REPORT

SHOSHONE RIVER AREA WILDLAND URBAN INTERFACE RISK ASSESSMENT AND MITIGATION PLAN

COMMUNITY FIRE PROTECTION PLAN

FINAL

Prepared for:

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Cody Field Office
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SHOSHONE RIVER AREA WILDLAND URBAN INTERFACE RISK ASSESSMENT AND MITIGATION PLAN

COMMUNITY ASSESSMENT

EXECUTIVE SUMMARY

The Shoshone River project area is located along the North and South Forks of the Shoshone River extending from the Shoshone National Forest boundary on the west to Cody, Wyoming in the east. Four priority areas of primarily private land were identified for assessment by the Bureau of Land Management (BLM) and the Park County Fire Protection District (PCFPD) #2.

Greystone Environmental Consultants, Inc. and Anchor Point Group (the Greystone Anchor Point team) conducted an assessment of the wildland fire hazard and risk in the priority areas. These areas were divided further into 18 communities based on similar wildland fire hazard characteristics for hazard analysis. The following hazards were identified: zero extreme hazard, zero very high hazard, seven high hazard, eight moderate hazard, and three low hazard.

The Greystone Anchor Point team also conducted assessments of 188 parcels in the project area. A 1-page description was prepared for each parcel. These are provided to BLM and the PCFPD #2 under separate cover to protect the privacy of the landowners.

The Greystone Anchor Point team also summarized an extensive list of values to be protected in the project area. Of these, five were identified as priorities for protection. Protection of life and fire fighter safety are always the highest priority in fire mitigation and suppression. Other prioritized values include: watershed, tourism, private property and infrastructure, and recreation.

Recommendations for mitigating wildland fire hazard are discussed in the mitigation plan, the second part of this report.

1.0 INTRODUCTION

Greystone Environmental Consultants, Inc. (Greystone) and the Anchor Point Group, LLC (Anchor Point) have completed the Shoshone River Area Wildland Urban Interface (WUI) Risk Assessment and Mitigation Plan project for the Cody Field Office of the Bureau of Land Management (BLM). The purpose of this project is to assess four priority areas identified by BLM and the Park County Fire Protection District (PCFPD) #2 in the Shoshone River area for wildland fire hazard and provide recommendations to minimize damage from future wildland fires.

This report format follows the requirements specified in the request for quotation for this project. It is presented in two parts: the community assessment and mitigation plan. After this introduction to the community assessment, Section 2.0 describes the project area. Section 3.0 presents a summary of the fire risk in the project area. Section 4.0 summarizes the hazards, including vegetation and structural hazards; 1-page community assessments are included in this section. Section 5.0 describes the values to be protected in the project area; this section will provide the basis for the Affected Environment section of future National Environmental Policy Act (NEPA) documents for the area. This section concludes with a discussion of the highest priority values to be protected in the event of a wildland fire. Section 6.0 describes the fire protection resources and capability in the project area.

The second part of this document presents the Greystone Anchor Point team's recommendations for mitigation in the project area. Section 1.0 summarizes the existing situation and organizational structure. Sections 2.0 and 3.0 present the goals, objectives, strategic plan, and desired condition for the mitigation plan. The recommendations are presented in Section 4.0, Actions and Methodology. The roles and responsibilities for recommendations outlined in the plan are presented in Section 5.0. Funding guidelines are presented in Section 6.0.

2.0 IDENTIFICATION AND DESCRIPTION OF AREAS TO BE EVALUATED

The Shoshone River project area is located west of Cody, Wyoming. The project area extends from the Shoshone National Forest boundary on the west, to Cody in the east. It includes both the North and South Forks of the Shoshone River west and south of the Buffalo Bill Reservoir. Highway 14 runs through the project area; it is also known as Highway 16, Highway 20, and the North Fork Highway. Four priority areas for assessment were identified by BLM and the PCFPD #2 (**see Figure 2-1**). These areas are made up of private land. Most are located west of Buffalo Bill Reservoir along drainages off of the North Fork of the Shoshone River near Highway 14. One assessment area is located just north of Buffalo Bill Reservoir along the North Fork; one is located east of Buffalo Bill Reservoir along the South Fork; and one is located south of Buffalo Bill Reservoir along the South Fork.

The priority areas were broken into 18 communities for hazard assessment. Communities were designated based on common characteristics for wildland fire assessment (**Figure 2-2**). Communities are discussed further in Section 4.2.1. The PCFPD #2 provides primary response for fire fighting for these communities; their resources and preparedness are discussed in Section 6.0.

The Shoshone River area has been significantly affected by wildland fire in the past. Fire ignitions and future wildland fire risk are discussed further in Section 3.0. The effects of past wildland fire on the local community are discussed in Section 5.1. The remainder of this section briefly discusses demographics, topography, and climate for the project area.

2.1 DEMOGRAPHICS

The Cody Country Chamber of Commerce reports the population of Cody in the year 2000 as 8,825 (Cody Country Chamber of Commerce 2004). The U.S. Census Bureau estimates the population for Park County in the year 2003 at 26,284 and for the state of Wyoming at 501,242 (U.S. Census Bureau 2004).

The racial profiles for Park County and Wyoming in the year 2000 are summarized in **Table 2-1** (U.S. Census Bureau 2004).

TABLE 2-1 2000 RACIAL PROFILES

	Park County	Wyoming
White persons	96.5%	92.1%
Black or African American persons	0.1%	0.8%
American Indian and Alaska Native persons	0.5%	2.3%
Asian persons	0.4%	0.6%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%
Persons reporting some other race	1.4%	2.5%
Persons reporting two or more races	1.1%	1.8%

Figure 2-1 Priority Areas

Figure 2-2 Communities Evaluated for Wildland Fire Hazard

The U.S. Census Bureau recorded 10,312 households in Park County and 193,608 in the state of Wyoming in the year 2000. The Bureau reports that the 1999 median household income was $35,829 in Park County, compared to $37,892 for the entire state, and that the 1999 per capita income was $18,020 in Park County, compared to $19,134 for the entire state (U.S. Census Bureau 2004).

2.2 TOPOGRAPHY

The topography for the project area generally consists of foothills originating from the Absaroka Range to the west and ending in the Big Horn Basin to the east. Elevations within the project area range from approximately 5,200 to 10,500 feet above sea level. The project area is surrounded by a number of mountains including Sheep, Table, Jim, Logan, Cedar, and Rattlesnake Mountains. The project area is dominated by long drainages from the foothills into the North and South Forks of the Shoshone River.

2.3 CLIMATE DATA

Climate in the project area is semi-arid with an average annual temperature of 46 degrees Fahrenheit (°F). January is the coolest month with an average monthly temperature of 24°F, and July is the warmest month with an average monthly temperature of 72°F. The area receives an average of 9.4 inches of rain and 32.2 inches of snow (Cody Country Web Site 2004). Winds in the project area generally blow from the North March through October. Between November and February, winds generally originate from the west or west-southwest (WRCC 2004).

The project area is classified as a Class 2 air shed (BLM 2004). Air quality is discussed further in Section 5.2.

3.0 ASSESSMENT OF RISK

Wildland fire risk refers to the probability that an ignition will occur with the potential to effect people, property, or the environment. Fire risk is primarily determined by the history of ignitions in the area.

The majority of the project area is considered at a high risk for WUI fires. The Wapiti subdivision is listed in the Federal Register as a community at high risk from wildland fire (USFS et al 2001). BLM (2003) assigns high to moderate risk rankings for communities in the project area. The Greystone Anchor Point team has further identified risk ratings for communities in the project area (see **Table 3-1**). Communities are identified on **Figure 2-2**.

TABLE 3-1 FIRE RISK BY COMMUNITY

Community Names	Risk Rating
Dunn Creek	High
Jim Creek	High
West Jim Creek	High
Upper Wapiti Heights	High
Lower Wapiti Heights	High
Logan Mountain	High
Old Johansson Ranches	High
Rattlesnake Mountain	High
South Fork Drainage	High
Canyon Creek	High
Big Creek (Road 6BU)	High
Green Creek	High
Whit Creek	Moderate
Breteche Creek	Moderate
Upper Breteche Creek	Moderate
Post Creek	Moderate
Hidden Valley/Sheep Mountain	Moderate
Golden Walls	Moderate

BLM Risk Assessment and Mitigation Strategies (RAMS) data uses six factors to derive wildland-fire risk rankings: fuels hazard, fire protection capability, wildland-fire ignition risk, wildland fire history, resource and economic values, and catastrophic fire potential. Of these factors, the Greystone Anchor Point team considers wildland-fire ignition risk, wildland fire history, and catastrophic fire potential the most significant components of risk.

The Greystone Anchor Point team used the BLM RAMS ignition-risk factors to provide the ratings in **Table 3-1** for communities that were not assessed by RAMS. These include: WUI-population density, the presence of above ground power distribution lines, industrial operations, recreation, roads, commercial developments, and other factors such as woodcutting and government operations.

The project area has a significant fire history. From 1992 to 2003, the Absaroka Front fire management unit (FMU) had 41 fires affecting more than 17,000 acres (BLM 2004). Approximately 80 percent of the fires were ignited by lightning and 20 percent were human-caused. The PCFPD #2 reports responding to an estimated 35 to 50 wildland fire calls per year in this area.

4.0 ASSESSMENT OF HAZARDS

This section provides a discussion of wildland fire hazards in the project area. Section 4.1 discusses the area vegetation, presents the fuel survey points collected during fieldwork, and discusses fire behavior modeling for the project area. Section 4.2 presents the structural hazards in the project area including the community assessments and a summary of the parcel-level surveys conducted. Section 4.3 discusses the wildland fire hazards unique to the project area.

4.1 ASSESSMENT OF VEGETATIVE FUEL HAZARDS

Vegetation across the project area was assessed in a number of ways. Fuel survey points identified by BLM and the PCFPD #2 were characterized and are discussed in Section 4.4.1. Fire behavior modeling was conducted based on fuel models provided by BLM and is presented in Section 4.4.2. Prescribed fire is used in and near the project area to manage vegetative fuel hazards. Historic and planned prescribed fire projects are discussed in Section 4.4.3 and shown in **Figure 4-2**.

Vegetation in the project area is dominated by Wyoming sage and cool season perennial grasses. Higher elevations include a small amount of limber pine, Douglas fir, and juniper. Vegetation was denser in the drainages and sparse along flat, open areas with some exposed soil and rocks. Cottonwood, greasewood, opuntia, cheat grass, rabbit brush, Utah juniper, rocky mountain juniper, and currant were also identified in the project area.

Fuels in the drainages are heavier fuels, such as trees and large brush, spaced closely together. In the flat, open areas, fuel types were predominately light grasses and small shrubs with more space between vegetation and some bare soil.

4.1.1. Fuel Survey Points

Thirteen points were surveyed to describe wildland fire conditions. BLM's field form was used to collect the following data: slope, aspect, fuel type, fuel density, fuel bed depth, canopy closure, elevation, and dominant vegetation. The 13 points assessed were identified by BLM and the PCFPD #2 in the project description. Fieldwork was conducted between July 25 and 30, 2004. At each fuel point, photographs were taken in the four directions. The 13 fuel points are shown on **Figure 4-1**. The field forms and photographs are included in **Appendix A**.

4.1.2. Fire Behavior Potential

Throughout most of the WUI areas of this project, grasses and shrubs constitute the primary carrier of fire. These fuels generally require windy conditions to sustain burning and are usually relatively easily extinguished once wind conditions subside. There is also a significant amount of forest in the area modeled that has high mortality from insects. The resulting standing dead and/or "red needle" trees make the potential for extreme fire behavior likely under average weather conditions. However, within the project area, these fuels are generally upslope from homes and therefore not a landscape-scale threat to WUI values. Where flammable tree species, like juniper and limber pine, do occur in the interface, they tend to grow in drainages and riparian areas. These fuels exist in stringers and patches that often contain a mixture of riparian shrubs and hardwoods that will moderate the fire behavior.

Figure 4-1 Fuel Survey Points

Figure 4-2 Shoshone National Forest

The fire behavior potential of the project area was modeled using Anchor Point's Wildfire Hazard Analysis methodology. This methodology provides a relative ranking of locations based upon expected fire intensity. Fire behavior is dependant upon aspect, slope, elevation, canopy cover, and fuel type. The model uses these inputs for fire behavior calculations. There is also a crown fire model that is calculated using canopy bulk density, crown-to-base height, and tree height. The hazard level is determined using FlamMap, developed by Systems for Environmental Management (Missoula, Montana) and the Fire Sciences Laboratory of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana) to evaluate the potential wildfire behavior potential.

Calculations for FlamMap are based on the Forest Service's fire behavior model BEHAVE. BEHAVE is a nationally recognized set of calculations to estimate a fire's intensity and rate of spread given simple, user-defined topography, fuels conditions, and weather. The following assumptions are used in BEHAVE modeling:

- Fire is predicted at the flaming front
- Fire is free burning
- Behavior is heavily weighted towards the fine fuels
- Continuous and uniform fuels
- Surface fires

More information on fire behavior modeling is available in the project file.

For this analysis, the project area is broken down into 10 meter grids. Using FlamMap's spatial analysis capabilities, each 10 meter square (m sq) grid is queried for its elevation, slope, aspect, and fuel type. These values are input into FlamMap, along with reference weather information. The outputs of FlamMap include the estimated Rate of Spread, Flame Length (from BEHAVE), and Crown Fire Activity for a fire in that 10 m sq grid. The model computes these values for each grid cell in the project area. These values are then reclassified into Wildfire Hazard classes of Not Applicable, Low, Moderate, High, Very High and Extreme.

The fire behavior potential maps (**Figures 4-3** and **4-4**) are derived from a combination of the FlamMap outputs (crown fire activity, flame length, and rate of spread). The fire behavior was modeled using both normal and extreme weather conditions. More information on the weather input is available in the project file. Crown fire activity, rate of spread, and flame length are discussed later in this section.

Fire behavior modeling is a prediction of likely fire behavior given a standardized set of conditions and a single point source ignition for every 10 by 10 meter area. As a result, it is inherently limited and subject to interpretation. Fire behavior modeling does not consider the cumulative impacts of increased fire intensity over time and space. The model also does not calculate the probability that a wildland fire will occur.

For the fire behavior potential maps (**Figures 4-3** and **4-4**), the following list provides a general description for each gradation of fire behavior severity.

Not Applicable: Areas where fuels are not present or are considered to be non-combustible such as golf courses and irrigated green belts.

Figure 4-3 Fire Behavior Under Normal Weather Conditions

Figure 4-4 Fire Behavior Under Extreme Weather Conditions

Low: In general, flame lengths, an indicator of heat intensity, are expected to be low enough for direct attack by hand crews. Fire spread will be generally slow, less than ½ mile per hour. Fire spread to aerial fuels, such as tree torching, is unlikely.

Moderate: Either flame length or rates of spread become more significant. Direct attack of the fire head may become inadvisable. Individual tree torching is more likely.

High: Flame lengths may make direct attack of many portions of the fire only possible by machinery or not possible at all; or, high rates of spread may result in dangerously rapid fire runs. Individual and group torching of trees should be expected. Dependent crown fire runs become possible.

Extreme: Indirect fire attack and aerial suppression methods are most likely appropriate. Depending on the fuel model, very intense and/or rapid fire runs are likely. Dependent crown fire runs become likely and independent crown fire runs may be observed during peak burning periods.

The fire behavior maps are derived from a combination of the FlamMap outputs: crown fire activity, rate of spread, and flame length. These factors are discussed and displayed separately to allow for independent interpretation of the inputs to the fire behavior maps.

Crown fire activity under both normal and extreme weather conditions are shown in **Figures 4-5** and **4-6**. Crown fire activity values are generated by the FlamMap model and classified into four categories based on standard ranges: active, passive, surface, and not applicable. In the surface fire category, little or no tree torching would be expected. During passive crown fire activity, isolated torching of trees or groups of trees would be expected and canopy runs would be limited to short distances. During active crown fire activity, sustained runs through the canopy may be observed along with surface fire activity.

Rate of spread under both normal and extreme weather conditions are shown in **Figures 4-7** and **4-8**. Spread rate values are generated by the FlamMap model and classified into four categories based on standard ranges: 0 to 20 chains per hour (CPH), 21 to 40 CPH, 41 to 60 CPH, and greater than 60 CPH. A chain is a logging measurement that is equal to 66 feet. One mile equals 80 chains.

Flame length under both normal and extreme weather conditions are shown in **Figures 4-9** and **4-10**. Flame length values are generated by the FlamMap model and classified into four categories based on standard ranges: 0 to 4 feet, 4.1 to 8 feet, 8.1 to 12 feet, and greater than 12 feet.

4.1.3. Prescribed Fire Projects

Both BLM and the Shoshone National Forest have conducted prescribed fire projects to manage vegetative fuels in and near the project area. BLM conducted prescribed burning on 330 acres of the Stone Bridge Allotment 3004 in 1996 and on 2,470 acres on Rattlesnake Creek, Allotment 3108 in 1997 and 1999 (Mononi 2004).

The Shoshone National Forest has conducted or is planning to conduct a number of prescribed burns on Forest Service land just outside of the project area (**see Figure 4-2**). These are briefly listed below:

Figure 4-5 Crown Fire Activity Under Normal Weather Conditions

Figure 4-6 Crown Fire Activity Under Extreme Weather Conditions

Figure 4-7 Rate of Spread Under Normal Weather Conditions

Figure 4-8 Rate of Spread Under Extreme Weather Conditions

Figure 4-9 Flame Length Under Normal Weather Conditions

Figure 4-10 Flame Length Under Extreme Weather Conditions

- Jim Mountain, prescribed burn, 1,200 acres
- Logan Mountain, prescribed burn, 3,000 acres
- Green Creek, mechanical treatment, 160 acres
- Various polygons west of project area, mechanical treatment and prescribed burn, 4,100 acres
- Various polygons west of project area, prescribed burn, 4,000 acres

Interagency burn projects could greatly reduce the cost and planning of the projects. There are many opportunities for interagency fuels reduction projects along the boundaries of the project area.

4.2 ASSESSMENT OF STRUCTURAL FUEL HAZARDS

Structural fuel hazards have been assessed at both the community level and parcel level. Both are discussed below.

4.2.1. Community Assessments

The purpose of the community assessment is to identify the potential for wildland fire impacts within the priority areas. The project was divided into seven geographic communities in the four priority areas by the BLM and PCFPD #2 in the original project description (**Figure 2-1**). The Greystone Anchor Point team further divided areas into 18 communities for analysis (**Figure 2-2**). Each community represents a relatively homogenous hazard type based on factors such as vegetation type, topography, and access. Not all properties within a community boundary have the same hazard factors; however, the community rating reflects the average hazard factors of the parcels.

The community assessment was conducted using a Wildfire Hazard Rating model originally developed for internal use by the Colorado State Forest and later updated by Anchor Point Group. The rating is designed to evaluate communities within the WUI for wildland fire hazard. The WHR model combines physical infrastructure, such as structure density and roads; fire behavior components like fuels and topography; and the field experience of wildland fire experts. It has been proven and refined by use in rating over 1,400 neighborhoods throughout the United States. More information on the model is available in the project file.

The Wildfire Hazard Rating model was developed to conduct triage on a threatened community in the path of an advancing wildland fire with moderate fire behavior. The rating system assigns up to a maximum of 50 points based on six categories: average lot size, slope, primary aspect, average fuel type, fuel continuity and surface fuel loading. The higher the community scores, the lower its wildland fire hazard. The final value is then used to group communities into one of five hazard ratings: Extreme, Very High, High, Moderate, or Low. Rankings are related to what is customary for the area and not all ratings occur in every geographic area. For this reason, a high hazard area on the plains of Kansas may not look like a high hazard area on the western slope of Colorado.

Of the 18 communities in the project area, none were found to represent an extreme or very high hazard. Seven communities were identified as having a high hazard, eight as moderate hazard, and three as low hazard (see **Table 4-1** and **Figure 2-2**).

TABLE 4-1 COMMUNITY HAZARD RATING

Community	Hazard Level	Score
Logan Mountain	High	12
Lower Wapiti Heights	High	14
Golden Walls	High	17
Green Creek	High	18
Old Johansson Ranches	High	18
Canyon Creek	High	20
Whit Creek	High	20
Dunn Creek	Moderate	22
Upper Wapiti Heights	Moderate	22
Rattlesnake Mountain	Moderate	23
Big Creek (Road 6BU)	Moderate	24
South Fork Drainage	Moderate	25
West Jim Creek	Moderate	28
Upper Breteche Creek	Moderate	28
Post Creek	Moderate	29
Jim Creek	Low	32
Breteche Creek	Low	32
Hidden Valley/Sheep Mountain	Low	38

A 1-page description is provided for each community on the following pages. The BLM community assessment forms are available in the project file. Recommendations are discussed further in Section 4.0 of the Mitigation Plan.

1. Logan Mountain

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	Seasonal ponds
Hazards:	Steep slopes, ravines, inadequate roads, no water supply

Description:

There are four homes in this community, all of which are remote and isolated. Most of the homes appear to have wood siding and asphalt roofs. All of these homes are located up a steep, narrow canyon with an average slope of 20 percent to 25 percent. Fuels are moderate loads of mixed conifer with grass understory (Fuel Model 2). The access road is in poor condition; it is narrow, steep, rutted, and does not have adequate turnarounds for fire apparatus. In wet conditions four-wheel-drive would be required to access the top. There is a good lookout point at the top of the road. Addresses are poorly marked.

Comments & Mitigation Notes:

Significant improvements need to be made in order to make this area safe for fire operations. All homes need extended defensible space. The road needs to be widened and the surface improved. Turnarounds for fire apparatus need to be constructed at 300-foot intervals along the access road. Due to the distance between homes, individual cisterns should be added at each residence to ensure an adequate water supply for fire suppression. All homes need reflective address markers at the intersection of the road and driveway (some of the homes have the driveway marker). Since there is only one way in and out of the area, thinning some of the heavier pockets of fuel adjacent to the roadway should be considered.

2. Lower Wapiti Heights

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	2, 9
Water supply:	None
Hazards:	Ravines, inadequate roads, inadequate water supply, shake roofs

Description:

Unlike the upper portion of Wapiti Heights, this area is built along a north/south running canyon bottom with heavy conifer loads (Fuel Model 9) in the drainage bottom and on slopes below homes. Above the canyon, the sage and short grass mixture (Fuel Model 2) becomes dominant. Most homes have wood siding and asphalt roofs, but some have shake roofs. All are on moderately sized lots with good spacing. The nearest reliable water supply is the fill site at the intersection of Jim Mountain Road and Highway 14 (about 3 miles away).

Comments & Mitigation Notes:

Since there is only one way in and out of the area, heavy fuels along the roadway should be thinned. Defensible space is recommended for all homes, and extended defensible space is highly recommended for homes in the timber. All homes need reflective address markers at the intersection of the road and driveway. A large community cistern should be added in this area.

3. Golden Walls

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	Yes
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	2
Water supply:	None
Hazards:	Ravines, inadequate roads, inadequate water supply

Description:

There are only three residences in this area, and two of these may be seasonal. There is good access to the residence at the corner of Golden Walls Road and Stagecoach Road, but the other two homes are located about 1/2 mile up the steep, narrow Golden Walls Road. These two homes are located mid-slope on a western aspect with ravines and slopes of approximately 20 percent below them. Although there is forest above these homes, the dominant fuel below and around the homes is sage with a grass understory (Fuel Model 2). The closest water supply is the Shoshone River, which would be very difficult to access at this point.

Comments & Mitigation Notes:

The existing homes need defensible space and turnarounds for fire apparatus. A community cistern should be considered, especially if further development is possible in this community. Road improvements would also be desirable if more homes are planned along Golden Walls Road.

4. Green Creek

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	Yes
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	2, 9
Water supply:	Fill site at Jim Mountain Road and Highway 14 Some sites along Green Creek may be suitable for drafting.
Hazards:	Ravines, inadequate roads, inadequate water supply

Description:

This community is built along the north/south running Green Creek drainage. There are over thirty homes in this area, most of which have wood siding and asphalt roofs. Many of the properties have vegetation immediately up to the structure. Green Creek Road is the only way in and out of this community. Although Green Creek Road is wide and in generally good condition, some of the other streets, such as Heidi and Laurel, are steep and narrow in spots. There are slopes of over 20 percent below some homes. Lower in the canyon, fuels are light to moderate loads of sage and short grasses (Fuel Model 2). Along the drainage and higher up slope, mixed conifer (Fuel Model 9) becomes dominant but occurs largely in stringers and patches near homes rather than as a continuous canopy. There is a high mortality of conifers here. Green Creek is not an adequate water source for fire suppression.

Comments & Mitigation Notes:

Many homes, especially those close to the heavier fuel loads, need defensible space. Also, extended defensible space is desirable for homes located in the timber. Pockets of conifer fuels should be thinned along the roads to protect the access. Construction of adequate turnarounds for fire apparatus are especially recommended for homes in the upper section of this community. A community cistern should be considered for this area.

5. Old Johansson Ranches

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2, 9
Water supply:	Fill site on Jim Mountain Road
Hazards:	Ravines, inadequate access roads, inadequate water supply

Description:

There are only two homes on Lower Cannonball Trail, but many more lots are available for development. Local sources indicate that there are five more homes to the north on Cannonball Trail, but there is a locked gate just north of the intersection with Lower Cannonball Trail, and none of these residences were accessible or visible for data collection. The two homes on Lower Cannonball are of wood siding construction with asphalt roofs on moderate sized lots. Access to this community is via approximately 3 miles of steep, narrow dirt roads. On Cannonball Trail there are no turnarounds adequate for large fire apparatus. Fuels are light to moderate loads of sage and short grasses (Fuel Model 2) with scattered pinyon/juniper concentrated in ravines. Although fuels are generally light here, jackpots of heavier fuels in ravines could produce significant ember cast in windy conditions. The closest water for fire suppression is at the corner of Jim Mountain Road and Highway 14 (about 15 minutes one way by car). The existing homes would need little work to have conforming defensible space. Most lots in this community are relatively clear of heavy fuels and have adequate space for fire apparatus to operate.

Comments & Mitigation Notes:

Existing homes need some work, mostly mowing and pinyon/juniper removal, to have defensible space. A community cistern and access road improvements should be considered if the housing density increases in this community.

6. Canyon Creek

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	Yes
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2, 6, 9
Water supply:	Canyon Creek may be suitable for drafting at some points.
Hazards:	Ravines, inadequate water supply, gas tanks near homes

Description:

This community is built along a north/south running canyon bottom. Fuels along the drainage are mostly riparian shrubs and hardwoods with conifer mixed in (Fuel Model 6). Conifers are dominant (Fuel Model 9) near many homes, especially those at higher elevations. Higher up slope above the drainage bottom, sage with grass understory (Fuel Model 2) and short grasses (Fuel Model 1) become dominant. There are approximately seven homes and two resorts with cabins in this area. Most of the buildings have wood siding or log construction with asphalt roofs. Many of the properties along the creek have vegetation immediately up to the structure. Access to most properties is good. There are many old outbuildings and woodpiles close to residences, and some homes have above ground gasoline tanks within 100 feet of homes. Canyon Creek is a perennial water source but would be difficult to access in most places. Rim Rock Ranch, at the end of the road, has mostly conifer fuels with grass understory (Fuel Model 2), broken by irrigated lawns and dirt parking lots. This property has a swimming pool that could be used as a draft water source.

Comments & Mitigation Notes:

Most homes need defensible space, and many would benefit from extended defensible space. Some yards need cleanup and removal of combustible materials, such as woodpiles, to at least 30 feet away from the home. Fuels should be removed from under and around gasoline tanks. Some homes need reflective address markers. A community cistern or a preplanned draft site should be considered.

7. Whit Creek

Hazard Rating:	**High**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	2, 6
Water supply:	Whit Creek may be draftable in some spots.
Hazards:	Ravines, inadequate roads, limited water supply

Description:

This area is composed of homes and ranches on large lots built above a significant drainage. There is a heavy riparian fuel load along the creek of hardwoods, shrubs, and occasional conifers, mostly limber pine and juniper (Fuel Model 6). This fuel load also borders the access road, but most homes are built in sage with grass understory (Fuel Model 2). Most residences are built of wood siding with asphalt roofs. Other than planted ornamentals, most homes have defensible spaces, and fuels are broken by irrigated fields and dirt clearings on many lots. There is only one way in and out of the area, and the road is quite narrow in spots. Water supply is also a problem in that the creek is too low or inaccessible to draft from in most places.

Comments & Mitigation Notes:

Access and water supply are the most critical needs in this community. A community cistern should be constructed. Fuels reduction, especially of juniper and other conifers, along the road should be considered. Where possible, road widening and the addition of turnarounds suitable for fire apparatus should be considered. Planting of ornamental conifers within 30 feet of homes should be discouraged. Some address markers are faded or missing.

8. Dunn Creek

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel models found in the neighborhood:	1, 2
Water supply:	None
Hazards:	Ravines, no water supply

Description:

This community is built along a south-facing slope above the Dunn Creek drainage. Fuels are light to moderate loads of sage with grass understory (Fuel Model 2) and patchy areas of short grasses (Fuel Model 1). Slopes near Highway 14 are less than 10 percent, increasing to approximately 17 percent to the north, below the last residence. Homes are mostly wood siding with asphalt roofs. Most of these homes lack defensible space, with sage and grass immediately up to the structures. Other than ornamental plantings, there are no trees in this community. There are ravines below some homes, but they tend to be shallow. Access is generally good; the road is narrow, but turnouts could be easily constructed along the road in most areas.

Comments & Mitigation Notes:

Dunn Creek is not a usable water supply; therefore, the biggest concern here is the lack of water for fire suppression. A community cistern should be added, especially if more development is planned. Most homes in this community need defensible space. Planting of flammable ornamentals within 30 feet of homes should be discouraged.

9. Upper Wapiti Heights

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	Fill site at the bottom of Jim Mountain Road
Hazards:	Ravines

Description:

This is an area of mostly newer homes, located on a south-facing bench of Jim Mountain. Most of these homes have log construction with asphalt roofs. Slopes immediately below homes are low; however, there are steep slopes and ravines below the entire community. Lots are moderate to large with good spacing between homes. The fuels are light; the dominant fuels are short grasses (Fuel Model 1) and sage with grass understory (Fuel Model 2). Access is good to all of the homes. The only concern here is that heavier fuel loads, mostly conifer and sage, in ravines below this area could generate embers. Any resulting ignitions should be easily controllable under most burning conditions. Address marking is generally good in this community.

Comments & Mitigation Notes:

Most homes need only minimal work to have defensible space. The nearest water supply is 2 to 3 miles away; therefore, a community cistern should be considered if more development is planned in this area.

10. Rattlesnake Mountain

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	Buffalo Bill Reservoir, about 1 mile away
Hazards:	Ravines, inadequate water supply, some steep slopes

Description:

These homes are built on a south-facing slope above the Buffalo Bill Reservoir. Homes are wood siding and log constructions. Most have ignition resistant roofs, but some have shake roofs. Fuels are light loads of short grasses (Fuel Model 1) and sage with grass understory (Fuel Model 2), and slopes are moderate. There are ravines and steeper slopes below some homes that have somewhat heavier fuel loads. Most homes have defensible space, but some need mowing and non-combustible strips next to foundations. There is evidence of bug kill in the tree stand on the slopes above these homes.

Comments & Mitigation Notes:

Although the reservoir is near this community, it may be advisable to add a cistern to this area to reduce the time required to establish a water supply in the event of a fire. Some homes need defensible space. Shake roofs should be replaced. Some homes need reflective address markers.

11. Big Creek (Road 6BU)

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	1, 2, 10
Water supply:	Seasonal ponds and stock tanks
Hazards:	Ravines, inadequate roads, inadequate water supply

Description:

This community is accessed one way, via an unrated bridge over the Shoshone River. The access road is generally good, but it is narrow in some spots, and there are few turnarounds. Most of the properties are large ranches with multiple outbuildings. There is one abandoned resort with cabins on the highway side of the bridge (south). Fuels are mostly sage with grass understory and scattered pinyon/juniper (Fuel Model 2). Near the end of the road and the Shoshone National Forest boundary the fuels change to conifer stands with high mortality (Fuel Model 10). On the south end of this community the fuels are broken by irrigated fields

Comments & Mitigation Notes:

Some homes and ranch buildings here need defensible space. The only water available for suppression is on private ranches; therefore, a community fill site should be considered. The bridge load rating should be tested and labeled. The northern portion of this community is notably more hazardous due to the change in fuels; however, this area is primarily occupied by one ranch.

12. South Fork Drainage

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 acre
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	None noted
Hazards:	Inadequate water supply

Description:

This is a community of relatively small homes on small lots, located on a rocky slope above South Fork Road. There are some shake roofs in this community, but most homes have wood siding and asphalt roofs. A few homes have defensible space, but most have ornamental conifers within 30 feet of the structure. Fuels are primarily light loads of short grasses and sage (Fuel Model 1 and Fuel Model 2). Many homes have good turnarounds, and access is generally good in spite of a few steep sections of road. No water supply suitable for fire suppression was noted in this community. This is a windy area, and the fire hazard, especially to homes with shake roofs, may be higher than the moderate slopes and light fuels would suggest.

Comments & Mitigation Notes:

Most homes need mowing and the removal of flammable ornamental plantings to have adequate defensible space. This area needs a community cistern. Shake roofs should be replaced.

13. West Jim Creek

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	2
Water supply:	Fill site at the bottom of Jim Mountain Road
Hazards:	Ravines, inadequate roads, inadequate water supply

Description:

This area is on a south-facing plateau, west of the Jim Creek drainage. There are two homes in this community, but only one of these could be located in this study. The assessed home has wood siding, an asphalt roof, and adequate defensible space. Fuels here are light to moderate loads of sage with grass understory (Fuel Model 2). Slopes are low around the existing home, but there is a potential for future homes to be located above steep slopes and ravines. The nearest water for fire suppression is the fill site at the bottom of Jim Mountain Road.

Comments & Mitigation Notes:

Defensible space is recommended for all future homes. If future development is planned, a community cistern and road improvements should be considered.

14. Upper Breteche Creek

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2, 6
Water supply:	Large pond at 250 Stagecoach, Breteche Creek
Hazards:	Ravines, inadequate access roads, steep slopes

Description:

The upper section of Breteche Creek is accessed off of Stagecoach Trail by a long, narrow dirt road that is steep in some spots and has some extreme drop-offs. This area is dominated by a 3,000-acre ranch, which contains two residences, a guesthouse, an historic homestead, and many cabins and outbuildings. The dominant fuel type is sage with a grass understory (Fuel Model 2), although the area along the creek bottom has a significant loading of hardwoods and riparian shrubs with scattered limber pine and juniper (Fuel Model 6). Most of the structures in this area are built of heavy timbers (logs) and ignition resistant roofs. There is a good water supply and a portable pump at 250 Stagecoach.

Comments & Mitigation Notes:

Most structures need defensible space.

15. Post Creek

Hazard Rating:	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	Yes
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	2
Water supply:	No water supply noted
Hazards:	Ravines, inadequate water supply

Description:

There are only two homes in this community, but there is the potential for four to five other residences. These are large lots, and the existing home that was available for evaluation has stone/wood siding and a wood shake roof. The existing home has good defensible space. Address marking and access are generally good in this area, but the road is a dead end and could be cut off by fire in extreme burning conditions. Fuels are moderate loads of sage with grass understory (Fuel Model 2), and the terrain is generally flat to low slope. There are ravines with heavier fuel loads in this area.

Comments & Mitigation Notes:

A community cistern should be added in this area, especially if additional development is planned. If more homes are built some consideration should also be given to thinning the sage along the access road. The existing shake roof should be replaced.

16. Jim Creek

Hazard Rating:	**Low**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	No
Average lot size:	1-5 acres
Fuel Model(s) found in the neighborhood:	1, 2, 6
Water supply:	Ponds and the fill site at bottom of Jim Mountain Road
Hazards:	Inadequate access roads

Description:

This area consists of a few homes built along the bottom of the north/south running Jim Creek drainage. Along the creek there are mostly hardwoods and riparian shrubs with scattered junipers and limber pine (Fuel Model 6). Above the creek bottom, fuels are sparse loads of sage with grass understory broken by significant openings (Fuel Model 2). Some homes along the creek have trees against the structures, but the majority are hardwoods. Most homes have wood siding and ignition resistant roofs. The access road is narrow in spots, but not generally threatened by fuel loads.

Comments & Mitigation Notes:

Some homes need defensible space and vegetation cleared along the driveway. Address marking needs significant improvement.

17. Breteche Creek

Hazard Rating:	**Low**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	Yes
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	Pond
Hazards:	Ravines

Description:

This is a relatively low hazard area, in spite of the presence of some steep slopes and ravines. Roads and driveways are wide with good surfaces and adequate turnarounds. Homes are well spaced on large lots. There are good defensible space clearings around homes, except for one residence with trees within 15 feet of the structure. Fuels are predominantly short grasses (Fuel Model 1) and sage with grass understory (Fuel Model 2). There are some riparian shrubs and hardwoods along the creek. Fuel loads in general are light to moderate. Fuel loads are broken by pasture on some properties. Most homes have log and wood siding with asphalt roofs. There is a large, easily accessible pond that would make a good draft site.

Comments & Mitigation Notes:

Defensible space cutting should be done, where necessary. Maintenance of existing defensible space and improvement of address marking are recommended.

18. Hidden Valley/Sheep Mountain

Hazard Rating:	**Low**
Does the neighborhood have dual access roads?	No
Are there road grades > 10 percent?	No
Are all access roads of adequate width?	Yes
Average lot size:	>5 acres
Fuel Model(s) found in the neighborhood:	1, 2
Water supply:	Cisterns, underground tanks
Hazards:	Ravines

Description:

Hidden Valley is dominated by a large ranch. The ranch has 1,000,000 gallons of water on site, wide gravel roads, ponds, and many large irrigated areas. Fuels are generally light to moderate loads of short grasses (Fuel Model 1) and sage with grass understory (Fuel Model 2). Some of the outbuildings have shake roofs, but the main residence has ignition resistant construction. There are some steep slopes here, but the area around the structures is relatively flat. Access to all of these structures is excellent. Sheep Mountain has two homes on large lots. These homes have stone/wood siding and asphalt roofs. There are steeper slopes below these homes, but the area within 50 feet of the structures is low angle. Fuels here are similar to those of Hidden Valley, except for some ornamental plantings near the homes that have been limbed up and are on irrigated lawn.

Comments & Mitigation Notes:

Maintain defensible space.

4.2.2. Parcel-Level Assessments

The Greystone Anchor Point team conducted assessments of 188 parcels in the project area from July 25 to 30, 2004. The project team started with Priority Area 1 and concluded with Priority Area 4 (**Figure 2-1**). Because the number of parcels and structures was significantly higher than that identified in the project description (158 parcels), one structure was surveyed per parcel and the remaining structures were listed in the project description. A 1-page description was prepared for every parcel. These are provided to BLM under separate cover to protect the privacy of the landowners. Greystone is working with the PCFPD #2 to send the assessments to the landowners before the second public meeting.

4.3 UNIQUE REGIONAL AND SITE-SPECIFIC WILDLAND FIRE SEVERITY FACTORS

The probability of increased fire ignitions and severe fire behavior is influenced by several local factors in the Shoshone project area. These factors include the topography, significant insect-related tree mortality adjacent to the project area, heavy fuel loads in the drainages, and a drought currently affecting the region.

The topography of the project area is dominated by a typical U-shaped river valley. It runs west to east from Yellowstone National Park to the town of Cody. This valley could channel winds, especially east or west winds, moving through the project area. Channeled wind creates wind-driven burning conditions which often result in extreme fire behavior. The project area is sage dominated, which burns easily and very intense under wind-driven conditions. Wind driven fires can be difficult to control.

Bark beetles have killed thousands of trees in the forested areas west of the project area. Increased fuel loads resulting from this mortality have raised the potential for extreme fire behavior. Extreme fire behavior could result in long range from a fire in these stands. Lofted firebrands could cause ignitions in the project area. Sage tends to be very receptive to firebrand ignitions.

The majority of the drainages running north and south through the project area contain heavier fuel loads than the surrounding upland areas. These drainages could exhibit extreme fire behavior during the dry times of the year. Fire could easily move up any drainage and rapidly increase in intensity.

For the past several years much of the intermountain west, including the project area, has experienced drought conditions. These conditions have lessened the seasonal variation in fuel moistures, thus creating a moisture deficit in the plants and an environment conducive to ignitions. Much of the vegetation in the project area is stressed and could burn easily under the right conditions.

5.0 VALUES TO BE PROTECTED

This section identifies the values to be protected within the Shoshone River project area. Values are those features which are susceptible to damage from a wildland fire. This section presents an assessment of economic, ecological, and social values to be considered in planning fire mitigation projects or in fighting wildland fires. This section concludes with a discussion of the prioritization of those values.

5.1 ASSESSMENT OF ECONOMIC VALUES

The Park County Chamber of Commerce, the Cody Country Chamber of Commerce, and BLM RAMS data were consulted to identify the economic values in the project area. Agriculture, consumptive commodities, community infrastructure, and tourism are discussed. Field observations were used to expand descriptions.

5.1.1. Agriculture

Agriculture is a significant component of the Park County economy. The Park County Land Use Plan identifies sustaining the agricultural business as a primary goal and objective for the county (Park County Commissioners 1998). In Park County, there are more than 700 farms in more than 800,000 acres (USDA 2002). The market value of crops sold in 2002 was estimated at $52.9 million for Park County (USDA 2002).

A small amount of agriculture was observed in the project area. Farming of alfalfa was observed along the north side of Highway 14, near Wapiti. The South Fork of the Shoshone River also has land used for farming. The Land Use Plan identifies the Middle Southfork and Lower Southfork planning areas as locations for continued agriculture use (Park County Commissioners 1998).

5.1.2. Consumptive Commodities

Consumptive commodities in the project area include timber, grazing, and watershed resources.

Timber

Timber harvesting is conducted on Forest Service and private land outside of the project area, but none is occurring within the project area (Dawson 2004, Mononi 2004). An active timber sale was conducted on BLM land within the Sheep Mountain community (BLM 2003). Some merchantable timber has been identified on BLM land on Rattle Snake Mountain. The project includes some thinning for a potential fuel break and a timber sale, scheduled for 2006 (Mononi 2004). The area may have 200 to 300 acres of potential timber that has not yet been quantified (Saville 2004a). If the drought and beetle epidemic continue, the BLM will likely look at other timber harvest projects in the project area (Mononi 2004).

Grazing

BLM-administered lands in the project area are included in allotments established for livestock grazing. The timing of the grazing varies and is generally on a rotational basis with either cattle or horses. The lower elevation areas are generally used in the early spring, fall, and winter; the upper elevation areas often have a summer grazing treatment included in the rotation. In the project area, there are 86 grazing allotments encompassing 124,000 acres (Saville 2004a, Mononi 2004).

Watershed

The project area is located within the North Fork Shoshone, South Fork Shoshone, and Shoshone watershed. Surface waters in the project area have received a classification rating by the Wyoming Department of Environmental Quality, Water Quality Division (2001). Class 2AB waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use. These waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture, and scenic values uses. Class 2C waters include only permanent and seasonal nongame fisheries. Uses designated for Class 2C waters include nongame fisheries, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture, and scenic values uses. Class 3B waters are tributary waters including adjacent wetlands that are not known to support fish populations or drinking water supplies and where those uses are not attainable (Wyoming Department of Environmental Quality 2001).

The assessment area includes a number of creeks which flow to the North and South Forks of the Shoshone River. Each water's classification is noted in parentheses. There are a number of creeks which flow to the North Fork of the Shoshone River (2AB), including Big Creek (2AB), Wall Creek (3B), Dunn Creek (3B), Trout Creek (2AB), Rattlesnake Creek (2AB), Trail Creek (3B), Lost Creek (3B), Canyon Creek (3B), Green Creek (2C), Rand Creek (3B), Whit Creek (2AB), Slack Creek (3B), Breteche Creek (3B), and Post Creek (3B). The South Fork of the Shoshone River (2AB) receives Bear Creek (2AB). The North and South Forks of the Shoshone River converge on the Buffalo Bill Reservoir (2AB). The Shoshone River exits the Reservoir to flow east to Cody.

5.1.3. Community Infrastructure

Community infrastructure in the project area is described below including power, communication, transportation, manufacturing, water, fuel, healthcare, and waste resources.

Power

Pacific Power provides electricity to the project area. Distribution lines were observed throughout the project area. The WAPA substation, located approximately 18 miles east of Wapiti, is the only power substation within the project area (McDowell 2004).

Communication

Telephone and cellular phone service are provided to the project area by Qwest, Cellular One, and Verizon Cellular (Cody Country Chamber of Commerce 2004). Cellular phone towers are visible from the highway throughout the project area.

Transportation

The project area communities on Rattlesnake, Logan, and Sheep Mountains are accessed via Public Access Roads, County roads, and State/Federal highways (BLM 2003). Communities in the South Fork drainage are accessed via Public Access Roads and County roads (BLM 2003).

Manufacturing

No major manufacturing facilities were observed in the project area. The project area contains limited commercial development. Businesses such as convenience stores, agriculture, ranching, camps, resorts, and stables were observed dispersed throughout the project area.

Water Storage and Distribution

No public water service is available for residents within the project area; residents use wells or cisterns. One exception is the Buffalo Bill Visitor Center, which has water trucked in from Shoshone Municipal Pipelines. The Bureau of Reclamation operates a water substation, just east of the dam, which provides water to Shoshone Municipal Pipelines, a generating station, power plants, and an irrigation district. Additionally, Shoshone Municipal Pipelines has two stations that are located within the project area, an underground emergency pump station at 12 Hayden Arch Road, and a booster pump station (structure) at 4818 North Fork Highway (Anderson 2004).

Fuel Storage

Natural gas is not distributed to residents of the project area (Thomas 2004). Residents of the project area have propane tanks at their homes, which are serviced by Blakeman Propane, Inc. (Williams 2004).

Healthcare

There are no hospitals or healthcare facilities in the project area. Residents commute to Cody for these services.

Landfills and Waste Treatment Facilities

There are two means of solid waste disposal for residents within the project area. Some residents haul their own trash to the Cody landfill, located east of the project area at 7753 Highway 120, Cody, Wyoming (Park County Chamber of Commerce 2004). Also, many residents in the project area use a private pick-up service, Keele Sanitation (Keele 2004).

There is not a waste treatment facility within the project area. Residents have individual septic systems at their homes (Sennitte 2004).

Other

Within the project area, most other services are provided in Cody. Wapiti has a church, kindergarten through 5th grade elementary school, and post office.

5.1.4. Tourism

Tourism is a significant component of the economic health of the project area. Lodging taxes alone bring in more than a million dollars annually to Park County (Park County Travel Council 2004). The Cody Country Chamber of Commerce estimates that total visitor spending in Park County in the year 2002 was 183 million dollars (Bryan 2004).

Tourism in the area is seasonal, with peak visitation occurring from the middle of May until the beginning of October. The major tourist attractions include Yellowstone National Park, Shoshone National Forest, the Buffalo Bill Dam Visitor Center, the Buffalo Bill Historical Center, the nightly rodeo, wild horse tours and mountain biking on BLM land, fishing, and hunting in the fall (Bryan 2004).

Fires can have a significant effect on the local tourism economy and are a primary concern of residents (Morrison 2004). Cody is the gateway city to the East entrance of Yellowstone National Park. In August 2003, the East and Grizzly Fires burned more than 23,000 acres of eastern Yellowstone National Park. That same summer, the Norris Creek and Blackwater Fires burned more than 6,500 acres in the North Fork Drainage of the Shoshone River (High Country Observer 2004). Due to the fires, the East entrance to Yellowstone National Park was closed, which had a negative impact on the tourist economy in Cody. However, Cody is fortunate in that tourists staying there have an alternative in the Northeast entrance to the park. Also, while fires do impact businesses that used for nightly stays, businesses such as dude ranches that provide longer-term stays and alternative activities on-site are not as affected by fires (Bryan 2004). Gene Bryan (2004) of the Cody Country Chamber of Commerce attributes the relative success of the Cody tourist industry during times of fire to Wyoming Travel and Tourism's daily website updates, which allow potential visitors to be aware of current local conditions.

Recreation

The project area is a popular recreation area for both local residents and visitors. It includes developed recreation sites, opportunities for dispersed camping, hunting, water-based activities, and hiking dispersed throughout the project area, both north and south of the highway.

Portions of the project area are located within or adjacent to the Buffalo Bill State Park. There are two developed campgrounds in the park within the project area. The North Shore Bay campground is 9 miles west of Cody, on Highway 14. It contains 35 sites and is open year-round. The North Fork campground is located 14 miles west of Cody, on the Highway 14. It contains 62 sites and is open April 1 through October 31. Hiking trails and fishing are easily accessible from both of these campgrounds (Wyoming Department of State Parks and Cultural Resources 2004).

The project area is a popular destination for fishing and hunting by both local residents and visitors (Hurley 2004; Saville 2004a). Hunting primarily occurs between October and December and the majority of licenses are issued for elk and deer. There are also licenses issued for big horn sheep, moose, upland game birds, and waterfowl (Hurley 2004). During the field visit, markers for fishing access were seen all along highway through project area.

Hiking and off-road vehicle use (limited to existing roads) are also recreation attractions within the project area on both private and public lands. Sheep Mountain, in particular, is a destination for hiking and off-road vehicle use by local residents and visitors (BLM 2003; Saville 2004a). The western boundary of the project area is adjacent to the Shoshone National Forest boundary where there are abundant hiking opportunities. The Table Mountain trailhead is located on Green Creek, at the Shoshone National Forest boundary.

5.2 ASSESSMENT OF ECOLOGICAL VALUES

This section discussed the ecological values to be considered in wildland fire mitigation in the project area, including ecosystem health, wildlife habitat, threatened and endangered species, air, soil, and water quality, and noxious weeds.

Biological Diversity and Ecosystem Health

Overall, biological diversity and ecosystem health in the project area are good (Saville 2004a). Beetle-kill of the area's forests is affecting ecosystem health (Saville 2004a). Large areas of dead and dying trees were seen in the western portion of the project area during field work.

During field work, rabbits, squirrels, chipmunks, and deer were observed on private land in the project area. Several residents also reported the presence of grizzly bears and elk, especially in the western portion of the project area.

Wildlife Habitat

The project area contains habitat for a wide variety of wildlife species (Saville 2004b). Yearlong and important winter range habitat for big game mammals including mule deer, elk, bighorn sheep, and antelope occurs along both sides of the North Fork of the Shoshone River valley. Sagebrush/bunch grass and mountain shrub/grass vegetation communities provide important forage for these species. The conifer timber located at the higher elevations provides thermal and hiding cover for deer and elk and the higher elevation rocky outcrops provide secure escape habitat for bighorn sheep. Antelope use the lower sagebrush-covered slopes. This area supports most of the antelope still remaining in the North Fork of the Shoshone River valley (Saville 2004b).

The current populations for mule deer and bighorn sheep are near the Wyoming Game and Fish Department's objective levels. Elk populations have been over the objective levels in recent years but have been reduced by extended hunting seasons. The small antelope herd remaining along the North Fork is included in a much larger herd unit, but an objective for this specific area would be to maintain and sustain the existing antelope population.

Upland game birds observed on public lands in the project area include sage grouse, blue grouse, chukar and hungarian partridge, and doves. The sagebrush/bunch grass habitat that is the predominant vegetation provides nesting cover and forage for these birds. Although no identified sage grouse lek sites have been located on public lands in this area, the presence of grouse during the spring period and good suitable nesting cover indicates that these public lands do provide sage grouse nesting habitat. Suitable nesting cover for partridge also occurs on this identified area. Doves are migratory but may nest in limited numbers along riparian corridors. Blue grouse are found at the higher elevations in mixed timber habitat. Numbers of blue grouse on BLM lands are low but increase on forested areas of the adjacent Shoshone National Forest.

Carnivore species that use public lands in the project area include: coyotes, mountain lions, black bear, grizzly bear, badger, fox, and weasel. Although no specific observations have been recorded, other potentially occurring species include: wolves, marten, bobcat, and possibly lynx. Most of these predator species are found in this area because of the significant ungulate and small mammal populations and the lack of human developments on public lands. Surrounding private lands habitat has been changed by human developments and year-round human presence.

Habitat on the public lands also supports many small mammal species and many species of migratory birds. Potentially occurring BLM sensitive species include: peregrine falcon, long-billed curlew, sage thrasher, sage sparrow, Brewers sparrow, Bairds sparrow, and white-tailed prairie dog. Most of these species are associated with sagebrush/grassland habitat types.

Some riparian habitat occurs along Slack Creek, beside seeps in the upper portion of the Slack Creek drainage, around Stonebridge Reservoir and along irrigation ditches that come out of the reservoir. There are no fisheries associated with any of these riparian zones on public land. Stonebridge Reservoir (all on private land) does support a trout fishery. Slack creek might have some potential fish habitat but the flow on the public land is minimal and there are barriers between the North Fork of the Shoshone River and the Slack Creek public land section. Prairie rattlesnakes have been observed at lower elevations, and blue-bellied lizards occur in rocky areas. No amphibians have been observed in this area but there is potential for toads and salamanders to be found in riparian zones.

Field observations were conducted in order to determine the dominant vegetation on private land within the project area. Sagebrush/perennial grasses is the dominant system throughout most of the project area. However, some communities also contain a fair amount of riparian/deciduous habitat, juniper, or limber pine.

Threatened and Endangered (T&E) and Endemic Species

Grizzly bears and bald eagles are the only known threatened and endangered species in the project area (Saville 2004a). The forested areas along drainages on Rattlesnake and Sheep Mountains are potential grizzly bear habitat. There are winter roosting and perching sites for the bald eagle along the Shoshone River west of the Reservoir. The Northern Rocky Mountain Wolf has been observed in the vicinity (Saville 2004b). The project area also contains potential lynx habitat. Lynx are known to exist on the adjacent Shoshone NF but have not been observed within the project area. The habitat in the project area would be considered marginal at best (Saville 2004a).

Grizzly bears have been observed on several occasions (primarily between May and June, but also in October) and a female with cubs has been observed in most years since about 1995 in this general area. Most of the lower elevation habitat does not provide suitable foraging or hiding cover for grizzly bears. The higher elevation slopes provide some forage forbs and grasses utilized by bears and timbered areas may provide suitable bedding and shelter sites. Primary use by bears likely occurs in spring and fall during green up and pre-hibernation periods and then only at the higher elevations. Ungulate carcass remains from winter kill or during hunting seasons may also be a food source for bears.

Wolves have not been observed to date on public lands, but have been observed in the North Fork valley. Ungulate use would also be the primary attraction of wolves to these public lands.

Bald eagles may occasionally cruise through these lands and could temporarily occupy the area if a food source such as an ungulate carcass or other carrion is available. This would likely be only short-term use and no known nesting or roosting sites are located on these lands. This area is not included in a lynx habitat analysis unit, and the lands being reviewed do not have suitable timber habitat for snowshoe hares and would not be considered important habitat for lynx. However, this area could provide a travel corridor and transitional habitat for lynx that could potentially use forested habitat on the Shoshone National Forest, but no lynx have been observed or documented near the area.

Appendix B lists plant and animal species of concern in Park County.

Air Quality

Air quality in the project area is generally good. The area is in attainment for all criteria pollutants. The closest non-attainment area is Sheridan, Wyoming for particulate matter (PM-10) (EPA 2004). Airsheds within the project area have moderate receptor sensitivity (BLM 2003).

The Washaki and North Absaroka Wilderness Areas located immediately west of the project area are Class 1 air sheds (EPA 2001). The entire project area is classified as a Class 2 air shed. Annual prevailing winds are from the north and usually carry smoke away from these wilderness areas. The Cloud Peak Wilderness area, also a Class 1 airshed, is located more than 120 miles east of the project area. It could be impacted from large prescribed fires during the winter time when prevailing conditions facilitate high lofting.

Prescribed fire projects require a permit from the Wyoming Department of Environmental Quality.

Water Quality

There are three Wyoming surface water classifications in the project area. Each water's classification is provided in Section 5.1. Several of the waters within the project area are Class 2AB, waters with sufficient quality and quantity to support drinking water supplies. Class 2AB waters are protected for drinking water and other uses. One water in the project area is Class 2C, a nongame fishery water. There are several Class 3B waters in the project area, those not known to support fish populations or drinking water supplies, but that can support other communities of aquatic life (Wyoming Department of Environmental Quality 2001).

Soil Quality

The mountain and river valley topography in the project area has resulted in soils formed from volcanic bedrock, shale, and sandstone (BLM 2004). Soils are typically well developed, productive, and susceptible to erosion. The erosion hazard over most of the project area is high and extreme. Erosion values were predicted in the Absaroka Fire Management Unit, which includes the project area, using the Forest Service Water Erosion Prediction Project (WEPP) interface. WEPP predicted that erosion values following a wildland fire could average 9 tons per acre and exceed 45 tons per acre in a worst case scenario (BLM 2004).

Noxious Weeds

Noxious weeds can be introduced or spread as a result of fire mitigation projects, prescribed fire, or wildland fire. Park County does not have their own regulations for noxious weeds, but follows the Wyoming Weed and Pest Control Act of 1973. The Wyoming Weed and Pest Council listed the following noxious weeds and pest for Park County (Wyoming Weed and Pest Council 2004a):

black henbane *(Hyoscyamus niger L.)*
bull thistle *(Cirsium vulgare (Savi) Tenore)*
common mullein *(Verbascum thapsus)*
flixweed *(Descurainia sophia)*
redstem filaree *(Erodium cicutarium (L.) L'Her. Ex Ait.)*
showy milkweed *(Asclepias speciosa)*

The Park County Weed and Pest Control District manages noxious weed prevention and control in the project area. They established the South Fork Weed Management Area in 1991. This area includes the southern half of the Buffalo Bill Reservoir. It was established primarily to reduce dalmatian toadflax (*Linaria dalmatica* (L.) Mill.) and to prevent the invasion of new species in the area, particularly spotted knapweed (*Centaurea maculosa* Lam.). Both of these species are listed on the Wyoming Weed and Pest Council designated list of noxious weeds, although they are not found on the 2003 list for Park County (Wyoming Weed and Pest Council 2004b).

The Park County Weed and Pest Control District plans to establish a North Fork Weed Management Area in 2005. The purpose of this management area will be to respond to an increase in leafy spurge (*Euphorbia esula* L.) and prevent the spread of all noxious weeds in the area.

The Park County Weed and Pest Control District indicated that they have observed outbreaks of dalmatian toadflax after both prescribed fires and wildland fires (Parsons 2004). They are also concerned with the spread of spotted knapweed after any soil disturbance associated with fire mitigation projects, prescribed fire, or wildland fire (Parsons 2004). The District meets with agencies, including BLM, annually to coordinate weed control efforts. All mitigation projects should be coordinated with the Park County Weed and Pest Control District.

BLM has also identified the following weeds of concern in the Absaroka Fire Management Unit, which includes the project area (Saville 2004b):

Musk thistle *cardus nutans*
Hoary cress (Whitetop) *Cardaria draba*
Russian knapweed *Centaurea repens*
Spotted knapweed *Centaurea maculosa*
Canada thistle *Cirsium arvense*
Houndstongue *cygnoglossum officinale*
Dalmation toadflax *Linaria dalmatica*
Saltcedar *Tamarix Ramosissma ledeb*
Cheatgrass *Bromus tectorum*

During field work an abundance of bull thistle (Cirsium vulgare (Savi) Tenore) was seen in the communities north of the Buffalo Bill Reservoir. Also, cheatgrass (Bromus tectorum L.) was observed to be abundant throughout the project area.

5.3 ASSESSMENT OF SOCIAL VALUES

Local residents have identified a number of social values worthy of protection in the project area. This section briefly discusses social values including quality of life, aesthetics, private property, livestock and pets, livelihood, and historical resources.

Quality of Life

Local residents live in the project area because they value their quality of life. They value the open spaces, the views in the area, their solitude, and the seclusion that the area offers. Most residents prefer minimal interaction and interference from others, including governmental agencies. With respect to wildland fire, property owners have expressed concern that mitigation on private land is irrelevant without significant work by the adjacent Shoshone National Forest (Morrison 2004).

Aesthetics and View

In discussions with local residents, they identify the view from their homes as one of the most valued resources of the area. The topography offers residents and visitors spectacular long-range views of mountains, hills, and valleys.

Home and Property

Residents indicated during the public meeting that they are interested in protecting their residents and property from wildland fire. The project area contains a large range of private property including small, primary residences, large second homes, home businesses, ranches, and other businesses.

Air Quality

Residents value the local, good air quality primarily for the views it affords. The air quality also provides clean air for breathing without odor from pollution or smoke.

Livestock and Pets

Dogs and horses were observed within all communities during field work. Also, some homes in the South Fork Shoshone drainage have llamas.

Livelihood

A number of residents support themselves with small businesses in the project area. Motels, ranches, small businesses, agriculture, camps, resorts, stables and small stores were observed in the project area. The western portion of the project area contains several ranches and lodges (for example, Green Creek Lodge and Rimrock Dude Ranch) and home businesses (for example, construction). Home businesses are also present in the northern portion of the project area (for example, cabins for rent and an outfitter).

Local residents also commute to Cody for work. **Table 5-1** reports the major employers in Cody (Cody Country Chamber of Commerce 2004).

TABLE 5-1 EMPLOYERS IN CODY

Major Employers	Product	Number of Full-Time Employees
Cody Lumber	Lumber Products	47
Buffalo Bill Historical Center	Museum	104
Celotex Corporation	Dry Wall	67
Holiday Inn Convention Center	Hotel	70
Y-Yex Corporation	Ag Products	145
Wal-Mart	Retail	200
Marathon Oil (Cody and Oregon Basin)	Oil	90
School District #6	Education	375
West Park Hospital, Long-term Care Center, and Chemical Dependency Centers	Health	472

Table 5-2 lists the employment by industry for Park County in the year 2000 (Wyoming Department of Administration and Information 2004).

TABLE 5-2 PARK COUNTY EMPLOYMENT SECTORS

Type of Employment	Percent of Total Employment
Farm and Agricultural Services	7.0
Farm	4.6
Agricultural Services	2.4
Mining	3.2
Manufacturing (including forest products)	4.4
Services and Professional	58.1
Transportation and Public Utilities	3.2
Wholesale Trade	2.1
Retail Trade	17.0
Finance, Insurance and Real Estate	7.1
Services (Health, Legal, Business, Others)	28.7
Construction	8.4
Government	18.9

Cultural/Historical Sites and Features

A variety of inventories to determine the presence or absence of cultural resources have been conducted in the planning area over the last 20 years (Chase 2004). These inventories have been conducted in response to energy-, highway-, range-, and realty-related activities requiring compliance with Section 106 of the National Historic Preservation Act. Inventories have identified many known sites of both prehistoric and Historic ages. Approximately 40 percent of the known sites have been determined eligible for the National Register of Historic Places and approximately 40 percent of the known sites have been determined not eligible for the National Register. The remaining sites have their eligibility for the National Register listed as unknown.

The known sites occur throughout the planning area. Known site types provide a cross section of Wyoming and Big Horn Basin Archaeology and range in age from 11,000 years ago to relatively recent Historic time. Known prehistoric site types include camp/habitation sites, lithic scatters, cairns, sites with ceramics, rock alignments, isolated hearths, trails, stone circles, quarries, graves, and rock art. There are likely additional types which have not yet been identified, and there are many more known sites that have not yet been recorded or evaluated. Known Historic period sites types include a dam, ditches and canals, trails and roads, stage and wagon routes, bridges, homesteads, corrals and livestock facilities, barns, oil and gas facilities, trash dumps, graves/cemetery, and historic inscriptions. It is also likely that other Historic period site types exist but have not yet been identified and there are many more known sites that have not yet been recorded or evaluated.

The true extent and nature of archaeological and historical resources in the project is not known because the area has not been completely or systematically inventoried. Inventories will continue to be conducted in response to land use applications on public lands.

Illegal collection of artifacts (both prehistoric and Historic), defacement of rock art and Historic inscriptions, illegal digging in prehistoric and Historic sites (aka Pot Hunting), rock collecting, recreational activities (both controlled and uncontrolled), livestock operations, construction, and other legal and illegal activities have contributed significantly to the degradation of the resource in the project area.

In addition to the resources on public lands, the landowner at 108 Green Creek reported petroglyphs on the property during field work.

5.4 PRIORITIZED VALUES TO BE PROTECTED

The Greystone Anchor Point team has identified five values to be protected as priorities in the project area. Any ranking process for values is inherently subjective and should be continuously updated by land managers.

Protection of life and fire fighter safety are always the highest priority in fire management. Based on the discussion of values above, the following resources should also be prioritized in fire planning:

- Watershed – Water is a precious and finite resource throughout the west. Fires have the potential to cause soil erosion and sedimentation of water resources.
- Tourism – Tourism is a significant economic component of the local economy. Wildland fires that deter tourists from the project area can have a detrimental effect on the area's businesses, residents, and economy.
- Private property and infrastructure – Destruction of private property or infrastructure in the project area would have a significant economic and social impact on local residents and businesses.
- Aesthetics – Residents and visitors value the project area for its open spaces and views. Wildland fires can affect these views both through altered landscape and visible smoke.
- Recreation – Both residents and visitors use recreation resources throughout the project area. Wildland fires can destroy recreation opportunities and prevent access to recreation areas.

6.0 ASSESSMENT OF FIRE PROTECTION AND PREPAREDNESS AND CAPABILITY

PCFPD #2 provides fire suppression services for the project area. The department has six fire stations; three provide service to the majority of the project area: Station 1 located in Cody; Station 4 at the corner of Highway 14 and Road 6GV (Jim Mountain Road); and Station 5 at Pahaska Tepee Park. Of these, Station 4 should provide the fastest response to most of the high hazard communities in the project area. Station 2 would most likely provide the fastest response to the Hidden Valley/Sheep Mountain and South Fork areas. Dispatch records indicate that the average time from dispatch to first engine rolling is approximately 3 minutes.

Discussions with PCFPD #2 officers indicated that radio communications, lookout locations, and potential safety zones for firefighters are generally adequate throughout the project area. Fire department officers were confident that their existing resources were adequate to effectively combat WUI fires threatening a small number of homes. The biggest concern cited was the availability of water for fire suppression. Recommendations to improve water supply is discussed in Section 4.5.1 under the *Comments and Mitigations* section of each community summary.

Mutual aid to PCFPD is available from the Meeteetse Fire District (two Type 6X engines, one Type 4X engine, and one water tender, 30 miles away), Powell Fire District (one Type 4X engine and three Type 1 or 2 pumpers, 25 miles away), Clark Fire District (one Type 6X engine, one Type 3 engine and one water tender, 30 miles away), the Shoshone National Forest (one Type 4X engine, two Type 6X, two hand crew squads, five person squads) and the BLM North Zone (one Type 6X engine, in Cody). There is also a type 3 helicopter available with an approximately 1.5-hour response time.

PCFPD maintains the following resources:

- Station 1 in Cody is staffed by 30 volunteer firefighters who respond to all fires in the district. Station 1 contains the following equipment:
    - Engine 1 – 1,500 gallon per minute pumper; 1,000 gallon tank; all National Fire Protection Association (NFPA) 1901 equipment
    - Engine 3 - 1,500 gallon per minute pumper; 3,000 gallon tank; all NFPA 1901 equipment
    - Engine 6 – 1,500 gallon per minute pumper; 500 gallon tank; 50 foot telesquirt; all NFPA 1901 equipment
    - Engine 4 - 750 gallon per minute pumper; 1,400 gallon tank; all NFPA 1901 equipment
    - Squad 7 - Heavy rescue equipment truck. Contains additional self-contained breathing apparatus (SCBA), extra breathing air, hydraulic rescue tools, generator, entry saws, ventilation fans, salvage covers, etc.
    - Rescue 8 - Light rescue truck
    - Engine 2 - Brush truck
    - Engine 5 - Brush truck

- Station 2 is located 13.5 miles south of Cody on the Southfork Highway. It is staffed by 11 volunteers and contains one engine: Engine 11 - 350 gallon per minute pumper, 1,000 gallon tank; all NFPA 1901 equipment.

- Station 3 is located 35 miles south of Cody on the Southfork Hwy. It is staffed by 5 volunteer firefighters and contains one following engine: Engine 10 - 450 gallon per minute pumper; 1,000 gallon tank; all NFPA 1901 equipment.

- Station 4 is located 20 miles west of Cody at the intersection of Jim Mountain Drive and the Highway 14. It is staffed by 5 volunteer firefighters and contains one engine: Engine 14 - 250 gallon per minute all wheel drive pumper; 500 gallon tank; NFPA 1901 equipment.

- Station 5 is located 50 miles west of Cody at Pahaska Lodge. It is staffed by 2 volunteers and contains one following engine: Engine 9 - 500 gallon per minute all wheel drive pumper; 750 gallon tank; NFPA 1901 equipment.

- Station 6 is located at the Way West Subdivision in Sunlight Basin. It is staffed by 6 volunteer firefighters and contains the following:
    - Engine 16 - 250 gallon per minute all wheel drive pumper; 750 gallon tank; all equipment to qualify as an ISO Class 9 engine
    - Engine 18 - Brush truck

PCFPD #2 employs three full time employees and has 60 volunteer firefighters. All of the PCFPD #2 firefighters have National Wildfire Coordinating Group (NWCG) S-130/190 training (basic wildland fire fighter training and fire behavior). Seven firefighters are qualified as a Single Resource (Crew Boss/Engine Boss level or higher). All firefighters are certified to at least Firefighter II by the State of Wyoming. All officers are certified to at least Fire Officer I by the State of Wyoming.

PCFPD #2 responded to 191 WUI ignitions in the last 5 years. This included 41 in 1999, 34 in 2000, 40 in 2001, 46 in 2002, and 30 in 2003.

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SHOSHONE RIVER AREA WILDLAND URBAN INTERFACE RISK ASSESSMENT AND MITIGATION PLAN

MITIGATION PLAN

EXECUTIVE SUMMARY

Greystone Environmental Consultants, Inc. and Anchor Point Group (the Greystone Anchor Point team) conducted an assessment of the wildland fire hazard and risk in four priority areas. These areas were divided further into 18 communities for hazard analysis. Of the 18 communities in the project area, none were found to represent an extreme or very high hazard; seven were identified as having a high hazard, eight as moderate hazard, and three as low hazard.

There are no landscape-level recommendations for fuel breaks or prescribed fire in the project area. Continued use of prescribed fire on public lands will benefit the ecosystem and return vegetation to more healthy and historic conditions. Neither prescribed fire or fuel breaks at a landscape-scale will provide significant protection to private property and infrastructure in the wildland-urban interface. Instead, defensible space is recommended for private property owners in the project area.

This report recommends mitigation by community, as ranked in the community assessment in Part I. This plan identifies defensible space as the most important mitigation recommendation. An aggressive program to implement defensible space for every home, prioritized by community hazard rating, is recommended. Once all interested landowners have created defensible space, mitigating access routes by prioritized community is also recommended. Further mitigation recommendations by community, such as providing cisterns, are provided with each community summary.

Several general recommendations are also discussed for addressing residences, emergency response planning, fire department preparedness, community education, and insect surveys.

This mitigation plan also includes a discussion of the roles and responsibilities of the agencies involved. It concludes with a brief discussion of funding resources.

1.0 BACKGROUND

This section briefly summarizes the existing situation and organization structure that are described more fully in the community assessment.

1.1 EXISTING SITUATION

The Shoshone River project area is addressed in this mitigation plan. The project area is located along the North and South Forks of the Shoshone River extending from the Shoshone National Forest boundary on the west to Cody, Wyoming in the east. Four priority areas made up of primarily private land were identified for assessment by the Bureau of Land Management (BLM) and the Park County Fire Protection District (PCFPD) #2 (**see Figures 2-1** and **2-2** of the Community Assessment).

Greystone Environmental Consultants, Inc. and Anchor Point Group (the Greystone Anchor Point team) conducted an assessment of the wildland fire hazard and risk in the priority areas. These areas were divided further into 18 communities for hazard analysis. Of the 18 communities in the project area, none were found to represent an extreme or very high hazard; seven were identified as having a high hazard, eight as moderate hazard, and three as low hazard.

The Greystone Anchor Point team also conducted assessments of 188 parcels in the project area, 2004. A 1-page description was prepared for every parcel. These are provided to BLM and the PCFPD #2 under separate cover to protect the privacy of the landowners.

The Greystone Anchor Point team also summarized an extensive list of values to be protected in the project area. Five were identified priorities for protection in the project area. Protection of life and fire fighter safety are always the highest priority in fire mitigation and suppression. Other prioritized values include: watershed, tourism, private property and infrastructure, and recreation.

The majority of the project area is considered at a high risk for WUI fires. From 1992 to 2003, the Absaroka Front fire management unit had 41 fires affecting more than 17,000 acres. Approximately 80 percent of the fires were ignited by lightning and 20 percent were human-caused. The PCFPD #2 reports responding to an estimated 35 to 50 wildland fire calls per year in the project area.

The probability of increased fire ignitions and severe fire behavior is influenced by several local factors in the Shoshone project area. These factors include the topography, significant insect-related tree mortality adjacent to the project area, heavy fuel loads in the drainages, and a drought currently affecting the region.

1.2 ORGANIZATIONAL STRUCTURE

This report has been overseen by the BLM and PCFPD #2. The Greystone Anchor Point team has worked with these two agencies to facilitate the involvement of other agencies and the public. Project implementation has included communication with the Park County Commissioners, the Shoshone National Forest, and the Wyoming State Forester. Two public meetings will be held to involve and educate the public. The BLM and PCFPD have joint responsibility for implementing any recommendations in this mitigation plan.

2.0 GOALS AND OBJECTIVES

Based on congressional direction, the BLM seeks to reduce the hazard of wildland fire through the Communities at Risk Program. The purpose of the program is to reduce the risk of wildland fire in WUI communities through education, prevention, hazardous fuels reduction, and increasing fire protection capabilities. The Shoshone River area assessment and mitigation plan has been conducted as part of this program. This section identifies the goals and objectives for the mitigation plan. There are three goals for this project:

1. Enhance life safety for residents and responders.
2. Mitigate (limit) wildland fire damage to property and infrastructure.
3. Mitigate wildland fire damage to the environment, quality of life, and other values to be protected.

In order to accomplish these goals, the following objectives have been identified:

1. Establish an approximate level of risk (the probability of an ignition occurrence) for the project area.
2. Provide a scientific analysis of the fire behavior potential of the project area
3. Group values-at-risk into "communities" that represent relatively homogenous hazard factors
4. Identify and quantify factors that mitigate the wildland fire hazard to the communities and their values to be protected
5. Recommend specific actions that will reduce hazards to the values-at-risk

3.0 STRATEGIC PLAN / DESIRED CONDITION

The desired condition of the project area is to use fuel treatments to reduce the threat of significant impacts from wildland fire in the project area. Treatments should reduce both the dangers associated with fire suppression for fire fighters and the risk to the general public.

The composition of forest and rangeland should more closely mimic their natural range of variability. These ecosystems will then be more likely to function in a healthy manner and be more tolerant to fire. Desired conditions for plant communities are described in detail in BLM's draft Fire Management Plan (BLM 2004).

As part of the desired future conditions, vegetation treatments should be designed to ensure the overall ecological health of treated areas. Noxious weeds and invasive species should be managed to prevent their introduction or spread. Riparian communities will be managed to protect the area's hydrology.

The most important aspect of the desired future condition in the project area is homeowner education and awareness. Creating defensible space around private property is the first priority in this mitigation plan.

4.0 TACTICAL PLAN

This section presents the tactical plan for addressing wildland fire hazard in the project area. Landscape level, community, and general recommendations are discussed below.

4.1 LANDSCAPE-LEVEL RECOMMENDATIONS

There are no landscape-level recommendations for fuel breaks or prescribed fire in the project area. Continued use of prescribed fire on public lands will benefit the ecosystem and return vegetation to more healthy and fire-adapted conditions. Neither prescribed fire or fuel breaks at a landscape-scale will provide significant protection to private property and infrastructure in the wildland-urban interface. Instead, defensible space is recommended for private property owners in the project area.

Conifer stands occur primarily in stringers and patches rather than as continuous canopy throughout the project area. These stands are highly susceptible to wildland fire due to their density and high mortality from beetle infestation. For more properties, if continuous fuel loads exist near residences, they are predominantly sage and short grasses. Some individual properties bordering the Shoshone National Forest would benefit from a shaded fuelbreak. However, creating defensible space around each building would be far more effective in reducing the overall threat of wildland fire to the majority of homes in the project area.

Given the fuel types present in the project area, landscape-scale fuel breaks are not likely to increase life safety or property conservation. Community- and parcel-level recommendations are therefore emphasized for the project area.

4.2 COMMUNITY-LEVEL RECOMMENDATIONS

The Greystone Anchor Point team recommends addressing mitigation by community in the order listed in **Table 4-1**. The community assessment identified seven of the 18 communities in the project area at high hazard. Construction type, condition, age, fuel loading of the structure and its contents, and location are all contributing factors in making homes more susceptible to ignition under even moderate burning conditions. Under extreme burning conditions, rapid fire growth and spread is possible in these areas due to steep topography and fast burning, flashy fuels. Some of these areas may also have poor access routes and long response times.

The most important goal for the improvement of life safety and property preservation is for every home in the project area to have conforming defensible space.

This is especially important for residences in high hazard communities that have flammable wood roofs. An aggressive program to implement defensible space for homes will do more to limit fire-related property damage than any other single recommendation in this report.

The Greystone Anchor Point team therefore recommends that BLM and PCFPD #2 work with property owners to implement defensible space on private property starting with the first priority community and proceeding as time and funds allow. Once all interested landowners have created defensible space, access routes may then be addressed, then the other recommended mitigation measure should be implemented for the community. These are provided at the bottom of each

community summary, under **Comments & Mitigation Notes**. General guidelines of other recommendations are provided in Section 4.3.

TABLE 4-1 COMMUNITY MITIGATION PRIORITIES

Community	Hazard Level	Priority
Logan Mountain	High	1
Lower Wapiti Heights	High	2
Golden Walls	High	3
Green Creek	High	4
Old Johansson Ranches	High	5
Canyon Creek	High	6
Whit Creek	High	7
Dunn Creek	Moderate	8
Upper Wapiti Heights	Moderate	9
Rattlesnake Mountain	Moderate	10
Big Creek (Road 6BU)	Moderate	11
South Fork Drainage	Moderate	12
West Jim Creek	Moderate	13
Upper Breteche Creek	Moderate	14
Post Creek	Moderate	15
Jim Creek	Low	16
Breteche Creek	Low	17
Hidden Valley/Sheep Mountain	Low	18

4.2.1 Defensible Space

Defensible space for individual structures should include the following:

- Clean roof and gutters
- Firewood uphill or on a side contour, at least 30 feet away from structure
- No combustibles or firewood under decks
- Screened off openings including attics, eves, siding, and foundations
- Irrigated greenbelt around structure, at least 30 feet
- 14 feet of vertical clearance for emergency vehicle access along driveways
- Mow grass and weeds to a low height, at least 30 feet from structure
- Remove any branches overhanging the roof or chimney
- Prune all trees 6 to 10 feet from the ground within the defensible space
- Post clearly marked address signs
- Remove all trash, debris, and cuttings from the defensible space
- Remove ground fuels within the defensible space
- See www.firewise.org for more information on creating and maintaining defensible space

4.2.2 Evacuation Routes

The communities in the project area were evaluated for accessibility, egress by evacuating residents, and ingress by emergency responders. Factors such as steep grades, narrow or poor road surfaces, long distances to water fill sites, inadequate turnarounds, locked gates, and heavy fuel loads in proximity to roads all increase the risk to evacuating residents and incoming responders. It is desirable to develop secondary escape routes in case the primary access to a community is cut-off by fire or smoke. Where alternate access routes exist, it is possible to pre-plan evacuations so that evacuating residents do not conflict with incoming resources.

With a few exceptions, the primary access to communities in the project area consists of dead end roads. Due to the topography of the area and the existing road network, no practical additional access routes are recommended in this report. The lack of secondary access in the project area makes keeping the primary access corridors open a critical life safety need for both evacuating residents and responders.

There are short segments of roads in the project area where heat and smoke could threaten access. The following general recommendations for fuels modification should be applied in conjunction with defensible space to increase safety for both residents and responders. The community profile sheets contain specific recommendations for mitigation of access routes.

Thinning along primary access routes into communities should include an area of at least 100 feet on either side of the centerline of the road, where practical. This distance should be modified to account for increased slope, other topographic features that increase fire intensity, and different fuel profiles (**Table 4-2**). This is especially important in communities with steep narrow roads and few turnouts. In these areas, safer access for firefighters will increase the number of structures that can be defended in a wildland fire. Existing and natural barriers to fire should be incorporated into the project dimensions.

TABLE 4-2 RECOMMENDED TREATMENT DISTANCES FOR MID-SLOPE ROADS

Percent Slope	Distance Above Road	Distance Below Road
30	70 feet	145 feet
35	65 feet	153 feet
40	60 feet	160 feet
45	55 feet	168 feet
50	50 feet	175 feet

Mitigating an access route may be a community project. Involve as many adjacent landowners as possible and draw the project area as large as possible. Cooperation between adjacent, contiguous homeowners is imperative to achieve the most effective wildland fire mitigation along access routes. If this is not possible, more intensive thinning may need to occur within the road easement to compensate for gaps in fuels modification on private land. Homeowner participation allows the project more flexibility in selecting trees and shrubs for removal; as a result, visual screening and aesthetics can be incorporated into the project. Enlarging the project dimensions can also allow more options for vegetative selection while still protecting the access corridor.
Fuels modification for access routes should include:

- Create tree crown separation of at least 10 feet with groups of trees and shrubs interspersed as desired
- Crown separation greater than 10 feet may be required to isolate adjacent groups or clumps of trees
- Limb all remaining trees to a height of 8 feet or one-third of the tree height, whichever is less
- Remove ground fuels within the project area
- Post placards clearly marking "fire escape route;" this will provide functional assistance during an evacuation and communicate a constant reminder of wildland fire to the community; mount signage on non-combustible poles.

4.3 GENERAL RECOMMENDATIONS

In addition to mitigation for the individual communities, several general measures can be taken to improve fire safety across the project areas. Addressing, emergency response planning, fire department training and equipment, community education, and insect surveys are discussed below.

4.3.1 Addressing

In some portions of the project area, reflective address markers have been added to existing address markers. These markers have white reflective lettering on a red rectangle. There is no consistency to their placement, including which side of the driveway, how high, or how close to the driveway these markers are placed. Address markers do not exist consistently throughout the project area. Many addresses would be difficult to find, especially at night.

The Greystone Anchor Point team recommends placing visible, reflective address markers consistently throughout the project area. The time saved, especially at night and in difficult conditions, could be significant. This is especially important for volunteer operators who may not have the opportunity to train on access issues in all communities. Address markers should be mounted on a non-combustible pole or similar mounting, at a consistent height and position relative to the driveway. In areas where multiple residences are serviced by a single driveway, all addresses should be mounted together and then marked again as the driveway splits. See the International Fire Code Institute (IFCI) Urban Wildland Interface Code 2000, Section 403.6 for more information on addressing.

4.3.2 Emergency Response Planning

The following recommendations should also be considered in planning for emergency use of access routes.

- In order to reduce conflicts between evacuating citizens and incoming responders, it is desirable to have nearby evacuation centers for citizens and staging areas for fire resources. Evacuation centers should include buildings with facilities large enough to handle the population. Schools and churches are usually ideal for this purpose. Pre-planning and public education are critical for evacuation centers to be effective.
- Fire staging areas should contain large safety zones, a good view in the direction of the fire, easy access and turnarounds for large apparatus, a significant fuel break between the fire and the escape route, topography conducive to radio communications, and access to water. Large irrigated greenbelts may make good safety zones for firefighting forces.

PCFPD #2 is encouraged to preplan the use of potential staging areas with mutual aid responders.

- Perform response drills to determine the timing and effectiveness of fire resource staging areas and access routes.
- Educate citizens on the proper escape routes, and evacuation centers to use in the event of an evacuation.
- Utilize a reverse 911 system or call lists to warn residents when an evacuation may be necessary. Notification should also be carried out by local television and radio stations. Any existing disaster notification systems, such as storm warnings, should be expanded to include wildland fire notifications.
- Emergency management and law enforcement personnel should be included in the development of preplans for citizen evacuation.
- Develop a Pre-Attack/Operational Plan for the project area. A pre-attack plan assists fire agencies in developing strategies and tactics that will assist in incident management.
- Utilize the structure triage methodology provided in **Appendix C** to identify homes not likely to be defendable.

4.3.3 Fire Department Training and Equipment

The following recommendations are made for the PCFPD #2.

- Provide continuing education for all firefighters including:
  - NWCG S-130/190 for all department members.
  - Annual wildland fire refresher and "pack testing" (physical standards test).
  - S-215 Fire Operations in the Urban Interface.
  - S-290 Intermediate Fire Behavior.
  - I-200 and I-300 – Basic and Intermediate incident command system (ICS).
- Equipment:
  - Consider adding a Type 6X engine (four-wheel-drive brush truck) at Station 4.
  - Consider additional staffing for Station 4.
  - Provide minimum wildland personal protective equipment (PPE) for all firefighters (see NFPA Standard 1977 for requirements).
  - Provide gear bags for both wildland and bunker gear to be placed on engines responding to fire calls. This will help ensure that firefighters have both bunker gear and wildland PPE available if the fire situation changes.
  - Provide and maintain a 10-person wildland fire cache at Station 4 in addition to the tools on the apparatus. The contents of the cache should be sufficient to outfit two squads for handline construction and direct fire attack. Recommended equipment would include:
    - Four cutting tools such as pulaskis or super pulaskis.
    - Six scraping tools such as shovels or combis.
    - Four smothering tools such as flappers.
    - Four backpack pumps with spare parts.
    - Two complete sawyer's kits including chainsaw, gas, oil, sigs, chaps, sawyer's hard hat, ear protection, flies, file guides, spare chains and a spare parts kit.

4.3.4 Community Education

Community responsibility for self-protection from wildland fire is essential. Educating homeowners is the first step in promoting a shared responsibility. Part of the educational process is defining the hazard and risks both at the community-level and the parcel-level; this has been done as part of this assessment process.

The Greystone Anchor Point team recommends the following important community education steps:

- Send the parcel-level assessments to homeowners to encourage attendance at the second public meeting for this project.
- Review the community-level assessments and mitigation measure at the second public meeting. Clearly communicate next steps and funding available.
- Follow-up with presentations of the community- and parcel-level assessments at neighborhood public meetings.
- Work toward achievement of national FIREWISE status for communities.
- Use public service announcements in the project area to maintain awareness of wildland fire danger and encourage defensible space. This could include billboards, a public service message on the utility bill, flyers in local stores, and public service announcements in the local newspaper.
- Disseminate wildland fire safety information in visitor packets that are available at the Chamber of Commerce, hotels, and campgrounds.

The following general recommendations are intended for residents and business owners in the project area.

1. Be aware of the current fire danger in the area.
2. Clean roof and gutters at least two times per year, especially in autumn, after strong winds, and in the spring before fire season.
3. Stack firewood uphill or on a side contour, at least 30 feet away from structures.
4. Don't store combustibles or firewood under decks.
5. Maintain and clean chimneys.
6. Screen off any openings in attics, eves, siding and foundations to reduce the likelihood of embers and firebrands entering them from a wildland fire.
7. When possible, maintain an irrigated greenbelt around the home.
8. Connect, and have available, a minimum of 50 feet of garden hose.
9. Post reflective lot and/or house numbers so that they are clearly visible from the main road. There should also be reflective numbers on the structure itself.
10. Trees along driveways should be limbed and thinned as necessary to maintain a minimum of 14 feet of vertical clearance for emergency vehicle access.
11. Every structure should have a maintained, defensible space.
    - Mow grass and weeds to a low height.
    - Remove any branches overhanging the roof or chimney.
    - Remove all trash, debris, and cuttings from the defensible space.

- Use Firewise plants in landscaping near homes. The use of pines, firs, junipers and other flammable conifers to landscape within the defensible space is strongly discouraged.

4.3.5 Insect Surveys

In addition to the recommendations above, the Greystone Anchor Point team recommends annual insect and disease surveys take place in any area exhibiting signs or symptoms of attacks. Insect surveys should be conducted in between an insect's flight periods to identify newly attacked trees. All newly attacked trees should be removed and treated prior to the beginning of the insect's next flight period. For example, mountain pine beetle (Dendroctonus ponderosae) should be surveyed for between the months of October and June. Mountain pine beetle-infested trees should be removed and treated prior to July 1 of the following year.

5.0 ROLES AND RESPONSIBILITIES

To be successful, community mitigation must be a community-based, collaborative effort. The current coordination between the BLM and the PCFPD #2 has already made great strides by facilitating the assessment conducted in this report.

The BLM and the PCFPD #2 will have the greatest responsibility for implementing the recommended mitigation projects. The Shoshone National Forest would also be a valuable participant in addressing cross-boundary projects. The Park County Commissioners are currently planning to prepare a community fire plan, and should also be encouraged to collaborate with this effort to facilitate planning efforts.

Nearly all of the recommendations from this report affect private land or access roads to private land. As such, their success will be largely dependent on the participation of landowners. BLM and PCFPD #2 are committed to encouraging the participation of as many interested landowners as possible; these outreach efforts began with the first public meeting for this project.

BLM and PCFPD #2 will identify funding for the implementation for mitigation projects. They will also prioritize and manage the distribution of these funds. All community-wide mitigation projects should be coordinated by a single point of contact, most likely a PCFPD #2 representative. Homeowner cooperation and permission for projects on private land will be more likely if there is a local fire department representative overseeing the details. This would also allow cross boundary projects to be more effectively implemented.

There are also recommendations for individual structures that are the responsibility of the homeowner. However, they will need a point of contact, most likely a member of the PCFPD #2, to help them implement these recommendations. The best defensible space will be created with some oversight and expert advice from fire department personnel. One-on-one dialog will continue to build the relationship with the community. It will also allow the agencies to keep track of the progress and update this plan to reflect the latest modifications.

6.0 FUNDING GUIDELINES

A number of funding sources are available to communities to implement mitigation recommendations. Once Community Fire Protection Plans are completed, federal funds become available for those projects. County and State funding also may be available. It is important to understand what funds are available, how to access them, and the restrictions on their use.

The Greystone Anchor Point team has found that identifying "cross-boundary" projects is particularly helpful in winning grant funds. For example, a project where the Shoshone National Forest, interested landowners, BLM, and the PCFPD #2 can work together.

There are many sources of funding for fire projects. Some available funds and where to find more information is provided below.

- Agency: Homeland Security, Office for Domestic Preparedness
  Purpose: to assist local, State, regional, or national organizations in addressing fire prevention and safety; the emphasis for these grants is the prevention of fire related injuries to children.
  More information: http://www.firegrantsupport.com/

- Agency: Federal Emergency Management Agency (FEMA)
  Purpose: to improve fire fighting operations, purchase firefighting vehicles, equipment, personal protective equipment, fund fire prevention programs, and establish wellness and fitness programs.
  More information: http://usfa.fema.gov/dhtml/inside-usfa/grants.cfm

- Agency: FEMA
  Purpose: Assistance to Firefighters Grant Program
  More information: www.usfa.fema.gov/dhtml/inside-usfa/apply.cfm and www.nvfc.org/federalfunding.html

- Agency: National Volunteer Fire Council
  Purpose: Support volunteer fire departments
  More information: http://www.nvfc.org/federalfunding.html

- Agency: Community Facilities Grant Program
  Purpose: help rural communities; funding is provided for fire stations
  More information: www.rurdev.usda.gov/rhs/

- Agency: Firehouse.com
  Purpose: Emergency services grants
  More information: www.firehouse.com/funding/grants.html

- Agency: Cooperative Forestry Assistance
  Purpose: assist in the advancement of forest resources management; the control of insects and diseases affecting trees and forests; the improvement and maintenance of fish and wildlife habitat; and the planning and conduct of urban and community forestry programs
  More information: www.usfa.fema.gov/dhtml/inside-usfa/cfda10664.html

- Agency: Forest Service, Economic Action Programs
  Purpose: Economic Action Programs that work with local communities to identify, develop, and expand economic opportunities related to traditionally underutilized wood products and to expand the utilization of wood removed through hazardous fuel reduction treatments.
  More information: www.fireplan.gov/community_assist.cfm

APPENDIX A

APPENDIX B

This appendix lists plant and animal species of concern. Each of these species is found in Park County, Wyoming, and has federally-protected status. Endemic species are included if they are at least considered sensitive. Non-endemic species are included if they have at least ESA Candidate species status. This information was obtained from the Wyoming Natural Diversity Database (WNDD).

Plant Species of Concern

Common Name *Scientific Name*	Heritage Rank	Federal Status	Range Context
Antennaria arcuata Meadow pussytoes	G2/ S2	USouth Fork Shoshone R4 Sensitive WY BLM Sensitive	Regional Endemic/ Core
Aquilegia laramiensis Laramie columbine	G2/ S2	USouth Fork Shoshone R2 Sensitive WY BLM Sensitive	Local Endemic/ Core
Artemisia biennis var. diffusa Mystery wormwood	G5T1Q/ S1	WY BLM Sensitive	Regional Endemic/ Core?
Artemisia porteri Porter's sagebrush	G2/ S2	WY BLM Sensitive	Local Endemic/ Core
Cymopterus evertii Evert's waferparsnip	G2G3/ S2S3	WY BLM Sensitive	Local Endemic/ Core
Descurainia torulosa Wyoming tansymustard	G1/ S1	USouth Fork Shoshone R2 Sensitive USouth Fork Shoshone R4 Sensitive WY BLM Sensitive	Local Endemic/ Core
Penstemon absarokensis Absaroka beardtongue	G2/ S2	USouth Fork Shoshone R2 Sensitive WY BLM Sensitive	Local Endemic/ Core
Penstemon laricifolius ssp. *exilifolius* White beardtongue	G4T2Q/ S2	USouth Fork Shoshone R2 Sensitive	Regional Endemic/ Core
Physaria lanata [Physaria didymocarpa var. lanata] Woolly twinpod	G5T2/ S2	USouth Fork Shoshone R2 Sensitive	Regional Endemic/ Core
Physaria saximontana var. saximontana Rocky Mountain twinpod	G3T2/ S2	WY BLM Sensitive	Local Endemic/ Core
Pyrrocoma carthamoides var. subsquarrosa [Haplopappus carthamoides var. subsquarrosus] Absaroka goldenweed	G4G5T2T3/ S2	USouth Fork Shoshone R2 Sensitive	Regional Endemic/ Core
Pyrrocoma integrifolia [Haplopappus integrifolius] Entire-leaved goldenweed	G3?/ S1	USouth Fork Shoshone R2 Sensitive	Regional Endemic/ Edge
Rorippa calycina Persistent sepal yellowcress	G3/ S2S3	WY BLM Sensitive	Regional Endemic/ Core
Shoshonea pulvinata Shoshonea	G2G3/ S2	USouth Fork Shoshone R2 Sensitive WY BLM Sensitive	Regional Endemic/ Core
Townsendia condensate var. anomala [Townsendia anomala] North Fork Easter-daisy	G4T2/ S2	USouth Fork Shoshone R2 Sensitive	Local Endemic/ Core

Common Name *Scientific Name*	Heritage Rank	Federal Status	Range Context
Draba globosa [Draba apiculata var. apiculata;D. densifolia var. apiculata] Rockcress draba	G3/ S2	USouth Fork Shoshone R4 Sensitive	Regional Endemic/ Edge
Ericameria discoidea var.linearis [Haplopappus macronema var.linearis; H. m. var. canescens] Narrowleaf goldenweed	G4G5T3/ S2	USouth Fork Shoshone R4 Sensitive	Regional Endemic/ Edge

Animal Species of Concern

Common Name *Scientific Name*	Heritage Rank	Federal Status	Range Context
McCown's longspur *Calcarius mccownii*	G5/ S2	USouth Fork Shoshone R2 Sensitive, WYGF NSS4	Regional Endemic
Chestnut-collared longspur *Calcarius ornatus*	G5/ S1	USouth Fork Shoshone R2 Sensitive, WYGF NSS4	Regional Endemic
Yellow-billed cuckoo *Coccyzus americanus*	G5/ S1	USFWS ESA Candidate (Western subspecies), USouth Fork Shoshone R2 Sensitive, Wyoming BLM Sensitive, WYGF NSS2	Very Small WY Range
Whooping crane *Grus Americana*	G1/ SAB/ S1N	USFWS Endangered	Accidental or Occasional in Wyoming
Bald eagle *Haliaeetus leucocephalus*	G4/ S3B/ S5N	USFWS Threatened (proposed for de-listing), WYGF NSS2	Moderate WY Range
Yellowstone cutthroat trout (Native pops.) *Oncorhynchus clarki bouvieri*	G4/ T2/ S2	USFWS ESA Listing Denied, USouth Fork Shoshone R2 Sensitive, Wyoming BLM Sensitive, WYGF NSS3	Regional Endemic
Westslope cutthroat trout *Oncorhynchus clarki lewisi*	G4/ T3/ S1	USFWS ESA Listing Denied, USouth Fork Shoshone R4 Sensitive	Regional Endemic
Arctic grayling (Upper Missouri River fluvial population) *Thymallus arcticus*	G5/ T2/ S1	WYGF NSS4, USFWS ESA Candidate	Regional Endemic Very Small WY Range
Black-tailed prairie dog (Large towns) *Cynomys ludovicianus*	G4/ S2	USFWS ESA Candidate, USouth Fork Shoshone R2 Sensitive, WYGF NSS3	Moderate WY Range
White-tailed prairie dog (Large towns) *Cynomys leucurus*	G4/ S3	USFWS Petitioned for ESA listing, Action Pending; USouth Fork Shoshone R2 Sensitive, Wyoming BLM Sensitive, WYGF NSS3	Regional Endemic

Common Name ***Scientific Name***	**Heritage Rank**	**Federal Status**	**Range Context**
Gray wolf *Canis lupus*	G4/ S1	USFWS Endangered	Small WY Range
Grizzly bear *Ursus arctos horribilis*	G4/ S1	USFWS Threatened	Small WY Range
Canada lynx [North American lynx] *Lynx canadensis [Felis lynx]*	G5/ S1	USFWS Threatened, WYGF NSS1	Small WY Range

APPENDIX C

Structural Triage and Preparation

Size-up Considerations

- What is the current and expected weather?
- Are fuels heavy, moderate, or light? What is the arrangement and continuity of fuels?
- Note any hazardous topography.
- What have fires in this area done before?
- What is the fire's current and expected behavior?
  - What is the rate and direction of spread?
  - What is the potential for spotting and firebrands?
  - Will topographical features or expected weather changes affect the rate of spread?
- What are the number and density of structures threatened?
- What are the available resources?
- Will you have to evacuate people or animals?
  - Are there residents that will not evacuate?
- How hazardous is the structure?
  - What is the roofing material?
  - Are the gutters full of litter?
  - Are there open eves and unscreened vents?
  - Does the structure have wooden decking?
  - Is there defensible space?
  - Are there large windows with flammable drapes or curtains?
  - What is the size and location of propane tanks and/or fuel storage tanks?

Fire Fighter Safety

- What are the routes of egress and ingress?
  - What is the largest engine that can access the structure safely?
  - Are the roads two way or one way?
  - Are there road grades steeper than 10%?
  - Are the road surfaces all weather?
  - Are there load-limited bridges?
- Are there anchor points for line construction?
- Are there adequate safety zones?
- What are the escape routes?
- Are there special hazards such as hazardous materials, explosives, high-voltage lines, or above ground fuel tanks?
- Are communications adequate?

Structure Triage Categories

Sort structures into one of three categories:

1. **Stand Alone or Not Threatened**
2. **Defendable**
3. **Not Defendable.**

- Factors that may make an attempt to save a structure too dangerous or hopeless.
  - The fire is making sustained runs in live fuels and there is little or no defensible space.
  - Spot fires are too numerous to control with existing resources.
  - Water supply will be exhausted before the threat has passed.
  - The roof is more than 1/3 involved in flames.
  - There is fire inside the structure.
  - Rapid egress from the area is dangerous or may be delayed.