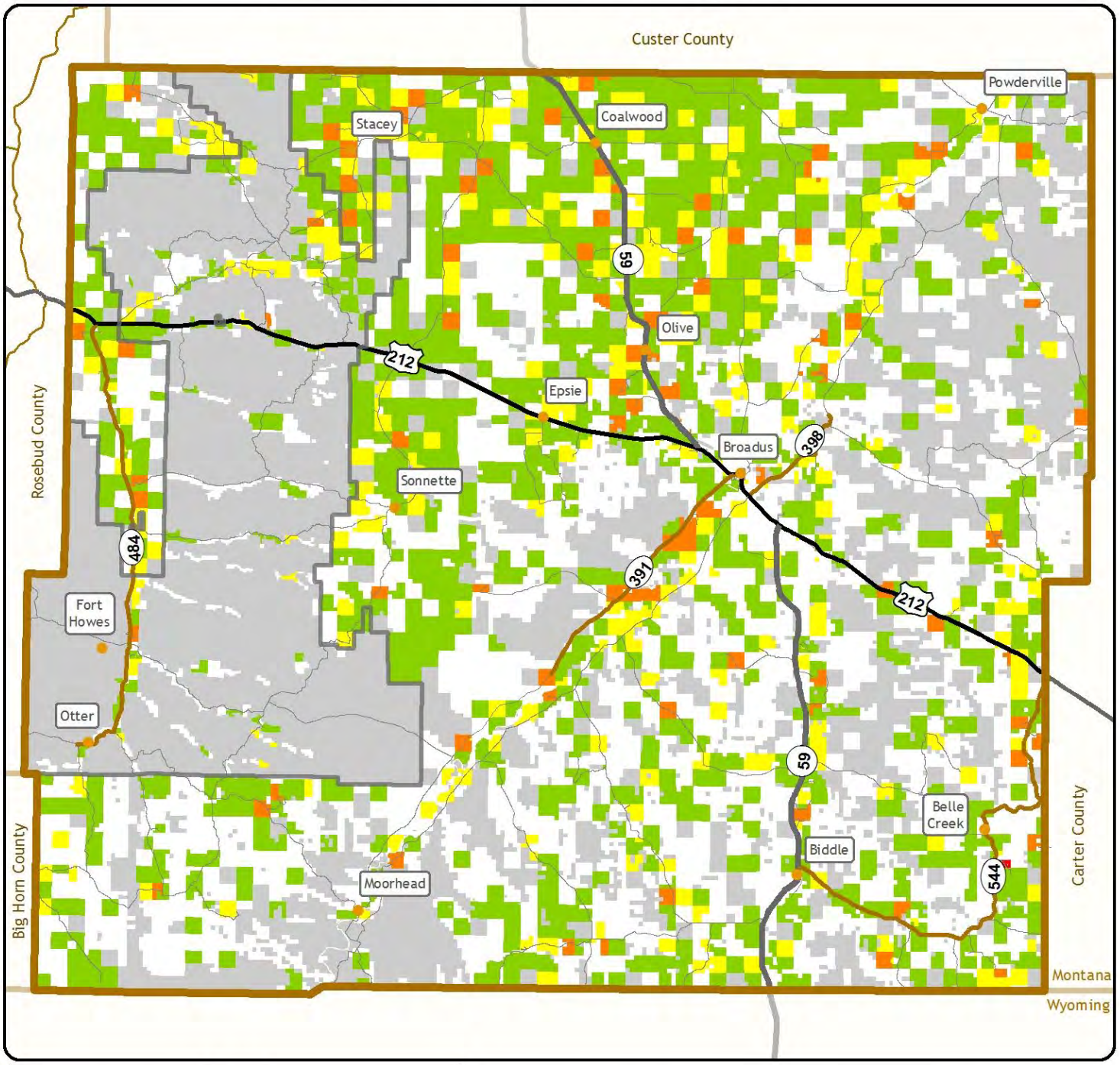
Infrastructure

Two heavily travelled Highways cross the County (Figure 4). These are US 212 which carries a high volume of truck traffic, and State Highway 59 which connects Miles City with Wyoming. There are numerous unpaved county roads accessing most of rural areas, with two-track dirt roads accessing most of the public lands in the County.

The County Sheriff's Department has delineated emergency service areas which help define its jurisdictional response.

All these infrastructure feature locations are linked to a set of response maps and a wall map of the entire County to facilitate response to the large, relatively remote County areas. It includes

Powder River County, Montana Community Wildfire Protection Plan
2016: Present Total Assessed Values by Parcel



Legend

- Powder River County Boundary
- National Forest Boundary
- Towns
- Roads
  - US
  - MT
  - Secondary
  - County Roads
- Other County Boundary
- Public Lands

$ Total Assessed Value

- 13 - 25,000
- 25,001 - 70,000
- 70,001 - 150,000
- 150,001 - 975,000
- 975,001 - 7,021,060

Total values include both structure and land values per 2016 MT data. Almost all values are less than $975,000. They are shown to provide a relative distribution in the County, not an absolute market valuation.

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Figure 4. Map- Assessed Values

mile markers, ownership, addressing, natural features, and administrative areas. The response maps are titled "Powder River County, Montana Fire and Emergency Services Run Maps – 2015 Vs 2.1 November 28, 2015", and the accompanying wall map in Dispatch and Fire is titled "Powder River County, Montana Resources and Conditions 2015 Update".

B. Wildfire Risk Assessment

1. The National Perspective

USDA and USDI have authored a detailed strategy in living with wildfire. (USDA and USDI. 2014). This strategy deals with the entire nation, but the analysis was conducted on a County basis. Here are some salient points relevant to PRC, relative to other Counties in the Country.

- PRC is a Western rural, partially-forested, wildfire-prone County with primarily natural landscapes and significant federal land ownership. It has little prescribed fire activity but a high historical frequency of severe wildfires. It has low home density in the WUI.
- Relative to other areas the County has generally a high area burned, but a low number of structures lost. Resource values other than housing are generally the most affected by wildfire.
- PRC has a moderate focus on home defensive actions, and a need for both home and community actions to protect values. The County may want to consider adjusting County building codes to accomplish this, but there are no municipal areas on which to focus.
- There are opportunities for using wildfire for resource benefits and managing ecological systems, but because of its remoteness, there is little opportunity for extractive forest activities that might benefit resources.
- Human-caused ignitions are low based on population and the rural nature of the area, but can be significant because of the potential for large fires.
- On a National level, PRC is a high priority for broad-scale fuels management and for community planning and education. The U. S. Forest Service is seen as a primary potential cooperator in these activities.

2. Wildfire Patterns in Powder River County

Wildfire History

Wildfires are a significant part of PRC's history. Table 2 shows wildfires since 1985. This data comes from the updated and merged data from the BLM, DRNC, and local data from PRC. The DNRC and BLM sources were similar, but had some overlap and some fires unique to each layer. There was some duplication with local data and some 2015 fires not in the databases. These were merged and checked to give the most accurate representation for PRC. Fire reporting from Fire Districts is sometimes not consistent, so fires may be under-represented in the southwest part of the County.

About 477,000 acres has burned in that 29-year period, over 23% of the County. Some of these areas actually have reburned over this time period as shown in Figure 7. The majority are on Federal lands on the western side of the County (Figure 8).

Table 2. Wildfires in Powder River County (1985 – 2015)

Fire Year	No. of Fires	Min Acreage	Max Acreage	Average Acreage	Total Acres
1985	4	13	2,578	688	2,750
1987	2	12	29	21	41
1988	16	11	17,186	1,388	22,205
1989	5	11	2,668	978	4,891
1990	2	47	131	89	178
1991	2	12	22	17	34
1992	7	15	7,034	1,446	10,119
1993	1	120	120	120	120
1994	7	12	230	53	370
1995	3	19	161	71	214
1996	3	30	1,722	610	1,831
1998	5	11	124	38	188
1999	1	112	112	112	112
2000	19	3	32,397	2,523	47,946
2001	5	5	111	31	154
2002	5	6	58	37	186
2003	6	20	5,403	1,627	9,760
2004	6	2	3,567	608	3,647
2005	2	2,685	2,685	2,685	5,371
2006	10	7	17,996	1,836	18,363
2007	19	2	10,730	1,644	31,240
2008	3	1	21	9	26
2009	13	0	70	12	150
2010	5	0	45	12	59
2011	12	2	34,550	4,395	52,744
2012	22	0	161,153	11,382	250,406
2013	11	0	49	17	186
2014	17	0	230	42	707
2015	37	0	5,404	364	13,464 *
Totals	**250**				**477,461**
Total Years	29		Average ac/year	16,464	

* This total reflects all reported fires regardless of response jurisdiction. In 2015 PRC fire departments responded to 27 fires totaling 10,706 acres within PRC boundaries.

Even though BLM and USFS lands are about the same proportion of the County (Table 1), a great majority of the acres burned on public lands occur on USFS lands (Table 3), likely due to the greater forest component in USFS ownership.

Table 3. Acres Burned on Public Lands in Powder River County

Owner	Total Acres Burned	% of Total Public Acres Burned	% of Total Acres Burned in County
Bureau of Land Management	35,448.1	10.7	7.4
Custer Gallatin National Forest	282,713.2	85.1	59.2
State of Montana	13,894.7	4.2	2.9
Totals	332,056.0	100.0	69.5

Burned acres vary by year, but show a long term trend. Most years have little burn activity, but every 12 years (1988, 2000, and 2012) show a large increase (Figure 5). This trend is not as well reflected in terms of starts (number of fires) in Figure 6. This shows that fire impacts probably better reflect short term weather patterns then the incidence of ignitions.

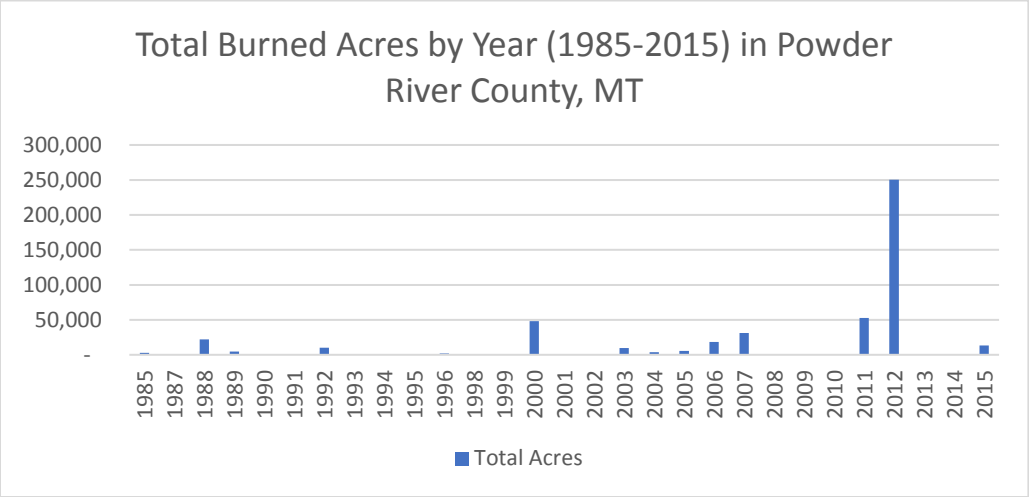


Figure 5. Total Burned Acres by Year (1985-2015) in Powder River County

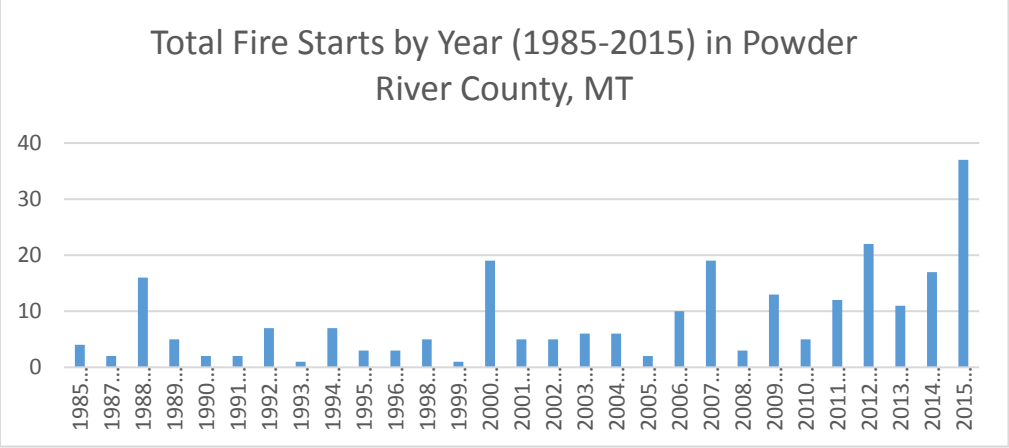
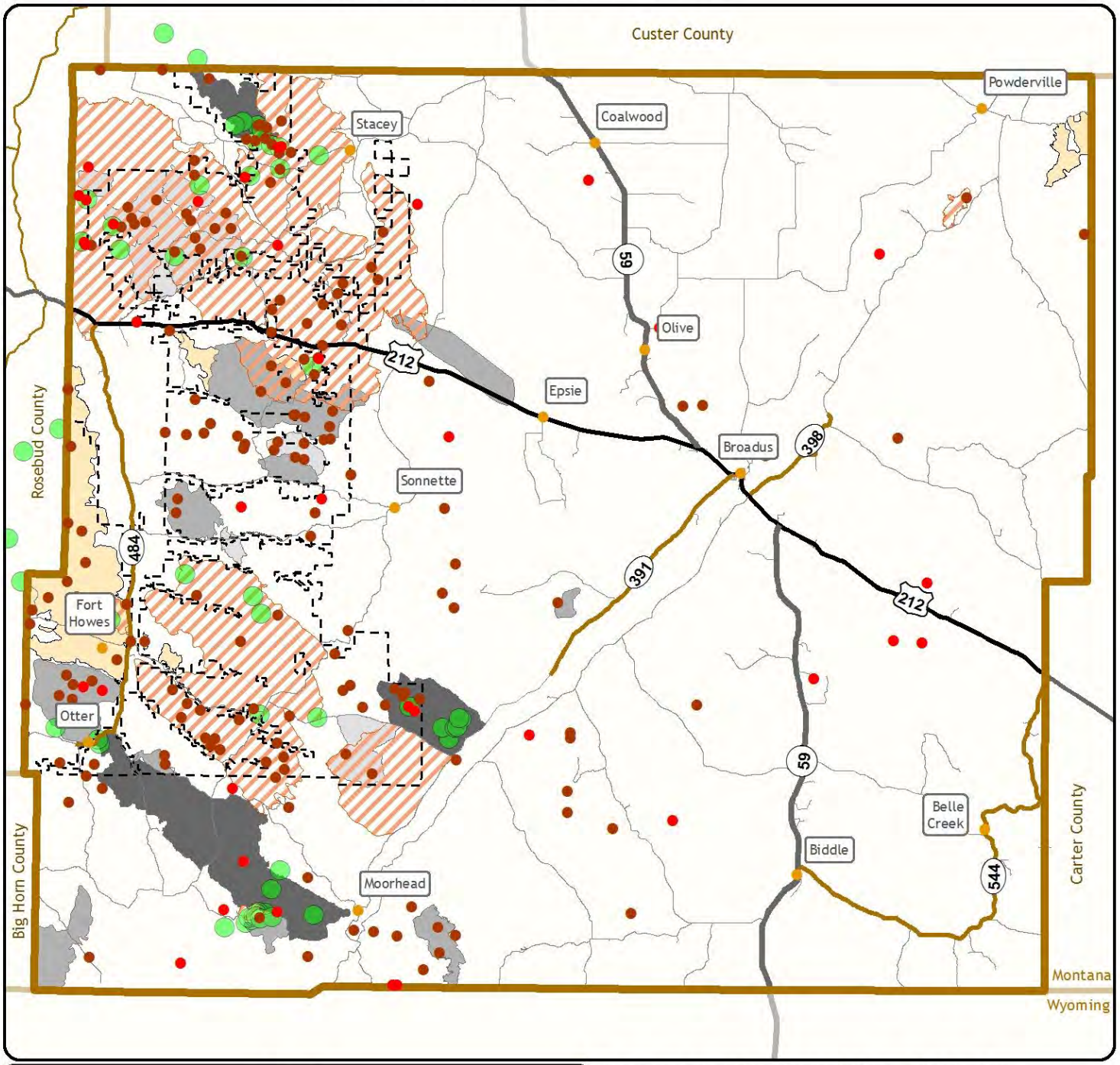


Figure 6. Total Fires by Year (1985-2015) in Powder River County

Powder River County, Montana Community Wildfire Protection Plan
2016: Wildfire History 1985-2015



Legend

- Powder River County Boundary
- US Forest Service Lands
- Towns
- Roads
  - US
  - MT
  - Secondary
  - County Roads
  - Other County Boundary
- 2015 Fires
- 1985-2014 Fires < 640 acres
- Coal Seam Ignition 2002 - 2015
- 1985 - 1996 Fires
- 2000 Fires
- 2003 - 2007 Fires
- 2011 Fires
- 2012 Fires

Total reported fires from 1985 to 2015 is 250.
2015 Fires are shown as points, but are generally small in size.
For 1985 - 2014, small fires (less than 640 acres) are also shown as points. Perimeters are shown for larger fires. Not all areas within perimeters were burned. Coal seam ignitions were collected by the BLM.

Note: This includes data from Montana Dept. of Natural Resources (DNRC), Bureau of Land Management (BLM), and Powder River County (PRC)/

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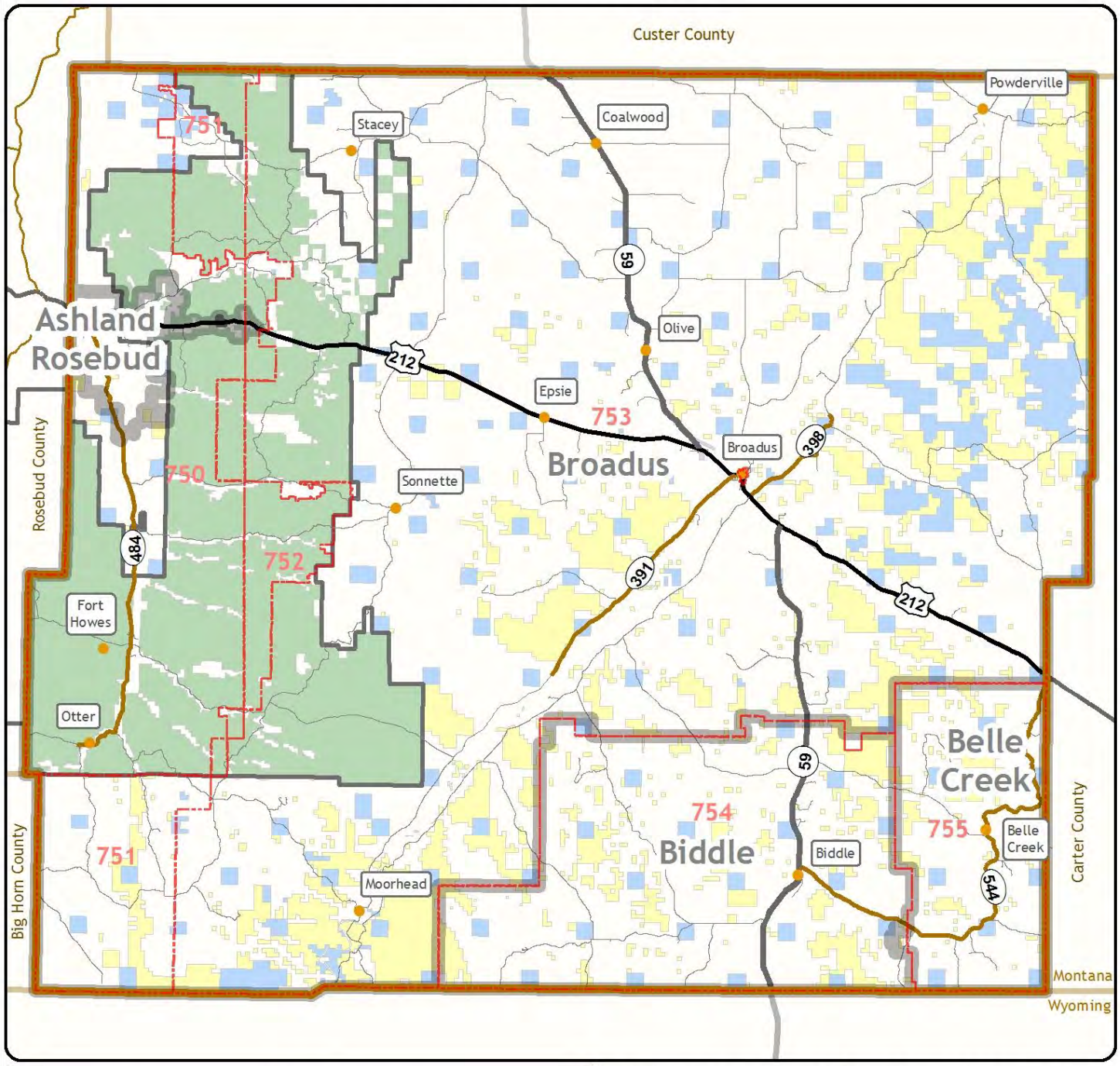
Figure 7. Map- Wildfire History

Powder River County, Montana Community Wildfire Protection Plan
2016: Administrative Features



Legend

- Powder River County Boundary
- Other County Boundary
- Towns
- Roads
  - US
  - MT
  - Secondary
  - County Roads
- Fire Districts
- Emerg. Service Area
- National Forest Boundary
- Montana State Trust Lands
- US Bureau of Land Management
- US Forest Service
- Other Public Ownership

Administratively, Powder River County has a rural Fire Department (Broadus); three rural Fire Districts; and seven Emergency Service Areas (used by Law Enforcement and ambulance services).
Land ownership includes US. Forest Service, Bureau of Land Management (BLM), State, and private, with a small amount of County ownership.

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Figure 8. Map- Administrative Features

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Causes of Wildfires.

Based on interviews, ranked causes of wildfires in the County are 1) lightning, 2) coal seam fires, and 3) human. Summarizing the merged fire history shows causes are lightning at 54%, with human causes at 2%. However, 64% are either miscellaneous or not entered, so this may be biased. It does indicate lightning plays a large part in fire starts over the last 29 years. This ranking is relatively consistent with Table 4, which lists wildfires in 2015 to which the Broadus Fire Department responded (Figure 9). Of 27 fires, 37% were lightning-caused, 33% were human-caused, 22% associated with coal seams, and 8% unknown. It appears all three causes are significant.

Table 4. 2015 Wildfire: Powder River Fire Department Participation

Fire ID	Description	Fire Date and Name	Acres
1	human caused dump fire that got away, we assisted Custer County,	3/7/15 Johnson fire Custer County	134
2	human caused burn barrel and high wind, started grass on fire	3/9/15 Barry Emmons garbage fire	1
3	Coal Seam fire in Custer County that we assisted on	3/12/15 Hercules fire Custer Co	8000
4	Tried to assist BLM on a little fire but got stuck trying to get to it, Wasn't many acres	3/14/15 CNF got stuck fire	6
5	Coal seam fire on or by the Terrett Ranch	3/22/15 Bringoff fire Beaver Creek	3000
6	power line blew down and started a ridgetop on fire, we assisted the BLM. rs	3/28/15 White tail Camp Ground	10
7	840	3/28/15 Hovermale fire	5
8	Coal seam fire on BLM, we got it mostly out and turned it over to the BLM. Approx. 148 acers.	4/13/15 Gay Ranch coal seam fire	148
9	Coal seam fire on CNF and BLM. Approx. 390 acers	4/14/15 Cabin Creek fire	390
10	Coal seam fire north of Ashland, mostly private, a little CNF	4/23/15 River Ranch	213
11	human caused Controlled burn that got away	5/2/15 Stigelmeier	50
12	Coal seam fire	6/27/15 River Ranch # 2	125
13	Human caused fire in heavy sagebrush and a little timber on Wyoming line	7/11/15 Bales fire	6250
14	Lightning caused fire	7/15/15 Dave Nisley fire	2
15	Lightning caused fire on a steep knob in trees and grass	7/23 Gaskill Fire	5
16	lightning caused, in trees and grass and heavy duff, took 4 trips to get it out	7/23/15 Bud Williams Fire	5
17	lightning caused fire on BLM	7/24/15 Wyoming line	53
18	lightning caused fire in trees and grass	7/27/15 Knutsen fire	8
19	Lightning caused fire in grass	7/27/15 John Nisley fire	6

20	Lightning caused fire along a ridge, BLM assisted	7/28/2015 FTY fire	327
21	A combine started a fire in a Pea field, right by the county line in Carter County	8/2/15 Bales Fire	86.2
22	lightning caused fire on a ridge top	8/5/15 Steve Held fire	6
23	Lightning caused fire	8/7/15 Collins fire	2.5
24	lightning caused fire on CNF, one of our satellite units responded	8/19/15 Lyda fire	2
25	powerline started a structure on fire in a 40 mph wind	10/11/15 Ritter fire	5
26	human caused unknown but suspect a cigarette in grass at the camp ground	10/28/15 Red Shale fire	0.5
27	human caused camp fire	12/17/15 Lemonade Springs fire	0.1
		Total Acres	18840.3
		Total Acres in PRC	10706.3

Lightning-caused fires are pretty much a given in this climate and vegetation type. Human-caused fires can be mitigated with better enforcement of burn regulations and education.

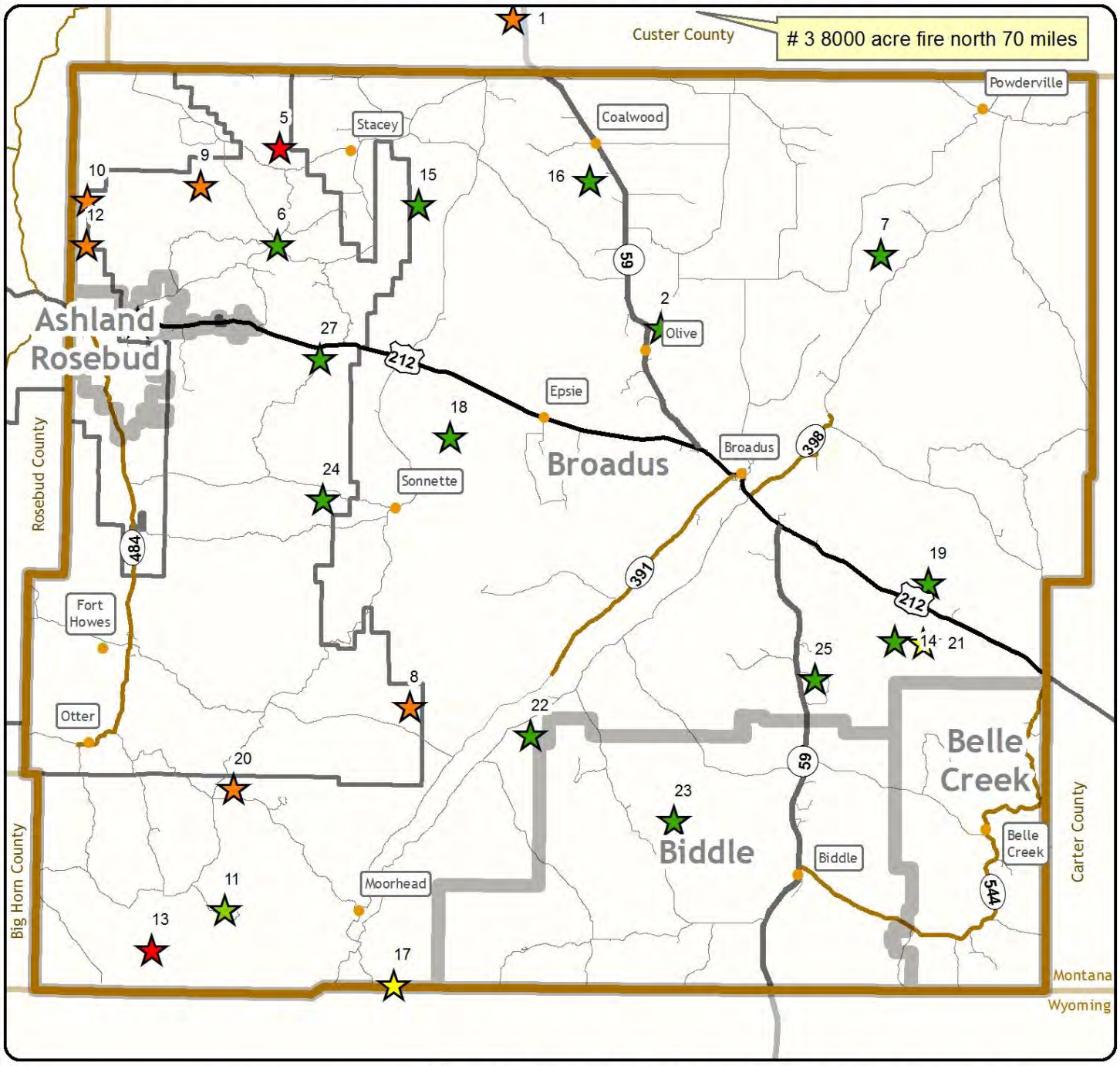
Coal seam fires are potentially a much greater threat, especially given the likelihood of a wildfire actually starting a seam fire, which can burn for years until favorable conditions start a wildfire. They are also hazards for cattle and fire fighters, as they can produce subsidence and cave-ins. DNRC estimates there are 500 active coal seam fire locations now. These generally resulted from the large 2012 fires. Up to 70% of wildfires ignite a coal seam. There may be up to 1000 active ones in the County. As climate change accelerates, warmer and drier conditions may increase their importance.

Coal seam fires are geographically related to the eastern side of the County. Figure 7, (Page 27) shows locations of coal seam fires collected by the BLM since 2002. They are highly related to previous fires and to the western landscape of scoria hills shown in Figure 3 on Page 21.

Based on these data, the importance of coal seam ignitions (which may burn for years in place before starting a wildfire) is probably as high as lightning or human causes. Short term weather patterns may produce favorable conditions for coal seam ignition only periodically. Also, "successful" wildfire starts may be lower during some years because of effective initial attack by Fire Departments on smaller fires during more favorable weather patterns.

Regardless of source, the patterns of wildfires in the County can be used to make some estimates as to chance of occurrence and impact, given an occurrence. Based on 29 years of data, Figure 10 shows the likelihood of a "successful" wildfire start in 10 x 10 mile areas. The western PRC has a much higher probability of ignition. Given an ignition, the impacts of wildfires can be estimated by ranking the area burned in each 10 x 10 sq. mile area (Figure 11). Again, western PRC has the highest impacts.

Powder River County, Montana Community Wildfire Protection Plan 2016
2015 Wildfires - Powder River County Fire Department Participation



Legend

- Powder River County Boundary
- Other County Boundary
- Towns

Roads

- US
- MT
- Secondary
- County Roads
- Fire Districts
- National Forest Boundary

2015 Fires

Acres

- 0-10
- 10-50
- 50-100
- 100-1000
- 1000-8000

In 2015 Powder River County Fire Departments responded to at least 27 wildfires. There were numerous additional small fires not recorded here. Total burned acres was 18,840 including two fires outside County boundaries. Fires within County boundaries totaled 10,804 acres.

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Figure 9. Map- Broadus Fire Dept. 2015 Fires

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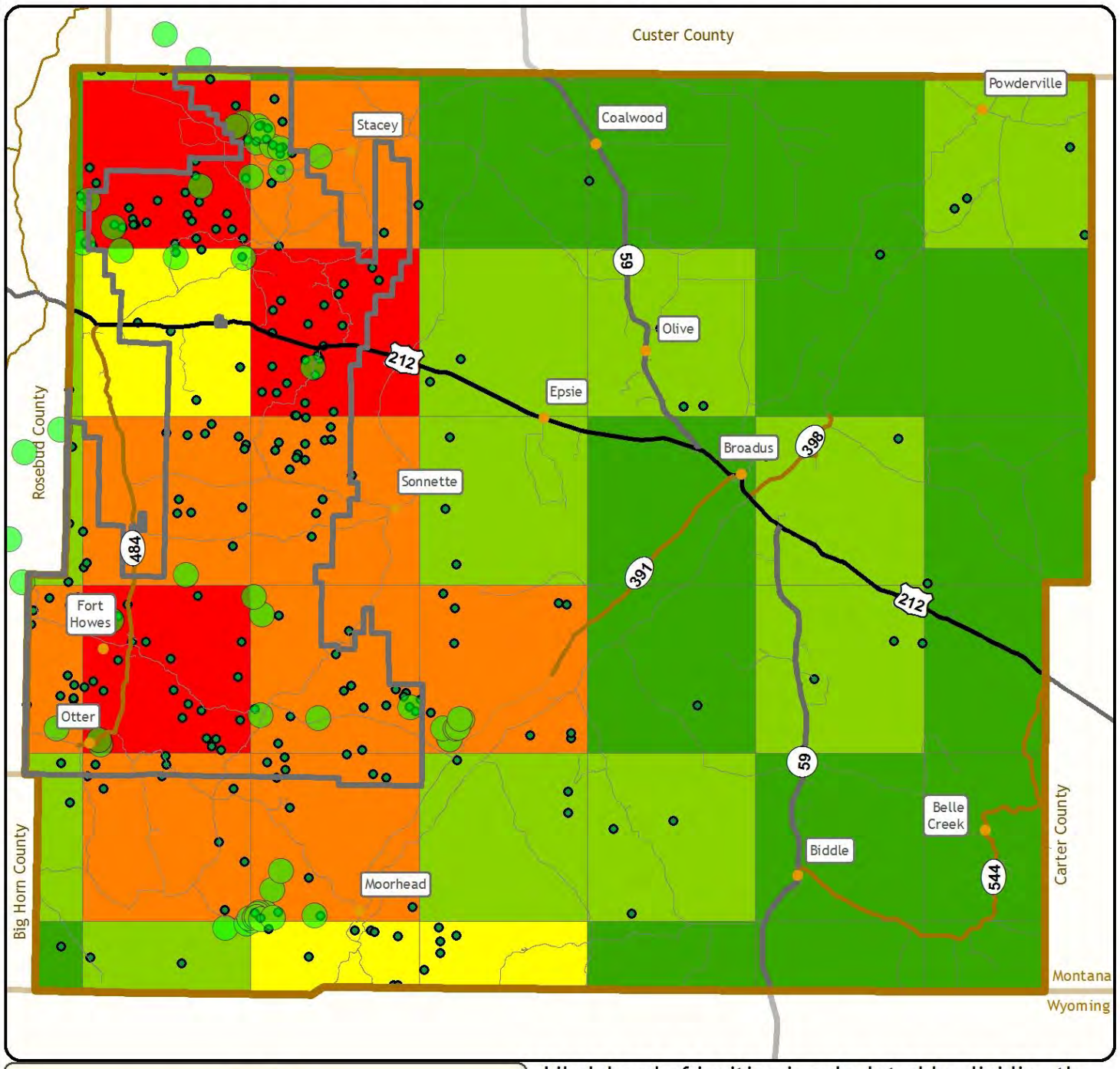
Powder River County, Montana Community Wildfire Protection Plan
2016: Wildfire Likelyhood based on Ignitions 1985 - 2015



Legend

- National Forest Boundary
- Powder River County Boundary
- Towns

Roads

- US
- MT
- Secondary
- County Roads
- Other County Boundary

- Coal Seam Ignitions
- Fire Polygon Centroids

% Probability of Ignition

- 0.0 - 0.5
- 0.6 - 1.9
- 2.0 - 3.7
- 3.8 - 7.9
- 8.0 - 11.6

Likelyhood of ignition is calculated by dividing the total number of reported fires in each 10 x 10 mile grid cell by the 250 reported fires over the time period 1985 - 2015. Centroids of each fire polygon are used which may not be the actual origin. Also, since this is based on reported fires, it only reflects significant ignitions that required some official response and documentation.

Coal seam ignitions were collected by the BLM from 2000 to 2016 (used only for display).

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Figure 10. Map- Wildfire Likelihood

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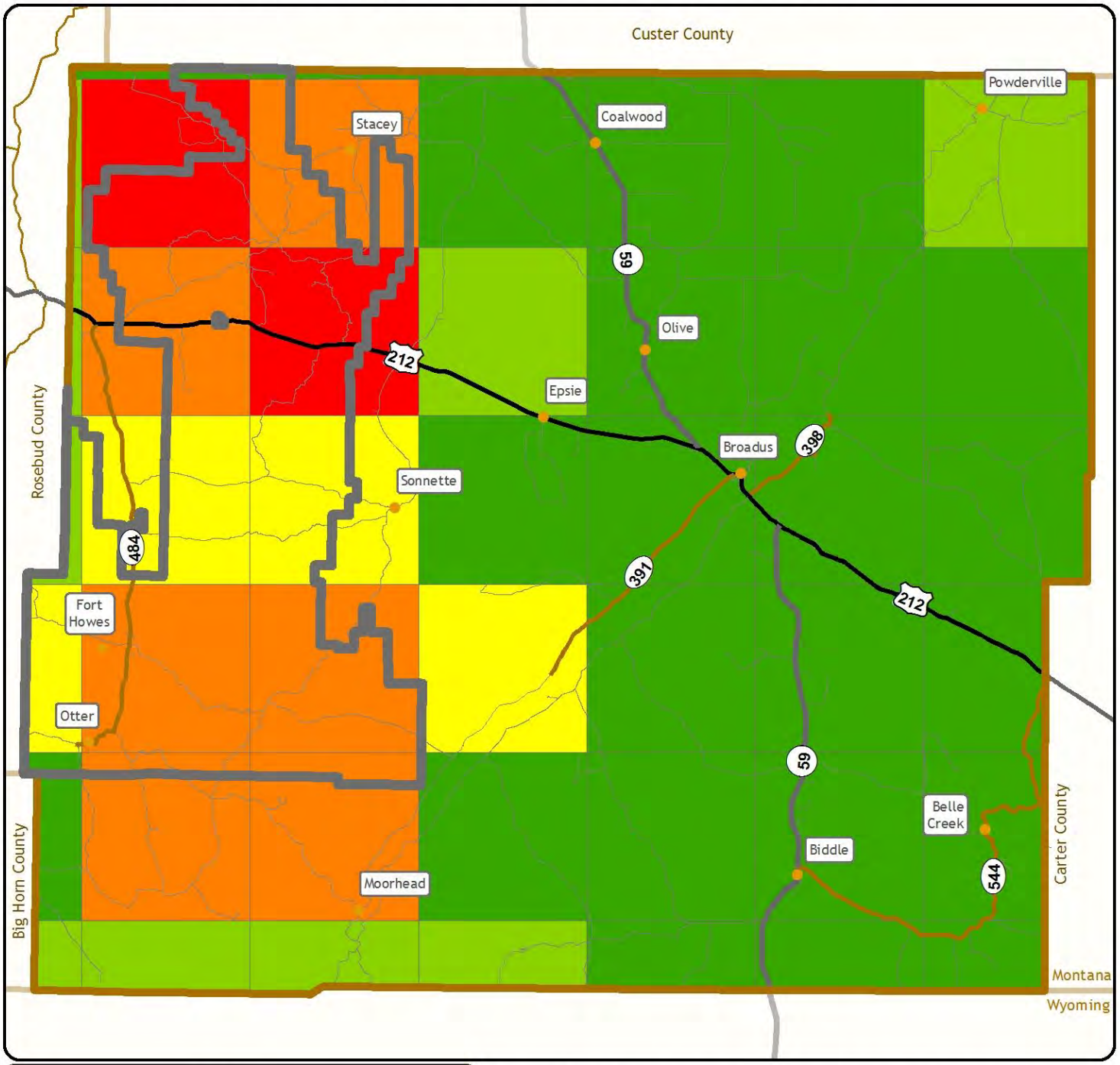
Powder River County, Montana Community Wildfire Protection Plan
2016: Wildfire Impacts Based on Acres Burned 1985 - 2015



Legend

- National Forest Boundary
- Powder River County Boundary
- Towns

Roads

- US
- MT
- Secondary
- County Roads
- Other County Boundary

Acres Burned

- 0 -2,800
- 2,800 - 9,600
- 9,600 - 18,000
- 18,000 - 48,000
- 48,000 - 70,000

This index reflects the total acres burned in each 10 mile x 10 mile grid cell over the period from 1985 to 2015. Total burned acreage is 477,461. Maximum total area of cell is 64,000 acres. Burned areas larger than this value are due to the reburn of some areas.

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Figure 11. Map- Wildfire Impacts

Wildfire Potential after the fires of 2011-2012

The 2011 and 2012 fires were some of the largest fires in the history of PRC. They burned 253,000 acres in PRC, which is over ½ of the total burned in the last 29 years (Table 2). Most were burned on USFS lands in the western side of the County (Figure 7, Page 27).

These fires were catastrophic in nature, and have long-ranging effects on resources, future fire behavior, and future suppression. The USFS completed an extensive post-fire analysis (Ashland Ranger District, 2014). Though there was extensive analysis of the effects on many resources, some of the salient conclusions that may affect PRC resources include the following quotes:

> **"4.4.15.4 Existing sustained crown fire potential due to expansive closed canopy forest**
>
> The Ashland RD still has some extensive tracts of Ponderosa Pine forest with greater than 40% canopy cover, particularly in the southwest corner of the district and in the 15 Mile area. These forests are susceptible to sustained crown fire during peak summer and/or drought conditions. Once crown fire is established under these conditions, suppression efforts have proven unsuccessful."
>
> "Areas outside of the 2011 and 2012 large fire perimeters were analyzed to determine the amount and location of remaining Ponderosa Pine forest with greater than 40% canopy cover. Even though there are some remnant stands of greater than 40% canopy cover within the large fire areas, they were excluded from the analysis because of their fragmented nature which limits the potential for sustaining crown fire. There are approximately 28,800 acres of 40-60% canopy cover and 1000 acres of greater than 60% canopy cover on the Ashland RD."
>
> **"4.4.15.5 Large scale wildfire potential due to expansive down and dead fuels in existing and Potential future continuous fuel beds**
>
> World image data used analyze standing dead and down dead in past wildfires was not available for the large wildfires that occurred in 2011 and 2012. Instead, potential areas for heavy continuous concentrations of dead fuel were determined using fire severity mapping. Severity class 3 and 4 areas were identified as likely to have extensive mortality that will become heavy concentrations of dead fuel in 5 -7 years."

Much of PRC has scattered woodlands, but only the higher density areas have potential for significant resource damage. Both of these conclusions have the potential to affect PRC resources in areas of higher density and recent burns. As was used in the Ashland work, LANDFIRE vegetation data from 2008 was used to determine stands with > 40% crown cover for the entire County. BAER (Federal Burned Area Emergency Response) data were used to determine areas in PRC that had severity class 3 and 4 (moderate to severe) for 2011 and 2012 fires.

These two layers were added to find areas that had significant crown cover (with attendant high fuel loadings) and that were burned to essentially standing dead, which estimate the area where significant reburn and fire fighter safety concerns due to dead fuels. These results only apply to

the 2011 Mill Creek Fire and the 2012 Ash Creek, Taylor Creek, and Dutch fires, but these make up almost all the burned acreage in that time period.

The two layers were subtracted to find where remaining high density stands occur in PRC both inside and outside 2011-2012 fire perimeters. They are almost entirely on USFS lands within the Forest Boundary (Figure 12).

On a County-wide basis the only significant high density stands are in the northwest part of the County, even though other areas of the County contain woodlands. Figure 12 shows both hazardous areas for reburn for 2011-2012 fires and remaining high-canopy forest for all ownerships. Almost all reburn and high-canopy stands occur on USFS lands north of Highway 212. This is also the area where significant remaining potential crown fire stands occur. Total reburn potential is 13,150 acres. This estimate is probably a minimum, since reburn potential for fires earlier than 2011 was not analyzed here. Total remaining high-canopy area is 22,729 acres, which does reflect earlier fires.

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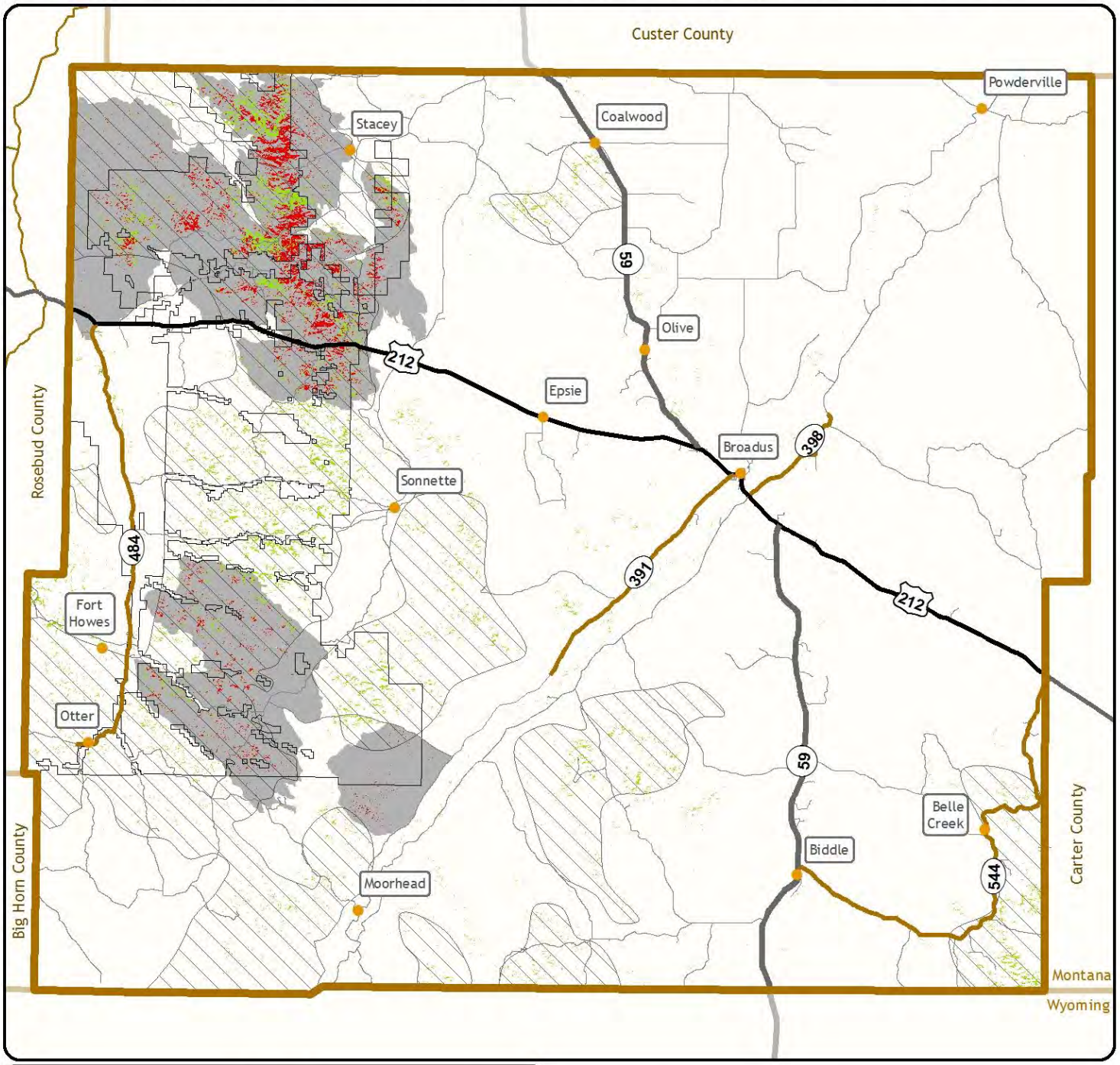
Powder River County, Montana Community Wildfire Protection Plan 2016: Present Wildfire Crown Fire and Reburn Potential from Fires in 2011 and 2012



Legend

- Powder River County Boundary
- Towns

Roads

- US
- MT
- Secondary
- County Roads
- Other County Boundary
- USFS Boundary

- Reburn Potential: high canopy cover forest and moderate to severe burn in 2011 and 2012
- Crown Fire Potential: remaining high canopy cover forest after 2011 and 2012 fires.
- Woodlands
- Mill Creek, Ash Creek, Dutch, and Taylor Creek Fire Perimeters

This analysis was based on interpretation of satellite imagery using LANDFIRE, a federal program and BAER spatial data, a federal program for Burned Area Emergency Response. It is designed for planning purposes, and though it has been field checked it should only be used at scales less than 1:24,000.

Woodlands were created using aerial imagery.

N

0 5 10 20 Miles

1:550,000

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Figure 12. Map- Crown Fire and Reburn Potential

Forest Recovery

Vegetative recovery can help reduce future hazards in burned areas. Technically the high canopy burned areas are still forested vegetation types. However, climate change and other factors may reduce this potential (Scott Studiner, USFS, personal communication). In Figure 13, photos A and B are of the 2012 Ash Creek Fire, showing prior the fire and post fire after just a few years. The point is that with the standing dead and intermingled green, there is an appearance of canopy that satellite imagery and aerial photography still pick up on. It still appears forested. However, C and D are of the Stag Fire of 2000. Photo C shows post four years after the fire, and D is 15 years, which appears to be still non-forest. Most of the Ash Creek Fire may look like this, but it is hard to picture now, either in person, by imagery, or photography. There may be significant increases in grass and shrub production in all USFS burned areas.

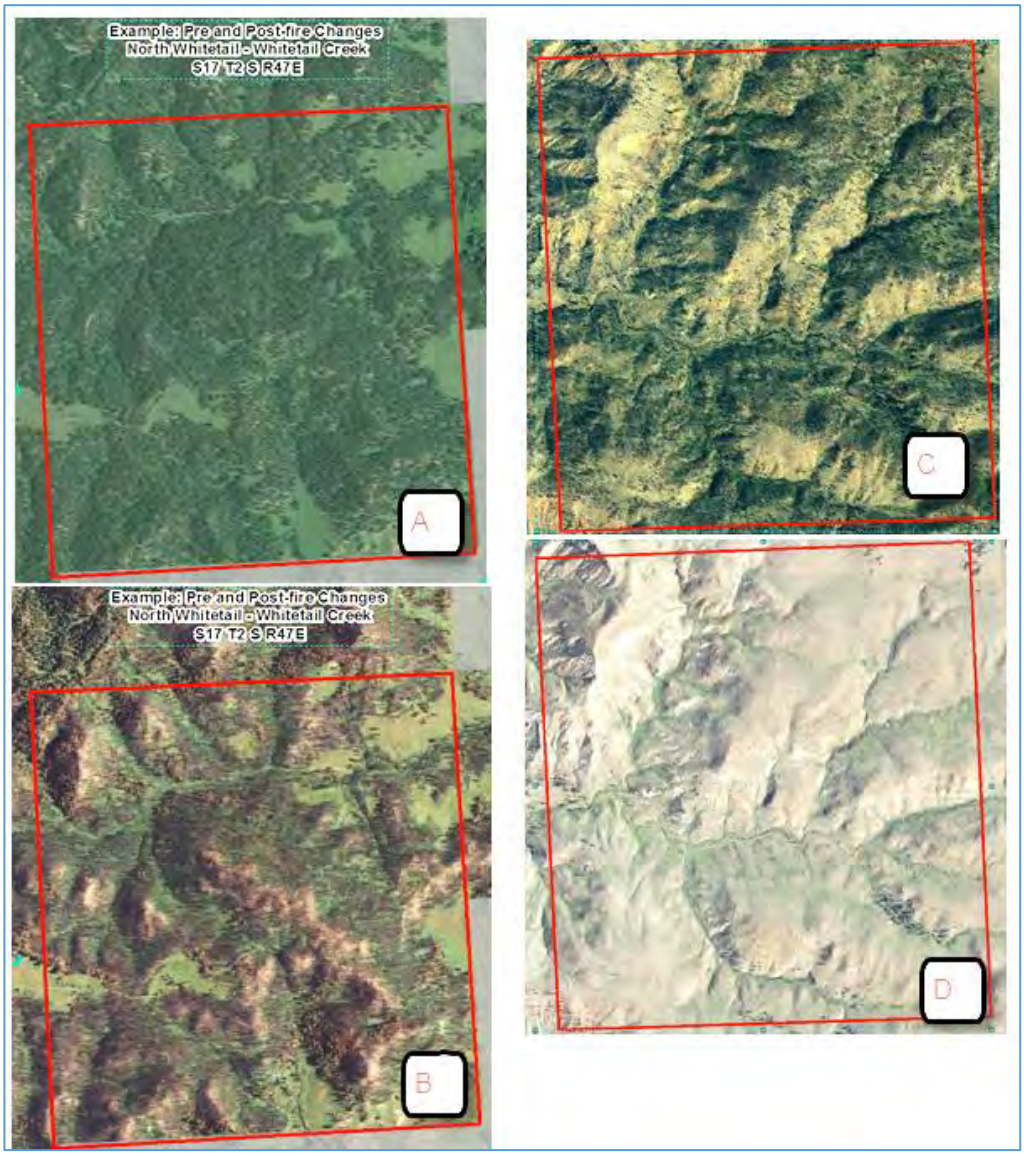


Figure 13. Aerial photos of Burn Recovery in Powder River County.

3. Values at Risk and the Wildland Urban Interface

As defined here, wildfire risk is a combination of the chances of occurrence (as discussed above) combined with the values that may be impacted. High wildfire potential may engender little risk if there are few or no values in the area, and if values are not affected, a wildfire may be of little risk. Therefore, in order to best reflect wildfire risk, it is necessary not only to evaluate wildfire probability (the chances of a wildfire and its extent), but also what values may be affected by wildfire. PRC has both areal and infrastructure resources and values that may be affected.

a) Infrastructure

Infrastructure values include structures, oil and gas fields, roads, towns, cell phone towers, radio repeaters, fire lookouts, and traffic on the heavily-traveled highways 212 and 59 (Figure 14).

There are 773 recorded structures in the County. Broadus itself has about 117 residential and commercial structures, with at least an additional 494 occupied structures outside of Broadus. These are primarily ranch or farm steads with some isolated second homes or rural residences. Biddle and Otter are the only unincorporated towns of any size with 473 occupants in 2007. There are likely less residents there now due to oil and gas and coal mining reductions.

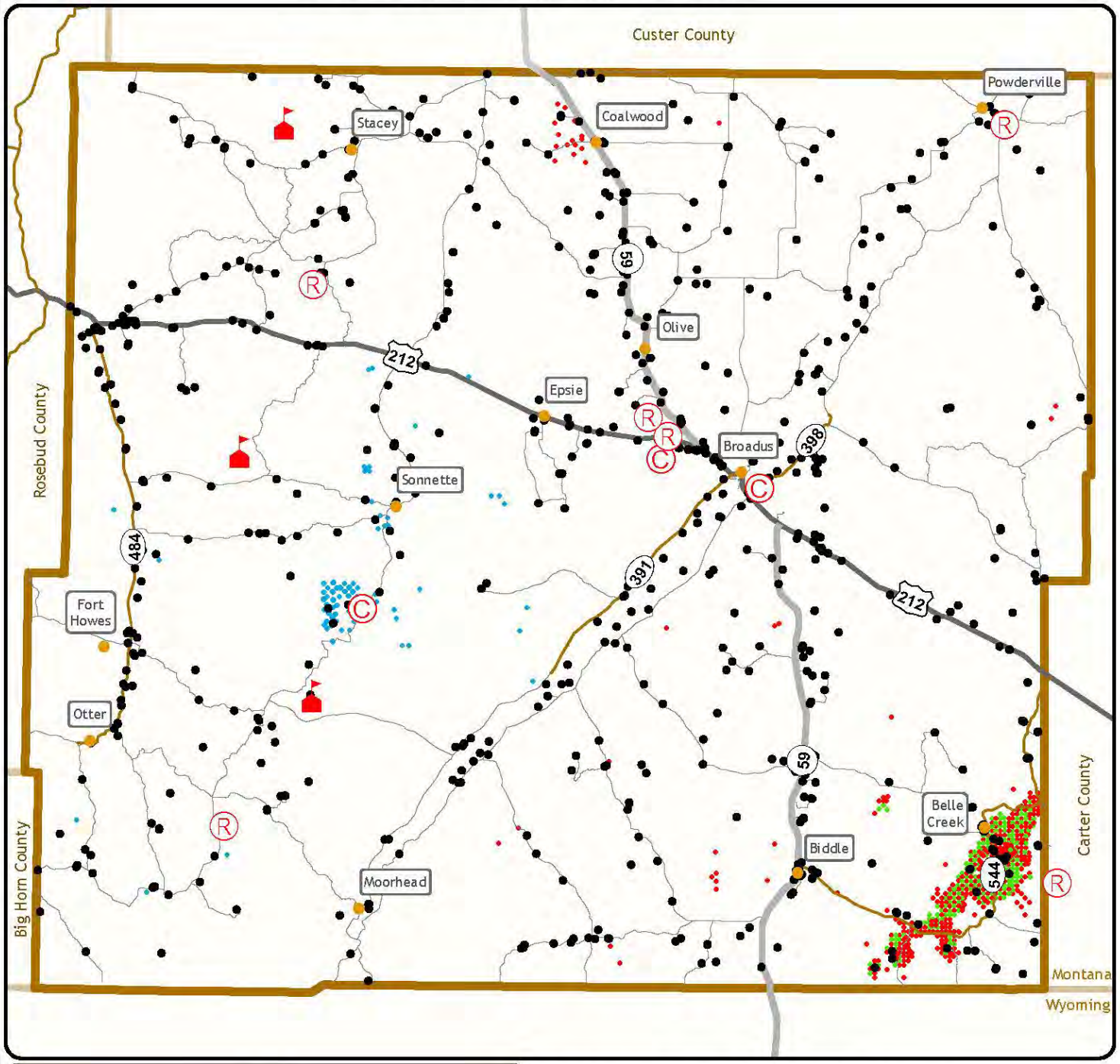
Of the 1,466 extractive wells in the County, most are abandoned or capped. There is an oil and gas field near Belle Creek (SE corner of PRC) that has about 646 oil and gas (55 producing) and 139 active injection wells. Twenty-six gas or dry hole wells are near Coalwood. There are 151 test wells in a grouping east of Fort Howes, but these are likely inactive.

There are dozens of inactive mines in the County (Powder River County, 2012). However, the potential large coal mine at Otter is not likely to develop in the near future.

There are about 200 miles of paved highways in the County, with about 66 miles being the heavily-travelled US 212, the main transport route. There are about 1000 miles of unpaved County roads, and about 850 miles of USFS roads within its boundaries.

There are six radio repeaters with two co-located near Broadus. There are three cell phone towers, with one co-located with the radio repeaters near Broadus. Petroleum product pipelines cross the County, but are not mapped.

Powder River County, Montana Community Wildfire Protection Plan
2016: Values at Risk - Infrastructure



Legend

- County Boundary
- Cell Tower
- Lookout
- Radio Repeater
- Towns
- Structures

Roads

- US
- MT
- Secondary
- County Roads
- Other County Boundary

Oil and Gas Wells

- Coal Bed Methane
- Gas; Oil
- Injection - Disposal; Injection, EOR

Infrastructure Values at Risk include structures, oil and gas fields, roads, towns, cell phone towers, radio repeaters, fire lookouts, and traffic on the heavily-traveled highways 212 and 59.
Note: not all structures are inhabited.
Pipelines cross the County, but are not mapped.

There are six radio repeaters with two co-located near Broadus. There are three cell phone towers.

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Figure 14. Map- Values at Risk (Infrastructure)

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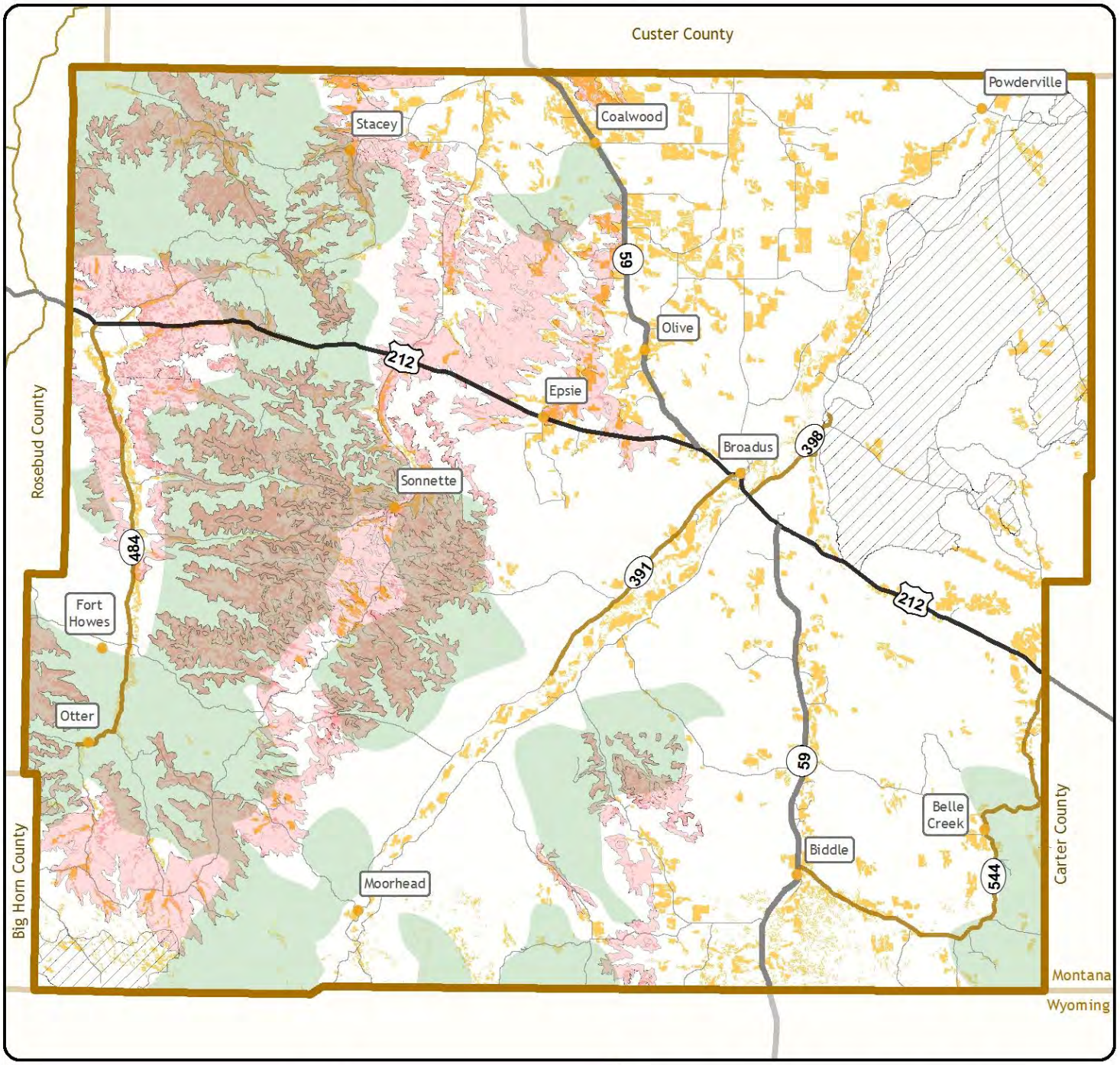
b) Natural Resources

PRC, though rural in nature with scattered infrastructure values, has significant areal values that may be at risk to wildfire (Figure 15). Specifically, over 151,000 acres are in high value pasture, crops, or hayland (from Montana Natural Resource Information Center in 2015). A significant area is forested, primarily in low-density ponderosa pine with low commercial value, though denser stands occur on National Forest lands. Of the 2,110,000 total acres in the County, about 1,4,10,182 are grasslands or shrublands, which are extensively utilized for grazing.

There are significant coal reserves in the County (Figure 15). Though these are not at high risk from wildfire, where exposed they may contribute to wildfire starts.

The BLM has three critical priorities in its fire programs. These are Life, Property, and now Sage Grouse. They are concerned about preserving habitat in Core Areas (BLM, 2015). The State of Montana has also made this a priority (State of Montana, 2014). Landowners now burning off sage in those areas may be creating a future problem by reducing habitat. This, in turn, may result in listing under the Threatened and Endangered Species Act, which will significantly increase restrictions on land use. Sage grouse core habitat makes up 179,841 acres (9%) of the County. These core areas are shown in Figure 15. Though most of these lands are either in state or federal (BLM) ownership, there are significant private lands within them (compare Figure 15 with Figure 8, Page 28– ownership). Wildfire on these lands may affect the sage grouse status and land owner management options. Forest Service lands in the County have low potential for Sage Grouse.

Powder River County, Montana Community Wildfire Protection Plan
2016: Values at Risk - Areas



Legend

- Powder River County Boundary
- Towns
- **Roads**
  - US
  - MT
  - Secondary
  - County Roads
- Other County Boundary
- Woodlands (mostly low density)
- Pasture, crops, haylands
- Grazing -grasslands and shrublands
- Core Area - Sage Grouse
- Coal Fields

Areal values at risk include Sage Grouse Core Habitat, cattle, grazing on grassland/shrublands, cropland, coal fields, and unburned forest land.

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Figure 15. Map- Values at Risk (Areas)

c) The Wildand Urban Interface (WUI)

The values at risk described above may not be at equal risk from wildfires. The "Wildland Urban Interface (WUI) is an area that being adjacent to forested vegetation general has a higher risk. The term WUI refers to the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Communities adjacent to and surrounded by wildlands are at varying degrees of risk from wildfires (NWCG, 2014).

A WUI fire situation exists anywhere that structures are located close to natural vegetation. A fire can spread from the vegetation to structures or vice-versa. A WUI can vary from a large housing development adjacent to natural vegetation to a structure(s) surrounded by natural vegetation. The two general categories of WUI are:

> (1) Boundary WUI means an area where a clearly defined, linear boundary of homes meets wildland vegetation. Typically, this sort of interface is on the fringe of large towns.
>
> (2) Intermix WUI means an area where structures are scattered among or mixed with wildland vegetation, without a clearly defined boundary. Typically, the intermix WUI is in rural areas where people have subdivided wildlands into small parcels of 1 to 40 acres. (Montana DNRC, 2009)

The WUI in the existing PRC CWPP plan is defined as follows:

> "While some areas of Powder River County were identified as At-Risk Communities in the January 4, 2001 Federal Register notice, Wildland Urban Interface Communities Within the Vicinity of Federal Lands That are at High Risk from Wildfire, other areas were not identified at that time. These communities fit the Healthy Forest Restoration Act definition of an At-Risk Community as 'a group of homes and other structures with basic infrastructure and services within or adjacent to Federal land *and* in which conditions are conducive to a large-scale wildland fire disturbance event *and* for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.' Consequently, for the purposes of this fire planning project, all private land within or adjacent to the Ashland Ranger District, Custer National Forest is considered wildland urban interface or WUI for Powder River County. WUI's are also identified as areas adjacent to lands managed by the BLM although most of these are scattered, smaller units that do not have the extent of forested vegetation. "(PRC, 2004)

For the purposes of this plan, this definition is used for part of PRC's WUI. It is calculated on a per-land parcel basis. Areas adjacent to BLM managed land are not used here, because of their scattered nature and the lack of forested vegetation.

The State of Montana has further mapped the WUI since this plan was written (DNRC, 2011). This definition emphasizes a buffered distance from major roads, (again on a land parcel basis) recognizing the importance of travel and evacuation routes and the higher number of structures along these major roads. Structure concentrations on County roads and near Belle Creek were also recognized.

Both these definitions were combined to create the updated WUI map for PRC. WUI's for Powder River County are identified on Figure 16. There are 554,387 acres of WUI in total, about ¼ of PRC. This appears to be quite large for a County with a population of only 1,700, but it actually reflects the rural, scattered nature of residences and other structures in the County.

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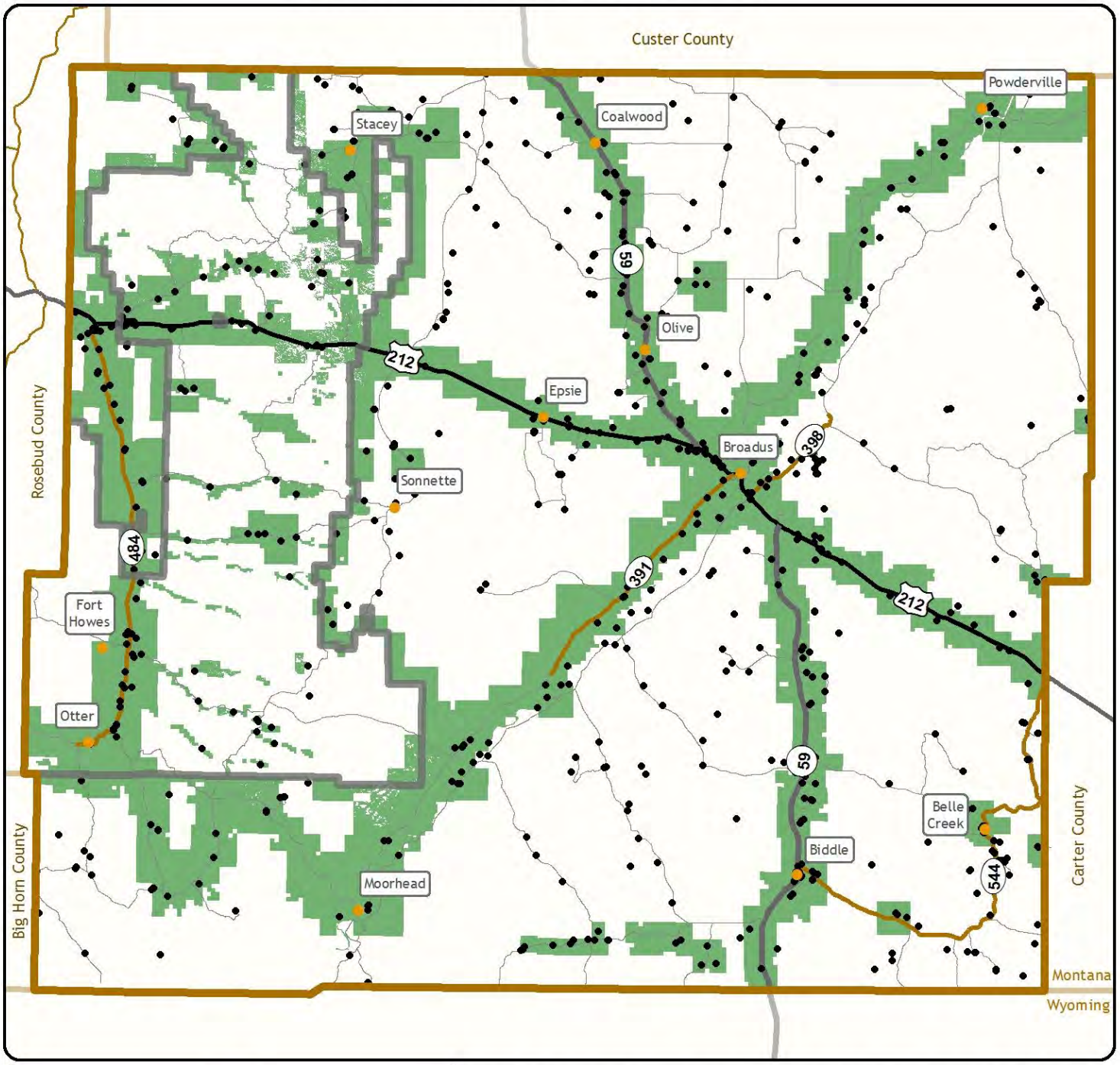
Powder River County, Montana Community Wildfire Protection Plan
2016: Wildland Urban Interface (WUI)



Legend

- Powder River County Boundary
- National Forest Boundary
- Towns
- **Roads**
  - US
  - MT
  - Secondary
- County Roads
- Other County Boundary
- 2016 WUI
- Structures

The WUI was created using State of Montana and PRC data.

Figure 16. Map -County Wildland Urban Interface

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4. FIRESAFE, Structural Ignitability, and Homeowner Preparedness

> "To be 'Fire Safe' is much different than to be 'fire proof'. Trees and homes in the woodlands will always burn under the right [or perhaps wrong] conditions because they are not 'fire proof'. Just because a home isn't technically 'fire proof' doesn't mean that it's never safe to live in a wooded community, if proper attention to given to the risks that wildfires present. To be 'fire safe' means to be aware of the risks that wildfires pose to homes in the woodlands, and to take the steps necessary to live safely in a wooded environment." (http://firesafemt.org/wp-content/uploads/2015/02/WHAT-DOES-IT-MEAN-TO-BE-FIRE-SAFE.docx)

Nearly all PRC residents live in rural areas that could be impacted by wildfire. Some live close to forests which have potential for large fires. Many residences are not only homes, but form the basis for the business of ranching and farming. Keeping their assets safe from fire is more than fire suppression and prevention. It is also making their investments safer from the fires that will likely come.

FIRESAFE Montana (http://firesafemt.org/) is a private, non-profit organization coordinating and supporting a statewide coalition of diverse interests working together to help Montanans make their homes, neighborhoods, and communities fire safe.

As part of a grant from the FIRESAFE program, the Broadus Volunteer Fire Department gathered 494 individual structure assessments to help evaluate and mitigate wildfire risks to the community. Each assessment includes 52 individual fields with detailed data on the structural ignition zone (roofs, vents, gutters, windows, siding, etc.); attachments such as decking and wood storage; the landscape ignition zone (vegetation and its location); topography (slope, landscape position, etc.); relationship to other non-mitigated structures and vegetation; and access and addressing. These data were in paper format, and were made electronic for use in improving fire safety in the County (Shovic, 2016; unpublished report).

FIRESAFE risk was evaluated by rating the number of numerical structural, attachments, landscape, topography, and access issues in for each assessment address (Table 5). In terms of structural ignitability, Moderate and High risks make up about 20% of the rated homes in the County (Table 5). Much more detail is available in the FIRESAFE data, and can be analyzed easily if necessary.

Table 5. Ratings of FIRESAFE Evaluations for Powder River County

Class	#	% of Total
VL	156	32
L	122	25
M	115	23
H	68	14

VH	33	6
Total	494	100

In terms of homeowner preparedness, Fire fighter and other emergency response is dependent on good access roads and legible addressing. Forty structures (9% of the total) have poor access to the property. One hundred seventy-three structures (24% of the total) have inadequate or missing addressing. These are items homeowners can directly control.

The above risks are displayed in Figure 17, with specific problems with access and addressing separately symbolized. When displayed over the Wildland Urban Interface (WUI), one can see some areas that have high ignitability risk, poor access, and lack of addressing, for example, near the Town of Biddle in SE PRC, and on the eastern side of the County on Highway 484.

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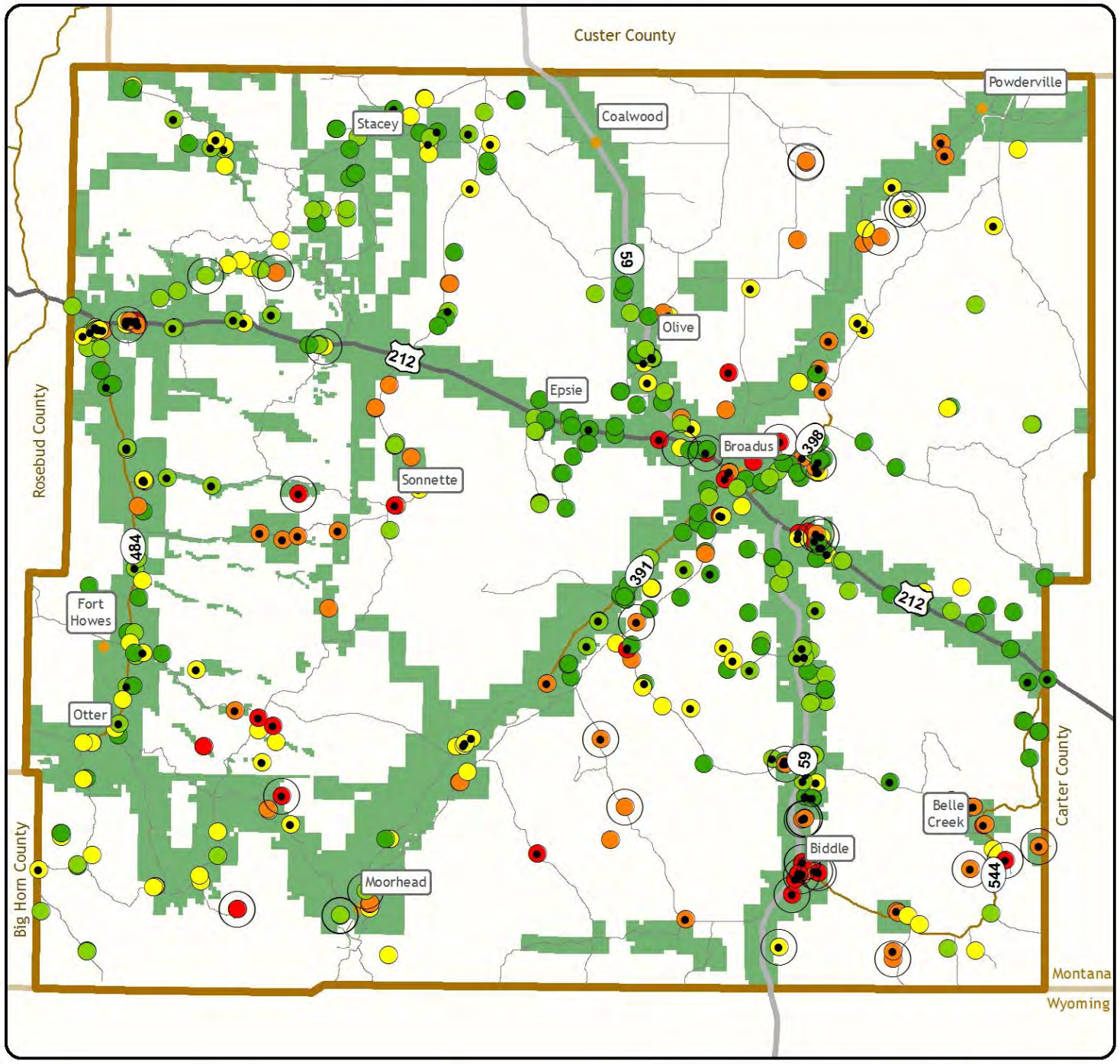
Powder River County, Montana Community Wildfire Protection Plan 2016: FIRESAFE Structure Evaluation



Legend

- No Address Sign
- Towns
- Poor Access

Roads
- US
- MT
- Secondary
- County Roads

FIRESAFE risk
- Very Low Risk
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

- Powder River County Boundary
- Other County Boundary
- 2016 WUI

FIRESAFE Structure evaluation data are described in the report "Powder River County, Montana FIRESAFE Data Input and Integration" by Henry Shovic

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Shovic Associates, LLC

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Figure 17. Map- FIRESAFE Structure Evaluation

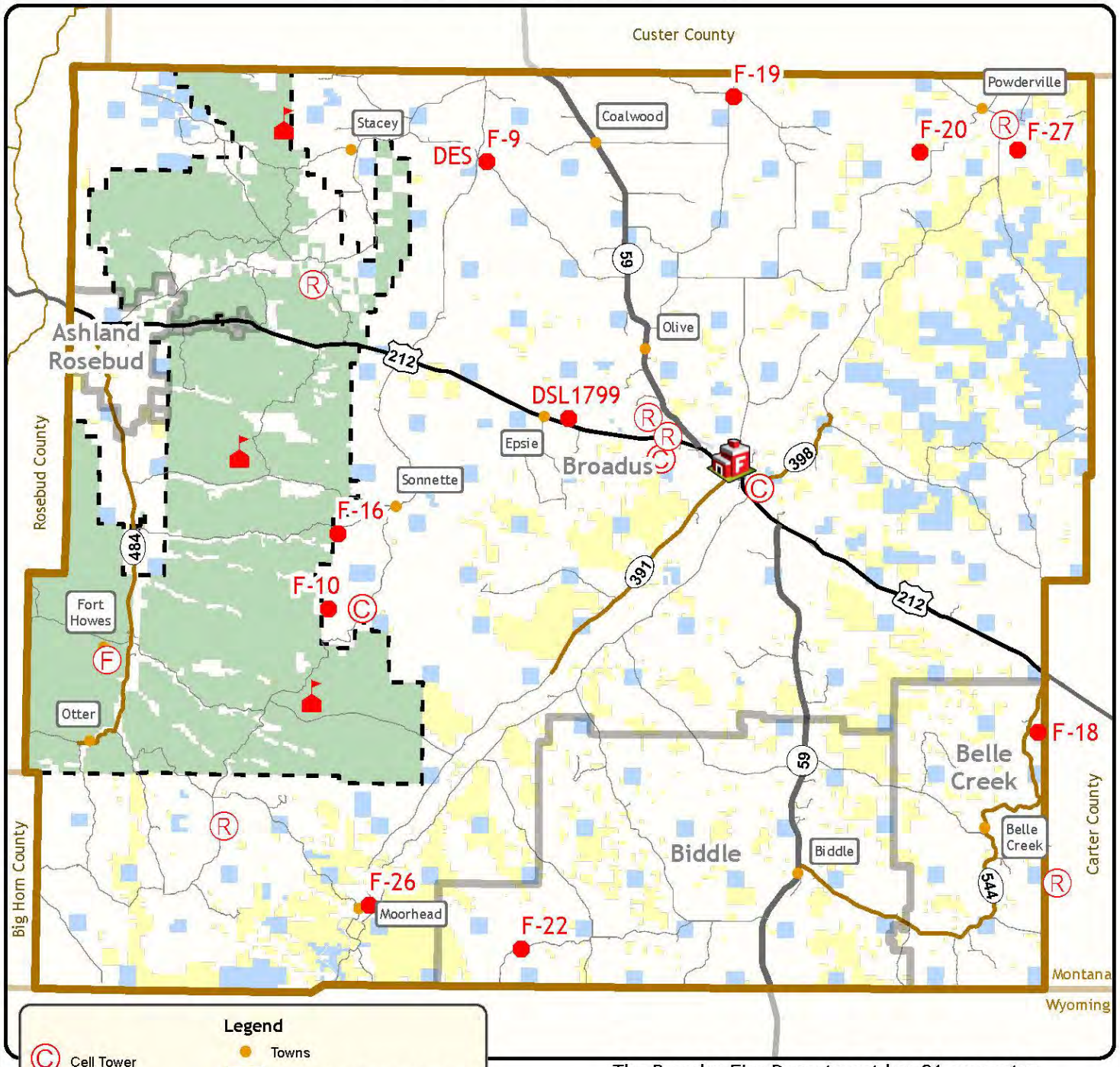
C. Wildfire Preparedness Assessment

The Fire Protection Organization

A variety of agencies deliver fire protection to the County. Bureau of Land Management (BLM) is responsible for fires on federal lands (including USFS lands). The State Department of Natural Resources and Fire Department Conservation (DNRC) provides two engines at ranches, as well as training and assistance as requested (DNRC, 2011). The County is responsible for all fires on private or State lands. There is a 24-hour Mutual Aid Agreement with DNRC for initial attack on any incidents that exceed the County's capacity (DNRC, 2012).

Figure 18 shows the County wildfire response situation. Besides the Broadus Fire Department, there are three all-volunteer Fire Districts in PRC (Biddle, Belle Creek, and Ashland Rosebud). Biddle has one wildand engine. Belle Creek has equipment provided by oil companies, as well as the County. The Ashland Rosebud District has no PRC apparatus, but gets mutual aid from the Ashland Fire Department and La Brae in Rosebud County. There is one Forest Service wildland engine at the Ashland District, west of the County.

Powder River County, Montana Community Wildfire Protection Plan
2016: Wildfire Response Situation



The Broadus Fire Department has 21 apparatus at the Broadus Fire Station and 11 satellite fire units with engines. There are six radio repeaters with two of those co-located near Broadus. There are three rural fire Districts. There is also a Bureau of Land Management (BLM) unit at Fort Howes. There are four lookouts (one outside County) and three cell towers. Initial attack responsibilities are:

National Forest and BLM lands: BLM

State and Private lands: County Fire Districts

Department of Natural Resources (DNRC) resources are available on request.

Figure 18. Map- Wildfire Response Situation

5 10 20 Miles

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Equipment

The Broadus Department is the largest and central to the County. It is an all-volunteer department and provides all structural fire protection for the town of Broadus, and through an agreement with the County, wildand and structural protection for Broadus Area. Most large-scale responses for wildfires comes from Broadus. There are two fire stations in the town. Equipment available there is listed in Table 6, including 10 wildfire engines, two tenders, six structural apparatus, and three Command and Search and Rescue vehicles. They are currently upgrading fire hydrants in Broadus.

Table 6. Fire Equipment Available in Broadus

Fire Equipment at the Town of Broadus, MT (2016)			
2 F-6	1992 Chevy K30 4x4	Grass Land, Type 6, 300gal, Foam	9-129
3 F-7	1992 Ford F350 4x4	Fast Attack, Type 6, 300gal, Foam	9-109
4 F-8	1993 Ford F350 4x4	Grass Land, Type 6, 300gal, Foam	9-161
7 F-11	2004 Chevy Tahoe	Command, Search&Rescue, Chase Rig	9-01797A
8 T-12	1986 White 6x6	Structure/Tender, Pump& Roll1200gal, Foam	DNR1133
9 F-13	2002 Honda 4Wheeler	25gal, Search& Rescue,Grass Land	PERM
10 F-14	2002 Honda 4Wheeler	25gal, Search& Rescue,Grass Land	PERM
11 T-15	1980 Ford F600	Tender,1000gal, Porta Tank,Fioating Pump,2 Porta Pump	9-112
13 F-17	1995 Ford F350 4x4	Grass Land Type 6 300gal Foam	9-172
14 Rescue	1979 Chevy K30 4x4	Jaws of Life,Hazmat,Rope Rescue,Generator	9-116
15 Chase	1995 Ford F250 4x4	Command, Search&Rescue, Chase Rig, Trailer Puller	9-164
16 LEPC	1987 Ford E350 Van	Hazmat,Chem Suits,Mass Cass,Gen,Radio Cache	9-102
17 Engine 1	2006 Sterling	City Pumper,1200gal,Foam,Generator,Pump&Roll	9-166
18 Engine 2	1972 Ford F750	City Pumper,1000gal	9-132
19 Engine 3	1967 Chevy C50	City Pumper 500gal	9--20
23 DSL1902	2010 550 SuperDuty	Grassland, 500gal, Foam type 5	DNR 1902
24 DSL 1978	2012 550 SuperDuty	Grassland, 500gal Foam type 5	DNR 1978

Fire Equipment at the Town of Broadus, MT (2016)			
28 T-21	2011 Freightliner	Tender,2000 gal,Porta tank,Porta Pumps	9-01131A
30 F-24	2002 Ford F-350 4x4	Grassland 300 gal, Foam type 6	9-01794A
31 F-25	2013 550 SuperDuty	Grassland 500 gal, Foam type 5	9-01795A
34 Rescue N	2015 550 SuperDuty	New Rescue Truck	9-02868A
35 Generator	30Kw Onan	Station 2	
36 Generator	20Kw Onan	Station 2	
37 Hall; Generator,Base Radio,MRE's,Water, ETC.			
38 12 Volt Portable Repeater @ Station 2			

Remote PRC and DNRC units are located at strategic points around the county, primarily on ranches. Table 7 describes these apparatus, and Figure 18 (Page 55) shows their location. They are staffed by local volunteers.

Table 7. Satellite Fire Units for Powder River County Fire Departments

Latitude	Longitude	ID	Description
45.710683	-105.723933	F-9	1970 Chevy K20 4x4 Grass Land, 225gal, Foam Hagedorn 9-169
45.32425	-105.9131	F-10	1974 Ford F250 4x4 Grass Land,225gal, Herman 9-160
45.389367	-105.902433	F-16	1980 Dodge W400 4xGrass Land Type 6 300gal Dennis Lyda 9--71
45.710683	-105.723933	DES	1968 Jeep 4x4 Grass Land, 225gal Hagedorn 9-110
45.72135	-105.191967	F-20	Grassland, 225gal, Dave Jurica
45.490383	-105.621083	DSL1799	2008 450 SuperDuty Grassland, 300gal, Foam type 6, Lester Aye DNR 1799
45.2217	-105.045883	F-18	Skid 225gal Skid Unit Red Tank Barbero's
45.7685	-105.4213	F-19	Skid 225gal Skid Unit, Foam Black Tank, Foam, Russiff
45.032933	-105.673917	F-22	1984 Ford F-250 4x4 Grassland 250 gal Matt Hubbard 9-01236A
45.069583	-105.858867	F-26	Skid 225gal Skid Unit Red Tank Fulton's
45.72295	-105.072133	F-27	Skid 225gal Skid Unit McGill

The BLM has stations in Fort Howes (in PRC) (Figure 18, Page 55), and in towns surrounding PRC (Jordan, Miles City and Ekalaka), and Camp Crook South Dakota. There are nine engines, one helicopter, and two single engine air tankers (SEATs) available on short notice. A runway is located near Broadus.

There are four fire lookout stations in or near PRC (Figure 18, Page 55) on USFS lands. These are Diamond Butte, Yeager Butte, and Liscom Butte in PRC, with Poker Jim (not shown) west of Fort Howes in Rosebud County. Two are staffed.

Water Sources

PRC is a semi-arid landscape, and reliable water sources are uncommon. No fire water sources have been developed outside of Broadus (which has a fire hydrant system). Tenders are kept at Broadus for structural fire and wildland support. The Fire Department also has cooperation from the County Road Department, which will contribute tenders (water trucks) as needed and as available. Sometimes these are located remotely, so can be available with reasonable response times.

Numerous ranches and farms have maintained water sources, such as stock tanks. The FIRESAFE evaluations show that in terms of structural protection in a wildfire situation, only 6% of evaluated structures have inadequate water supplies near the structure. Most remote structures are ranch and farmsteads, so often have truck mounted spray units which they also use for local wildfire suppression.

Staffing

The Broadus Fire Department has a complement of 28 volunteers. For structural fires and highway accidents there is generally adequate response. However, for wildand response, because of the long travel times, off-road locations, and common overnight requirements, but sometimes mean only one or two firefighters might be able to respond.

Communications

With the increasing use of cell phones and installation of towers in the County, coverage has improved since 2004. There are three cell towers (Figure 18, Page 55). With the exception of the area near Biddle in the SE part of the County, cell access is adequate, though sometimes not in low areas. In these areas coverage generally can be obtained by moving to ridgetops. Cell service is supplemented by towers in Carter County and in Wyoming. Radio service is also adequate, except for the area near the Moorhead road in the southwest part of the County.

Fire paging has been recently upgraded to a cell-based system using smartphones. The Bureau of Land Management Miles City dispatch office is well integrated with PRC dispatch and fire paging. “Reverse 911” systems have been reviewed for rapid updates in an emergency.

IX. Values at Risk and Recommended Mitigation Activities

Values at risk to wildfire are where values intersect areas with wildfire potential. Where these values coincide with the issues and objectives of our plan determines our mitigation recommendations.

A. Fuels Mitigation in the Wildland Urban Interface

In 2004 the PRC Fire Plan identified the need for fuels reduction in the WUI (Powder River County, 2004), particularly near USFS lands. Since then, the fires of 2011 and 2012 have made this need more urgent and with the advent of better data and modern technology, they can be located. The present analysis narrows this down.

Woodlands areas with reburn potential and remaining densely-forested areas are shown on Figure 12, Page 39. These areas have potential for increased hazards. Values that may be affected were captured by the Wildand Urban Interface (WUI) delineation (Figure 16, Page 49). Reviewing these two maps, it is apparent that the values at risk of wildfire are concentrated in an area north of Highway 212, in the NW part of the County.

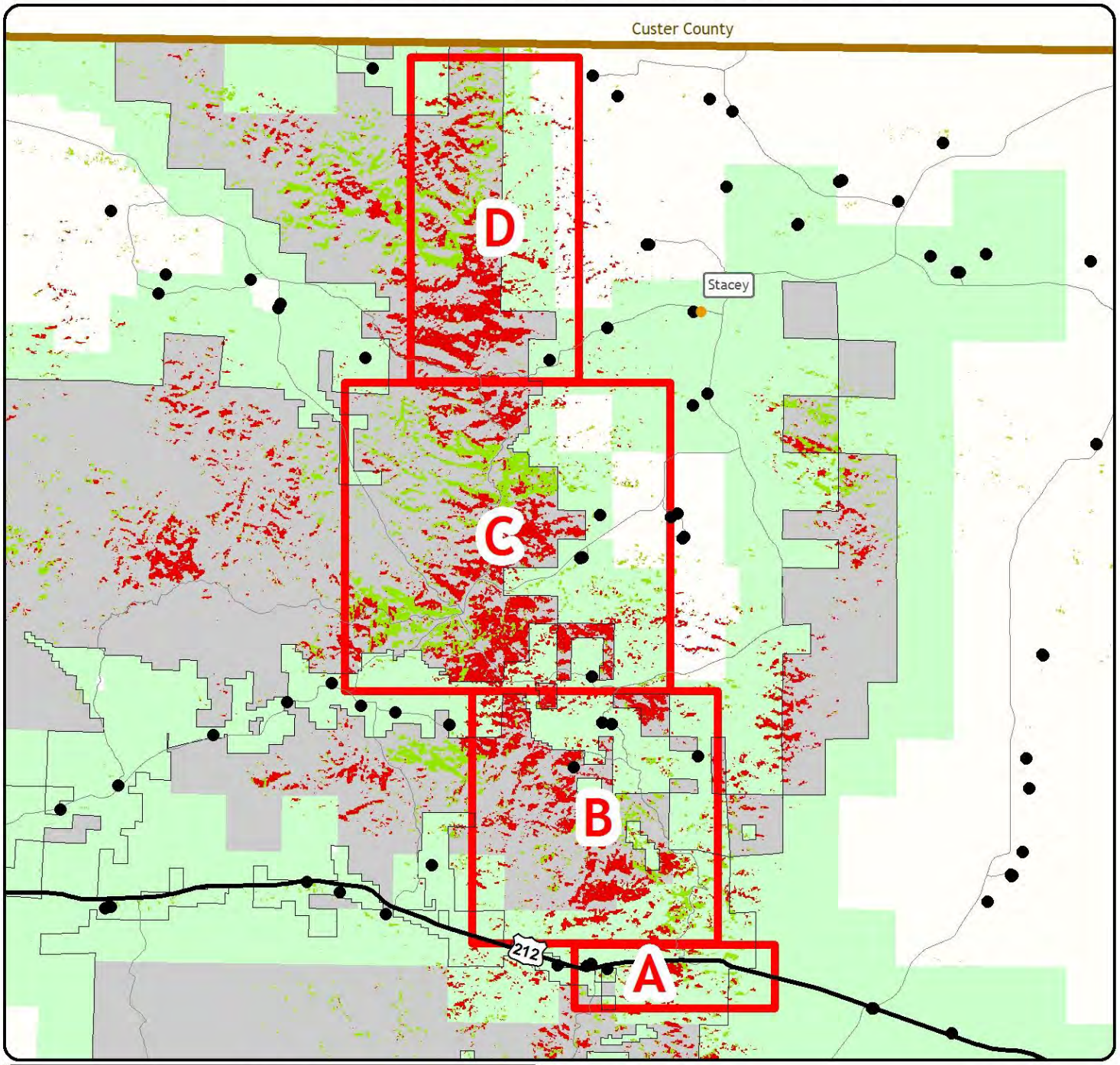
Values at risk do not just include residences. Grazing lands, farm lands, highways, and coal seams may also be at risk. Presence of infrastructure (residences, farm and ranch operations, pipelines, power lines and USFS facilities) can be used to further refine these potential areas. This is beyond the scope of this plan, but should be considered when doing more detailed planning in cooperation with the USFS. See Figure 19 for an example of structures potentially at risk.

Figure 19. Aerial image of structures at risk (scale about 12,500)

These areas at risk are mapped in Figure 20. They are the specific areas where fuels reduction on Federal lands could benefit County resources and population. They may not reflect USFS priorities relating to their long term objectives. However, they are recommended for consideration from the County perspective in terms of values and risks to those values.

Area A has the main highway 212 corridor, which is a main route for travel, evacuation, and emergency response, near the Suicide Pass Road and Three Mile Road. Area B includes the Trail's End and Suicide Pass Road including the East Fork of Little Pumpkin, Cabin, and Wilbur Creeks. Area C contains the Beaver Pumpkin Divide Road, including the West Fork of Little Pumpkin Creek, north of the Little Pumpkin Creek Road. Area D is the Liscom, Gaskill, and Split Rock Creeks area, north of the Beaver Stacey Road.

Powder River County, Montana Community Wildfire Protection Plan 2016: Potential Fuels Reduction Areas in NW Powder River County



Legend

- Powder River County Boundary
- Structures
- Towns
- Roads
  - US
  - MT
  - Secondary
  - County Roads
- 2016 WUI
- WildfireRiskAreas070716
- Reburn Potential: high canopy cover forest and moderate to severe burn in 2011 and 2012
- Crown Fire Potential: remaining high canopy cover forest after 2011 and 2012 fires.
- USFS Land

This analysis was based on interpretation of satellite imagery using LANDFIRE, a federal program and BAER spatial data, a federal program for Burned Area Emergency Response. It is designed for planning purposes, and though it has been field checked it should only be used at scales less than 1:24,000. Wildland Urban Interface was created for the County Fire Plan. Rectangles show potential fuel reduction areas.

N

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Figure 20. Map- Potenti Fuel Reduction Areas

B. Structural Ignitability and Homeowner Preparedness in the WUI

Figure 17, Page 53 shows the distribution of structural ignitability for inhabited structures in the County. Though there are numerous structures at risk in the County, there are also 311 structures within the WUI, with 71 in the high or very high structural ignitability category.

Furthermore, comparing Figure 17, Page 53 (structures) with Figure 12, page 39 (reburn and crown fire potential) shows there are 54 structures at high risk for wildfire in the northwest section of the County (Figure 21). It might be beneficial to identify local structural risks using the FIRESAFE data and encouraging and assisting these homeowners to prepare for wildfire.

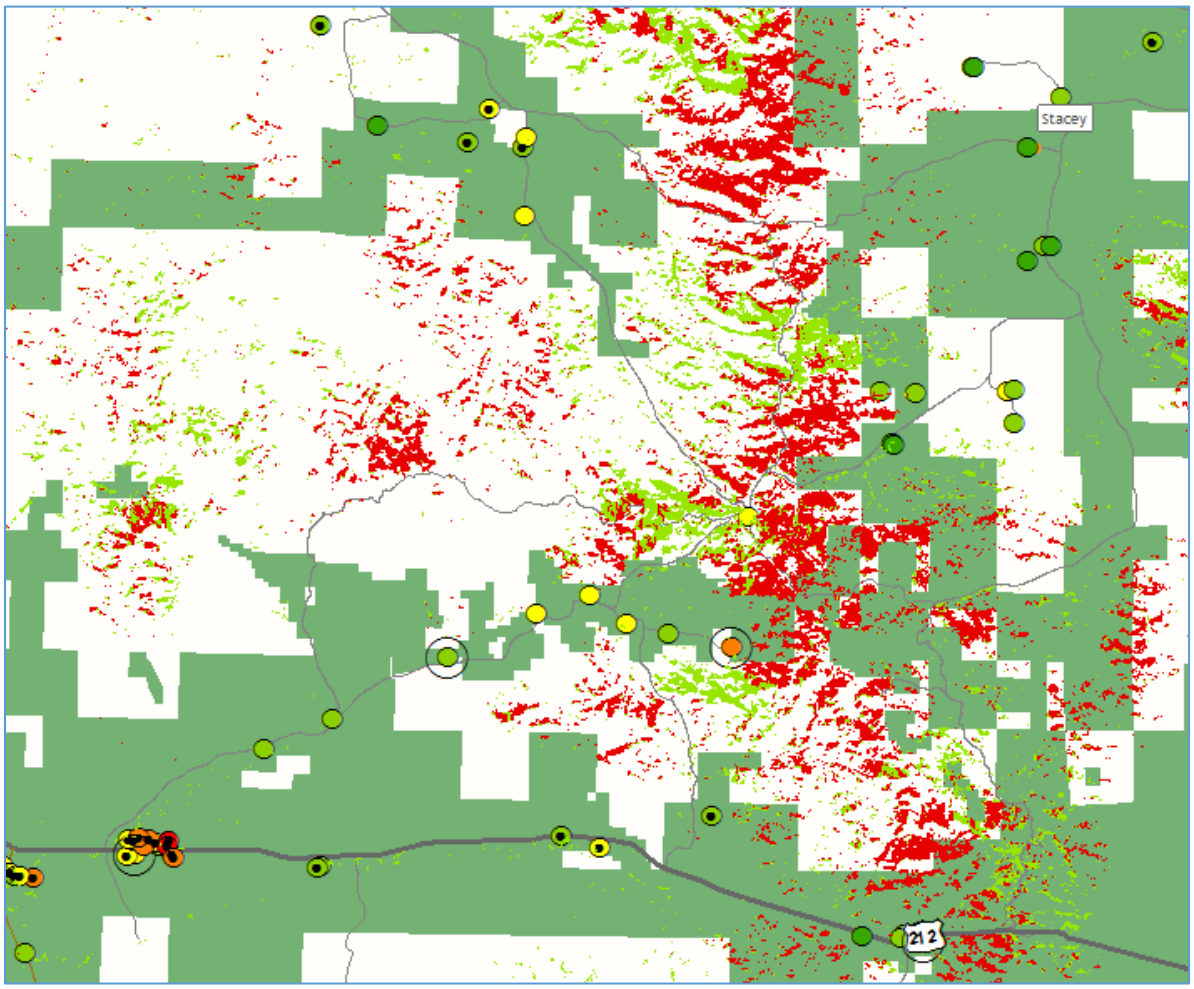

Figure 21. FIRESAFE results with WUI and Wildfire Risks in NW Powder River County

Outside of this critical area, residence preparedness could still be improved (Figure 17, Page 53). A County-sponsored addressing program, community education, and possible financial assistance are recommended for residents throughout the County.

PRC has a relatively low growth rate. However, there are occasionally new developments proposed in the western part of the County. Use of WUI development guidelines would be beneficial for any new subdivisions or communities proposed in that area (DNRC, 2009). These guidelines address specific development criteria, suggested zoning regulations, potential financial assistance, and homeowners' guidance.

C. Wildland Fire Prevention

In addition to ongoing fire prevention programs, the issue of coal seam fires, both as ignition sources for wildfires, and a resultant of wildfires are a major concern. Coal seams are common in the western side of the County (Figure 15, Page 45) and scoria (brick-like remnants of baked strata near coal seam fires) on that landscape (Figure 3, Page 21) appears to be consistent with a history of fires. Dozens of recent coal seam ignitions have been documented (Figure 7, Page 27). And these coal seams occur in the WUI and where re-burning or canopy fire is possible. Recommendations could include aerial patrols of the area, mitigation of burning seams, research on remote sensing of surface seam fires, and education of landowners, especially in areas near structures or other infrastructure.

Wildfire or even prescribed fire in Sage Grouse core areas (Figure 15, Page 45) may influence future management of this species on BLM or State lands. On any ownership, burning sagebrush may reduce habitat to critical levels, triggering potential Federal attention. Education of landowners is recommended to help avoid this potential restriction of management options on rangeland.

D. Wildland Fire Response

Historically, grassland and woodland fires occur throughout the County (Figure 7, Page 27). However, in the eastern part they are generally small in size, and don't pose an enormous risk to values. This is graphically displayed in ignitions (Figure 10, Page 33), and historical impacts (Figure 11, Page 35). This was also verified by 2015 data (Figure 9, Page 31). It is apparent the highest potential for catastrophic wildfire is in the western part of the County.

Wildand response units are well distributed across the County (Figure 18, Page 55). It appears that for the eastern part of the County, potential for catastrophic fires is low (based on vegetation (Figure 12, Page 39) and effective suppression response). However, the situation is very different in the western part. Additional response capability may be required in this area due to reburn potential and remaining dense forest. This may require additional support from BLM for USFS lands, and additional County support for private lands within the WUI near USFS lands. Evacuation and Refuge preparations may also need an increase. Fires on these lands may affect the entire County, burning power lines that serve Broadus, disrupting traffic on Highway 212, and causing a flood of displaced persons.

Wildfire response in the remainder of the County appears adequate, even with the long response distance for a Broadus-based response. Of course this is personnel dependent, with

only a few volunteers able to respond to remote areas. Fires in the southwest Districts may have been under reported in the past, but this is improving.

Water supply is apparently adequate, but is based on informal, private sources. The Broadus Fire Department has expressed concerns about water availability, so has taken steps to mitigate this problem, including gaining cooperation with the Roads department, maintaining Tenders, and using local, informal water supplies. The sources may need to be mapped and verified to help newer personnel or mutual aid responders use them in remote wildfire and structural situations.

Since the 2012 fires, The County has additional emergency services preparations. Some examples are:

- A fireline around Broadus has been excavated.
- The Broadus nursing home has a new generator; most ranches now have generators.
- Communications have been improved.
- Have a County Fire Warden now to facilitate resource availability and use, as well as assisting in enforcing burn bans and other fire restrictions.

While adequate firefighting equipment and apparatus is apparently available in the County, wildfires can put excessive demands on the few responders, and can affect response effectiveness. Volunteer recruitment, retention, and response should continue to be addressed.

X. Action Items

Our 2016 objectives were developed using the 2004 plan's objectives, issues brought up by our collaborators, and the situation analysis in this Plan. Recommendations from this analysis are translated below into action. Our 2016 objectives are listed below, with action items to address each of them.

A. Improve Prevention and Suppression

1. Prepare for the potential of another large wildfire event, based on the large 2012 fires and their impacts on the County, in terms of impacts on emergency services, housing, and cleanup.

There is a significant chance of another catastrophic wildfire in PRC. This will probably occur in the northwest part of the County. Significant values are at risk there not only because of remaining dense forest, but also potential for a reburn of fuels created during 2011-2012 and earlier. County fire emergency resources are well-distributed for fires around the County, but may not be optimally-placed for quick response in this area.

1) *Action item: Review needs in the NW for possible addition of suppression resources.*

2. Emphasize impacts on firefighter safety, on emergency services, temporary housing, and cleanup. Review communications systems.

Communication systems were reviewed. The present cell-based system appears adequate for fire emergency work, backed up by radio systems. Coal seam fire hazards, reburn potential in previously burned areas, and access through areas having blowdown are issues in safety. These hazards are addressed below.

3. Address the effects, future potential, and effective suppression of coal seam fires.

Coal seam fires significantly affect resources, fire-fighters, and wildfire starts. This is well documented by the BLM, PRC, and DNRC.

2) *Action item: Participate in on-going research in identifying active coal seam fires over the County, using remote sensing.*
3) *Action item: Investigate and staff for suppression of coal seam fires themselves, in addition to the wildfires they cause.*
4) *Action item: Consider locating and informing residents of active coal seam fires near their residences.*

4. Review local suppression resources. The size of the County and its rural nature makes it difficult to provide adequate resources in a timely manner.

5) *Action item: Consider historical wildfire patterns and impacts in distribution of resources and staffing*.
6) *Action item: Consider forming a new Volunteer Fire District in the NW part of the County with local volunteers and infrastructure.*
7) *Action item: Review in detail communication systems to assure adequate coverage.*

5. Emphasize support of the Volunteer Fire Districts and the Fire Department. Continue support of mutual aid programs. Emphasize limits in water supply.

Remote assignments and longer term commitments are difficult to staff. Mutual aid is essential to control these incidents. Water supply is primarily based on local, private sources.

8) *Action item: Consider a program to improve volunteer response on longer incidents.*
9) *Action item: Consider mapping and formalizing water supplies to aid new volunteers in locating on incidents.*
10) *Action item: Consider grants for improving these water supplies.*
11) *Action item: Improve communication with the three Fire Districts, in terms of fire reporting and collaboration.*

B. Reduce Hazardous Fuels/Restore Fire Adapted Ecosystems

1. Review the effects of the 2012 fires on the risks in the wildland urban interface (WUI).

It is apparent that the large fires of 2011 and 2012 have not reduced wildfire risk. It may actually have increased, due to reburn potential.

12) *Action item: Promote increased FIRESAFE education of the residents of the 50 to 70 structures in the updated WUI.*

2. Review Federal prescribed burning programs where appropriate for protection of County residents and resources.

Federal prescribed burning programs are generally small and in transition.

13) *Action item: Encourage USFS staff to consider the potential effects on the WUI in their fuel reduction future programs, and to use County values at risk in considering locations.*

3. Recognize oil and gas activities in suppression planning.

This was recognized in our situational analysis. Oil and gas activities are now at a low level. Active wells and fields are mapped. Pipelines are unmapped.

14) *Action item: Identify and map pipeline locations.*

4. Recognize large coal bed methane projects are unlikely in the near future.

This was recognized in our situational analysis. No action items are proposed.

C. Promote Community Education and Assistance

1. Utilize the FIRESAFE home evaluation data to evaluate defensibility where appropriate. Use results to help focus education and assistance to home owners to improve their situation where appropriate.

We did extensive review of structural ignitability and homeowner preparedness in our situation analysis.

15) Action item: Use FIRESAFE information to initiate a homeowner education system where needed to improve defensibility.

2. Evaluate and educate the public on new Federal issues that may affect management and suppression (sage grouse concerns).

Our situational analysis showed these new concerns, where they are, and how they may affect management.

16) Action Item: Establish an education program for landowners in the Sage Grouse Core Areas.

3. Establish a burn permit system for the County.

Burn permit systems are useful in prevention, education, enforcement, and communication.

17) Action item: establish a burn permit system for the County.

4. Update and integrate new spatial information to enhance suppression and preparedness. This includes an updated forest inventory, locating values at risk (for example, cell phone towers and radio repeaters), and fire history to update wildfire risk and impacts.

Spatial layers were created for cell phone towers, lookouts, apparatus, present forest cover, values at risk, and updated fire history.

18) Action Item: provide updated spatial data to the County on DVD in a standard GIS format compatible with PRC in-house GIS including metadata.

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XII. Appendix One - Documents

A. Project Initiation Letter

To: BLM, USFS, DNRC

Subject: Update of the Powder River County Community Wildfire Plan

The Powder River County Fire Plan (2004) has been used for the last 12 years in guiding resource use and hazard mitigation. Conditions in the County have changed over this time period, including changes in the potential development of the Otter Coal Fields, recent drought, recent large fires (notably in 2012), Federal land management, and changes in applicable laws and regulations. Technology and available planning data have changed (in particular, many residences in the County now have site-specific defensibility evaluations using the FIRESAFE program). Wildfire communications, availability of resources, and agency roles have also evolved. Situational analysis has advanced, in terms of mapping wildfire potential, values at risk, and potential responses.

Hence the Powder River County Commissioners have initiated an update process. Our goal is to optimize fire protection for our resources and the safety of the public. Our process is to bring up to date the community fire plan to reflect current conditions, advances in technology, latest spatial information, current laws and regulations, and updated objectives. We will use the current Plan as a base and recent work and data collected for the FIRESAFE program, as well as current GIS data, as well as Agency data and objectives.

We have contracted with an experienced consultant to help us with the update. He will be working with our Fire Chief, Raymond Ragsdale to complete it in August of 2016. We would be pleased if you would be willing to participate as appropriate in setting objectives, reviewing proposals, and developing the specifics of our plan. Our contractor, Henry Shovic, will be contacting you to solicit your input and desired level of involvement. We appreciate very much any help you can provide him, especially in situational analysis pursuant to your Agency's objectives.

Please contact us at any time.

Sincerely,

Darold Zimmer, chairman

David Richards, vice-chairman

Rod Schaffer

Powder River County Commissioners.

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Broadus Volunteer Fire Department

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B. Meeting Notes

Issues and Concerns for the Powder River County Community Fire Plan Update

051616

Henry Shovic, Facilitator

The issues listed below are from two meetings with collaborators (external agencies and County Commissioners), visits with the Broadus County Volunteer Fire Chief and Fire Warden, and previous documentation. They are used to formulate Plan issues and help develop action plans to address them.

Concerns/Issues from Collaborators Meeting 042516

Collaborators Meeting attendees:

BLM: Rick Lang 406 233 2900 rlang@blm.gov

BLM: Mitch Bloxham 406 784 6180 mbloxham@blm.gov

BLM: Scott McAvoy 406 233 2875 smcavoy@blm.gov

DNRC: Randy Sanders 406 233 2904 rasanders@mt.gov

BLM: Eric Lepisto 406 233 2903 elepisto@blm.gov

USFS: Scott Studiner 406 784 2344 sstudiner@fs.fed.us

Broadus Vol. Fire Dept. Chief: Raymond Ragsdale 406 935 2242 rayrags_goneropin@yahoo.com

Facilitator: Henry Shovic 406 570 7946 henry.shovic@shovic.com

Issues:

- From BLM. There is some bias in fire data. Poss. Missing some BLM fires; contact Diana Samson.

  Also, County data could be captured to get a better fire distribution south of the main highway. The PRC fire plan update is timely, since the DNRC update is also due for their Cooperative plan.

  Lookouts, repeaters not in right locations, need cell towers marked

- Pipelines cross the County. Their positions are unmapped. Locating may be needed to help determine values at risk. Additional pipelines may be constructed in the future,

increasing fire suppression costs. Oil Companies have fire suppression equipment. What Is available?

- FS Overstory vegetation is overestimated.
  Contact Forest Service Forester to review

- Firefighter safety.
  Downed jackstrawed timber in burned areas is a firefighter hazard. Travel barriers, snag hazards, fire intensity.

- Coal seam fires are a significant source of wildfire ignition.
  DNRC estimates 500 active coal seam fire locations now. These generally resulted from the large 2012 fires. Up to 70% of wildfires ignite a coal seam. There may be up to 1000 in the entire County. This ignition potential should influence the PRC fire plan. There are ongoing studies to identify where they are (in Rosebud County). They require significant resources to monitor and suppress. They are also a significant firefighter hazard, in terms of ground subsidence and spot ignitions.

  Coal seams are generally on the west side of the County, in rough country (see map).

  Generally, ranked causes of wildfires in the County are 1) lightning, 2) coal seam fires, and 3) human.

- Volunteer Fire Departments – personnel. (DNRC).
  Volunteer response lowers during heavy, repeating fire-fighting periods. Staffing fires may require a cultural change. Often wildfire response is limited (often to one person in one Engine, for multiple operational periods in remote areas).

  Though official volunteering is scattered, there is a good response from local landowners. They have sprayer units and other heavy equipment.

  It is difficult to convince local firefighters to get “Red cards” or certification in wildand fire-fighting.

- DNRC has a concern that wildland engines are not distributed well around the County.

- Communications during fire events is improving.
  But there are still common “dead spots”. Fire paging communications are sometimes sporadic.

  DNRC is willing to participate in improving communications. Fire paging is improving.

- Sage Grouse: BLM has three critical priorities in its Fire programs.
  These are Life, Property, and Sage Grouse. The latter is their third priority. They are concerned about preserving habitat in Core Areas. The State of Montana has also made this a priority. Landowners now burning off sage in those areas may be creating a future problem by reducing habitat. This, in turn, may result in listing under the Threatened and Endangered Species Act, which will significantly increase restrictions on land use. Forest Service lands in the County have low potential for Sage Grouse.

  There should be a Prescribed Burning Standard Operating Procedure (SOP) or Fire Departments to address the importance of Sage Grouse.

  This may be addressed in the proposed Burn Permit system.

- Forest Service and the WUI
  There could be Forest Service lands in the PRC WUI. FS: There is a prescribed burning program of 4,000 acres. They have been cooperating with adjacent landowners in this program. Because of the fire environment (Ponderosa Pine and grassy understory), prescribed burns are more dominant than thinning projects.

  BLM lands: No prescribed burning planned. Mechanical treatment of junipers is emphasized in the southwest part of the County.

- Burn Permits. Currently there is no formal burn permit system in the County.
  The County is currently considering starting one. Advantages are a prevention tool, monitoring, and enforcement mechanism. The system will also help in communicating burn bans and possibly help in Sage Grouse management.

  Fire restrictions (burn bans, etc.) are currently discussed on an as-needed basis via conference calls. This coordinates 11 Montana Counties.

- Water Supply
  There are few formally-developed water supplies in the County. Local landowner supplies are usually used for wildland fire fighting. The Broadus Fire Dept. and the County Road Department can supply tenders, but they are limited to main roads, and often driving times are long.

County Commissioners Meeting 042516

County Commissioner Meeting Attendees:

PRC County Commissioners 406-436-2657 crichards@prco.mt.gov
- Darold Zimmer, chairman
- David Richards, vice-chairman
- Rod Schaffer

Broadus Vol. Fire Dept. Chief: Raymond Ragsdale 406 935 2242 rayrags_goneropin@yahoo.com
Facilitator: Henry Shovic 406 570 7946 henry.shovic@shovic.com

Fire-Related County Issues:

- Burnt timber from large fires of 2012: blowdown and jackstrawed remaining trunks may bring another catastrophic fire.

- Potential for Post-Fire Cleanup is large with larger fires. Costs will be high: homesteads, powerlines, cattle deaths, new or modified cattle range, stock tanks, waterlines, fences, power outages.

- Too many fires come back after initial control. Coal seam fires are the worst. There are many potentials for wildfire ignitions. There are safety issues for fire fighters.
    - Need locations of coal seams near residences.

- Preparations for future catastrophic fire have been made. Some examples are:
    - Fireline around Broadus has been excavated.
    - Nursing home has a new generator, most ranches now have generators.
    - Communications have been improved.
    - Have a County Fire Warden now to facilitate resource availability and use.

- Some other Concerns include potential emergency refugees in the event of a large, widespread, and threatening fire. Where and how do we accommodate them?

- Sage Grouse: There are landowner concerns about potential implications of Sage Grouse habitat preservation efforts. Those efforts may hamper management

- Maintain privacy for FIRESAFE individual structure data.

- Other Lower Priorities:
    - Otter Creek Coal development potential: No issues now.
    - Oil and Gas and Pipelines are a concern for resource protection.

- Hazmat incidents on the Highway
- Sagebrush control
- Improving defensible space in County

Issues from the Broadus Fire Chief

- Communications
  - Phone system of Paging needs updating
  - Cell coverage poor around Biddle
- Limited Volunteer Response outside of Broadus – long response times when coming from Broadus to outlying areas.

Issues Identified through other informal methods.

- The Otter Creek coal project – the economics of coal extraction have significantly changed over the last five years. A large project here is less likely.
- Changes in the Wildland Urban Interface (WUI) – improvements in technology and changes in conditions that change the WUI.
- Deployment of Fire Fighting Resources – possibly need more manned satellite stations, decrease response times to outlying, at risk areas
- Sage Grouse – core habitat and other habitat is in PRC. How to protect in light of BLM requirements and State of Montana Executive orders
- Oil and Gas development in SE PRC – developments may alter the need for response in terms of training and equipment
- Communication Issues – dead spots still exist in the County
- Changes in risks from recent large fires on the Ashland Ranger District and nearby areas
- Fuels Treatment projects on Federal land and their effects on PRC resources and values.
- Available new data on values at risk, and effects of climate change in the County.
- Significant increases in PRC's ability to synthesize previously-unused spatial resource data into useful information
- The recent development of extensive structural defensibility information from the FIRESAFE program
- Coal Seam Fires – special hazards associated with these fires.
- Water Supply – Arid County lands, lack of developed supplies
- Potential Fuel Treatments relevant to WUI