Bisbee Community Wildfire Protection Plan

Prepared by:

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Design Inc.

February 2007

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ACRONYMS AND ABBREVIATIONS

ADOT	Arizona Department of Transportation
ASLD	Arizona State Land Department
BA	Basal Area
BCCFC	Banning Creek Canyon Firewise Committee
BCFG	Bisbee Community Firewise Group
BCWPP	Bisbee Community Wildfire Protection Plan
BFD	Bisbee Fire Department
BLM	Bureau of Land Management
CWPP	Community Wildfire Protection Plan
dbh	Diameter at breast height
drc	Diameter at root collar
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FRCC	Fire Regime Condition Class
FS	Forest Service
GDFMP	Gila District Fire Management Program
GIS	Geographic information system
HFRA	Healthy Forests Restoration Act of 2003
HIZ	Home Ignition Zone
ISO	Insurance Services Office
LCNCA	Las Cienegas National Conservation Area
NEPA	National Environmental Policy Act
NFD	Naco Fire District
NFP	National Fire Plan
NWCG	National Wildfire Coordinating Group
SJFD	San Jose Fire District
SR	State Route
SWReGAP	Southwest Regional GAP Analysis Project
TFO	Tucson Field Office
TNC	The Nature Conservancy
US	United States
USC	United State Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
WFLC	Wildland Fire Leadership Council
WUI	Wildland-urban interface

I. INTRODUCTION

The Bisbee Community Wildfire Protection Plan (BCWPP) was developed in response to the Healthy Forests Restoration Act of 2003 (HFRA) for the at-risk communities and private inholdings located in and around the communities of Bisbee (including Old Bisbee, Warren, and San Jose) and Naco (including Bisbee Junction), the outlying intermix community of Banning Creek, and the unincorporated outlying areas surrounding the Naco and San Jose Fire Districts (including Rio Vista) (Figure 1.1).. The communities of Bisbee and Naco and the surrounding intermix areas are located in Cochise County, approximately 25 miles east of Sierra Vista and 26 miles west of Douglas. Access to the communities is from State Route (SR) 80 traveling west from Douglas, SR 90 and SR 80 traveling east from Sierra Vista, or SR 80 traveling south from Benson. Several secondary residential roads also provide access to the community.

The HFRA legislation established unprecedented incentives for communities to develop comprehensive wildfire protection plans in a collaborative, inclusive process. Furthermore, this legislation gives direction to the US Departments of the Interior (USDI) and Agriculture (USDA) to address local community priorities in fuel reduction treatments, even on nonfederal lands.

HFRA emphasizes the need for federal agencies to collaborate with communities in developing hazardous fuel reduction projects and places priority on treatment areas identified by communities through the development of a community wildfire protection plan (CWPP). Priority areas include the wildland-urban interface (WUI), municipal watersheds, areas impacted by windthrow or insect or disease epidemics, and critical wildlife habitat that would be negatively impacted by a catastrophic wildfire.

In compliance with Title 1 of HFRA, the CWPP requires agreement among local governments, local fire departments, and the state agency responsible for forest management (in Arizona, the State Forester). The CWPP must also be developed in consultation with interested parties and the applicable federal agency managing the land surrounding the at-risk communities (for this plan, the Bureau of Land Management [BLM] Gila District.)

The BCWPP was developed to assist local governments, the fire department, and residents in the identification of lands—including public lands—at risk from severe wildfire threat. It also allows those entities to identify strategies for reducing fuels on wildlands while improving watershed and rangeland health, supporting local industry and local economies, and improving public/firefighter safety and response capabilities.

Guidance for development of the BCWPP is based on *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (Communities Committee et al. 2004) and was collaboratively developed through consultation with the BLM Tucson Field Office (TFO) using *The Healthy Forests Initiative and Healthy Forests Restoration Act: Interim Field Guide* (USDA and USDI 2004).

A. Background

The Bisbee Community Firewise Group (BCFG) was formed to create a CWPP that captures local interest and advances understanding regarding critical wildfire issues. The BCFG is composed of representatives from the community of Bisbee, the Bisbee Fire Department (BFD) and Fire Chief, Cochise County

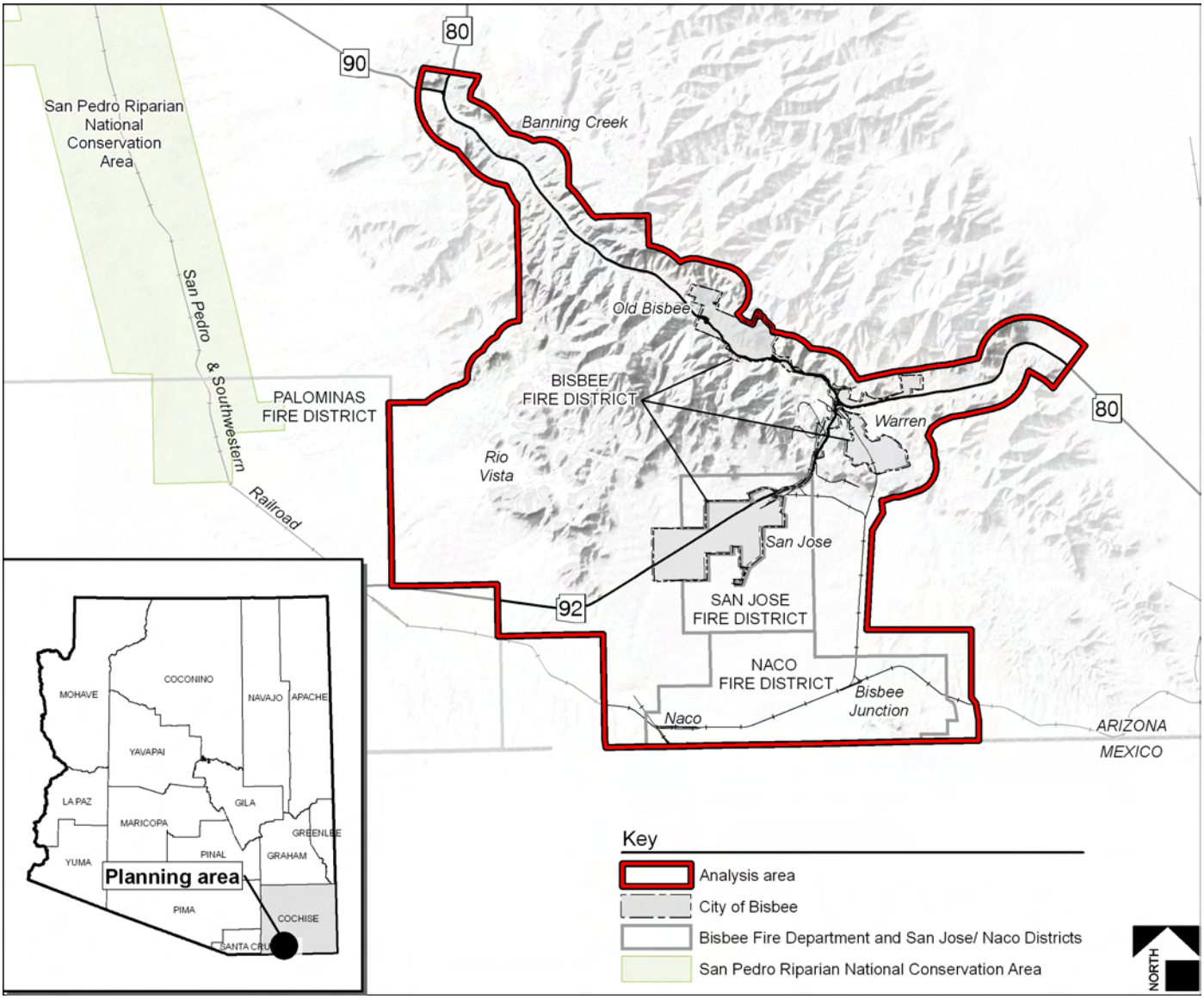

Figure 1.1. Analysis area

Emergency Services Coordinator, the BLM Gila District Fire Mitigation Specialist, the Arizona State Land Department (ASLD) Division of Forestry District Forester, local representatives from The Nature Conservancy (TNC), and other interested individuals. The BCFG has been the core of the public involvement process for this BCWPP and meets all collaborative guidance criteria established by the Wildland Fire Leadership Council (WFLC). A Memorandum of Understanding (http://www.fireplan.gov/leadership/memorandum.html) created the WFLC in 2002 to support the implementation and coordination of the National Fire Plan and the Federal Wildland Fire Management Policy.

The BCFG developed this CWPP to increase preparedness, to reduce hazardous wildland fuels, and to increase communication with local, county, state, and federal emergency response personnel by determining high-risk areas for catastrophic wildland fire, developing mitigation measures to reduce

hazardous wildland fuels, improving emergency response to unplanned wildfire, and reducing structural ignitability.

To aid in the development of this plan and during the initial analysis for proposed wildland fuel mitigation recommendations, the BCFG reviewed the following additional documents:

- *Federal Register*, Vol. 66, No. 3 (2001a)
- *Federal Register*. Vol. 66, No. 160 (2001b)
- *Field Guidance: Identifying and Prioritizing Communities at Risk* (National Association of Sate Foresters 2003)
- *Arizona Wildland Urban Interface Assessment* (Arizona Interagency Coordination Group 2004)
- *Arizona Communities at Risk Matrix* (Arizona State Forester 2005)
- *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan* (2002)
- *Banning Creek Canyon Firewise Committee (BCCFC) goals and projects*

The BCFG also reviewed Section 101.16.B.iii of HFRA to determine the area required adjacent to an evacuation route for hazardous fuel reduction measures in order to provide safer evacuation from the at-risk community. Using the information gathered from these supporting documents, the Bisbee Fire Chief, the ASLD, and the BLM TFO Manager agreed that the communities of Bisbee, Naco and the outlying communities of Banning Creek, and the unincorporated areas within the San Jose Fire District qualify as intermix communities (Federal Register 2001a) at risk from wildland fire. The BCFG, therefore, will petition the Arizona State Forester to include the communities of Bisbee (including Old Bisbee, Warren, and San Jose), Naco (including Bisbee Junction), and the outlying unincorporated areas of the San Jose Fire District and the community of Banning Creek within the Arizona Communities At Risk Matrix (Arizona State Forester 2005) when next updated.

Figure 1.2 summarizes the process that the BCFG followed to produce the BCWPP. At the far right of each tier is the “product” resulting from the activities in that tier. These tiers correspond to the sections in the BCWPP and serve as a guide for the rest of this document.

B. Wildland Urban Interface (WUI) and Delineation Process

A WUI is commonly described as the zone where structures and other features of human development meet and intermingle with undeveloped wildland or vegetative fuels. Communities in the WUI face substantial risk to life, property, and infrastructure. Wildland fire in the WUI is one of the most dangerous and complicated situations firefighters face. Both the *National Fire Plan* (NFP) 2000—a response to catastrophic wildfires— and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan* (2001)—a plan for reducing wildland fire risk—place a priority on working collaboratively with communities in the WUI to reduce their risk from large-scale wildfire. HFRA builds on existing efforts to restore healthy wildland conditions in the WUI by empowering local communities and by authorizing expedited environmental assessments,

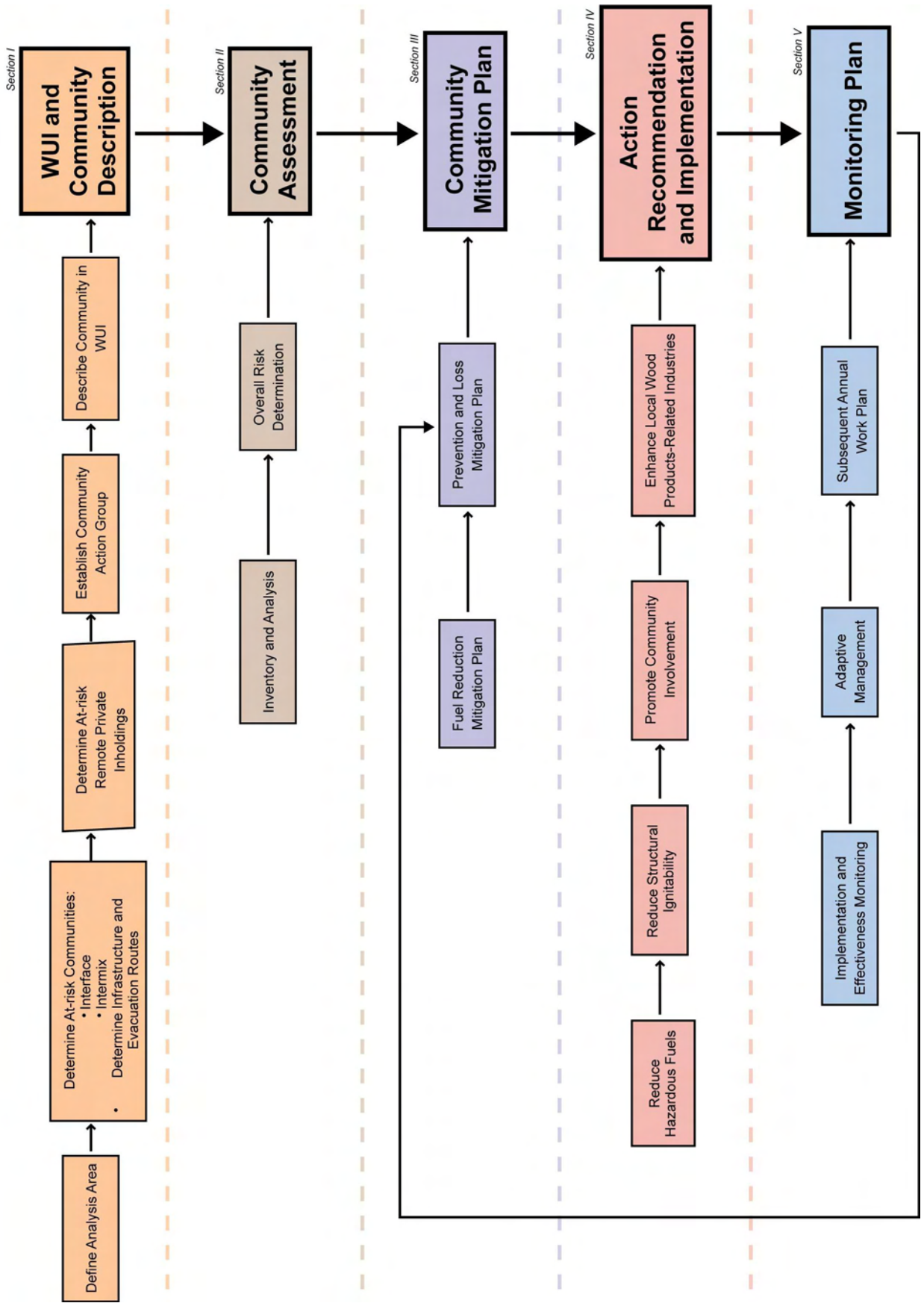

Figure 1.2. Process followed to produce the BCWPP

administrative appeals, and legal review for qualifying projects on federal land. The BCWPP process of delineating the WUI boundary involved collaboration between local, state, and federal governments. The identified WUI is the minimum area needed to provide protection to the community and surrounding community values. The WUI identified includes a total of 52,236 acres made up of private, state and federal lands (Figure 1.3). The current conditions of the lands that surround the community are conducive to a large-scale wildland fire, and such a wildfire could threaten human life and property.

General elements used in creating the WUI for the communities included the following:

- Fuel hazards, consideration of local topography, vegetative fuels, and natural firebreaks
- Historical fire occurrence
- Community development characteristics
- Local firefighting preparedness
- Infrastructure and evacuation routes

C. Desired Future Condition and Relevant Wildfire Mitigation Projects

1. Federal Lands within the WUI.

The desired future condition of federal land is a return to Condition Class I status. Federal lands in this condition class can carry wildfire without significant impacts on habitat components. Once in this condition class, natural processes such as fire can be incorporated into long-term management practices to sustain habitat health. Federal wildfire reduction policy on public lands (i.e., BLM) is planned and administrated locally through the BLM TFO, which is the governing agency for the federal land associated with the BCWPP planning area. Under the Proposed Action described in the *Proposed Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management Finding of No Significant Impact (FONSI) and Environmental Assessment* (USDI BLM 2004), BLM-administered public lands are assigned one of two land use allocations for fire management. Allocation 1 includes areas suitable for wildland fire use for resource management benefit. Allocation 2 includes areas not suitable for wildland fire use for resource benefit. With the exception of a small amount of desert shrub vegetation associations within the WUI, most of the WUI is classified as Allocation 1 BLM lands.

2. Nonfederal Lands in the WUI

The desired future condition of nonfederal lands in the WUI is to have private landowners comply with Firewise standards recommended by the BFD. Firewise is a national program that helps communities reduce the risk of wildfires and provides them with information about organizing to protect themselves against catastrophic wildfires and mitigating losses from such fires. Within Arizona, the Arizona State Forester administers the Firewise certification program. BFD personnel have made this information available to their citizens and encourage its application. Residential and other structures that comply with these standards significantly reduce the risk of fire igniting in the community and spreading to the surrounding habitat. Additionally, structures that comply with Firewise recommendations are much more

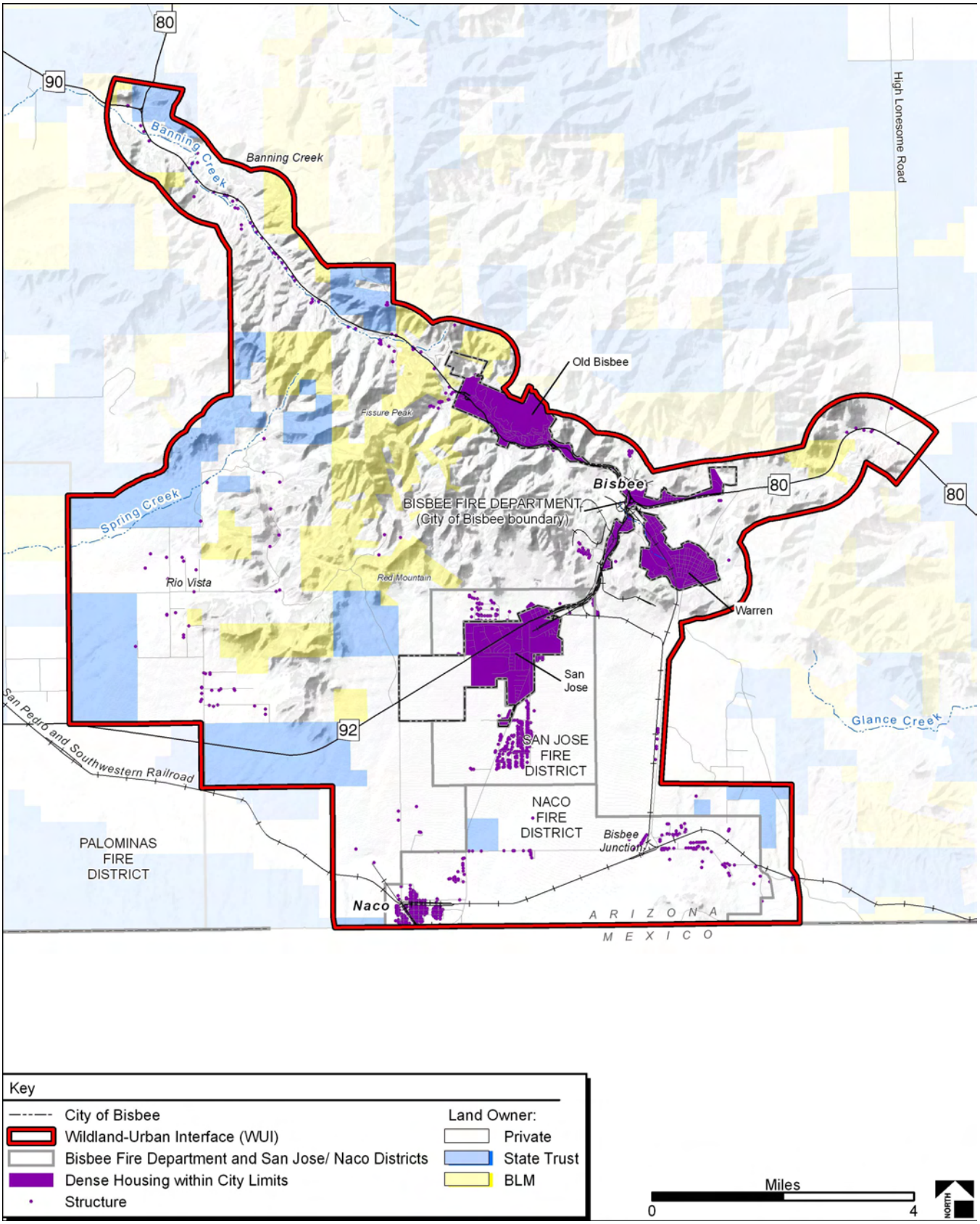

Figure 1.3. Bisbee WUI land ownership

likely to survive wildland fires that spread into the community. See http://www.firewise.org/ for further information.

The BCFG is aware that wildland fuel accumulations and community growth in the WUI have produced areas at high risk from catastrophic wildfire. The community aspires to achieve a restored, self-sustaining, and biologically diverse area of mixed open space and developed areas, which contribute to a quality of life demanded by local citizens. The BCFG recognizes that protection from catastrophic wildland fire requires collaboration and implementation through all levels of government and through an informed and motivated public. The community considered ecosystem restoration, community protection, and public and firefighter safety while developing this CWPP.

To date, Cochise County has not developed community-based emergency evacuation plans. Limited access routes to many rural communities within the county restrict planning options for residential evacuation. Plans outlining emergency procedures in case of evacuation, essential items to take when evacuating, registration/reception centers, transportation planning, home security, family communication, and animal and pet evacuation suggestions could be developed by individual communities in cooperation with Cochise County in the future if initiated by the local community. The BFD does plan to work with the County in developing such a notification and evacuation plan for the Bisbee community.

3. Specific Community Fuels Mitigation Projects

Financial commitments required to reduce the risk of catastrophic wildfire can be extensive for the BLM, as well as for the small rural communities surrounded by public lands. The BLM and the communities of Bisbee and Naco have implemented fuel mitigation projects for wildland fire suppression. A list of recent wildland fuel mitigation projects conducted within or adjacent to the BCWPP WUI is described in Table 1.1.

Table 1.1. Bisbee wildland fuel mitigation projects and wildland fire response enhancements

Project area location	Treatment name	Description	Acres treated or grant received
Fuels treatment project in Bisbee	Site #1	Fuel break around Mule Mtn. communication towers. Maintained every 1–2 years	3 acres
	Site #2	Banning Creek fuel reduction around homes	6–10 acres
Grant for equipment	Grant #1	2002 Rural Fire Assistance Grant, acquisition of radios	$10,000
	Grant #2	2002 FEMA Grant, safety equipment and new turnout gear	$56,000
	Grant #3	2003 FEMA Grant, structure firefighting engine	$150,000
	Grant #4	2005 FEMA Grant, radio upgrades	$20,000
	Grant #5	2006 Governor of Highway Safety Grant for extrication equipment	$20,000

Source: BFD, BLM Gila District, BCCFC, ASLD, and BCFG

D. Goals

The BCFG agreed on nine primary goals of the BCWPP:

- Identify areas of fire risk and recommend treatment and mitigation strategies
- Reduce hazardous wildland fuels on both public and private lands
- Integrate BCCFC goals and projects into overall CWPP
- Promote community involvement and education
- Recommend measures to reduce structural ignitability in the BCWPP area
- Identify areas for installation of fire and fuel breaks to protect community values
- Identify funding needs and opportunities
- Improve fire prevention and suppression
- Assist Cochise County in developing an emergency notification and evacuation plan

Although the goals of this CWPP, as determined by the BCFG, are mostly strategic in a planning sense, the action recommendations designed to reach these goals are more prescriptive. In developing this CWPP, it is not intended for each action recommendation to meet each goal; some action recommendations are specific to one goal or a few goals. For instance, wildland fuel-reducing treatments in designated fuel break areas of the WUI will assist in meeting fire prevention and suppression goals but may not be designed to directly assist Cochise County in developing an emergency notification and evacuation plan. However, the BCFG believes that the synergistic effects of implementing all action recommendations will eventually achieve the stated goals of the BCWPP.

The BCWPP meets all criteria of HFRA. It has been collaboratively developed and agreed on by the applicable local government, the BFD, the state agency responsible for forest management, the BLM TFO (the primary relevant federal entity), and other interested parties. The BCWPP establishes a coordinated, collaborative, performance-based framework of recommendations to meet its outlined goals.

E. Planning Process

Several county, BLM Safford (Gila) district, and local planning documents and studies include wildfire management guidelines and standards that are relevant for the BCWPP planning area. The goals, policies, and guidelines outlined in these documents, in addition to the above-mentioned public involvement process, were all critical inputs into the development of the BCWPP. The studies, plans, and documents reviewed include the following:

- The Report of the Governor's Arizona Forest Health Oversight Council (2005)
- *Cochise County Comprehensive Plan* (2006)
- *USDI BLM TFO Gila District Resource Management Plan* (1991)
- *Proposed Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management FONSI and Environmental Assessment* (USDI BLM 2004)

- *Banning Creek Canyon Firewise Goals, Objectives and Action Plans* (2006)
- *Palominas Firewise Community Board CWPP* (2004)

Successful implementation of the BCWPP will require a collaborative effort among the cooperating agencies, local government and the residences of the local communities. The BCFG must develop processes and systems that ensure recommended treatments and actions of the BCWPP comply with HFRA, the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the National Historic Preservation Act, and other applicable federal, state, and local environmental regulations.

Upon approval of this BCWPP by the Bisbee City Council, the Bisbee Fire Department Chief, the Naco Fire District Chief, San Jose Fire District Chief, and the Cochise County Board of Supervisors—and upon concurrence from the BLM TFO Manager, the Arizona State Forester, the Naco Fire District Board of Directors, and the San Jose Fire Board of Directors—action recommendations of the BCWPP will be forwarded to the Arizona State Forester and the BLM TFO Manager for implementation of the priority action recommendations.

II. COMMUNITY ASSESSMENT

The community assessment is a risk analysis of the potential for catastrophic wildfire in the communities of Bisbee, Naco, and the outlying areas identified by the BCFG. This risk analysis incorporates the current condition class, wildfire fuel hazards, risk of ignition, wildfire occurrence, and at-risk community values. Local preparedness and protection capabilities are also factors that contribute to the delineation of areas of concern. The areas of concern for wildland fuel hazards, risk of ignition and wildfire occurrence, and community values are evaluated to determine areas of high wildland fire risk.

Approximately 30% of the Bisbee WUI is located within the Granitic Hills ecological site with slopes ranging from 15% to 60%. This ecological site is represented by a variety of perennial grasses, perennial forbs, succulent, cacti, and desert shrubs. The limey upland ecological site covers an additional 60% of the WUI. Limey uplands are dominated by perennial grass and desert shrubs on slopes ranging from 25% to 60% within and adjacent to the community of Bisbee. As the WUI extends south to the community of Naco, the limey upland ecological site and associated vegetation persist; however, the slope average drops dramatically ranging from near 0% to 10%. The WUI receives 12 to 16 inches of rainfall annually and consists of a variety of grasslands and semidesert vegetation types. These include historical climax plant communities, mesquite/native grass associations, and sacaton grass communities, as well as areas of nonnative invaded grasslands and woody invasions in the mixed oak/pinyon/juniper/shrub associations. The rolling unbroken expanse of steep slopes and associated shrublands is the most striking ecological feature of the Bisbee WUI. (See http://websoilsurvey.nrcs.usda.gov/app/ for soils mapping and additional soils information).

A. Fire Regime and Condition Class

Prior to European settlement of North America, fire played a natural (historical) role in the landscape. Five historical fire regimes have been identified based on the average number of years between fires (fire frequency) combined with the severity (amount of overstory replacement) of fire on the dominant overstory vegetation:

Table 2.1. Fire regime information

Regime	Frequency	Severity
Regime I	0–35 years	Low[a]
Regime II	0–35 years	High[b]
Regime III	35–100 years	Low
Regime IV	35–100 years	High
Regime V	200+ years	High

[a]Less than 75% of the dominant overstory vegetation replaced.
[b]Greater than 75% of the dominant overstory vegetation replaced (stand replacement).

The total WUI area analyzed includes 52,236 acres. All of the lands analyzed within the WUI are consistent with Fire Regime I (1,727 acres), Fire Regime II (40,015 acres), and Fire Regime IV (8,225 acres) as described in *Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management* (Schmidt et al. 2002). Approximately 2,269 acres could not be classified because of coarse resolution of

the datasets. The condition class of wildland habitats describes the degree to which the current fire regime has been altered from its historical range, the risk of losing key ecosystem components, and the vegetative attribute changes from historical conditions. For example, a habitat in Condition Class I is a habitat in its natural fire range and at low risk for losing ecosystem components from wildland fire. Condition Class II habitat has moderately departed from its historical fire-occurrence range and has a moderate risk of losing habitat components. Condition Class III habitats have significantly departed from their historical fire-regime ranges, and their risk of losing key habitat components is high (Fire Regime Condition Class [FRCC] Interagency Working Group 2003).

The majority of the BCWPP WUI area is currently in Condition Class II (40,504 acres); 8,770 acres are already in Condition Class I, while 247 acres are in Condition Class III. The remaining acreage is either urban, nonvegetated, or unresolved due to gaps in the available datasets. Because condition class categories are based on coarse-scale data that is intended to support national-level planning, any interpolation of this data for localized conditions may not be valid (FRCC Interagency Working Group 2005a). Therefore, local agencies are asked to provide data for localized conditions. Some of the known local conditions are the proliferation of nonnative grasses, such as Lehmann lovegrass, increasing woody species invasion, and salt cedar invasion within the WUI riparian areas. This indicates that the riparian and mesquite bosque areas no longer conform to components of Condition Class I lands. As a result, local conditions indicate that the riparian area of the WUI actually falls within Condition Classes II and III. The BCFG has recommended that riparian areas within the WUI are restored to Condition Class I status. Maps, downloadable datasets and further information for Condition Class can be found at: http://www.fs.fed.us/fire/fuelman/

The BCFG has recommended that the desired future condition for federal and nonfederal lands within the WUI should follow those developed in the *Proposed Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management FONSI and Environmental Assessment* (USDI BLM 2004):

1. Semidesert Grassland and Desert Scrub communities desired future condition:

   Perennial grasses to cover its historic range of variability, annual grass cover is reduced, an adequate cover and mix of natural plant species that have good vigor are dominant. In terms of fire management and fire ecology, the desired future conditions are for fire to control or reduce exotic annual weeds such as red brome and to limit woody vegetation such as juniper, tarbush, whitethorn and creosote bush to non-hazardous levels. (p. 2-3)

2. Desert Scrub communities desired future condition:

   . . . adequate cover and mix of natural plant species that have good vigor. In terms of fire management and fire ecology, the Desired Future Conditions are for fire to control or reduce the exotic annual weeds such as red brome and to limit woody vegetation to non-hazardous levels. (p. 2-3)

B. Fuel Hazards

The arrangement of fuel, relative flammability, and fire potential of vegetation varies throughout the WUI. Wildland fuel hazards depend on a specific composition, type, arrangement, and/or condition of vegetation

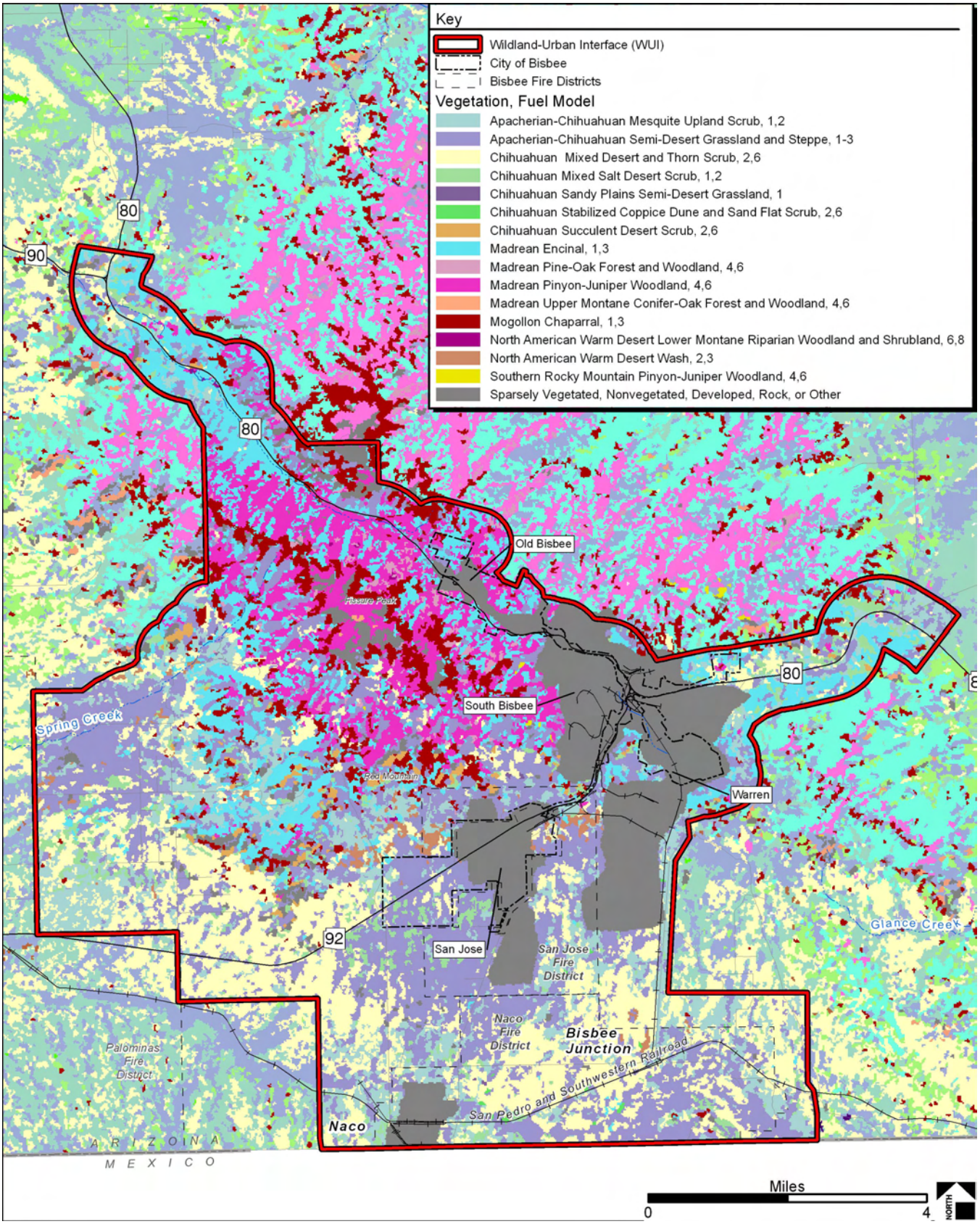

Figure 2.1. Vegetation types within the WUI

such that if the fuel were ignited, an at-risk community or its community infrastructure could be threatened. The vegetation associations found within the WUI (Figure 2.1) were identified and mapped using Southwest Regional Gap Analysis Project (SWReGAP) data. This dataset provides the level of vegetative detail necessary for aligning flammability with existing vegetation. The existing arrangement and flammability of vegetation associations largely determines wildland fire behavior. Evaluation of the vegetative fuels on federal and nonfederal land in the WUI was conducted through spatial analysis using geographic information system (GIS) technology in a series of overlays that helped the BCFG to identify areas at risk from wildland fire. For the WUI, the vegetation type, density, and distribution were analyzed to help categorize high-risk areas for fire ignition and fire spread from wildland fuels.

The use of vegetation data in predicting wildfire behavior has been quantified by developing descriptions of associated fuel properties that are described as fuel models. The fuel model (as described by Anderson 1982) and vegetation fuel fire risk rating within the BCWPP are shown in Table 2.2. Vegetation and physical characteristics of the WUI include 14 vegetation associations and 9 mostly nonvegetated associations that are grouped into 5 major vegetation fuel types. Each associated fuel model predicts the total fuel load, rate of spread, and flame length possible for each vegetation association. Assigning a fuel model to each vegetation association within the WUI will assist in predicting wildfire behavior and thus proper suppression response (refer to Anderson 1982 for detailed fuel model descriptions). Desert grasslands, and upland shrub communities dominate the Bisbee WUI.

The Grassland association includes a variety of herbaceous, scrub, and shrub species, with a shrub canopy ranging from less than 10% to 35% (Photo 2.1). This is an extensive area of the WUI, covering 13,391 acres (26% of WUI acres). The grasslands found within the southern area of the WUI, including Huachuca Terrace, Bisbee Junction, and Naco west to Spring Creek, have been classified by Gori and Enquist (2003) as primarily “shrubland-former grasslands, TYPE F: former grassland with > 15% canopy cover of mesquite and juniper combined and/or >35% total shrub cover; perennial grass canopy cover usually < 1%, always < 3%; type conversion to shrubland that is either permanent or will require 40+ years of livestock exclusion for partial recovery of perennial grasses.” (p. 4). The northern WUI area, including Bisbee, has been classified as “shrub-invaded native grassland with restoration potential, TYPE B: grasslands composed of native perennial grasses and herbs (non-natives absent or uncommon) with 10-35% total shrub cover and mesquite or juniper cover < 15%. A key characteristic of this type is its restoration potential—that is, shrub cover can be reduced using prescribed burns and site restored back to TYPE A grassland either immediately or after some period of grazing rest (< 15 years) when sufficient fine fuels have accumulated for fire spread.” (p. 4) Historical fire frequencies in southeastern Arizona grasslands have been estimated to average 7 to 10 years with a range of 3 to 22 years and was the major disturbance regime maintaining the structure of native grasslands (Huachuca Area Fire Partners Fire Management Plan 2005). Total wildland fuel load for grasslands in the WUI can exceed 3 tons/acre producing flame lengths of 12 feet and rates of spread > 6,800 feet/hour (Anderson 1982).

Table 2.2. Fuel model, fire danger ratings, and intensity level of vegetation associations in the WUI

Fuel type	Vegetation Association[a]	Fuel model	Wildfire Risk Rating[b]	Fire danger rating model[c]	Flame length (ft)	Fire Intensity Level (FIL)	Rate of spread ft/hr (ch/hr)	Acres
Grassland types	Chihuahuan Sandy Plains Semidesert Grasslands	1	L	L and T	4–7	3	2,100–6,660 (32–100)	25
	Apacherian-Chihuahuan Semidesert Grassland and Steppe	1–3	H	L and N	12–20	6	6,825 (104)	13,366
Scrub types	Chihuahuan Mixed Salt Desert Scrub	1 and 2	L	T	6	4	2,300 (35)	1,699
	Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	2 and 6	L	T	4-7	3	2,300 (35)	34
	Chihuahuan Succulent Desert Scrub	2 and 6	L	F and T	4-6	3	2,300 (35)	361
	Chihuahuan Mixed Desert and Thorn Scrub	2 and 6	L	F and T	6–32	4–6	2,300 (35)	9,151
Shrubland	Apacherian-Chihuahuan Mesquite Upland Scrub	1 and 2	M	F	6	4	2,300 (35)	5,962
	Madrean Encinal	1 and 3	M	B and T	6	4	2,100 (32)	6,360
	Mogollon Chaparral	1 and 6	M	F and T	6	4	2,100 (32)	2,502
	North American Warm Desert Wash	2 and 3	H	F	6–12	4–6	2,100–4,950 (32–75)	375
Oak/Juniper/ Pinyon	Madrean Pine-Oak Forest and Woodland	4 and 6	M	E and T	19	6	400 (6)–4,950 (75)	314
	Southern Rocky Mountain Pinyon-Juniper Woodland	4 and 6	M	F and R	1–6	4	65–2,100 (1–35)	14
	Madrean Upper Montane Conifer-Oak Forest and Woodland	4 and 6	M	N	19	6	4950 (75)	11
	Madrean Pinyon-Juniper Woodland	4 and 6	M	E and T	19	6	65 – 2,100 (1 -35)	4,420
Deciduous Southwest Riparian	North American Warm Desert Lower Montane Riparian Woodland and Shrubland	6 and 8	H	E and T	6–19	6	400 – 4,950 (6 – 75)	21

Continued

Table 2.2. Fuel model, fire danger ratings, and intensity level of vegetation associations in the WUI

Fuel type	Vegetation Association[a]	Fuel model	Wildfire Risk Rating[b]	Fire danger rating model[c]	Flame length (ft)	Fire Intensity Level (FIL)	Rate of spread ft/hr (ch/hr)	Acres
Other	North American Warm Desert Volcanic Rockland	NA	L	NA	NA	NA	NA	242
	North American Warm Desert Bedrock Cliff and Outcrop	NA	L	NA	NA	NA	NA	840
	North American Warm Desert Pavement	NA	L	NA	NA	NA	NA	124
	Open Water	NA	L	NA	NA	NA	NA	95
	Developed, Open Space–Low Intensity	NA	L	NA	NA	NA	NA	1,275
	Developed, Medium-High Intensity	NA	L	NA	NA	NA	NA	891
	Recently Mined or Quarried	NA	L	NA	NA	NA	NA	4151
	Agriculture	NA	L	NA	NA	NA	NA	2
							Total	52,235

[a] *Source:* Southwest ReGAP Land Cover Legend Descriptions (NatureServe 2004). See Appendix A for the vegetation association descriptions.

[b] "L = low", "M = medium", and "H = high"

[c] *Source:* The National Fire Danger Rating System (National Wildfire Coordinating Group [NWCG] 2002). See Appendix B for the National Fire Danger Rating System model definitions.

Photo 2.1. Grassland vegetation association

The Desert Scrub vegetation association (Photo 2.2) occurs on dryer upland sites and includes areas of bare ground and rock also supporting a variety of grass, herbaceous, scrub, and shrub species. The Desert Scrub vegetation association constitutes 11,245 acres (21% of the WUI acres).

Photo 2.2. Desert Scrub vegetation association

The shrubland vegetation communities (Photo 2.3) include upland mesquite/grasslands, Desert Wash associations, and Madrean Encinal (dominated by evergreen oaks) associations, and they are the largest vegetation type within the WUI, accounting for 15,199 acres (29% of WUI acres). The upland mesquite associations vary from dense stands with canopies of 80% or higher to areas of mature trees with canopy cover of 35% to 60%. The understory of the mesquite types vary from a mix of nonnative Lehmann to Johnson grass and pigweed with some areas of native grasses, dependent on canopy closure. Areas of higher canopy closure (> 60%) support little herbaceous and perennial grass cover, limiting fine fuels needed for fire laddering and limiting rate of spread. Mature mesquite are considered to be trees with trunks and limbs greater than 6 inches diameter at breast height (dbh). Within the mesquite bosque, mature stands provide habitat for a variety of cavity-nesting bird species. The mesquite bosque areas within the WUI also provide recreation, and areas for nature study and wildlife observation. The Mesquite Upland community provides movement corridors and foraging areas for a variety of wildlife species. The adjacent upland vegetation associations include Mesquite Upland, with Semidesert Grassland and Desert Scrub mix. The Madrean Encinal association dominated by evergreen oaks, occurs along the swales with a predominately graminoid layer creating areas of open woodlands and savannas to areas of high canopy.

Photo 2.3. Shrubland vegetation association

The Oak/Juniper/Pinyon association (Photo 2.4) occur throughout the foothill slopes, plateaus, and mountains in mostly dry rocky soils. Madrean oaks, junipers, and some pinyon trees dominate the vegetation. Shrub species such as live oaks can also be present. The understory vegetation is variable and includes woodland shrubs with an associated graminoid layer. This fuel type is a major vegetation component of the WUI within an escarpment ascending northwest to southeast; it accounts for 4,759 acres (9%) of the BCWPP.

Photo 2.4. Oak/Juniper/Pinyon vegetation association

The Deciduous Southwest Riparian (Photo 2.5) associations of cottonwood and willow can be intermixed with alkali sacaton grasslands. The riparian mixed deciduous association accounts for a minimal 21 acres

(< 1% of the WUI) of the WUI, which contributes significantly to vegetation and wildlife biodiversity as well as to the principal recreational use areas within the WUI.

Photo 2.5. Deciduous Southwest Riparian vegetation association

The disturbed habitats and non-wildland-fire habitats, such as nonvegetated natural areas, open water, developed, mined and agricultural areas, account for 7,620 acres (15%) of the WUI. Several fuel hazards components, including vegetation type and density, previously burned areas, slope and aspect, and areas previously treated to reduce wildland fuel hazards, were analyzed for wildland fire potential.

For example, there are areas of the WUI adjacent to the community of Bisbee that are steep and heavily dissected, with many areas having slopes > 20% which are heavily vegetated with grass and shrubs. Slopes ≥ 20% and areas with south-, southwest-, or west-facing slopes in areas of high wildland fuels were identified as having greater risks because of the fuel ladder-fire effect associated with steep terrain and decreased humidity associated with the microclimates created by exposed aspects. Areas of moderate fuel hazard in high slopes, (i.e., ≥ 20%) are considered a high fuel hazard, while the same fuel type on slopes < 20% are still considered a moderate fuel hazard. Other untreated or unburned areas that fall under the category of moderate ground fuels and do not overlap areas with steep slopes or with south, southwest, or west aspects are considered a moderate risk from fuel hazards. All other areas have a low risk from fuel hazards, including the areas that have been previously treated or burned. The wildland fuel hazard component influence was compiled to depict areas of high, moderate, and low wildland fire potential based on vegetation type, density, and arrangement and to show areas with higher wildfire risk and, therefore, areas of greater concern to the BCFG (Figure 2.2).

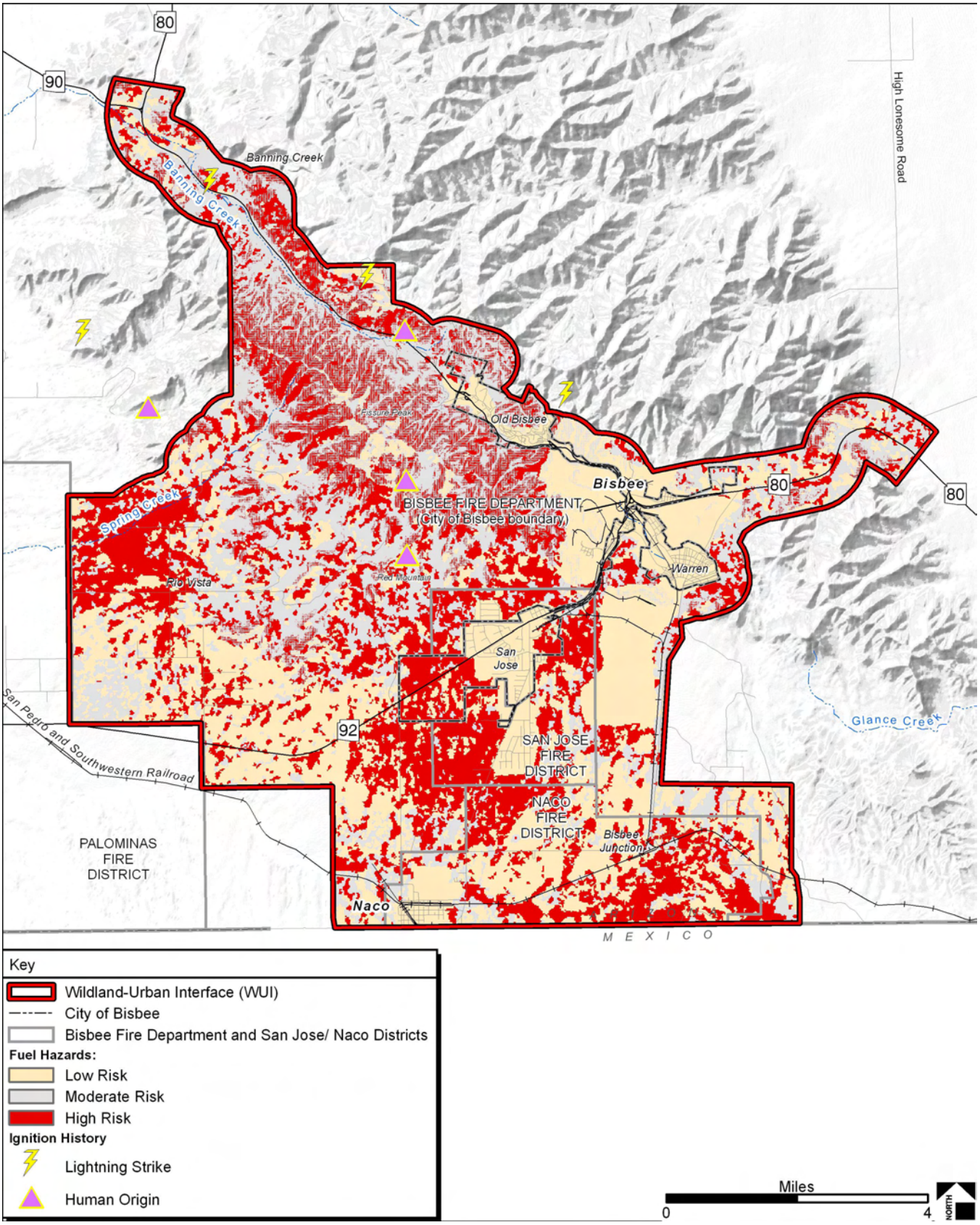

Figure 2.2. Fuel hazards and ignition history

Table 2.3 identifies the different values given to these various fuel hazards components. The influences the components carry were compiled to create areas of high, moderate, and low fuel hazards. This compilation of fuel hazards is shown in Figure 2.2.

Table 2.3. Fuel hazard components

Fuel Hazards Components	Influence[a]
Vegetation type and density	
• Grasslands in fuel model 3; Deciduous riparian and desert wash associations, moderate risk vegetation associations in slopes ≥ 20%	H
• Shrubland associations in fuel model 3 and oak/juniper/pinyon associations in fuel models 4 and 6	M
• Desert shrub associations and other habitats	L
Burned areas (within the past 5 years)	L
Slopes **≥** *20%*	H
Aspect (south-, southwest-, or west-facing slopes)	M
Treated areas	L

Source: Logan Simpson Design Inc.
[a] H = High, M = Moderate, L = Low

The greatest wildland fuel hazard within the BCWPP resides within the Grassland and Shrubland vegetation associations of the WUI in relation to effects of slope and aspect. In riparian vegetation associations consisting of heavy saltcedar where dead fuels accumulate within the vertical plant column and where there are riparian mixed deciduous tree species, total wildland fuels can be > 20 tons per acre and produce flame lengths > 6 feet above the overstory with a rate of spread of > 8 chains per hour. In addition, some grasslands, such as those dominated by sacaton grasses, can produce wildfires of high intensity and high rates of spread capable of igniting adjacent overstory vegetation associations. Moderate wildland fuel risk is associated with the ecotone of the riparian and desert upland vegetation associations. In areas where shrub canopy is > 35%, light fuels produced by the herbaceous understory are reduced because of overstory shading and competition from overstory shrub species. Under extreme fire conditions, upland mesquite communities can carry crown fires with moderate intensities and high rates of spread. Lower wildland fire risk occurs in desert scrub and desert shrub communities in which total fuel loading is low with no continuous arrangement of ground or aerial fuels. Desert upland vegetation associations are not fire-dependent communities, and wildfires within desert vegetation associations will be suppressed.

C. Community Descriptions and Values at Risk

Bisbee is the county seat of Cochise County and is home to numerous lodgings, restaurants, museums, community festivals, commercial ventures, residences, local services and a historic mine. The community of Bisbee comprises three different areas: Old Bisbee, Warren District, and San Jose District.

Old Bisbee is located to the north of SR 80 running through downtown. Old Bisbee's commercial district is on the National Register of historic places as a historic district; this district is a tourism destination for southern Arizona. Old Bisbee's residential areas are made up of historic homes flanking the hillsides along a series of winding and steep access roads. Bisbee's steep hillsides have led to the development of a community stair system. Old Bisbee's tight streets and steep hillsides can prove difficult for emergency equipment and can increase response time when responding to wildland or structure fires.

The Warren District is located east of Old Bisbee at the junction of SR 80 and SR 92. Bisbee City Hall is located in the Warren District. Many of the city's residences, schools, parks, hospital, and other community infrastructure are found within the Warren District. These resources are valuable assets to the community and should be protected from wildland fire risk.

The San Jose District is located south and west of Warren and includes the Cochise County offices. About half of the San Jose community lies within the city limits of Bisbee, while the other half is an unincorporated area within the San Jose Fire District response zone. A large grocery and shopping center is located within the San Jose District as well as numerous residences, local businesses, churches, and an animal hospital.

Outside of Old Bisbee and to the west of downtown lies the unincorporated intermix community of Banning Creek. Numerous residences line Banning Creek Canyon and flank SR 80 on either side. People living along this corridor enjoy the riparian influence of Banning Creek, and wildlife is abundant; however, steep slopes, combined with vegetation encroachment into the riparian areas, and small narrow driveways provide a volatile mix if a wildland fire were to occur. Citizens in this area are well educated about their risk from fire and have formed the BCCFC to help alleviate their risk from wildland fire.

Naco is a border community along the US–Mexico border, located south of Bisbee's San Jose District. The community of Naco has a significant historical association; it is believed that Spanish explorer Francisco Vázquez de Coronado traveled through this area during his expedition north from Mexico through the present-day southwestern United States. Naco has strong ties to American history as Coronado is thought to have traveled this area in his explorations through the southwestern US. Mining and ranching are the main economic pursuits in the area. Naco developed as a railroad town with strong ties to international commerce. Today, the railroad is no longer active, but Naco is host to a port-of-entry facility. To the east of Naco is a collection of residences known as Bisbee Junction. Bisbee Junction, for the purposes of this plan, is considered part of the community of Naco since it houses many of the area residents. For its historical significance, as well as ties to mining, ranching, and homeland security, Naco is worth protecting from wildland fire threat.

Collectively, the BCWPP communities consist of both private lands and public lands administered by the BLM TFO and the ASLD. The total area analyzed within the WUI includes 52,162 acres of wildland by all ownerships. The communities are composed of residential dwellings and associated unoccupied outbuildings, as well as commercial buildings, community infrastructure, and a historic mine.

The majority of wildfire starts around the community of Bisbee have occurred on the rugged hillsides surrounding Old Bisbee and Warren. Although landscape-scale fires have not been prevalent in the desert vegetation zones of the WUI, natural and human fire starts do occur and are suppressed and contained each year. Hot, dry weather conditions, dry fuels, and increasing fuel loading on federal and nonfederal lands contribute to the potential for catastrophic wildland fires in and around the Bisbee communities. As a

result, the BFD and governmental agencies have initiated fire preparedness and land treatment planning efforts to deal with the types and densities of wildland fuels that significantly threaten the community with potential catastrophic wildfire.

The emphasis of this CWPP is to improve community wildland fire protection and firefighter and public safety. The communities recognize that firefighter and public safety are the first priority in all fire management events. The communities further acknowledge the value of reestablishing the natural fire regime to minimize the potential of catastrophic wildland fire. The BCWPP is also intended to assist in aligning wildland fire response to a level consistent with the resource values at risk, while striving for cost-effective firefighter and public safety.

Current wildland fire protection is primarily provided by the BFD. The BFD is a public fire department with 21 personnel. BFD provides fire protection and ambulance service to the 6,800 residents of Bisbee and emergency medical response to additional residents throughout Cochise County. All fire department personnel are Arizona State-certified Level II firefighters. The BFD conducts firefighting and EMT trainings. The BFD operates two fire stations and averages 5 calls per day. Fire Station #1 is located at 192 Highway SR 92 at the north end of the San Jose District; Fire Station #2 is located at 644 Tombstone Canyon on the west end of old Bisbee. The BFD has both mobile and portable radio communication systems supported by a mountaintop radio repeater for better coverage throughout the response area. The City of Bisbee and the Arizona Water Company supply the community of Bisbee and outlying areas with water. BFD also relies on a reservoir located to the north of Old Bisbee as a water source during fire response, in addition to the Bisbee community pool (also located in Old Bisbee). Naco Water Company provides service to the community of Naco and Bisbee Junction.

The BFD also provides fire coverage for wildland fires under an agreement with the ASLD. In addition to fire response, the BFD responds to medical and hazardous materials incidents. Additionally, the BFD provides structural fire protection to community residents. The BFD also relies on San Jose and Naco volunteer fire departments to respond to wildland and structure fires within the WUI boundary. ASLD Division of Forestry, also provides assistance through a signed cooperative agreement for the protection of forest, wild and agricultural lands, and rural structures as provided for within the Cooperative Forestry Assistance Act, 16 United States Code (U.S.C.) Section 2106. In addition to the ASLD cooperative agreement, the BLM and the Forest Service (FS) can also provide fire assistance to the BFD and surrounding volunteer fire departments.

Cumulative at-risk community resources include private and community structures, communication facilities, power lines, local recreation areas, cultural and historic areas, sensitive wildlife habitat, watersheds, natural resources, and air quality. As agreed to by the BCFG, developed land and other infrastructures within the area of highest flammability were given the highest priority for protection by the BCFG.

In areas where community values occur within or adjacent to areas of high risk because of the fuel hazards of vegetation associations, a cumulative risk from catastrophic wildland fire is created. These areas of cumulative risk are of greatest concern to the community.

The major concerns for the BFD include 1) the delayed response time by available mutual-aid fire departments, 2) acquisition of additional firefighting equipment, and 3) insufficient dispatch and

communication capabilities. Additionally, many residences in the identified WUI were not designed with adequate ingress and egress or emergency vehicle access. Private structures without adequate access and readily available water supplies increase the risk of greater habitat and structural losses from large wildland fires.

A short-range goal of the BFD, in conjunction with the BCFG, is completing individual wildland-fire home assessments through use of the Redzone software, a commercially produced software package designed for use on handheld personal data recorders. The software is used to collect locations and data about structures, water sources, and other information (www.redzonesoftware.com). Recommendations to landowners for wildfire risk mitigation are included in Section III of this CWPP. Additional recommendations for remote private lands include identifying properties by name on placards or road signs and locating wells or surface water sources that could be used to replenish water supplies for fire-response equipment—both ground-based drafting and aerial bucketing—by also identifying well or source names on placards or road signs.

1. Housing, Businesses, Essential Infrastructure, and Evacuation Routes

The BCFG identified high-risk areas, including the economic corridors that line SR 80 and SR 92 and that have been and continue to be the focus of community development. Structures associated with housing and commercial development located in isolated subdivisions and in more dispersed areas of the county are also at high risk. The BCFG identified significant infrastructures, such as powerlines, airport facilities, the historic Queen Mine, and the reservoir northwest of historic Bisbee within the designated WUI, and it has recommended fuel modification treatments that will reduce the threat of wildland fire affecting these facilities. The BCFG has also identified transportation corridors between WUI communities that will serve as evacuation routes and resource distribution corridors in the event of wildland fire. The BCFG has recommended fuel modification treatments for evacuation corridors that will provide safe evacuation as well as emergency vehicle response from WUI communities in the event of catastrophic wildland fire.

2. Recreation Areas/Wildlife Habitat

Recreational areas, including designated RV parks, open areas, museums, historic mining areas, community parks, and the Bisbee community stair system are located on private, municipal, state, and federal lands. These features are economic, environmental, and quality-of-life resources for the surrounding communities. These areas have been analyzed as a community value because of the benefits that they provide to the local citizens and community visitors.

The BCFG has researched and found that the WUI area is located on a major flyway and is prime habitat for many wildlife species. Habitat-enhancing treatments for reducing wildland fuel and lessening the threat of catastrophic wildland fire will help preserve sensitive habitat and wildlife species in accordance with Section 102.a.5.B of HFRA and will also protect recreational values associated with wildlife viewing by local residents and visitors.

3. Local Preparedness and Protection Capability

For many years the Insurance Services Office (ISO) has conducted assessments and rated communities on the basis of available fire protection. The rating process grades each community's fire protection on a scale from 1 to 10, (1 being ideal and 10 being poor) based on the ISO's Fire Suppression Rating Schedule. There are five factors that make up the ISO fire rating. Water supply, the most important factor, accounts for 40% of the total rating. Type and availability of equipment, personnel, ongoing training, and the community's alarm and paging system account for the remaining 60% of the rating. The BFD has achieved an ISO rating of 6. Naco and San Jose Fire Districts have not yet received ISO ratings.

Table 2.4 identifies the values given to these various community values components. Visual representations of these community value components are mapped in Figure 2.3.

Table 2.4. Community values and structure density

Community value components	Value[a]
Housing and businesses structures and infrastructure in high risk, > 10 structures per 5 acres	H
Housing and business structures and infrastructure in medium risk, 2.1–10 structures per 5 acres	M
Housing and business structures and infrastructure in low risk, 0–2 structures per 5 acres	L
All other areas	L

[a] H = High, M = moderate, L = low

Source: Logan Simpson Design Inc.

D. Cumulative Risk Analysis

The cumulative risk analysis synthesizes the risk associated with fuel hazards, areas of past fire occurrence, and community values. These different components were analyzed spatially, and an overall cumulative risk for the WUI was calculated. Table 2.5 and Figure 2.4 display the results of the cumulative risk analyses, identifying the areas and relative percentages of WUI areas of high, moderate, and low risk.

High-risk areas due to volatile fuels, steep slopes, lack of recent fires, and difficult access surround Banning Creek Canyon and Old Bisbee. Warren is surrounded by low to moderate fuel hazards but has a high structure density, causing a higher wildfire risk rating. San Jose is at risk due to the surrounding flammable vegetation as well as structure density. Naco and Bisbee Junction's risk stems from the concentration of housing, reliance on an all-volunteer fire department, and an often-longer response time. More than half of the total WUI area is at high risk from wildland fire occurrence, and more than three-quarters of the area is at moderate to high risk. To better protect the communities of Bisbee and Naco and the surrounding intermix communities, a community mitigation plan has been outlined in Section III.

Table 2.5. Cumulative risk levels, by percentage of the WUI area

SJCWPP communities	High risk (%)	Acres	Moderate risk (%)	Acres	Low risk (%)	Acres	Total acres
Bisbee Area	37	19,268	34	17,704	29	15,264	52,162

Source: Logan Simpson Design Inc.

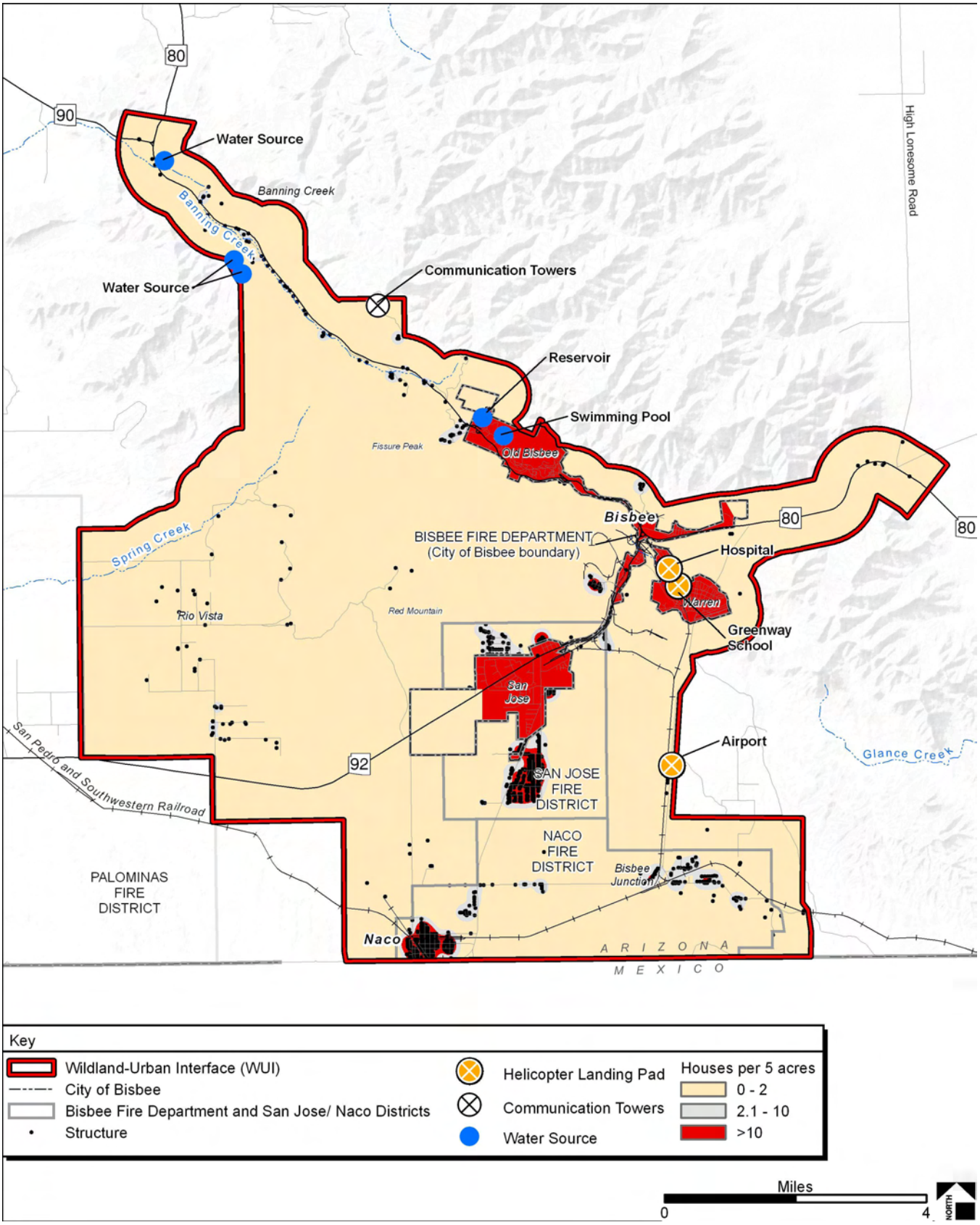

Figure 2.3. Community values and structure density

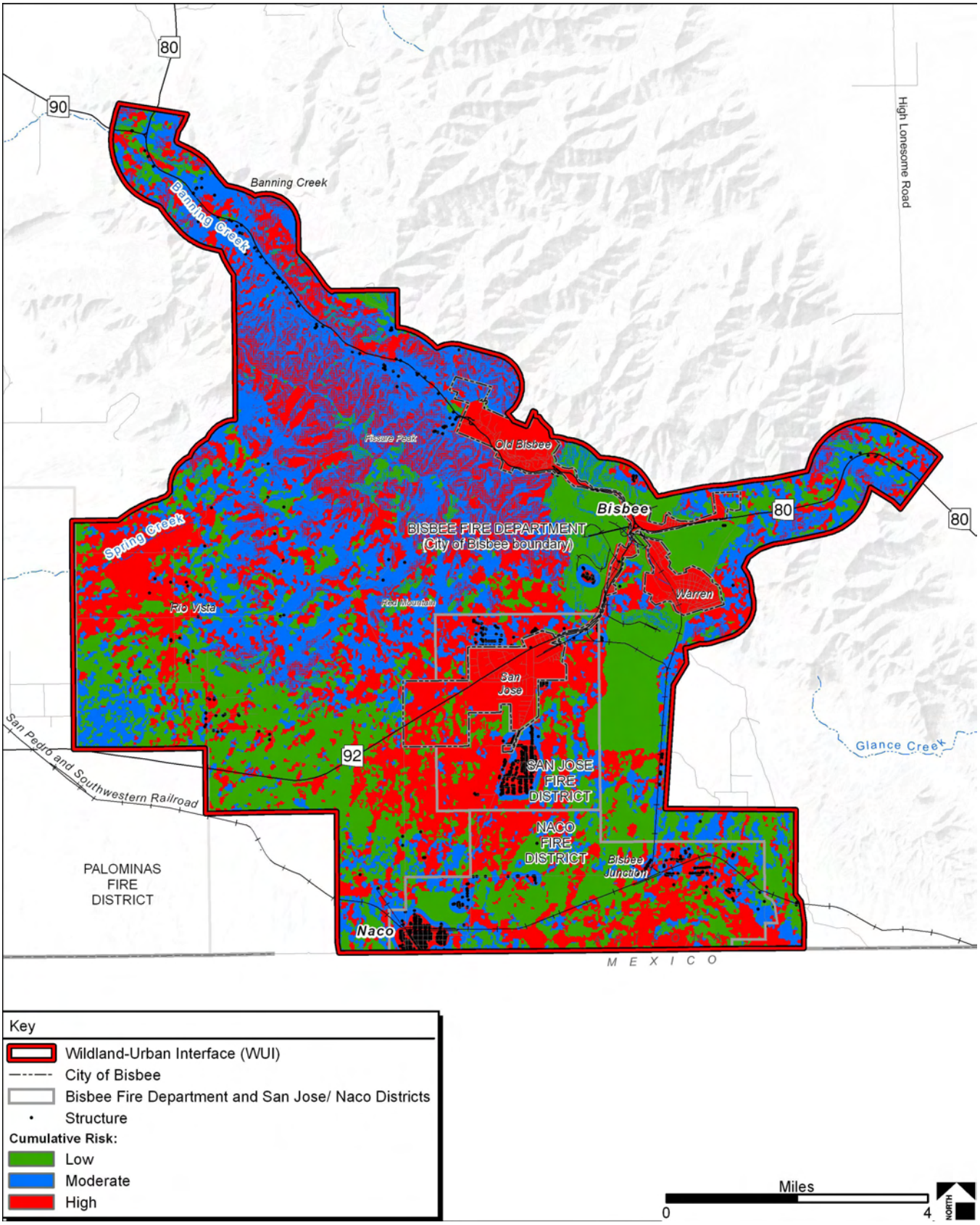

Figure 2.4. Cumulative risk analysis

III. COMMUNITY MITIGATION PLAN

Section III prioritizes the areas needing wildland fuel treatment and recommends methods of treatment and management strategies necessary to mitigate the potential spread of catastrophic wildland fire in the WUI. The recommendations from the communities of Bisbee and Naco for enhanced wildland fire protection capabilities, public education, information, and outreach are also presented in this section.

A. Fuel Reduction Priorities

After determining the areas at greatest risk of wildland fire (Section II), the BCFG has developed a series of proposed actions, including residential treatments, a series of firebreaks appropriate for the wildland fuel type, and broad areas of fuel mitigation treatments (Table 3.1). The BLM Gila District and the BCFG have proposed wildland fire mitigation projects for public and private lands determined as "at risk," with priority emphasis placed on lands located within a one-quarter-mile buffer of BLM properties. The mitigation efforts are designed to reduce home ignitions within one-quarter mile of BLM public lands, to reduce exposure to firefighters, to provide communities with financial and educational assistance, and to improve efficiency of fire operations. The BLM plans to help these homeowners establish firebreaks around their homes. Initially, the BLM will help establish firebreaks as budgets and workloads allow. BLM will pay 50% cost share with private landowners to establish home ignition zone firebreaks on private land. Once established homeowners will be responsible to maintain the firebreaks. In addition to home firebreaks, the BLM will help improve escape routes for landowners that have only one-way out through BLM public lands during wildfire events. Fuels reduction and mitigation work will only be permitted on BLM properties or after written authorization from a private landowner is granted on private properties. The BLM will also complete any necessary environmental documentation before completing work. These proposed actions are recommended to prevent wildfire spread from public lands to private land. Conversely, these treatments will help to reduce the risk of fires spreading to public lands that originate on private property by creating a defensible space for wildland firefighters.

The recommended wildland fuel mitigation projects are focused on protection of life and property from wildland fire. These recommendations will allow fire managers to reduce the wildfire hazard on public and private land through the reduction of hazardous fuels. Proposed treatments may be continuous across property boundaries to allow for the most effective protection from wildfires. These treatments, especially proposed firebreaks, will complement fuel hazard reduction work that individual landowners have undertaken. Hazardous fuels reduction on BLM-administered land is primarily through firebreaks. Firebreaks vary in size and length. Additional treatments on BLM-administered properties involve broader land treatment applications of wildland fuel reduction and habitat restoration. Additional firebreaks or hazardous fuels reduction projects may be developed over time and will conform to the types of treatment recommendations developed by the BCFG. The firebreak model used within the Bisbee area are based on the *Decision Memorandum on Action and for Application of: Categorical Exclusion 1.12 Las Cienegas National Conservation Area, Bisbee and Sonoita Community Firebreaks* (USDI BLM TFO 2007); see Appendix C for the mitigation measures and stipulations outlined in that decision memorandum and used by the BCFG for the BCWPP. Additional firebreak recommendations are identified in Table 3.1. These

Table 3.1. Fuel modification and treatment plans

Treatment No.	1 Developed private parcels less than 2 acres				2 Undeveloped private parcels or single-structure parcels more than 2 acres		3 Grassland Fire Breaks		4 Oak/pinyon/juniper and Shrublands within the WUI	
Treatment category	**Zone 1** (0–10 feet from structures)	**Zone 2** (10–30 feet from structures)	**Zone 3** (30–100 feet from structures)	**Zone 4** (100–600 feet around home)	**Slopes < 20**	**Stream beds, channels, and slopes ≥ 20**	**Slopes < 20**	**Slopes ≥20**	**All slopes**	**Firebreaks**
Vegetation	Remove ladder fuels by pruning the lower third of trees or shrubs up to a maximum of 8 feet to reduce flammable vegetation. Remove and destroy insect-infested, diseased, and dead trees and shrubs Grasses and forbs may be cut with a mower, as long as stubble of at least four inches is remaining.	Remove ladder fuels by pruning the lower third of trees or shrubs up to a maximum of 8 feet; remove and destroy insect-infested, diseased, and dead trees. Create separation between trees, tree crowns, and other plants based on fuel type, density, slope, and other topographical features. Reduce continuity of fuels by creating a clear space around brush or planting groups. Grasses and forbs may be cut with a mower, as long as stubble of at least four inches is remaining.	Remove ladder fuels by pruning the lower third of trees or shrubs up to a maximum of 8 feet; remove and destroy insect-infested, diseased, and dead trees. Maximum density of trees (whichever is greater: 60 Basal Area (BA) at 80–100 trees/acre *or* average density of 100 trees/acre). Grasses and forbs may be cut with a mower, as long as stubble of at least four inches is remaining.	For natural areas, thin selectively and remove highly flammable vegetation. Carefully space trees; choose Firewise [a] plants.	Remove ladder fuels by pruning the lower third of trees or shrubs up to a maximum of 8 feet; remove and destroy insect-infested, diseased, and dead trees. Maximum density of trees (whichever is greater: 60 BA [b] at 80–100 trees/acre *or* average density of 100 trees/acre) See fuel modification plan (this section) developed to promote riparian health, to prevent spread of fire to adjacent property, and to create defensible space with considerations for wildlife and groundwater protection. Single structure or structures on parcels in excess of 2 acres should include Treatment 1 in proximity of structures and Treatment 2 to remaining acres.	Remove dead, diseased, and dying trees. Fell dead trees away from stream channels with defined bed and banks. Areas should be hand-thinned and piled; inaccessible areas may be treated with periodic prescribed fire. Develop fuel modification plan (this section) for treatments.	Grassland types may be mechanically treated to reduce or remove vegetation, including mowing, chopping, and/or mastication to stubble of at least 4 inches remaining. Ensure that removal of vegetation within a designed firebreak of more then one chain (66 feet) in width and length is sufficient to protect federal, state, or private land values. Fuel reduction treatments within grassland vegetation types may include multiple-entry burns to maintain stand structure and reduce fine fuels. All Pre-settlement trees will be retained; other trees encroaching on grasslands will be removed. Mechanical/chemical treatment may be used to maintain firebreaks on private lands. See the fuel modification plan (this section) developed to prevent spread of fire to adjacent property and to create defensible space with considerations for wildlife and groundwater protection.	Same as for slopes < 20 %. Fuels treatments may require hand-thinning and hand-piling in steep slopes. Prescribed fire may be used to reduce unmanageable fire potential (see Treatment 5). Designated fire breaks may be increased to no more than two chains in steep slopes where herbaceous (fine fuels) and subshrub species fuel loads increase to pretreatment levels within three years. See fuel modification plan (this section) developed to promote forest health, to prevent spread of fire to adjacent property, and to create defensible space with considerations for wildlife and groundwater protection.	Spacing may be variable with a 15-foot minimum to promote 1) wildlife habitat while breaking horizontal fuel loading, allowing for patches of closely spaced trees to provide adequate cover, and 2) other habitat components while incorporating openings to increase herbaceous forage production, to maximize edge effect, and to promote fire-resilient stands. Mechanical thinning and Prescribed fire (see Treatment 5) to reduce vegetative fuels and move stands toward potential natural vegetation groups as described in the *FRCC Interagency Handbook*. All trees > 10 inches drc will be targeted as leave trees unless necessary to achieve the desired 15-foot spacing between leave trees. Emphasis will be placed on removing species listed in Appendix C.	Woodland and shrub trees < 8 inches drc will be thinned or burned to a spacing of 15 feet between trees, to achieve like conditions. Shrub and tree trunks will be severed less than 4 inches from the ground. Mechanical treatments, such as crushing, chipping, mastication, and prescribed fire, may be used to create open stands producing flame lengths of ≤ 4 feet to minimize crown fire potential with fuels conducive to suppression action. Herbaceous and subshrub understory may be mechanically treated, including mowing, chopping, and masticating, to limit fine fuel loading while protecting soil integrity from rainfall runoff. Emphasis will be placed at removing species listed in Appendix C.
Slash	Remove dead plant material from ground; prune tree limbs overhanging roof; remove branches within 10 feet of chimney; remove flammable debris from gutters and roof surfaces; and reduce natural flammable material 2–4 feet above the ground around improvements.	Control soil erosion from small water flow channels by use of rock or noncombustible velocity-reducing structures. Remove all leaf litter to a depth of 1 inch.	Same as Zone 2.		All slash, snags, and vegetation that may grow into overhead electrical lines; other ground fuels, ladder fuels, and dead trees; and the thinning from live trees must be removed, mechanically treated (chipped, etc.), or piled and burned along with existing fuels.	Clean dead and down debris in channels where debris may be mobilized in floods, thus creating downstream jams. Some slash and debris can be scattered and retained in small, ephemeral streambeds in which slash can help retain runoff and sediment and provide headcut stabilization.	Slash from grassland treatments may be burned, removed, masticated, or turned.	Same as < 20 %; however, slash maybe hand-piled and ignited with Prescribed Fire being the primary slash reduction treatment.	Slash may be burned or piled and burned or chipped and removed. Slash from grassland treatments may be burned, removed, masticated, or turned.	Slash may be burned, piled and burned, or chipped and removed. Slash from grassland treatments may be burned, removed, masticated, or turned (disked).

Continued

Table 3.1. Fuel modification and treatment plans

Treatment No.	5 Prescribed fire	6 Escape and resource transportation corridors (federal and nonfederal lands)	7 Riparian areas (federal, nonfederal and private lands)		8 Conditional suppression areas (federal and nonfederal lands)	9 Saltcedar (federal and nonfederal lands)
Treatment category	**Federal, state, or private lands**	**Federal, state, or local government where designated as escape route**	**Federal or state lands**	**Firebreaks private lands**	**Federal, state, or private lands**	**Federal, state, or private lands**
Vegetation	Prescribed fire will be used as a tool to accomplish specific resource management objectives in accordance with FS and BLM standards and guides. Prescribed fire on BLM land is authorized if part of an approved prescribed fire burn plan. As additional areas within the WUI are identified, Prescribed fire may be used as a treatment tool provided that a Wildland Fire Implementation Plan is in effect and all conditions set forth have been met. Prescribed fire can occur at low, moderate, and high intensity. High-intensity fire will be used to create openings by removing all aboveground vegetation	Reduce fuel loading by thinning trees < 8 inches drc. Reduce trees to 15-foot spacing. Shrub and tree trunks will be severed no less than 4 inches from the ground. Stands will be variable across the landscape, such as retention of bands of higher density vegetation with sufficient understory to maintain functionality of important wildlife movement corridors in areas of low structure density. Mechanical treatments may include chipping, piling and burning, or removal and prescribed fire in the project area. Trees may be left in clumps with fuel ladders removed from below. Dead, diseased, and dying trees of all sizes will be emphasized for removal. Some trees over 8 inch drc may be cut to reduce safety hazard, or when needed to reach desired 15-foot spacing. Escape and resource transportation corridors may serve as firebreaks in all vegetative types. Firebreaks for each vegetation type, as described in this table, should be implemented at no more than two chains in each direction from the centerline of the escape and resource transportation corridors Emphasis will be placed at removing species listed in Appendix C. Grasses and forbs may be cut with a mower, as long as stubble of at least four inches is remaining.	Riparian treatments will be limited in scope. The majority of riparian areas that fall in the WUI boundary will be avoided unless deemed a fuel hazard. Clearing or cutting of any material within 10 feet of any stream on BLM land is prohibited to prevent the risk of accelerating erosion Treatments may include some overstory removal of deciduous riparian trees and shrubs in areas where encroachment has increased heavy woody fuels (emphasizing removal and control of saltcedar and other invasive trees). Treatments will emphasize nonnative species. Snags > 8 inches may be retained. All pre-settlement trees including snags will be targeted for retention. Restricting the removal of the vegetative over story in the riparian areas to the period of October 15 through March 31 will prevent the disturbance of any nesting by neotropical migrant bird species, including the Southwestern Willow Flycatcher. Fuels reduction between October 15 through March 31 in riparian areas, as long as fire danger is not extreme Emphasis will be placed at removing species listed in Appendix C.	Private land treatment should use hand tools, chain saws, or mowers. Dead vegetation and slash should be removed. Ladder fuels including limbs and branches should be removed up to a maximum of 8 feet aboveground. All mechanized equipment must meet state and local fire department standards. Perform treatments October through March annually.	This prescription includes lands with desert shrub/scrub vegetation types in which no fuel modification treatments have been identified as necessary to provide protection from wildland fire. The threat from catastrophic wildland fire is low or nonexistent. This includes areas where fire never played a historical role in developing and maintaining ecosystems. Historically in these areas fire return intervals were very long. These are areas in the WUI where fire could have negative effects unless fuel modifications take place. These include areas in which the use of fire may have ecological, social, or political constraints and areas in which mitigation and suppression are required to prevent direct threats to life or property. Wildland fire growth within these areas will be monitored for private property, ecological, and cultural threats before initiating suppression. Agency and fire department policy provisions will determine suppression response.	Areas of monotypic saltcedar or in mix with other invasive species may be treated mechanically, chemically, or by controlled burning and reburning to reduce stem density, canopy, and excessive fuel loading. Mechanical removal by cutting below the root collar during November through January is preferred. Mechanical whole-tree extraction has achieved as high as 90 % mortality on initial treatments and may be considered a preferred treatment. Low-volume oil-based herbicide applications in late spring to early fall would be considered for control of small plants (< 2 inches drc). Low-volume cut-stump herbicide applications will be considered in combination with mechanical treatment. Preferred phenological stage for burning is peak summer months and postavian breeding months. Black lines should be at least 700 feet wide, and headfire installed with temperatures 65 °F to 95°F, relative humidity of 25 to 40 %, and wind speeds < 15 mph. Maintenance, revegetation, restoration, and monitoring should follow as needed for each treatment area.
Slash	Slash, jack piles, down logs when more than 600 feet from private property may be burned. Pile or prescribed fire will be used to remove fuel when more than 600 feet from private land, or as designated. Snags and down woody material may be retained in areas where fire resilience is not compromised.	Snags, slash, and down logs will be removed within 600 feet of private land. When more than 600 feet from private property, pile burning, or prescribed fire will be used to remove fuel. Snags and down woody material may be retained in areas where fire resilience is not compromised. Vehicle pullouts should be planned in appropriate numbers and locations where vegetation, slope, and terrain permit.	After removal of heavy woody fuels, fine fuels may be maintained by cool-season low-intensity prescribed fire that move slowly downslope or into prevailing winds to mid-slope. Large down woody material and snags (≥ 12 inches) may be retained in riparian areas.	Fuel treatments and woody material removal will occur on existing roads. Cool season low intensity prescribed fire may be used for maintenance of fine fuels. Pile or jackpot burning will not occur in ephemeral, intermittent, or perennial stream channels.	Response will be for full suppression when firefighter and public safety, property, improvements, or natural resources are threatened.	Created slash will be piled with preexisting fuels and burned or otherwise used for soil stabilization. Disturbed areas should be immediately revegetated with a native plant community that contains no invasive species and meets other land use objectives, such as wildlife habitat enhancements or recreational use benefits.

Notes:

[a] A list of Firewise plants can be found by using the Firewise literature listed in Appendix D, Additional Resources

[b] BA = basal area (in square feet); dbh = diameter breast height; drc = diameter root collar.

firebreaks were developed by the BCFG participating resource specialists based on firebrand movement during peak fire season under normal weather conditions in relation to slope and fuel type. All of the different firebreak treatments identified in Table 3.1 are designed to adhere to the stipulations identified in Appendix C for application on federal lands. The recommended land treatments and firebreaks will provide for community value protection, enhance restoration of native vegetation, and provide for wildlife habitat needs.

The recommended firebreak fuel mitigation measures and stipulations meet the BCWPP goals of reducing hazardous wildland fuels on both public and private lands, improving fire prevention and suppression, restoring riparian health, involving the community, protecting the ecosystem, and expediting project implementation.

To prioritize treatment management units, the WUI has been identified, analyzed, and categorized according to potential risk from wildfire. The analyses of community values, fuel hazards, and fire history were compiled into a single map that depicts areas of low, moderate, and high risk (Figure 2.4). The cumulative risk map from the previous section was used to create a treatment management units map (Figure 3.1). Proposed treatments are listed in Table 3.1. The risk areas were further identified and categorized into manageable, site-specific units in the WUI, with an overall risk value determined for each unit. In addition, each site-specific area in the WUI has been labeled according to the community or response zone in which the management area is located. In the BCWPP, 54 site-specific units were identified and given overall risk values. Each site-specific area was also ranked by wildfire risk, described and given recommendations for preferred treatment types and methods. The different management units, with corresponding treatment recommendations, are found in Table 3.2. The BCFG has suggested implementing landscape-level treatments across the treatment units when necessary to protect from catastrophic wildland fire and to promote overall ecosystem health.

Private land treatments in the WUI typically occur on small land parcels, near power lines, structures, and other obstacles. In many cases, cut trees and slash cannot be piled and burned on small private land parcels or it is not the preferred slash treatment by the owner of a small residential lot or by the BCFG. Piling and burning cut trees and slash is not permitted on BLM lands under the Categorical Exclusion for hazardous fuels reduction; therefore, vegetation will be cut, removed, or chipped and will be transported to a disposal site. The BCFG has also recommended that firebreaks constructed on both public and private lands be maintained in accordance with the above mitigation measures and stipulations in rotating two to three-year intervals to ensure the integrity of the firebreak through removal of fine and light vegetative fuels, therefore restricting wildland fire movement.

Treatment of wildland fuels within the WUI is expected to generate considerable slash and vegetative waste material. Private individual use of wood products from fuel reduction treatments within the WUI is primarily for fuel wood. Commercial use of the woody material from fuel reduction treatments is also primarily limited to fuel wood, and any commercial value of treatment by-products (bio-renewable use) will not affect cost of treatments. If wildland fuel modification prescriptions require follow-up pile burning or herbicide application after vegetation treatment, the total cost/acre treated could be as high as

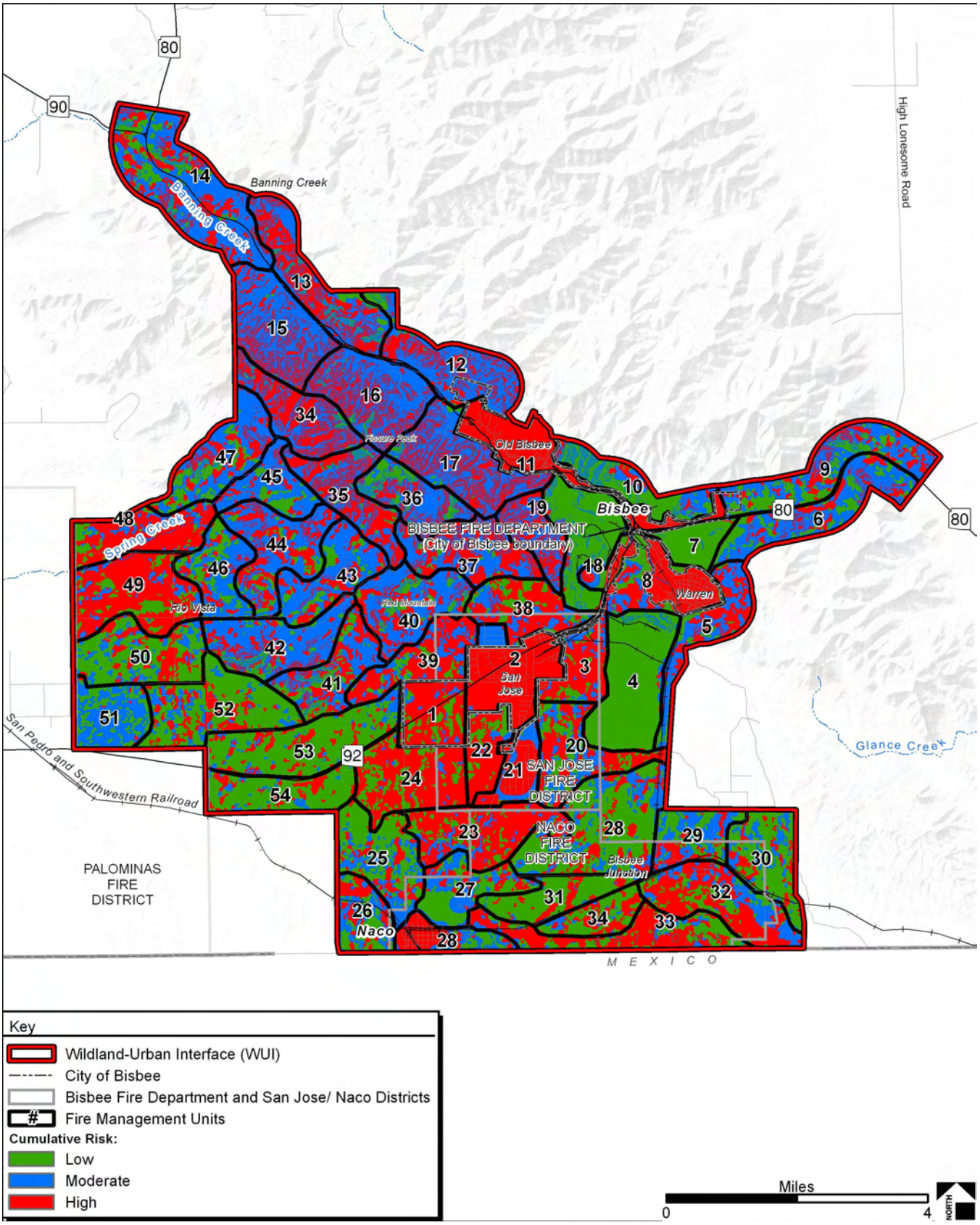

Figure 3.1. Treatment management units

Table 3.2. Identified treatment management units with recommended treatments

Treatment management area map ID	Risk value[a]	Location and description	Recommended treatment(s)	Total acres	Federal acres	Nonfederal acres
1	H	Land to the west of San Jose District	2,6	651	0	651
2	H	San Jose District	1,6	1,025	0	1,025
3	H	Land to the east of San Jose District	2,6	627	0	627
4	L	Tailing Ponds to the east of San Jose District and south of Warren District	NA	1,358	0	1,358
5	H/M	Land east of Warren	2,4	764	0	764
6	M	Land at the far east of the WUI; south of SR 80	2,6	1,148	69	1,079
7	L	Mined area to the north of Warren	NA	392	0	392
8	H	Warren District, including land west of SR 80 and housing cluster west of SR 80	1,2,6	1,090	0	1,090
9	M	Land in the easternmost portion of WUI; north of SR 80	1,2,4,6	1,201	0	1,201
10	L	Land north of SR 80; east of Old Bisbee	1,4,6	728	10	718
11	H	Old Bisbee	1,6	953	0	953
12	M	Land to the northwest of Old Bisbee, including Mule Mountain communication towers	1,2,4,6	1103	416	687
13	H	Land west of Mule Mountain and north of SR 80	1,2,4,6	1,144	358	786
14	M	Land in far northwestern portion of WUI	1,2,4,6,7	1,886	127	1,759
15	M	Portion of land south of Banning Creek along western edge of WUI	1,2,4,6,7	1,204	195	1,009
16	H/M	Land south of Banning Creek and west of Old Bisbee	1,2,4,6,7	1,186	459	727
17	H/M	Land directly south and southwest of Old Bisbee	1,2,4,6,	1,232	406	826
18	L	Land surrounding Queen Mine Pit	NA	956	0	956
19	H	Land directly west of Queen Mine Pit	2,4	527	0	527
20	H	Lands southwest of large tailing ponds	2,4,8	955	0	955
21	H	Unincorporated residences south of San Jose	1,2	472	0	472
22	H	Undeveloped land south of San Jose district	3	488	0	488

Continued

Table 3.2. Identified treatment management units with recommended treatments

Treatment management area map ID	Risk value[a]	Location and description	Recommended treatment(s)	Total acres	Federal acres	Nonfederal acres
23	H	Northernmost portion of Naco Fire District	1,2,8	1,102	0	1,102
24	H	Land Southwest of San Jose and North of Naco	6	1,117	0	1,117
25	L	Land northwest of Naco	2,4,8	1,011	0	1,011
26	L	Land directly west of Naco	2,4,8	577	0	577
27	L	Scattered housing and golf course Northeast of Naco	1,2,4,8	728	0	728
28	L	Northwest of Bisbee Junction	1,8	2,165	0	2,165
29	M	Land northeast of Bisbee Junction	1,2,4	639	0	639
30	L	Land to the far east of Bisbee Junction	2,8	868	0	868
31	L	West of Bisbee Junction and North of railroad tracks	1,2,8	664	0	664
32	H	Land southeast of Bisbee Junction	1,2	1,143	2	1,141
33	H	Land along southern border of WUI and east of Naco	2	1,001	0	1,001
34	L	Land to west of Bisbee Junction and south of railroad	2,7,8	1,351	294	1,057
35	H	Land southwest of Fissure Peak	2,4,5	866	428	438
36	M	Land southeast of Fissure Peak	2,4,5	703	366	337
37	H	Land northeast of red Mountain	2,4	968	52	916
38	H	Land north of San Jose district	2,6	779	0	779
39	H	Land northwest of San Jose District	2	808	0	808
40	M	Red Mountain area	2,5	997	463	534
41	M	Land southwest of Red Mountain	2,5	828	160	668
42	M	Land west of Red Mountain	4,5	1,046	453	593
43	M	Land Northwest of Red Mountain	2,4,5	869	507	362
44	H	Land west of Red Mountain and south of Spring Creek	2,4,5	1,095	147	948
45	M	Land west of Fissure Peak, south of spring creek	2,4,5,7	596	0	596

Continued

Table 3.2. Identified treatment management units with recommended treatments

Treatment management area map ID	Risk value[a]	Location and description	Recommended treatment(s)	Total acres	Federal acres	Nonfederal acres
46	M	Land to the west of treatment area 44	2,4,5	706	196	510
47	M	Land west of Fissure Peak north of Spring Creek	7,8	995	2	993
48	H	Land on western edge of WUI and north of Spring Creek	7	890	0	890
49	H	Land on western edge of WUI south of Spring Creek	2,7	1,262	37	1,225
50	L	Land on western edge of WUI and south of treatment area 49	2,8	1,096	37	1,059
51	M	Land on west edge of WUI south of treatment area 50	4	724	0	724
52	L	Land east of treatment area 51	1,2,8	1,320	131	1,189
53	L	Land North of State Route 92 and west of WUI	2,6,8	1,360	162	0
54	L	Land south of SR 92 on west edge of WUI	6,8	867	0	867

[a]L= low, M = medium, and H = high.

$5,000.00/acre on small land parcels consisting mostly of individual plant treatments within the riparian corridor (USDA Forest Service [FS] and New Mexico Energy, Minerals and Natural Resources Department 2005) and as high as $580.00/acre in upland areas. For private land treatments to be conducted in a fiscally reasonable and timely manner, the BCFG investigated costs associated with the use of the ASLD Fire and Fuels Crew through the established agreement with the ASLD Division of Forestry. The estimates of daily costs, which include a 20-person inmate labor crew and chipper for a 100-mile roundtrip to the project site by the ASLD Division of Forestry Crew Carrier, are as follows:

- 8-hour day: $692.75
- 10-hour day: $792.75
- 12-hour day: $892.75

Depending on variables associated with topography, fuel loading, and vegetation type (e.g., overstory tree removal or subshrub thinning) a fully staffed ASLD fire and fuel crew, during an 8-hour workday (a total workday of 10 to 12 hours depending on travel) can treat from 0.5 to 4 acres per day. Table 3.3 further describes the acreage of treatment that a ASLD crew can conduct during an 8-hour workday.

The BCFG has recommended that wildland fuel modification projects be contracted to the ASLD to ensure treatments are conducted in a timely manner and at a reasonable cost. Cost estimates for treatments in the

Table 3.3. Acres of wildland fuels mitigation treatment conducted by ASLD fire and fuel crew during 8-hour on-site workday

Vegetative association	Average acres per day treated
Ponderosa Pine/Mixed Conifer	0.5 to 1 acre per day
Pinyon/Juniper	1 to 2 acres per day
Mesquite Woodland	3 to 4 acres per day
Oak Woodland	3 to 4 acres per day
Riparian	1 to 2 acres per day (depending on fuel loading)

WUI are based on the estimates provided by the ASLD Forestry Division for the fire and fuel crew costs for both federal and nonfederal land treatments. The ASLD fire and fuels mitigation crews do not remove hazardous trees or provide "climbers" for pruning or segmented tree removal, which is occasionally required on private lands. The BCFG does support and encourage local business development that will complement wildland fuel mitigation needs within federal and nonfederal lands of the WUI. The BCFG has recommended that private landowners who wish to adopt fuel modification plans other than those described in Table 3.2 should have their plan prepared or certified by a professional forester, a certified arborist, or other qualified individuals. Fuel modification plans for federal and state lands within one-half mile of private land may be prepared for wildlife and watershed benefits. An example of such a benefit includes the retention of large snags for wildlife value. Fuel modification plans may also extend into areas more than 600 feet from private lands where fire resiliency is not impaired and mitigation or fuel reduction efforts will not compromise public or firefighter safety. A fuel modification plan must identify the actions necessary to promote rangeland, wildlife, or watershed health and to help prevent the spread of fire to adjacent property by establishing and maintaining defensible space. The action identified by the fuel modification plan should be completed before development of the property or identified during project initiation on federal and state lands.

Alternate Federal, State, or Private Land Wildland Fuel Modification Plan

A fuel modification plan for federal and state lands will follow agency procedures, standards, and guides. Fuel modification treatment plans for private land parcels should at least include the following information:

- A copy of the site plan
- Methods and timetables for controlling, changing, or modifying fuels on the properties in a timely and effective manner
- Elements for removal of slash, snags, and vegetation that may grow into overhead electrical lines; removal of other ground fuels, ladder fuels, and diseased, dying, and dead trees; and thinning of live trees
- Methods and timetables for control and elimination of diseased or insect-infested vegetation
- A plan for the ongoing maintenance of the proposed fuel reduction and control measures for disease and insect infestations
- A proposed vegetation management plan for groupings of parcels under multiple ownership accepted by all individual owners (subject to compliance with this section)

HFRA was designed to expedite administrative procedures for conducting hazardous wildland fuel reduction and restoration projects on federal lands. Regardless of priority treatments selected for federal lands, a NEPA study (an environmental assessment) must be conducted for fuel reduction projects. Although HFRA creates a streamlined and improved process for reviewing fuel reduction and restoration treatments, it still requires that appropriate environmental assessments be conducted and that collaboration be maintained. To meet conditions established by the Healthy Forest Initiative, the USDA and the USDI adopted two new categorical exclusions from the normal review steps of an environmental assessment or an environmental impact statement. These exclusions are for hazardous fuels reductions and for rehabilitation of resources and infrastructure damaged by wildfire. For a hazardous fuels reduction project on public lands to be categorically excluded from documentation of the results of an environmental assessment, the project must meet specific requirements:

- It must have less than 4,500 acres to be treated, with mechanical slash treatment restricted to no more than 1,000 acres.
- Its lands must be within current Condition Class 2 or 3.
- It must not be in a wilderness or wilderness study area.
- It must not include use of pesticides and herbicides or new road or infrastructure construction.
- It may include sale of vegetative products if the primary purpose is to reduce hazardous fuels.

The recommended treatments within the BCWPP have been developed with consistency with federal land management action alternatives and are intended to be compliant with Categorical Exclusion 10, Fuel Reduction. The purpose of Categorical Exclusion 10, Fuel Reduction, is “to facilitate efficient planning and decision concerning rehab of areas so as to reduce risks to communities caused by severe fires, and to restore fire-adapted ecosystems” (USDA FS 2000).

B. Prevention and Loss Mitigation

The BCWPP will be used as a resource to assist in the coordination of long-term interagency mitigation of catastrophic wildfire events in the community. The community’s goals of the BCWPP area are to:

- improve fire prevention and suppression to protect private property,
- construct a series of firebreaks (fuel mitigation) to disrupt continuous hazardous wildland fuels adjacent to private lands, or on private lands within one-quarter mile of BLM property,
- promote community involvement and education to prevent unwanted human-caused fires,
- recommend measures to reduce structural ignitability in the BCWPP area,
- preserve aesthetics and wildlife values within riparian areas,
- identify funding needs and opportunities,
- expedite project planning through partnerships with the BLM and other private and public entities in managing wildland-fire risk within the WUI.

The BCWPP should be periodically reviewed and updated as needed. Successful implementation of this plan will require a collaborative process among multiple layers of government entities as well as a broad range of community interests. The community of Bisbee has made the following action recommendations:

1. Improved Protection Capability and Reduction in Structural Ignitability

The community considers the risk of wildland fire igniting and spreading throughout the WUI a serious issue. The BFD, the BLM Gila District, and the BCFG believe actions to reduce fire risks and to promote effective responses to wildland fires must be undertaken. The following are recommendations to enhance protection capabilities in the community of Bisbee:

a. Improve dispatch and alerting capabilities by enhancing the existing radio system; this should be jointly investigated by the County, community, and federal and state agencies. The alerting system could additionally include the development of a "phone tree" community warning system.
b. Support the creation of a fire evacuation plan for Banning Creek Canyon written by the BCCFC.
c. Additional comprehensive and frequent training for firefighters should be jointly conducted by the Southeast Zone, ASLD; the Cochise County Fire Association; the BLM Gila District; and the BFD. A common training activity should be conducted once a year before the fire season for the purpose of emphasizing tactics of WUI suppression and interagency coordination. Continue to provide WUI fire suppression training and ensure that the training is made available to all firefighters from the BFD, the Naco and the San Jose fire districts.
d. Conduct fire safety and fire training for BCCFC members, City of Bisbee residents and any additional interested community members within the WUI boundary.
e. Add two qualified Firewise assessors to serve the local communities.
f. Obtain a mower/chipper/shredder for use by the BFD for wildland fuel mitigation projects.
g. Obtain a new type 6 engine for wildland fire response by the BFD.
h. Expansion or construction of a new fire station for the Naco Fire District.
i. Update mapping capabilities of the BFD through GIS software and GPS units, both engine based and handheld.
j. Work cooperatively with Arizona Department of Transportation (ADOT) to coordinate mowing schedule prior to fire season to best serve community needs and reduce unwanted ignitions.
k. Distribute literature discussing Firewise construction to developers and new homebuilders at the city and county level. City of Bisbee will work with developers to have them construct and maintain firebreaks in new developments. Cochise County Planning and Zoning department will distribute literature when new builders inquire about and apply for permits.
l. Identify and locate new locations for future wildland fire water supply sites.
m. Acquire new 2000-gallon water tender for Bisbee Fire Department

2. Promote Community Involvement and Improved Public Education, Information, and Outreach

The County and community will develop and implement public outreach programs to help create an informed citizenry. The goal is to have residents support concepts of Firewise landscaping and naturally functioning riparian systems through restoration management and rapid response to wildland fire. The BCWPP is intended to be a long-term strategic instrument containing prescriptive recommendations to address hazardous fuels. A grassroots collaborative structure of individual citizens, fully supported by local governments partners, will provide the most effective long-term means to achieve these goals and to

maintain community momentum. Additional education resources are listed in Section VIII of the BCWPP. The components of such a structure include the following recommendations:

a. Complete the wildland fire home assessment through the use of existing Redzone software and submit wildland fire hazard mitigation strategies for each private property to landowners.
b. Expand the use of current public information tools for Firewise residential treatments as an immediate action step. This will be accomplished through presentations by the BFD, use of the Arizona Firewise Communities education trailer at community events, development of specific promotional materials, and distribution of existing Firewise information to new residents in a city welcome packet and to existing residents through utility mailings.
c. Partner with BCCFC for seamless Firewise planning.
d. Use the resources of the Office of the State Forester, which has an agreement with the FS Region 3 to provide forest health analysis and evaluation for all nonfederal lands in Arizona. The Office of the State Forester and its District Offices are tasked with Firewise program outreach throughout the state and assist in community outreach programs. Community bulletins and other public service announcements concerning wildfire threat and preparedness should be developed with assistance from the Office of the State Forester and its District Offices.
e. Site, identify, and pursue necessary permissions for future outreach and informational sign locations.
f. Establish and maintain a working relationship with ADOT to install fire prevention and mitigation signs along ADOT transportation corridors
g. Place and maintain bilingual wildfire caution signs within WUI areas.
h. Coordinate with neighboring Firewise groups, such as the Palominas Firewise Community Board, to better manage fire education along WUI borders.
i. Develop and deploy fire mitigation, fire prevention, and Firewise message signs, including current fire danger signs, bilingual wildfire caution signs, and roadside identification and directional signage to residences, water sites for firefighting use, and helicopter landing sites.

3. Encourage use of woody material from WUI fuel mitigation programs.

The County and community will continue to support and promote private contractors who perform fire-safe mitigation work. The community will continue to support and promote new businesses involved in the wildland fuel reduction market. Bisbee is committed to employing all appropriate means to encourage the use of vegetative by-products available from the fuel management program within the WUI. Such possible uses encouraged by the community include the following:

a. Identify community groups to use bagged mesquite barbecue wood as a fundraising opportunity. Bagged mesquite can be used for “campfire cooking”, for commercial and personal culinary uses. This material can be sold to visitor and community markets by the community groups as a fundraising opportunity.
b. Market firewood to local residents, visitors, and adjacent communities.
c. Market mesquite wood for artwork, furniture, and other specialty wood products.

d. Support the future potential for using woody material biomass in the production of wood pellets. Using woody biomass to produce wood pellets is a potentially emerging market, support for this market should be at a local level as well as regional level.

IV. BCWPP PRIORITIES: ACTION RECOMMENDATIONS AND IMPLEMENTATION

The BCWPP community has developed action recommendations (see Section III.B) necessary to meet the plan's objectives. A series of recommendations that will reduce structural ignitability and improve fire prevention and suppression have also been developed by the BCFG. A unified effort to implement this collaborative plan requires timely decision making at all levels of government.

To meet BCWPP objectives, the BCFG has developed the following priority action recommendations. At the end of the fiscal year, projects implemented from these priority action recommendations will be monitored for effectiveness of meeting BCWPP objectives. For the life of the BCWPP, recommendations for additional projects will be made for each coming fiscal year on the basis of project performance from the previous fiscal year.

A. Administrative Oversight

Generally, the most efficient way to manage the mitigation of wildland fire threat in the WUI is through delegating and ensuring responsible authorities for implementing and monitoring the action recommendations of the BCWPP. Establishing a unified effort to collaboratively implement the BCWPP embraces adaptive management principles that enhance decision making and reduce inconsistency at all levels of government.

Therefore, the BCFG has recommended that the BFD, NFD, and SJFD will be collectively responsible for administering the CWPP, while the BLM will be responsible for fuel mitigation projects on BLM-administered lands within the WUI. Cochise County will also have some administrative duties related to plan implementation. Details of specific administrative tasks are outlined in Section V of this plan.

B. Priorities for Construction of Firebreaks

Table 4.1 describes proposed firebreaks within the WUI boundary and priority for construction as recommended by the BCFG. Before and after pictures from a home ignition zone (HIZ) firebreak constructed around a home can be seen in Photo 4.1. Figure 4.1 displays the proposed firebreak treatment areas. This action recommendation will reduce wildfire potential to the community. All firebreaks have "high" valuations for reducing risk. The BCFG looked at the treatment management unit map and the associated risk levels (Figure 3.1) to prioritize firebreak construction. Firebreaks were prioritized based on highest risk and proximity to structures.

C. Priorities for Protection Capability and Reduced Structural Ignitability

The BCWPP communities will evaluate, maintain, and, where necessary, upgrade community wildfire preparation and response facilities, capabilities, and equipment. Table 4.2 lists the priority action recommendations. Refer back to the action items in Section III and list any additional priorities in Table 4.2.

Table 4.1. Priority action recommendations for construction of firebreaks

Firebreak area	Treatment management units	Location and description	Project partners	Estimated treatment costs
BLM HIZ Firebreaks #1	12,14,16	Banning Creek Canyon, Fuels reduction around homes within BLM one-quarter-mile buffer. Primarily shrub, oak, and scrub types with a small grassland component.	BLM, BFD, and private landowners	Up to 20 structures to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$4,618.33**
BLM HIZ Firebreaks #2	11,17	Old Bisbee, fuels reduction around homes within BLM one-quarter-mile buffer. Primarily pinyon/juniper/oak and shrub with a small grassland component.	BLM, BFD, and private landowners	Up to 13 structures to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$3,001.92**
BLM HIZ Firebreaks #3	40,49,50,52	Rio Vista and Red Mountain, fuels reduction treatment around homes within BLM one-quarter-mile buffer. A mix of shrub, scrub, grass, and a small component of pinyon/juniper/oak.	BLM, BFD, and private landowners	Up to 225 structures to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$51,956.25**
City of Bisbee Firebreak #4	2	San Jose District, strategic firebreak surrounding at-risk homes. Primarily grass and shrub removal with a small scrub component.	City of Bisbee, BFD, SJFD, and private landowners	25 acres to be treated at a cost of $692.75/day, completing 3 acres/day for a total cost of **$5,542.00**
Firebreak maintenance	11,12,14,16,17, 40,49,50,52	Firebreaks maintenance, performed by landowners at least once a year following treatment.	Private landowners	Up to 258 HIZ firebreaks and 25 acres to be maintained each year.

Photo 4.1. Before- and after-construction pictures of a home ignition zone firebreak

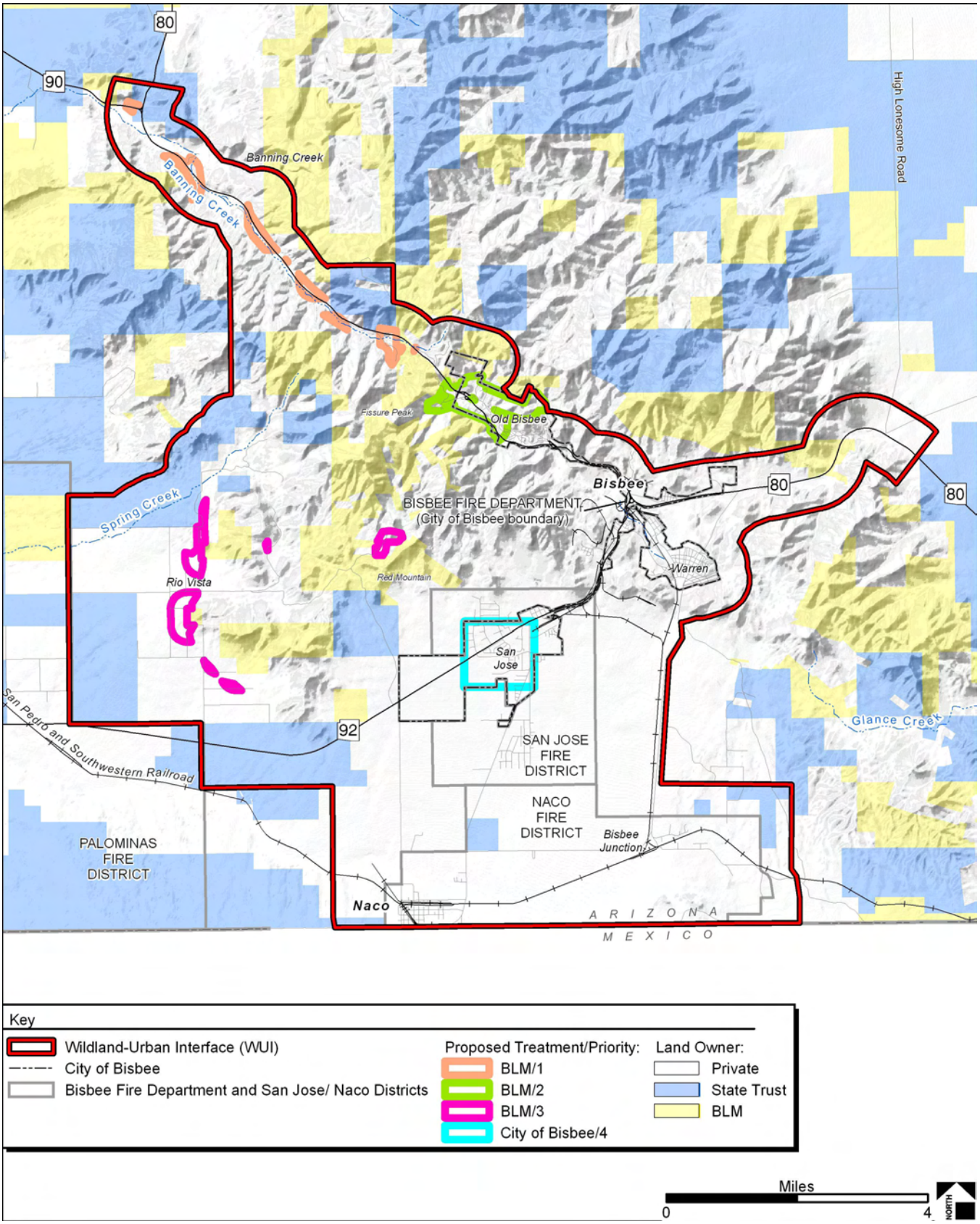

Figure 4.1. Priority firebreak treatment areas

Table 4.2. Action recommendations for wildland fire protection and reduced ignitability

Partners	Project	Equipment/expenses	Timeline
BFD and ASLD	Acquire new 2,000-gallon water tender for use by BFD.	$150,000 for new tender and outfitting equipment	Apply for grant and acquire new tender, 2007
BFD, City of Bisbee, ADOT, and Cochise County	Coordinate with ADOT to schedule mowing along state highways and with Cochise County to schedule mowing along County maintained roads.	Time and effort by city and fire department staff	BFD and City of Bisbee will call ADOT and Cochise County in January each year to schedule mowing preferably between February and March each year prior to fire season
City of Bisbee, BFD, and BCCFC	Conduct yearly fire safety training during fire prevention week to serve interested homeowners and the community of Bisbee.	$5,000 annually	Apply for funds and plan and schedule first event, 2007; continue yearly
BFD and BCCFC	Send one person per year to Arizona Wildfire Academy to add 2 Firewise assessors to serve the local communities.	$1,000 annually	BCCFC representative by 2007; BFD representative by 2008
BFD, NFD, and SJFD	Train all wildland fire staff in S130 Basic Wildland Firefighting, S190 Introduction to Wildland Fire behavior, S215 Operation in the Wildland Fire Urban Interface, and S 290 Intermediate fire behavior.	$5,000 annually	Send five people per year to Arizona Wildland Fire Academy

D. Priorities for Promoting Community Involvement through Education, Information, and Outreach

The BFD will implement public outreach and education programs for residents to heighten awareness and understanding of the threat that wildland fire poses to the community.

Table 4.3 displays the BCWPP priority recommendations to promote community involvement. Additional programs that could be used or developed to enhance community outreach and education may be developed and implemented in the future.

Table 4.3. Action recommendations for enhanced public education, information, and outreach

Partners	Project	Equipment/expenses	Timeline
BFD, City of Bisbee, and ADOT	Coordinate with ADOT to install fire prevention and mitigation signs along ADOT transportation corridors	Time and effort of department staff for applications and documentation; minimal installation costs for crew labor to be paid by City of Bisbee or BFD	Identify location and complete any needed documents to install existing sign in 2007
City of Bisbee	Coordinate with new homebuilders and developers to distribute Firewise literature and to encourage Firewise building construction (an example of Firewise construction is shown in Appendix E)	Time and effort of city staff; potential future costs for additional brochures as demand increases	Acquire initial brochures in early 2007; distribute and discuss the literature in 2007; determine any additional needs in 2007 for next fiscal year
City of Bisbee, BFD, Cochise County, BLM, and BCCFC	Support and assist BCCFC with its upcoming Farmer's Market event	Potential use of Firewise trailer; time and effort costs for agency staff	Early 2007
City of Bisbee, BFD, NFD, SJFD, and BCCFC	Obtain Redzone software and field data recording devices (PDAs) to conduct fire assessments	$3,000 for software and PDA devices	Apply for grants in 2007; acquire and begin using equipment 2007
Cochise County	Distribute Firewise literature to persons inquiring about building permits within the unincorporated areas of the BCWPP	$250 for Firewise building construction packet per person; provide 100 packets per month to persons inquiring or applying for building permits within the county; $300,000 annually	Apply for grants and acquire Firewise packets; begin distribution in 2007–2008
City of Bisbee, BFD, SJFD, NFD, BCCFC, and private landowners	Advertise and complete fire assessments within the WUI area; assessments may begin prior to acquisition of Redzone software and field devices, but these tow action items should be streamlined if possible; implementation of recommended items is the responsibility of the landowners	$45/home; conduct 10–20 assessments annually; $900 annually	To begin as soon as first Firewise-qualified assessor completes training in 2007; implement recommendations in 2007–2008
BFD, NFD, SJFD, City of Bisbee, BCCFC, and Cochise County	Establish new Firewise communities within the WUI area using the BCCFC as the project model	$5,000 every 5 years	Establish one new committee serving a new area every 5 years

E. Requested Funding for Implementation of the BCWPP

Table 4.4 summarizes the total costs to implement the BCWPP action recommendations.

Table 4.4. BCWPP proposed budget

BCWPP objective	Estimated cost
Wildland fuel mitigation	$65,118.50
Wildland fire protection and reduced ignitability	$161,000.00
Public education, information, and outreach	$308,900.00
Total requested implementation funds	$535,018.50

V. MONITORING PLAN

Monitoring is essential to ensure that BCWPP goals are met. The BFD, the NFD, the SJFD, the BLM, and Cochise County will actively monitor the progress of the BCWPP communities' action recommendations to determine the effectiveness of ongoing and completed projects in meeting BCWPP objectives as well as to recommend future projects necessary to meet BCWPP goals.

In accordance with Section 102.g.5 of HFRA, the BCWPP communities will participate in a multiparty monitoring program to assess progress toward meeting BCWPP objectives. This authority to participate in multiparty monitoring will be vested in the BFD chief, NFD chief, SJFD chief, the BLM fire mitigation specialist, and Cochise County Emergency Services Coordinator, as the BCWPP administrators responsible for implementing and monitoring the BCWPP. The BCWPP communities believe that participation in multiparty monitoring will provide effective and meaningful ecological and socioeconomic feedback on landscape and site-specific fuel reduction projects and watershed enhancements and would also assist in land-management planning.

This section details the performance measures that will be used to assess the effectiveness of BCWPP projects. Monitoring will include assessing and evaluating the success of individual BCWPP project implementation and success of a given project's effectiveness in furthering BCWPP objectives.

A. Administrative Oversight, Monitoring, and BCWPP Reporting

The BFD, NFD and SJFD chiefs are collectively responsible for monitoring the community recommendations for fuels reduction projects on nonfederal lands (fuel hazard removal on private lands within the WUI), reduction in structural ignitibility, and public education and outreach. The BLM will be responsible for establishment of fuel mitigation projects on BLM-administered lands and for lands within the one-quarter mile buffer of BLM lands within the WUI. Requests for HFRA grant funds through the Arizona State Forester Fire Assistance Grant process will be submitted by the BFD, NFD and SJFD annually to implement the action recommendations for private land treatments, mitigation features for reduced structural ignitibility, firefighting response, and public outreach. For BLM-administered firebreaks, the BLM will pursue funding to construct firebreaks within the one-quarter mile buffer of lands surrounding BLM properties within the WUI. Maintenance of BLM established firebreaks on Federal lands are the responsibility of the BLM. Maintenance of firebreaks on private property is the responsibility of the private landowners. The fire chiefs will perform monitoring and reporting of the BCWPP on a three-year basis to provide information on additional measures necessary to meet BCWPP goals, to review priority action items and to document completed projects.

The BCWPP administrators will be mutually responsible for implementing and monitoring the BCWPP action recommendations. The BCWPP administrators should also assist federal and state agencies and private landowners in identifying appropriate grant and other funding mechanisms necessary to implement the action recommendations of the BCWPP. Grant information should be routinely searched to identify updated grant application cycles. The following is a list of federal, state, and nongovernmental Web sites that should be monitored to obtain updated grant application cycle information:

Federal

- www.blm.gov
- www.fs.fed.us/r3
- www.fs.fed.us/r3/partnerships/
- www.firegrantsupport.com/
- www.fireplan.gov
- www.nrcs.usda.gov
- www.ojp.usdoj.gov

State

- www.AZSF.az.gov (also www.AzStateFire.org)
- www.land.state.az.us

Nongovernmental

- http://cals.arizona.edu/firewise
- www.iwjv.org
- www.sonoran.org
- www.azwildlife.org
- www.naco.org/techassistance

Reporting by the BCWPP administrators should include successful grant awards received for implementing the action recommendations of the BCWPP. Every three years, the BCWPP administrators will produce an annual report detailing the success of BCWPP project implementation and overall progress toward meeting BCWPP goals. The BCWPP administrators will also make recommendations to the signatories to update the Community Mitigation Plan (including Fuel Reduction Priorities) and the Prevention and Loss Mitigation Plan portions of the BCWPP, using adaptive management principles. This information will ensure timely decision making for all levels of government and will provide the input necessary for the development of an updated BCWPP work plan, and for prioritization of project recommendations for the next 3-year period. The BCWPP administrators will present the updated work plan to the BCWPP signatories for their agreement and approval. BLM Gila District staff will review established firebreaks and will make recommendations to update the Community Mitigation Plan and the Prevention and Loss Mitigation Plan portions of the CWPP. This information will ensure timely decision making for all levels of government and provide the input necessary for the development of additional project recommendations. The administrators will present any BCWPP updates to the signatories for their agreement and submission to the City of Bisbee, and Cochise County for agreement and the Arizona State Forester, and the BLM for their concurrence. The administrators will also submit the action recommendations of the updated BCWPP for funding through all appropriate funding sources.

B. Effectiveness Monitoring

Table 5.1 shows the performance measures the BCWPP administrators will use to assess BCWPP performance against the plans goals. To assist in tracking fuel treatments being planned and completed through Arizona fire assistance grant programs, the BCWPP administrators will cooperate with the Arizona State Forester's State Fire Mapping program by providing detailed mapping information as requested. In addition to monitoring the performance measures each year, the BCWPP administrators should assess the current status of wildland fuel hazards and look for any new or developing issues not covered by the BCWPP. As new issues arise, such as insect or nonnative species infestations, further identification of risks and recommendations for treatment should be amended to update the existing BCWPP. As part of effectiveness monitoring, the BCWPP administrators should review existing treatment units and make recommendations for adding any new areas of concern and reducing the risk level in any newly treated areas. These recommendations are to be included in their 3-year report.

Table 5.1. Performance measures to assess BCWPP progress

Goal	Performance measure
Identify areas of fire risk and recommend treatment and mitigation strategies. Install firebreaks to protect community values	Prepare report every three years to identify areas of reduced risk due to implementation of BCWPP recommended action items: • Review Table 4.1 annually to identify completed projects. Recently constructed firebreaks should be removed from the priority list and identified as having been treated to achieve a lower risk rating. • As established, BLM will visually inspect firebreak construction on BLM properties or on lands within the one-quarter mile buffer to determine success of reduction in fuel loading. Landowners will be responsible to annually monitor previously treated areas to determine if any previously treated areas have returned to a high-risk condition. • Reprioritize firebreak construction priority list based on untreated areas of highest risk in the treatment management units map or in previously treated areas identified as having returned to high risk.
Reduce hazardous wildland fuels on both public and private lands	Determine effective treatment of high-risk areas : • Gather and report number of treated acres of nonfederal WUI lands that are in Condition Class 2 or 3, are identified as high priority by the BCWPP communities, and are moved to Condition Class 1 or acceptable level of wildland fuel. • Gather and report total acres treated through any fuel reduction measures, including prescribed fire, that are conducted in the WUI. The change of condition class should be determined for small projects and/or treatment areas through use of the *Fire Regime Condition Class Guidebook Fire Regime Condition Class Version 1.2* (2005).
Promote community involvement and education	Ensure community involvement in fire planning and decision making: • Adopt and use Firewise standards. • Record the number of fire assessments completed in relation to the number or participating homeowners and pamphlets distributed. • Determine if a fire evacuation plan for Banning Creek Canyon has been written by the BCCFC. • Determine if a yearly fire safety and fire training has been conducted for BCCFC members, Bisbee residents and other interested WUI homeowners. Record the number of attendees and document each event to ensure that topics are relevant to community needs and build upon previous efforts. Initiate community outreach programs: • Ensure individual home assessments have been completed and entered into Red Zone software. • Determine if progress has been made with Cochise County to implement evacuation plans for identified high-risk areas. • Determine number of handouts issued by Cochise County's Planning and Zoning office.
Improve fire prevention and fire suppression efforts and recommend measures to reduce structural ignitability in the BCWPP area	Enhance current fire suppression efforts, staff levels, and protection capabilities: • Determine additional needs for BFD, NFD and SJFD training. • Upgrade City of Bisbee communication system. • Develop effectiveness monitoring of fire prevention and suppression that includes –acres burned and degree of severity of wildland fire, –percentage of wildland fire controlled on initial attack, –number of homes and structures lost to wildland fire. • Document if new water tender was applied for an received • Determine if current and proposed water sources have been identified and if existing water sources have been outfitted with fire department and fire district hookups. • Establish a wildland fire team within the BFD • Develop Emergency Response Plan with Cochise County and ensure it is in use. • Ensure consistent fire management model is in use.
Identify funding needs and opportunities	• Document grants received and applied for each year.

VI. Declaration of Agreement and Concurrence

The following partners in the development of this Community Wildfire Protection Plan have reviewed and do mutually agree or concur with its contents:

Agreement

Richard Searle — Date
Chair, Cochise County Board of Supervisors

Ronald Oertle — Date
Mayor, City of Bisbee

Jack Earnest — Date
Chief, Bisbee Fire Department

Jesse Morales — Date
Chief, Naco Fire District

Lee Lewis — Date
Chief, San Jose Fire District

Hayley Smith — Date
Chair, Banning Creek Canyon Firewise Community

Concurrence

Kirk Rowdabaugh
Arizona State Forester

Date

Bonnie Winslow
Bureau of Land Management, Gila District Manager (Acting)

Date

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VIII. GLOSSARY OF FIRE MANAGEMENT TERMS

A

Aerial Fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Aerial Ignition: Ignition of fuels by dropping incendiary devices or materials from aircraft.

Air Tanker: A fixed-wing aircraft equipped to drop fire retardants or suppressants.

Agency: Any federal, state, county, or city government organization participating with jurisdictional responsibilities.

Anchor Point: An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.

Appropriate Tools: Methods for reducing hazardous fuels including prescribed fire, wildland fire use, and various mechanical methods such as crushing, tractor and hand piling, thinning (to produce commercial or pre-commercial products), and pruning. They are selected on a site-specific case and are ecologically appropriate and cost effective.

Aramid: The generic name for a high-strength, flame-resistant synthetic fabric used in the shirts and jeans of firefighters. Nomex, a brand name for aramid fabric, is the term commonly used by firefighters.

Aspect: Direction toward which a slope faces.

B

Backfire: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

Backpack Pump: A portable sprayer with hand-pump, fed from a liquid-filled container fitted with straps, used mainly in fire and pest control. (see Bladder Bag)

Bambi Bucket: A collapsible bucket slung below a helicopter. Used to dip water from a variety of sources for fire suppression.

Behave: A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: BURN and FUEL.

Bladder Bag: A collapsible backpack portable sprayer made of neoprene or high-strength nylon fabric fitted with a pump. (see Backpack Pump)

Blow-up: A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. (see Flare-up)

Glossary adapted from the NIFC's glossary (see http://www.nifc.gov/fireinfo/glossary.html).

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush Fire: A fire burning in vegetation that is predominantly shrubs, brush and scrub growth.

Bucket Drops: The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.

Buffer Zones: An area of reduced vegetation that separates wildlands from vulnerable residential or business developments. This barrier is similar to a greenbelt in that it is usually used for another purpose such as agriculture, recreation areas, parks, or golf courses.

Bump-up Method: A progressive method of building a fire line on a wildfire without changing relative positions in the line. Work is begun with a suitable space between workers. Whenever one worker overtakes another, all workers ahead move one space forward and resume work on the uncompleted part of the line. The last worker does not move ahead until completing his or her space.

Burnable Acres: Any vegetative material/type that is susceptible to burning.

Burned Area Rehabilitation: The treatment of an ecosystem following fire disturbance to minimize subsequent effects. (1995 Federal Wildland Fire Policy.)

Burn Out: Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.

Burning Ban: A declared ban on open air burning within a specified area, usually due to sustained high fire danger.

Burning Conditions: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Burning Index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

Burning Period: That part of each 24-hour period when fires spread most rapidly, typically from 10:00 a.m. to sundown.

Burn Intensity: The amount and rate of surface fuel consumption. It is not a good indicator of the degree of chemical, physical and biological changes to the soil or other resources. (see Fire Severity)

C

Campfire: As used to classify the cause of a wildland fire, a fire that was started for cooking or warming that spreads sufficiently from its source to require action by a fire control agency.

Candle or Candling: A single tree or a very small clump of trees that is burning from the bottom up.

Chain: A unit of linear measurement equal to 66 horizontal feet.

Closure: Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Front: The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 or more miles per hour often continue for 12 to 24 hours.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Command Staff: The command staff consists of the information officer, safety officer and liaison officer. They report directly to the incident commander and may have assistants.

Community Impact Zone (CIZ): The zone around a community that may be impacted by wildfire. Similar to Defensible Space, but on a community level.

Complex: Two or more individual incidents located in the same general area, which are assigned to a single incident commander or unified command.

Condition Class: Based on coarse scale national data, Fire Condition Classes measure general wildfire risk as follows:

> Condition Class 1. For the most part, fire regimes in this Fire Condition Class are within historical ranges. Vegetation composition and structure are intact. Thus, the risk of losing key ecosystem components from the occurrence of fire remains relatively low.
>
> Condition Class 2. Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified on these lands.
>
> Condition Class 3. Fire regimes on these lands have been significantly altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure and diversity have been significantly altered. Consequently, these lands verge on the greatest risk of ecological collapse. (Cohesive Strategy, 2002, in draft)

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line: All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coyote Tactics: A progressive line construction duty involving self-sufficient crews that build fire line until the end of the operational period, remain at or near the point while off duty, and begin building fire line again the next operational period where they left off.

Creeping Fire: Fire burning with a low flame length and spreading slowly.

Crew Boss: A person in supervisory charge of usually 16 to 21 firefighters and responsible for their performance, safety, and welfare.

Critical Ignition Zones: Those areas that are likely to be key in the formation of large wildfires if ignition occurs at that location. These include locations such as at the bottom of a hill, or in fuels that will ignite easily and sustain growth of fire with increasing flame lengths and fire intensity.

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

Curing: Drying and browning of herbaceous vegetation or slash.

D

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Debris Burning: A fire spreading from any fire originally set for the purpose of clearing land or for rubbish, garbage, range, stubble, or meadow burning.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, “defensible space” is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation. (see Survivable Space)

Deployment: See Fire Shelter Deployment.

Detection: The act or system of discovering and locating fires.

Direct Attack: Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Dispatch: The implementation of a command decision to move a resource or resources from one place to another.

Dispatcher: A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control in first attack, and sends them to the proper place.

Dispatch Center: A facility from which resources are directly assigned to an incident.

Division: Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located with the Incident Command System organization between the branch and the task force/strike team.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

Dozer Line: Fire line constructed by the front blade of a dozer.

Drip Torch: Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.

Drop Zone: Target area for air tankers, helitankers, and cargo dropping.

Drought Index: A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm: Thunderstorm in which negligible precipitation reaches the ground. Also called a dry storm.

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

E

Ecosystem: A spatially explicit, relative homogeneous unit of the Earth that includes all interacting organisms and components of any part of the natural environment within its boundaries. An ecosystem can be of any size, e.g., a log, pond, field, forest, or the Earth's biosphere (Society of American Foresters, 1998).

Ecosystem Integrity: The completeness of an ecosystem that at geographic and temporal scales maintains its characteristics diversity of biological and physical components, composition, structure, and function (Cohesive Strategy, 2000).

Energy Release Component (ERC): The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Engine: Any ground vehicle providing specified levels of pumping, water and hose capacity.

Engine Crew: Firefighters assigned to an engine. The Fireline Handbook defines the minimum crew makeup by engine type.

Entrapment: A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information,

analysis and an array of action alternatives, allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Equilibrium Moisture Content: Moisture content that a fuel particle will attain if exposed for an infinite period in an environment of specified constant temperature and humidity. When a fuel particle reaches equilibrium moisture content, net exchange of moisture between it and the environment is zero.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won't burn, natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Escaped Fire: A fire that has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended Attack Incident: A wildland fire that has not been contained or controlled by initial attack forces and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

Extreme Fire Behavior: "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

F

Faller: A person who fells trees. Also called a sawyer or cutter.

Field Observer: Person responsible to the Situation Unit Leader for collecting and reporting information about an incident obtained from personal observations and interviews.

Fine (Light) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fingers of a Fire: The long narrow extensions of a fire projecting from the main body.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Behavior Forecast: Prediction of probable fire behavior, usually prepared by a Fire Behavior Officer, in support of fire suppression or prescribed burning operations.

Fire Behavior Specialist: A person responsible to the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuel, weather and topography.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur or to provide a control line from which to work.

Fire Cache: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in fire suppression.

Fire Crew: An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire Defense System: The cumulative effect of the fire suppression system of a community, including fuels reduction programs, fire breaks, defensible space, and the response capabilities of emergency personnel.

Fire Frequency: The natural return interval for a particular ecosystem.

Fire Front: The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Hazard Reduction Zone: Home ignition zone area, where fuel reduction and home fire resistant projects should take place to reduce the risk of a wildfire damaging a structure.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Line: A linear fire barrier that is scraped or dug to mineral soil.

Fire Load: The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Management Planning: A generic term referring to all levels and categories of fire management planning, including: preparedness, prevention, hazardous risk assessment, and mitigation planning.

Fire Mitigation – Vegetative or structural treatments or strategic practices used to reduce the negative impacts of wildland fires and to improve public and firefighter safety.

Fire Perimeter: The entire outer edge or boundary of a fire.

Fire-prone ecosystem: Ecosystems that historically burned intensely at low frequencies (stand replacing fires), those that burned with low intensity at a high frequency (understory fires), and those that burned very infrequently historically, but are not subject to much more frequent fires because of changed conditions. These include fire-influenced and fire-adapted ecosystems (Cohesive Strategy, 2000).

Fire Regime: A generalized description of the role fire plays in an ecosystem. It is characterized by fire frequency, predictability, seasonality, intensity, duration, scale (patch size), as well as regularity or variability. Five combinations of fire frequency, expressed as fire return interval in fire severity, are defined:

> Groups I and II include fire return intervals in the 0 - 35 year range. Group I includes Ponderosa pine, other long needle pine species, and dry site Douglas fir. Group II includes the drier grassland types, tall grass prairie, and some Pacific chaparral ecosystems.

Groups III and IV include fire return internals in the 35 - 100+ year range. Group III includes interior dry site shrub communities such as sagebrush and chaparral ecosystems. Group IV includes lodgepole pine and jack pine.

Group V is the long interval (infrequent), stand replacement fire regime and includes temperate rain forest, boreal forest, and high elevation conifer species.

Fire-Return Interval: The number of years between successive fire events at a specific site or an area of a specified size.

Fire Risk Reduction Zone: A zone targeted for risk reduction, including measures such as fuels reduction, access protection, and construction of structures to minimize the risk of ignition from wildfire.

Fire Season: (1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. (2) A legally enacted time during which burning activities are regulated by state or local authority.

Fire Severity: The amount of heat that is released by a fire and how it affects other resources. It is dependent on the type of fuels and the behavior of the fuels when they are burned. (see Burn Intensity)

Fire Shelter: An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life-threatening situations, as a last resort.

Fire Shelter Deployment: The removing of a fire shelter from its case and using it as protection against fire.

Fire Storm: A fire of great size and intensity that generates and is fed by strong inrushing winds from all sides; the winds add fresh oxygen to the fire, increasing the intensity.

Fire Triangle: Instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, fuel) necessary for combustion and flame production; removal of any of the three factors causes flame production to cease.

Fire Use Module (Prescribed Fire Module): A team of skilled and mobile personnel dedicated primarily to prescribed fire management. These are national and interagency resources, available throughout the prescribed fire season, that can ignite, hold and monitor prescribed fires.

Fire Use: The combination of wildland fire use and prescribed fire application to meet resource objectives.

Fire Weather: Weather conditions that influence fire ignition, behavior and suppression.

Fire Weather Watch: A term used by fire weather forecasters to notify using agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into dangerous fire weather.

Fire Whirl: Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame. Fire whirls range in size from less than one foot to more than 500 feet in diameter. Large fire whirls have the intensity of a small tornado.

FIREWISE: A public education program developed by the National Wildland Fire Coordinating Group that assists communities located in proximity to fire-prone lands. (For additional information visit the Web site at

http://www.firewise.org.)

Firefighting Resources: All people and major items of equipment that can or potentially could be assigned to fires.

Flame Height: The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flaming Front: The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone, combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flanks of a Fire: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash Fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, that ignite readily and are consumed rapidly when dry. Also called fine fuels.

Forb: A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.

Fuel: Combustible material. Includes, vegetation, such as grass, leaves, ground litter, plants, shrubs and trees, that feed a fire. (see Surface Fuels)

Fuel Bed: An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control. Incorporated within this are treatments to protect, maintain, and restore land health and desired fire cycles.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fusee: A colored flare designed as a railway-warning device and widely used to ignite suppression and prescription fires.

G

General Staff: The group of incident management personnel reporting to the incident commander. They may each have a deputy, as needed. Staff consists of operations section chief, planning section chief, logistics section chief, and finance/administration section chief.

Geographic Area: A political boundary designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of firefighting resources.

Ground Fuel: All combustible materials below the surface litter, including duff, tree or shrub roots, dried out dead wood, peat, and sawdust that normally support a glowing combustion without flame.

H

Haines Index: An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line: A fireline built with hand tools.

Hazard Reduction: Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Hazardous Fuels Reduction: “Fuel Reduction” is defined as the manipulation or removal of fuels, including combustion, to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control. Incorporated within this are treatments to protect, maintain, and restore land health and desired fire cycles. “Hazard Reduction” is defined as any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Head of a Fire: The side of the fire having the fastest rate of spread.

Heavy Fuels: Fuels of large diameter such as snags, logs, large limb wood, that ignite and are consumed more slowly than flash fuels.

Helibase: The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot: A temporary landing spot for helicopters.

Helitack: The use of helicopters to transport crews, equipment, and fire retardants or suppressants to the fire line during the initial stages of a fire.

Helitack Crew: A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions: Planned actions required to achieve wildland prescribed fire management objectives. These actions have specific implementation timeframes for fire use actions but can have less sensitive implementation demands for suppression actions.

Holding Resources: Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

Home Ignitability: The ignition potential within the Home Ignition Zone.

Home Ignition Zone: The home and its immediate surroundings. The home ignition zone extends to a few tens of meters around a home not hundreds of meters or beyond. Home ignitions and, thus, the WUI fire loss problem principally depend on home ignitability.

Hose Lay: Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew: A highly trained fire crew used mainly to build fireline by hand.

Hotspot: A particular active part of a fire.

Hotspotting: Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

I

Incendiary: Causing or capable of causing fire.

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Action Plan (IAP): Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map.

Incident Command Post (ICP): Location at which primary command functions are executed. The ICP may be co-located with the incident base or other incident facilities.

Incident Command System (ICS): The combination of facilities, equipment, personnel, procedure and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.

Incident Commander: Individual responsible for the management of all incident operations at the incident site.

Incident Management Team: The incident commander and appropriate general or command staff personnel assigned to manage an incident.

Incident Objectives: Statements of guidance and direction necessary for selection of appropriate strategy(ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

Indigenous Knowledge: Knowledge of a particular region or environment from an individual or group that lives in that particular region or environment, e.g., traditional ecological knowledge of American Indians (FS National Resource Book on American Indian and Alaskan Native Relations, 1997).

Infrared Detection: The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

J

Job Hazard Analysis: This analysis of a project is completed by staff to identify hazards to employees and the public. It identifies hazards, corrective actions and the required safety equipment to ensure public and employee safety.

Jump Spot: Selected landing area for smokejumpers.

Jump Suit: Approved protection suite work by smokejumpers.

K

Keech Byram Drought Index (KBDI): Commonly used drought index adapted for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

Knock Down: To reduce the flame or heat on the more vigorously burning parts of a fire edge.

L

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Large Fire: (1) For statistical purposes, a fire burning more than a specified area of land, e.g., 300 acres. (2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Lead Plane: Aircraft with pilot used to make dry runs over the target area to check wing and smoke conditions and topography and to lead air tankers to targets and supervise their drops.

Light (Fine) Fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number on a scale of 1 to 6 that reflects frequency and character of cloud-to ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Line Scout: A firefighter who determines the location of a fire line.

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

M

Micro-Remote Environmental Monitoring System (Micro-REMS): Mobile weather monitoring station. A Micro-REMS usually accompanies an incident meteorologist and ATMU to an incident.

Mineral Soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Mobilization: The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Modular Airborne Firefighting System (MAFFS): A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in dropping retardant on wildland fires.

Mop-up: To make a fire safe or reduce residual smoke after the fire has been controlled by extinguishing or removing burning material along or near the control line, felling snags, or moving logs so they won't roll downhill.

Multi-Agency Coordination (MAC): A generalized term that describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Mutual Aid Agreement: Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

N

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make decisions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Wildfire Coordinating Group (NWCG): A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the US Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

Nomex ®: Trade name for a fire resistant synthetic material used in the manufacturing of flight suits and pants and shirts used by firefighters. (see Aramid)

Normal Fire Season: (1) A season when weather, fire danger, and number and distribution of fires are about average. (2) Period of the year that normally comprises the fire season.

O

Operations Branch Director: Person under the direction of the operations section chief who is responsible for implementing that portion of the incident action plan appropriate to the branch.

Operational Period: The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Overhead: People assigned to supervisory positions, including incident commanders, command staff, general staff, directors, supervisors, and unit leaders.

P

Pack Test: Used to determine the aerobic capacity of fire suppression and support personnel and assign physical fitness scores. The test consists of walking a specified distance, with or without a weighted pack, in a predetermined period of time, with altitude corrections.

Paracargo: Anything dropped, or intended for dropping, from an aircraft by parachute, by other retarding devices, or by free fall.

Peak Fire Season: That period of the fire season during which fires are expected to ignite most readily, to burn with greater than average intensity, and to create damages at an unacceptable level.

Performance Measures: A quantitative or qualitative characterization of performance (Government Performance and Results Act of 1993).

Personnel Protective Equipment (PPE): All firefighting personnel must be equipped with proper equipment and clothing in order to mitigate the risk of injury from, or exposure to, hazardous conditions encountered while working. PPE includes, but is not limited to, 8-inch high-laced leather boots with lug soles, fire shelter, hard hat with chin strap, goggles, ear plugs, aramid shirts and trousers, leather gloves, and individual first aid kits.

Preparedness: Condition or degree of being ready to cope with a potential fire situation.

Prescribed Fire: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed Fire Plan (Burn Plan): This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription: Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project Fire: A fire of such size or complexity that a large organization and prolonged activity is required to suppress it.

Pulaski: A combination chopping and trenching tool, which combines a single-bitted axe-blade with a narrow adze-like trenching blade fitted to a straight handle. Useful for grubbing or trenching in duff and matted roots. Well-balanced for chopping.

R

Radiant Burn: A burn received from a radiant heat source.

Radiant Heat Flux: The amount of heat flowing through a given area in a given time, usually expressed as calories/square centimeter/second.

Rappelling: Technique of landing specifically trained firefighters from hovering helicopters; involves sliding down ropes with the aid of friction-producing devices.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn: The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Red Card: Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression and support positions in a large fire suppression or incident organization.

Red Flag Warning: Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (Rh): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Remote Automatic Weather Station (RAWS): An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which the data is re-transmitted to an earth-receiving station for use in the National Fire Danger Rating System.

Resiliency: The capacity of an ecosystem to maintain or regain normal function and development following disturbance (Society of American Foresters, 1998).

Resources: (1) Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. (2) The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Resource Order: An order placed for firefighting or support resources.

Response Time: The amount of time it takes from when a request for help is received by the emergency dispatch system until emergency personnel arrive at the scene.

Retardant: A substance or chemical agent that reduces the flammability of combustibles.

Restoration: The active or passive management of an ecosystem or habitat toward its original structure, natural compliment of species, and natural functions or ecological processes (Cohesive Strategy, 2000).

Run (of a fire): The rapid advance of the head of a fire with a marked change in fire line intensity and rate of spread from that noted before and after the advance.

Running: A rapidly spreading surface fire with a well-defined head.

Rural Fire Assistance: The Department of the Interior Rural Fire Assistance program is a multi-million dollar program to enhance the fire protection capabilities of rural fire districts. The program will assist with training, equipment purchase, and prevention activities, on a cost-share basis.

S

Safety Zone: An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of a blow-up in the vicinity.

Scratch Line: An unfinished preliminary fire line hastily established or built as an emergency measure to check the spread of fire.

Severe Wildland Fire (catastrophic wildfire): Fire that burns more intensely than the natural or historical range of variability, thereby fundamentally changing the ecosystem, destroying communities and / or rate or threatened species /habitat, or causing unacceptable erosion (GAO / T-RCED-99-79) (Society of American Foresters, 1998).

Severity Funding: Funds provided to increase wildland fire suppression response capability necessitated by abnormal weather patterns, extended drought, or other events causing abnormal increase in the fire potential and/or danger.

Single Resource: An individual, a piece of equipment and its personnel complement, or a crew or team of individuals with an identified work supervisor that can be used on an incident.

Size-up: To evaluate a fire to determine a course of action for fire suppression.

Slash: Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps and broken understory trees or brush.

Sling Load: Any cargo carried beneath a helicopter and attached by a lead line and swivel.

Slop-over: A fire edge that crosses a control line or natural barrier intended to contain the fire.

Slurry: A mixture typically of water, red clay and fertilizer dropped from air tankers for fire suppression.

Smokejumper: A firefighter who travels to fires by aircraft and parachute.

Smoke Management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering Fire: A fire burning without flame and barely spreading.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spark Arrester: A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.

Spot Fire: A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast: A special forecast issued to fit the time, topography, and weather of each specific fire. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts.

Spotter: In smokejumping, the person responsible for selecting drop targets and supervising all aspects of dropping smokejumpers.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area: Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging areas are managed by the operations section.

Strategy: The science and art of command as applied to the overall planning and conduct of an incident.

Strike Team: Specified combinations of the same kind and type of resources, with common communications, and a leader.

Strike Team Leader: Person responsible to a division/group supervisor for performing tactical assignments given to the strike team.

Structure Fire: Fire originating in and burning any part or all of any building, shelter, or other structure.

Suppressant: An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when direction applied to burning fuels.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

Surface Fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also

grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

Survivable Space: The distance between vegetational fuels and a structure necessary to protect the building from radiant heat and its ignition mechanics. The separation distance was formerly called “Defensible Space” due to the implication that the fire department could intercede. The term “Survivable Space” eliminates the dependence on manual suppression and implies that the distance alone provides the protection. (see Defensible Space)

Swamper: (1) A worker who assists fallers and/or sawyers by clearing away brush, limbs and small trees. Carries fuel, oil and tools and watches for dangerous situations. (2) A worker on a dozer crew who pulls winch line, helps maintain equipment, etc., to speed suppression work on a fire.

T

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Tanker: Either a tank truck used to deliver water from a water source to the scene of a fire, or a fixed wing aircraft used for fire suppression by dropping slurry on the flank or head of a fire.

Temporary Flight Restrictions (TFR): A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident that restricts the operation of nonessential aircraft in the airspace around that incident.

Terra Torch ®: Device for throwing a stream of flaming liquid, used to facilitate rapid ignition during burn out operations on a wildland fire or during a prescribed fire operation.

Test Fire: A small fire ignited within the planned burn unit to determine the characteristic of the prescribed fire, such as fire behavior, detection performance and control measures.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Two-way Radio: Radio equipment with transmitters in mobile units on the same frequency as the base station, permitting conversation in two directions using the same frequency in turn.

Type: The capability of a firefighting resource in comparison to another type. Type 1 usually means a greater capability due to power, size, or capacity.

U

Uncontrolled Fire: Any fire that threatens to destroy life, property, or natural resources, and [definition completed from National Wildfire Coordinating Group, Glossary of Wildland Fire Terminology www.nwcg.gov/pms/pubs/glossary/ (a) is not burning within the confines of firebreaks, or (b) is burning with

such intensity that it could not be readily extinguished with ordinary tools commonly available. (see Wildfire)

Underburn: A fire that consumes surface fuels but not trees or shrubs. (see Surface Fuels)

Unplanned and Unwanted Wildland Fires: An unplanned and unwanted fire is one burning outside the parameters as defined in land use plans and fire management plans for that location (including areas where the fire can be expected to spread) under current and expected conditions. Unplanned and unwanted fires include fires burning in areas where fire is specifically excluded; fires that exhibit burning characteristics (intensity, frequency, and seasonality) that are outside prescribed ranges, specifically including fires expected to produce severe fire effects; unauthorized human caused fires (arson, escaped camp fires, equipment fires, etc.); and fires that occur during high fire dangers, or resource shortage, where the resources needed to manage the fire are needed for more critical fire management needs. Unplanned is not the same as unscheduled. The time of a lightning fire ignition is not known; however, a lightning-caused fire could still be used to meet fuels and ecosystem management objectives if that type of fire is expected to burn within the parameters of an approved plan; the fire is burning within the parameters for the area; is not causing, or has the potential to cause, unacceptable effects; and funding and resources to manage the fire are available.

V

Vectors: Directions of fire spread as related to rate of spread calculations (in degrees from upslope).

Volunteer Fire Department (VFD): A fire department of which some or all members are unpaid.

W

Water Tender: A ground vehicle capable of transporting specified quantities of water.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wet Line: A line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire.

Wildfire: [definition added from National Wildfire Coordinating Group, Glossary of Wildland Fire Terminology www.nwcg.gov/pms/pubs/glossary/] An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fire where the objective is to put the fire out. (see Uncontrolled Fire; Wildland Fire)

Wildland: [definition added from Wikipedia.org] wildland is an areas of land where plants and animals exist free of human interference. Ecologists assert that wildlands promote biodiversity, that they preserve historic genetic traits and that they provide habitat for wild flora and fauna.

Wildland Fire: Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific, planned resource management objectives in predefined geographic areas outlined in Fire Management Plans. Wildland fire use is not to be confused with “fire use,” which includes prescribed fire.

Wildland Urban Interface (WUI): The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (Glossary of Wildland Fire Terminology 1996).

Wind Vectors: Wind directions used to calculate fire behavior.

APPENDIX A: VEGETATION ASSOCIATION DESCRIPTIONS

The following is general information about the Southwest Region Gap Analysis Project landcover descriptions used for the vegetation analysis portion of this CWPP. The information contained in this appendix is taken from *Southwest Regional GAP Analysis Project- Land Cover Data Legend Descriptions* (2004). The following includes the vegetation associations composing the wildland-urban interface of the Bisbee Community Wildfire Protection Plan. For additional information, see the Southwest Regional Landcover Data Web site (http://ftp.nr.usu.edu/swgap/landcover.html).

Grassland Associations

S113 Chihuahuan Sandy Plains Semi-Desert Grassland

Concept Summary: This ecological system occurs across the Chihuahuan Desert and extends into the southern Great Plains where soils have a high sand content. These dry grasslands or steppe are found on sandy plains and sandstone mesas. The graminoid layer is dominated or codominated by Achnatherum hymenoides, Bouteloua eriopoda, Bouteloua hirsuta, Hesperostipa neomexicana, Pleuraphis jamesii, Sporobolus cryptandrus, Sporobolus airoides, or Sporobolus flexuosus. Typically, there are found scattered desert shrubs and stem succulents such as Ephedra torreyana, Ephedra trifurca, Fallugia paradoxa, Prosopis glandulosa, Yucca elata, and Yucca torreyi that are characteristic of the Chihuahuan Deser

S077 Apacherian-Chihuahuan Semi-Desert Grassland and Steppe

Concept Summary: This ecological system is a broadly defined desert grassland, mixed shrub-succulent or xeromorphic tree savanna that is typical of the Borderlands of Arizona, New Mexico and northern Mexico [Apacherian region] but extends west to the Sonoran Desert, north into the Mogollon Rim and throughout much of the Chihuahuan Desert. It is found on gently sloping bajadas that supported frequent fire throughout the Sky Islands and on mesas and steeper piedmont and foothill slopes in the Chihuahuan Desert. It is characterized by typically diverse perennial grasses. Common grass species include Bouteloua eriopoda, Bouteloua hirsuta, Bouteloua rothrockii, Bouteloua curtipendula, Bouteloua gracilis, Eragrostis intermedia, Muhlenbergia porteri, Muhlenbergia setifolia, Pleuraphis jamesii, Pleuraphis mutica, and Sporobolus airoides, succulent species of Agave, Dasylirion, and Yucca, and tall-shrub/short-tree species of Prosopis and various oaks (e.g.,Quercus grisea, Quercus emoryi, Quercus arizonica). Many of the historical desert grassland and savanna areas have been converted, some to Chihuahuan Mesquite Upland Scrub (CES302.733) (Prosopis spp.-dominated), through intensive grazing and other land uses.

Desert Scrub Associations

S062 Chihuahuan Mixed Desert and Thorn Scrub

Concept Summary: This widespread Chihuahuan Desert land cover type is composed of two ecological systems the Chihuahuan Creosotebush Xeric Basin Desert Scrub (CES302.731) and the Chihuahuan Mixed Desert and Thorn Scrub (CES302.734). This cover type includes xeric creosotebush basins and plains and the mixed desert scrub in the foothill transition zone above, sometimes extending up to the lower montane woodlands. Vegetation is characterized by Larrea tridentata alone or mixed with thornscrub and other desert scrub such as Agave lechuguilla, Aloysia wrightii, Fouquieria splendens, Dasylirion leiophyllum, Flourensia cernua, Leucophyllum minus, Mimosa aculeaticarpa var. biuncifera, Mortonia scabrella (= Mortonia sempervirens ssp. scabrella), Opuntia engelmannii, Parthenium incanum, Prosopis glandulosa, and Tiquilia greggii. Stands of Acacia constricta Acacia neovernicosa or Acacia greggii dominated thornscrub are included in this system, and limestone substrates appear important for at least these species. Grasses such as Dasyochloa pulchella, Bouteloua curtipendula, Bouteloua eriopoda, Bouteloua ramosa, Muhlenbergia porteri and Pleuraphis mutica may be common, but generally have lower cover than shrubs.

S116 Chihuahuan Mixed Salt Desert Scrub

Concept Summary: This system includes extensive open-canopied shrublands of typically saline basins in the Chihuahuan Desert. Stands often occur on alluvial flats and around playas. Substrates are generally fine-textured, saline soils. Vegetation is typically composed of one or more Atriplex species such as Atriplex canescens, Atriplex obovata, or Atriplex polycarpa along with species of Allenrolfea, Flourensia, Salicornia, Suaeda, or other halophytic plants. Graminoid species may include Sporobolus airoides, Pleuraphis mutica, or Distichlis spicata at varying densities.

S068 Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub

Concept Summary: This ecological system includes the open shrublands of vegetated coppice dunes and sandsheets found in the Chihuahuan Desert. Usually dominated by Prosopis glandulosa but includes Atriplex canescens, Ephedra torreyana, Ephedra trifurca, Poliomintha incana, and Rhus microphylla coppice sand scrub with 10-30% total vegetation cover. Yucca elata, Gutierrezia sarothrae, and Sporobolus flexuosus are commonly present.

S061 Chihuahuan Succulent Desert Scrub

Concept Summary: This ecological system is found in the Chihuahuan Desert on colluvial slopes, upper bajadas, sideslopes, ridges, canyons,hills and mesas. Sites are hot and dry. Gravel and rock are often abundant on the ground surface. The vegetation is characterized by the relatively high cover of succulent species such as Agave lechuguilla, Euphorbia antisyphilitica, Fouquieria splendens, Ferocactus spp., Opuntia engelmannii, Opuntia imbricata, Opuntia spinosior, Yucca baccata, and many others. Perennial grass cover is generally low. The abundance of succulents is diagnostic of this desert scrub system, but

desert shrubs are usually present. This system does not include desert grasslands or shrub-steppe with astrong cacti component.

Shrublands Vegetation Associations

S058 Apacherian-Chihuahuan Mesquite Upland Scrub

Concept Summary: This ecological system occurs as upland shrublands that are concentrated in the extensive grassland-shrubland transition in foothills and piedmont in the Chihuahuan Desert. It extends into the Sky Island region to the west and the Edwards Plateau to the east. Substrates are typically derived from alluvium, often gravelly without a well-developed argillic or calcic soil horizon that would limit infiltration and storage of winter precipitation in deeper soil layers. Prosopis spp. and other deep-rooted shrubs exploit this deep soil moisture that is unavailable to grasses and cacti. Vegetation is typically dominated by Prosopis glandulosa or Prosopis velutina and succulents. Other desert scrub that may codominate or dominate includes Acacia neovernicosa, Acacia constricta, Juniperus monosperma, or Juniperus coahuilensis. Grass cover is typically low. During the last century, the area occupied by this system has increased through conversion of desert grasslands as a result of drought, overgrazing by livestock, and/or decreases in fire frequency. It is similar to Chihuahuan Mixed Desert and Thorn Scrub (CES302.734) but is generally found at higher elevations where Larrea tridentata and other desert scrub are not codominant. It is also similar to Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub (CES302.737) but does not occur on eolian-deposited substrates.

S051 Madrean Encinal

Concept Summary: Madrean Encinal occurs on foothills, canyons, bajadas and plateaus in the Sierra Madre Occidentale and Sierra Madre Orientale in Mexico, extending north into Trans-Pecos Texas, southern New Mexico and sub-Mogollon Arizona. These woodlands are dominated by Madrean evergreen oaks along a low-slope transition below Madrean Pine-Oak Forest and Woodland (CES305.796) and Madrean Pinyon-Juniper Woodland (CES305.797). Lower elevation stands are typically open woodlands or savannas where they transition into desert grasslands, chaparral or in some cases desertscrub.

Common evergreen oak species include Quercus arizonica, Quercus emoryi, Quercus intricata, Quercus grisea, Quercus oblongifolia, Quercus toumeyi, and in Mexico Quercus chihuahuensis and Quercus albocincta. Madrean pine, Arizona cypress, pinyon and juniper trees may be present, but do not codominate. Chaparral species such as Arctostaphylos pungens, Cercocarpus montanus, Purshia spp., Garrya wrightii, Quercus turbinella, Frangula betulifolia (= Rhamnus betulifolia), or Rhus spp. may be present but do not dominate. The graminoid layer is usually prominent between trees in grassland or steppe that is dominated by warm-season grasses such as Aristida spp., Bouteloua gracilis, Bouteloua curtipendula, Bouteloua rothrockii, Digitaria californica, Eragrostis intermedia, Hilaria belangeri, Leptochloa dubia, Muhlenbergia spp., Pleuraphis jamesii, or Schizachyrium cirratum, species typical of Chihuahuan Piedmont Semi-Desert Grassland (CES302.735). This system includes seral stands dominated by shrubby Madrean oaks typically with a strong graminoid layer. In transition areas with drier chaparral systems,

stands of chaparral are not dominated by Madrean oaks; however, Madrean Encinal may extend down along drainages.

S057 Mogollon Chaparral

Concept Summary:

This ecological system occurs across central Arizona (Mogollon Rim), western New Mexico and southern Utah and Nevada. It often dominants along the mid-elevation transition from the Mojave, Sonoran, and northern Chihuahuan deserts into mountains (1000-2200 m). It occurs on foothills, mountain slopes and canyons in drier habitats below the encinal and Pinus ponderosa woodlands. Stands are often associated with more xeric and coarse-textured substrates such as limestone, basalt or alluvium, especially in transition areas with more mesic woodlands. The moderate to dense shrub canopy includes species such as Quercus turbinella, Quercus toumeyi, Cercocarpus montanus, Canotia holacantha, Ceanothus greggii, Forestiera pubescens (= Forestiera neomexicana), Garrya wrightii, Juniperus deppeana, Purshia stansburiana, Rhus ovata, Rhus trilobata, and Arctostaphylos pungens and Arctostaphylos pringlei at higher elevations. Most chaparral species are fire-adapted, resprouting vigorously after burning or producing fire-resistant seeds. Stands occurring within montane woodlands are seral and a result of recent fires.

S020 North American Warm Desert Wash

Concept Summary: This ecological system is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains and basin floors throughout the warm deserts of North America. Although often dry, the intermittent fluvial processes define this system, which are often associated with rapid sheet and gully flow. This system occurs as linear or braided strips within desert scrub- or desert grassland-dominated landscapes. The vegetation of desert washes is quite variable ranging from sparse and patchy to moderately dense and typically occurs along the banks, but may occur within the channel. The woody layer is typically intermittent to open and may be dominated by shrubs and small trees such as Acacia greggii, Brickellia laciniata, Baccharis sarothroides, Chilopsis linearis, Fallugia paradoxa, Hymenoclea salsola, Hymenoclea

monogyra, Juglans microcarpa, Prosopis spp., Psorothamnus spinosus, Prunus fasciculata, Rhus microphylla, Salazaria mexicana, or Sarcobatus vermiculatus.

Oak/Pinyon Juniper Associations

S035 Madrean Pine-Oak Forest and Woodland

Concept Summary: This system occurs on mountains and plateaus in the Sierra Madre Occidentale and Sierra Madre Orientale in Mexico,Trans-Pecos Texas, southern New Mexico and Arizona, generally south

of the Mogollon Rim. These forests and woodlands are composed of Madrean pines (Pinus arizonica, Pinus engelmannii, Pinus leiophylla, or Pinus strobiformis) and evergreen oaks (Quercus arizonica, Quercus emoryi, or Quercus grisea) intermingled with patchy shrublands on most mid-elevation slopes (1500-2300 m elevation). Other tree species include Cupressus arizonica, Juniperus deppeana, Pinus cembroides, Pinus discolor, Pinus ponderosa (with Madrean pines or oaks), and Pseudotsuga menziesii. Subcanopy and shrub layers may include typical encinal and chaparral species such as Agave spp., Arbutus arizonica, Arctostaphylos pringlei, Arctostaphylos pungens, Garrya wrightii, Nolina spp., Quercus hypoleucoides, Quercus rugosa, and Quercus turbinella. Some stands have moderate cover of perennial graminoids such as Muhlenbergia emersleyi, Muhlenbergia longiligula, Muhlenbergia virescens, and Schizachyrium cirratum. Fires are frequent with perhaps more crown fires than ponderosa pine woodlands, which tend to have more frequent ground fires on gentle slopes.

S038 Southern Rocky Mountain Pinyon-Juniper Woodland

Concept Summary: This southern Rocky Mountain ecological system occurs on dry mountains and foothills in southern Colorado east of the Continental Divide, in mountains and plateaus of north-central New Mexico, and extends out onto limestone breaks in the southeastern Great Plains. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the

distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture ranging from stony, cobbly, gravelly sandy loams to clay loam or clay. Pinus edulis and/or Juniperus

monosperma dominate the tree canopy. Juniperus scopulorum may codominate or replace Juniperus monosperma at higher elevations. Stands with Juniperus osteosperma are representative the Colorado Plateau and are not included in this system. In southern transitional areas between Madrean Pinyon-Juniper Woodland (CES305.797) and Southern Rocky Mountain Pinyon-Juniper Woodland (CES306.835) in central New Mexico, Juniperus deppeana becomes common. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species are more typical of southern Rocky Mountains than the Colorado Plateau and include Artemisia bigelovii, Cercocarpus montanus, Quercus gambelii, Achnatherum scribneri, Bouteloua gracilis, Festuca arizonica, or Pleuraphis jamesii.

S111 Madrean Upper Montane Conifer-Oak Forest and Woodland

Concept Summary: This system occurs at the upper elevations in the Sierra Madre Occidentale and Sierra Madre Orientale. In the U.S., it is restricted to north and east aspects at high elevations (1980-2440 m) in the Sky Islands (Chiricahua, Huachuca, Pinaleno, Santa Catalina, and Santa Rita mountains) and along the Nantanes Rim. It is more common in Mexico and does not occur in Arizona central highlands. The vegetation is characterized by large- and small-patch forests and woodlands dominated by Pseudotsuga menziesii, Abies coahuilensis, or Abies concolor and Madrean oaks such as Quercus hypoleucoides and

Quercus rugosa. It is similar to Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland (CES306.823).

S112 Madrean Pinyon-Juniper Woodland

Concept Summary: This system occurs on foothills, mountains and plateaus in the Sierra Madre Occidentale and Sierra Madre Orientale inMexico, Trans-Pecos Texas, southern New Mexico and Arizona, generally south of the Mogollon Rim. Substrates are variable, but soils are generally dry and rocky. The presence of Pinus cembroides, Pinus discolor, or other Madrean trees and shrubs is diagnostic of this woodland system. Juniperus coahuilensis, Juniperus deppeana, Juniperus pinchotii, Juniperus monosperma, and/or Pinus edulis may be present to dominant. Madrean oaks such as Quercus arizonica,

Quercus emoryi, Quercus grisea, or Quercus mohriana may be codominant. Pinus ponderosa is absent or sparse. If present, understory layers are variable and may be dominated by shrubs or graminoids.

Deciduous Southwest Riparian Association

S094 North American Warm Desert Lower Montane Riparian Woodland and Shrubland

Concept Summary: This ecological system occurs in mountain canyons and valleys of southern Arizona, New Mexico, and adjacent Mexico and consists of mid- to low-elevation (1100-1800 m) riparian corridors along perennial and seasonally intermittent streams. The vegetation is a mix of riparian woodlands and shrublands. Dominant trees include Populus angustifolia, Populus deltoides ssp. wislizeni, Populus fremontii, Platanus wrightii, Juglans major, Fraxinus velutina, and Sapindus saponaria. Shrub dominants include Salix exigua, Prunus spp., Alnus oblongifolia, and Baccharis salicifolia. Vegetation is dependent upon annual or periodic flooding and associated sediment scour and/or annual rise in the water table for growth andreproduction.

Additional Sparsely Vegetated and Nonvegetated Associations

S019 North American Warm Desert Volcanic Rockland

Concept Summary: This ecological system occurs across the warm deserts of North America and is restricted to barren and sparsely vegetated (<10% plant cover) volcanic substrates such as basalt lava (malpais) and tuff. Vegetation is variable and includes a variety of species depending on local environmental conditions, e.g., elevation, age and type of substrate.

Typically scattered Larrea tridentata, Atriplex hymenelytra, or other desert shrubs are present.

S016 North American Warm Desert Bedrock Cliff and Outcrop

Concept Summary: This ecological system is found from subalpine to foothill elevations and includes barren and sparsely vegetated landscapes (generally < 10% plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included are unstable scree and talus slopes that typically occur bellow cliff faces. Species present are diverse and may include Bursera microphylla, Fouquieria splendens, Nolina bigelovii, Opuntia bigelovii, and other desert species, especially succulents. Lichens are predominant lifeforms in some areas. May include a variety of desert shrublands less than 2 ha (5 acres) in size from adjacent areas.

S021 North American Warm Desert Pavement

Concept Summary: This ecological system occurs throughout much of the warm deserts of North America and is composed of unvegetated to very sparsely vegetated (< 2% plant cover) landscapes, typically flat basins where extreme temperature and wind develop ground surfaces of fine to medium gravel coated with “desert varnish.” Very low cover of desert scrub species such as Larrea tridentata or Eriogonum fasciculatum is usually present. However, ephemeral herbaceous species may have high cover in response to seasonal precipitation, including Chorizanthe rigida, Eriogonum inflatum, and Geraea canescens.

N11 Open Water

Concept Summary: Areas of open water, generally with less than 25% cover of vegetation or soil.

N21 Developed, Open Space - Low Intensity

Concept Summary: Open Space: Includes areas with a mixture of some construction materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include largelot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes. Developed,

Low Intensity: Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include singlefamily housing units.

N22 Developed, Medium–High Intensity

Concept Summary: Developed, Medium Intensity: Includes areas with a mixture of constructed materials and vegetation. Impervious surface accounts for 50-79 percent of the total cover. These areas most commonly include single-family housing units.

Developed, High Intensity: Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.

D03 Recently Mined or Quarried

Concept Summary: Areas where open pit mining or quarries are visible in the imagery (images acquired between 1999-2001), and are 2hectares or greater in size.

N80 Agriculture

Concept Summary: An aggregated landcover type that includes both Pasture/Hay (N81): areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle, where pasture/hay vegetation accounts for greater than 20 percent of total vegetation, and Cultivated Crops (N82): areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards, where crop vegetation accounts for greater than 20 percent of total vegetation. N82 also includes all land being actively tilled.

APPENDIX B. NATIONAL FIRE DANGER RATING SYSTEM FUEL MODEL SELECTION KEY

I. Mosses, lichens, and low shrubs predominate ground fuels

A. An overstory of conifers occupies more than one third of site

Model Q

B. There is no overstory or it occupies less than one-third of the site

Model S

II. Marsh grasses and/ or reeds predominate

Model N

III. Grasses and/ or forbs predominate

A. There is an open overstory of conifer and/or hardwoods

Model C

B. There is no overstory

1. Woody shrubs occupy more than one-third, but less than two-thirds of the site

Model T

2. Woody shrubs occupy less than two thirds of the site

a. The grasses and forbs are primarily annuals

Model A

b. The grasses and forbs are primarily perennials

Model L

IV. Brush, shrubs, tree reproduction or dwarf tree species predominate

A. The average height of woody plants is 6 ft. or greater

1. Woody plants occupy two-thirds or more of the site

a. One-fourth or more of the woody foliage is dead

1) Mixed California chaparral

Model B

2) Other types of brush

Model F

b. Up to one-fourth of the woody foliage is dead

Model Q

c. Little dead foliage

Model O

2. Woody plants occupy less than two-thirds of the site

Model F

B. Average height of woody plants is less than 6 ft.

1. Woody plants occupy two-thirds or more of the site

a. Western United States

Model F

b. Eastern United States

Model O

2. Woody plants occupy less than two-thirds but greater than one third of the site

a. Western United States

Model T

b. Eastern United States

Model D

3. Woody plants occupy less than one-third of the site

a. The grasses and forbs are primarily annuals

Model A

b. The grasses and forbs are primarily perennials

Model L

V. Trees predominate

A. Deciduous broadleaf species predominate

1. The area has been thinned or partially cut leaving slash as the major fuel component

Model K

2. The area has not been thinned or partially cut

a. The overstory is dormant; leaves have fallen

Model E

b. The overstory is in full leaf

Model R

B. Conifer species predominate

1. Lichens, mosses, and low shrubs dominate as understory fuels

Model Q

2. Grasses and forbs are the primary ground fuel

Model C

3. Woody shrubs and/or reproduction dominate as understory fuels

a. The understory burns readily

1) Western United States

Model T

2) Eastern United States

a) The understory is more than 6 feet tall

Model O

b) The understory is less than 6 feet tall

Model D

b. The understory seldom burns

Model H

4. Duff and liter, branch wood and tree boles are the primary ground fuel

a. The overstory is over mature and decadent; there is a heavy accumulation of dead debris

Model G

b. The overstory is not decadent; there is only a nominal accumulation of debris

1) Needles are 2 inches or more in length (most pines)

a) Eastern United States

Model P

b) Western United States

Model U

2) The needles are less than 2 inches long

Model H

VI. Slash is the predominate fuel type

A. The foliage is still attached; there has been little settling

1. The loading is 25 tons/acre or greater

   Model I

2. The loading is less than 25 t/ac but greater than 15 t/ac

   Model J

3. The loading is less than 15 tons/acre

   Model K

B. Settling is evident; the foliage is falling off; grasses, forbs and shrubs are invading

1. The loading is 25 tons/acre or greater

   Model J

2. The loading is less than 25 tons per acre

   Model K

APPENDIX C. CATEGORICAL EXCLUSION

This categorical exclusion (CE) should be used for BLM properties or projects implemented with federal funds within the BCWPP WUI area. Table 3.1 contains all treatment types recommended by the BCFG, incorporating the requirements of this CE for each treatment. Applying any of the treatment types within Table 3.1 will meet the requirements of this CE on federal properties and for federally funded projects in addition to being appropriate treatments.

Decision Memorandum on Action and for Application of:
Categorical Exclusion 1.12
Las Cienegas National Conservation Area, Bisbee and Sonoita Community Firebreaks

U.S. Department of the Interior
Bureau of Land Management
Tucson Field Office
Cochise County, Arizona

PART I: PURPOSE AND NEED FOR ACTION

Hazardous Fuels Reduction Firebreaks recommended for structures on or near the LCNCA, or related to mitigation recommendations in the Bisbee and Sonoita Community Wildfire Protection Plans (CWPP).

The proposed action is a fire mitigation project proposed by the Gila District Fire Management Program (GDFMP) for public lands. This project is focused on protection of life and property to private citizens from wildland fire on BLM lands. Conversely, it will reduce the risk of fires spreading on BLM lands that originate on private property, by creating a defensible space for wildland firefighters. The areas of these projects are deemed mixed wildland urban interface. The projects will allow BLM fire managers to reduce the wildfire hazard on BLM land through the reduction of hazardous fuels. GDFMP crews or contractors are planning to remove live and dead fuel through thinning and pruning on BLM and private lands, so that firebreaks can be continuous across property boundaries, allowing for the most effective protection from wildfires for these communities. These firebreaks will complement fuel hazard reduction work that landowners have undertaken.

Hazardous fuels reduction on Bureau of Land Management (BLM) administered land varies on or near the Las LCNCA currently do not exceed 50' wide, and currently not greater then 500' long (0.6 acres in size). Bisbee area firebreaks will likely be 50-100' wide. This programmatic CX is designed to allow future firebreaks that are necessary to be established, as per the recommendations in the Bisbee and Sonoita CWPP's or based on recommendations of the Gila District Fire Mitigation Specialist, be allowed to go forward, without each project having to be approved individually, if they meet the mitigation measures/stipulations of this CX. Vegetation would be cut, removed or chipped. This includes the cutting, mowing, and removal of hazardous, flammable fuels in accordance with the Permit Stipulations noted below. All operations would be conducted according to Arizona State Land Department (ASLD) regulations and in a manner that minimizes risk for the ignition of wildfire, erosion of soil, destruction of residual live vegetation, or other environmentally-degrading activity.

Mitigation Measures/Stipulations:

1. Removal of hazardous, flammable fuels will **only** be permitted on BLM administered land or after receiving written authorization from private landowners.

2. The following **hand tools** could be used: weed eaters, hand saws, small chain saws, hand winches, and come-alongs are acceptable, or a **mower**, if it meets specifications listed below.

3. **Dead vegetation less than eight inches in diameter** may be removed, as per specific directions from authorized BLM officers. Removal of all dead vegetation in the firebreaks can be cut and removed.

4. Hazardous fuels reduction projects will stress tree spacing, by **focusing on maintaining 15 foot spacing** between leave trees.

5. **Emphasis will be placed on maintaining the following species**: Arizona Walnut, Arizona (Velvet) Ash, Net-leaf Hackberry, Buttonwillow, Cottonwood, Willows, and Mexican Elderberry. When possible, these species will not be removed: Graythorn, Condalia, Wolfberry, Sumac, Anisacanthus, Seepwillow, Willow-leafed Groundsel and Saltbush.

6. **Emphasis will be placed at removing:** Mesquite, Catclaw, Tamarisk, Snakeweed, Burroweed, Burro Brush, Rabbitbrush and Threa-leafed Groundsel.

7. **Live vegetation with basal diameters (4" stump height) no greater than eight inches** may be removed, without authorization from the LCNCA or the Tucson Field Manager or his/her representative. **Shrub and tree trunks** will be severed **four inches or less** from the ground. **Ladder fuels** (limbs or branches) will be removed by pruning the lower third of trees and shrubs up to a maximum of eight (8) feet above the ground.

8. Live mesquites which are cut down will have their root balls removed within the project area or addressed with a herbicide application.

9. **Grasses and forbs** may be cut with a mower, as long as **stubble of at least four inches** is remaining.

10. **All severed material will be chipped on BLM land or on private property.** Clearing of vegetation by mechanical vehicles or equipment is authorized, as long as the use is compatible with decisions in the Resource Management Plan (e.g, sediment, erosion, root rot disease, aquatic conservation strategy, etc.).

11. BLM will **encourage the use of bio-renewable products** that may result form the hazardous fuels reduction work.

12. Chain saws and ATV's will only be used by federal employees or contracted crews. All mechanized equipment **must** meet ASLD standards, and applicant must have an ASLD operations permit for approved spark arresters. The permittee must obtain an ASLD operations permit. Permittee must comply with all ASLD fire restriction requirements. Fire suppression tools will be kept at hand during all clearing operations, such as: ax, shovel, water, and bucket.

13. The use of herbicides or pesticides on BLM land are **prohibited.**

14. All **survey monuments, witness corners, reference monuments,** and **bearing trees** will be protected against destruction, obliteration, modification, or damage during the operation.

15. If the permittee (BLM crews or contracted crews) discovers, encounters, or becomes aware of any **objects or sites of cultural, historical, or paleontological value** (grave markers, historical or prehistorical ruins, graves, old dumps, etc.) on the project area, the land owner will stop all operations and notify the authorized officer **immediately**. Prior to project work, archeologist will be notified, so that field review or clearance to proceed is granted.

16. Permittee will undertake every reasonable measure to **minimize erosion, soil disturbances, ground disturbing activity or the introduction or spread of noxious weeds.** Equipment will be washed prior to bringing on site to reduce the likelihood of introducing new weeds onto the site.

17. Permittee will undertake every reasonable measure to **minimize disturbance to live vegetation** not removed for fuel hazard reduction.

18. Permittee will not block or close roads or trails used by the public. Existing telephone, television cable, or electrical transmission structures and lines or existing fences, ditches, roads, trails, or other improvements on the public lands will be protected.

19. Clearing or cutting of **any** material within 10 feet of any stream on BLM land is prohibited to prevent the risk of excelerating erosion. Riparian areas are clearly defined on the attached maps, if applicable.

20. Burning on BLM land is authorized if part of an approved prescribed fire burn plan.

21. Due to the small area affected by the firebreaks, there will be little effect on upland wildlife such as ground nesting birds and rabbits. These species are abundant enough that any nesting that is disrupted will have little effect on the population. Restricting the removal of the vegetative over story in the riparian areas to the period of October 15 through March 31 will prevent the disturbance of any nesting by neo-tropical migrant bird species, including the Southwest Willow Flycatcher.

22. Permittee may reduce fuels between October 15 through March 31 in riparian areas, as long as fire danger is not extreme. In upland areas the permittee may reduce fuels from October 15 through May 31.

23. This authorization is for reducing hazardous vegetation and dead organic material on BLM land that compliments similar work completed on the permittee's property adjacent to BLM.

24. Fuel hazard reduction work will be monitored by GDFMP staff at least once a year, following fuels treatment.

Plan Conformance:

1) Department of Interior Manual 516 DM, chapter 2, appendix 1,1.12 (Hazardous Fuels Thinning)
2) 10-year Comprehensive Strategy, goal #2 (hazardous fuels reduction pg. 9)
3) Las Cienegas Resource Management Plan and Environmental Impact Statement
(pg. 2-38, agency preferred alternative, Wildland Fire Management)
4) Safford District Resource Management Plan and Environmental Impact statement
(pg. 42, preferred alternative, planning action 2 paragraph e)

Moreover, these hazardous fuels reduction activities: 1) Will not be conducted in wilderness areas or where they would impair the suitability of wilderness study areas for preservation for wilderness; 2) will not include the use of herbicides or pesticides; 3) will not involve the construction of new permanent roads or other infrastructure; 4) will not include sales of vegetative material that do not have hazardous fuels reduction as the primary purpose; 5) will not exceed 1000 acres for mechanical hazardous fuels reduction activities and will not exceed 4500 acres for hazardous fuels reduction using fire; 6) will only be conducted in wildland urban interface or in Condition Classes 2 or 3, Fire Regime Groups I, II, III, outside the wildland urban interface.

Specialist Signature _____ **Date** 1/16/7

PART II: CATEGORICAL EXCLUSION REVIEW **Subactivity 2824**
Assignment and Review **NEPA #: AZ-420-2007-009**
Project Name: LCNCA, Bisbee and Sonoita Community Firebreaks
Location (legal description): Throughout LCNCA, Bisbee and Sonoita Fire Districts
Project Lead: David Peters, Fire Mitigation Specialist, Gila District Fire Management Program
Draft Review: Unit Manager/Supervisor: _____ **Date:** 1/18/07

Technical Review:

Exception Applies? Yes	Exception Applies? No	NAME	EXCEPTION	SIGNATURE	DATE
( )	(✓)	Bill Auby	(1) Have Significant adverse effects on public health or safety?	B Auby	1-19-07
( )	( )	Catie Fenn	(2) Have adverse effects on such unique geographic characteristics as historic or cultural resources, parks, recreation or refuge lands, wilderness areas, wild or scenic rivers, sole or principal drinking water aquifers, prime farmlands, wetlands, floodplains or ecologically significant or critical areas including those listed on the Department's National Register of Natural Landmarks.		1/19/07
( )	(✓)	Keith Hughes	(3) Have highly controversial environmental effects.	D. Tuggy	1-31-07
( )	(✓)	Bill Auby	(4) Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks.	B Auby	1-19-07
( )	(✓)	~~Dan Moore~~ GRANT DRENNEN	(5) Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.		1/31/07
( )	(✓)	Catie Fenn	(6) Individually Insignificant, but cumulatively significant effects.		1/29/07
( )	(✓)	Max Witkind	(7) Have adverse effects on properties listed or eligible for listing o n the National Register of Historic Places.	P. Gibson for M. Witkind	1/31/07
( )	(✓)	Keith Hughes	(8) Have adverse effects on species listed on the List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species.	D. Tuggy for KH	1-31-07
( )	(✓)	Keith Hughes	(9) Require compliance with EO 11988, 11990 (Protection of Wetlands) or the Fish and Wildlife Coordination Act.	D Tuggy for KH	1-31-07
( )	( )	~~Dan Moore~~ GRANT DRENNEN	(10) Threaten to violate a Federal, State, local or tribal law or requirement imposed for the protection of the environment.		1/31/07

Approval:
Unit Manager/Supervisosr: _____ **Date:** 2/1/07
Environmental Coordinator: _____ **Date:** 2.1.07
Field Manager: _____ **Date:** 2-2-07

Compliance with the National Environmental Policy Act
The proposed action is categorically excluded from further documentation under the National Environmental Policy Act (NEPA) in accordance with 516 DM 2, appendix 1, 1.12. The application of this categorical exclusion is appropriate in this situation because there are no extraordinary circumstances potentially having effects which may significantly affect the environment. The application of this categorical exclusion is appropriate in this situation because there are no extraordinary circumstances potentially having effects which may significantly affect any of the ten exceptions listed in 516 DM 2, appendix 2 (actions that require an environmental assessment)

If any archeological, paleontological, and/or historic resources are encountered during the removal of the mesquite stumps, all work will cease in the immediate area. The Tucson Field Office (TFO) archeologist shall be notified. Work will not resume in that area until clearance is given by TFO archeologist TFO Archeologist will be on site during the removal of mesquite stumps

Persons and Agencies Consulted
Tucson Field Office NEPA Team:
Bill Auby, Geologist
Damon McRae, Fire Management Officer
Linda Marianito, Environmental Coordinator
Catie Fenn, Recreation Planner
Dan Moore, Hydrologist
Keith Hughes, Natural Resources Specialist (Wildlife)
Max Witkind, Archeologist

Consultation with USDA Forest Service may be necessary if the Sonoita CWPP recommends firebreaks adjacent to national forest lands.

Decision and Rationale on Action
Necessary firebreaks will be implemented. Risk analysis worksheets identifying potential job hazards have been completed In addition daily safety briefing will be conducted and documented. I have reviewed the plan conformance statement and have determined that the proposed action is in conformance with the approved land use plan and that no further environmental analysis is required. NEPA #: AZ-420-2007-009.

Implementation Date
Firebreak projects will be implemented between the dates of October 15 through May 31 Projects may require yearly maintenance (mower, weed eater, grass whip, hand scythe, tractor mowers, chainsaws) to control grasses, small brush, biannual thinning of brush/shrubs, and every few years pruning limbs on mesquites or other trees listed in the mitigation/stipulations section of this document.

Administrative Review or Appeal Opportunities
This project is subject to administrative review or appeal.

Contact Person
David Peters, Fire Mitigation Specialist, Gila District Fire Management Program,
Tucson Field Office, 12661 East Broadway Blvd., Tucson, AZ 85748, David_Peters@BLM.gov, 520.258.7207

This project is subject to NEPA team review after 5 years, to make sure the project standards are appropriate to adequately protect homes from wildfires and to address environmental concerns.

Part III: DECISION I have reviewed this plan conformance and NEPA compliance record and have determined that the proposed action does not conflict with major land-use-plans and will not have any major adverse impacts on other resources. Therefore, it does not represent an exception, and is categorically excluded from further environmental review. It is my decision to implement the project, as described, with the mitigation measures attached.

Authorized Official: Patrick Madigan **Date:** 2-2-07

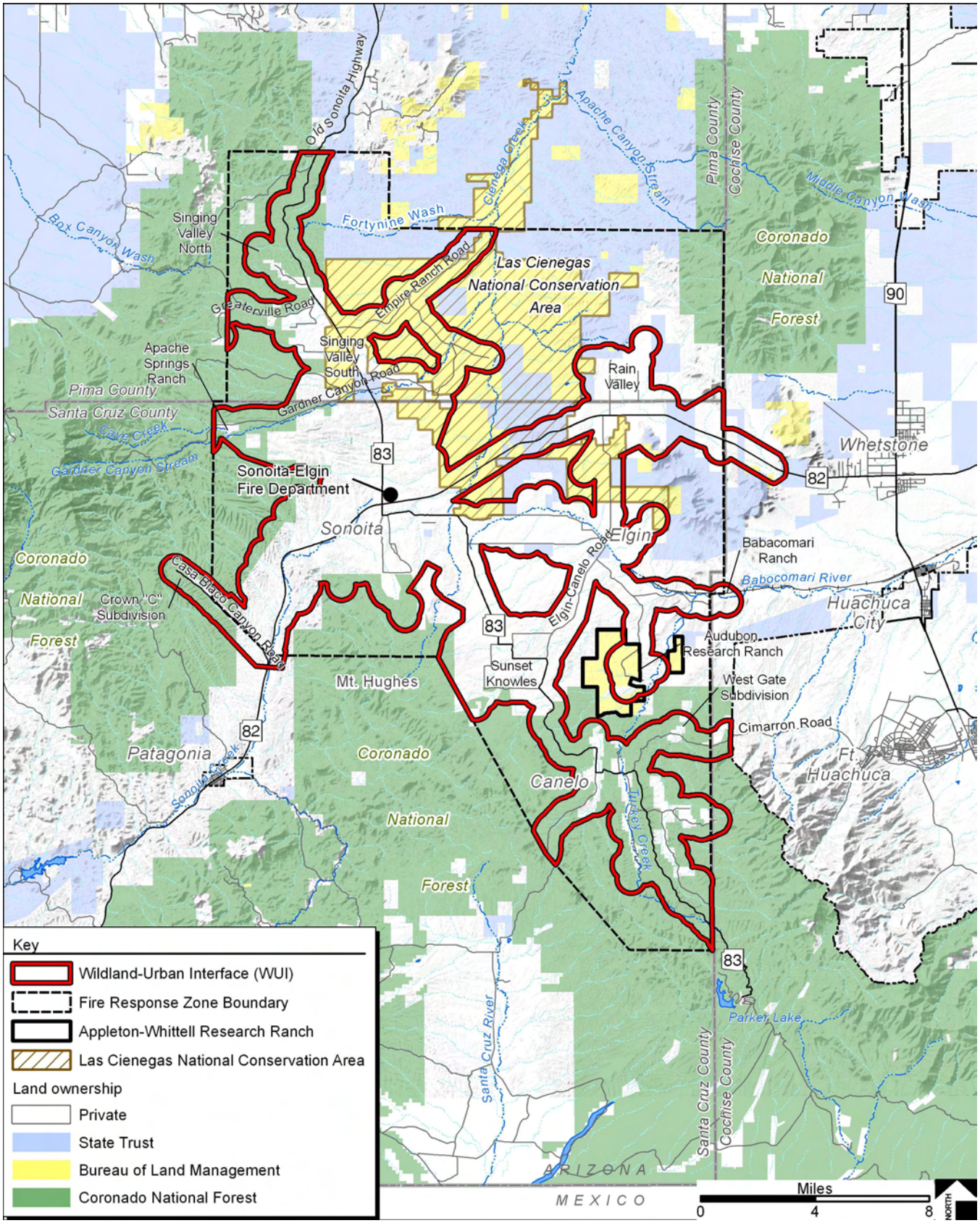

Figure C1. LCNCA and Sonoita Elgin CWPP WUI boundary

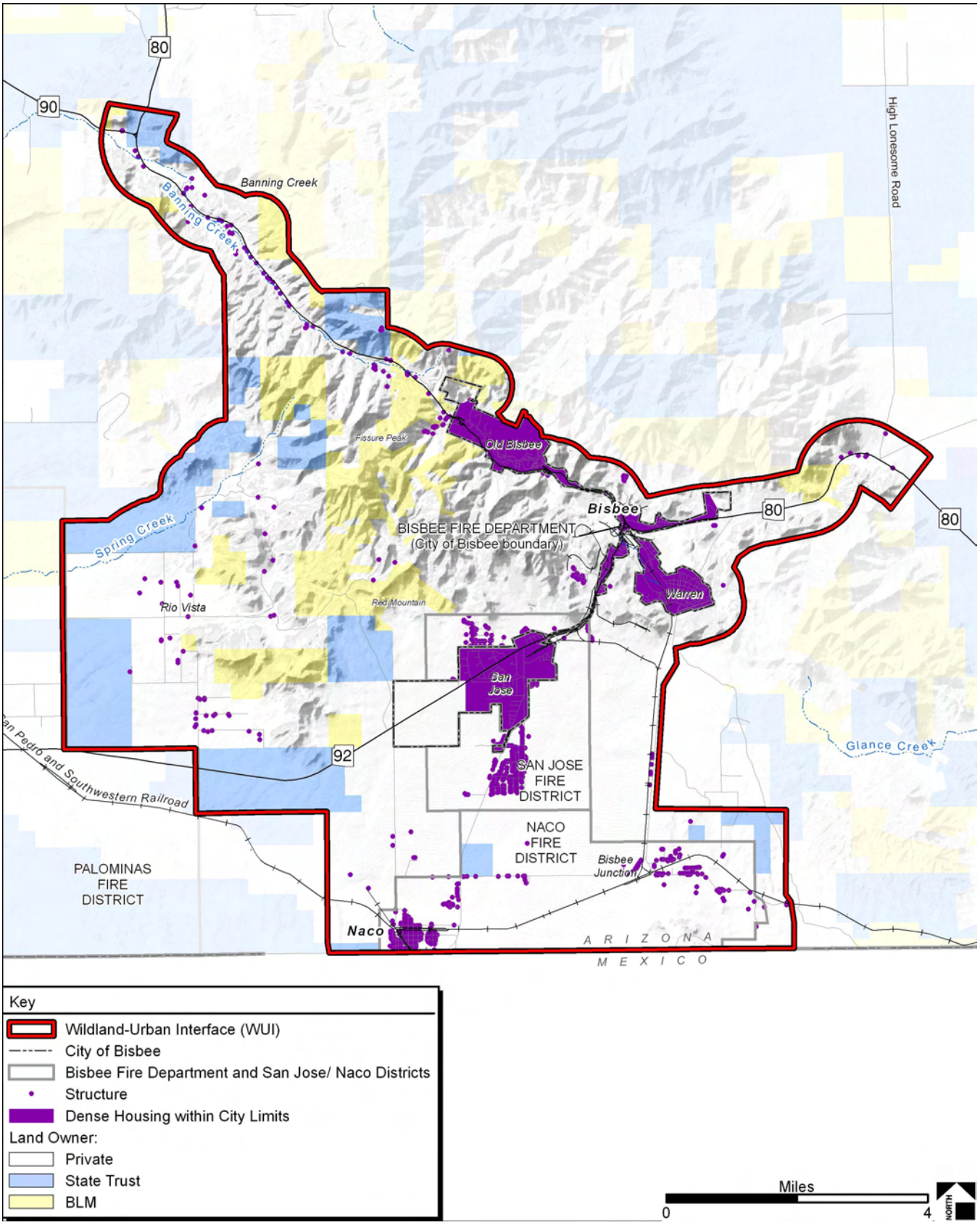

Figure C2. Bisbee CWPP WUI boundary

APPENDIX D. ADDITIONAL RESOURCES

Firewise Information and Web Sites

Arizona State Forester. Provides granting and other information sources.
http://www.azsf.az.gov/Grants/grants.html

Bureau of Land Management fire site *http://www.fire.blm.gov/*

Colorado State Forest Service. *Protecting Your Home, Forest and Property From Wildfire.*
http://csfs.colostate.edu/protecthomeandforest.htm

Ecological Restoration Institute. *Forest Restoration for Homeowners, A Guide for Residents of Southwestern Ponderosa Pine Forests. Information pamphlet covering homeowner strategies for fire safety. http://www.eri.nau.edu/cms/files/General/ERIhomeowners.pdf*

Joint Fire Sciences CWPP Project Team. *"Enhancing Collaboration and Building Community Capacity.*
http://www.jfsp.fortlewis.edu

Environmental Protection Agency. Catalog of Federal Funding Sources for Watershed Protection
http://cfpub.epa.gov/fedfund

Federal Emergency Management Agency (FEMA), State Hazard Mitigation Officers
http://www.usfa.fema.gov; http://www.fema.gov/about/contact/shmo.shtm

FEMA, Kids wildland fire website
http://www.fema.gov/kids/wldfire.htm

FEMA, Pre-disaster Mitigation Program.
http://www.fema.gov/government/grant/pdm/index.shtm

Fire Safe Council.
http://www.FireSafeCouncil.org

Firewise Communities website: *http://www.firewise.org/index.php*

Firewise Communities, *USA national recognition program*. *http://www.firewise.org/usa*

Five-Star Restoration Matching Grants Program. USDA Woody Biomass Grant Program. Provides grant funding for treatments of biomass from fuels and restoration treatments.
www.fpl.fs.fed.us/tmu/grant/biomass-grant.html

Joint Fire Science Program, *Wildfire Protection Plans.* Provides resource links and information for community wildfire protection planning. *http://jfsp.fortlewis.edu/links.asp*

National Association of Fire Chiefs. Information on equipment training and resources. *http://www.iafc.org*

National Fire Lab. *http://www.firelab.org*

National Fire Plan Community Assistance.
http://www.fireplan.gov/overview/NationalFirePlanCommunityAssistance2006.htm

National Fire Protection Association (NFPA) *NFPA 299 (Standard for Protection of Life and Property from Wildfire); NFPA 295 (Standard for Wildfire Control); NFPA 291 (Recommended Practice for Fire Flow Testing and Marking of Hydrants); NFPA 703 (Standard for Fire Retardant Impregnated Coatings for Building Materials); NFPA 909 (Protection of Cultural Resources); NFPA 1051 (Standard for Wildland Fire Fighter Professional Qualifications); NFPA 1144 (Standard for Protection of Life and Property from Wildfire); NFPA 1977 (Standard on Protective Clothing and Equipment for Wildland Fire Fighting) http://www.nfpa.org; http://www.nfpa.org/Catalog*

National Interagency Fire Center *http://www.nifc.nps.gov/fire*

National Interagency Fire Center. *Wildland Fire- Communicator's Guide.* This is a guide for fire personnel, teachers, community leaders, and media representatives.
http://www.nifc.gov/preved/comm_guide/wildfire/pdfs/chapter_4.pdf

National Park Service. *Community Tool Box.* Excellent information and materials provided for use in public participation and collaborative projects. *http://www.nps.gov/phso/rtcatoolbox/*

National Park Service. Fire and Aviation. *http://www.nps.gov/applications/fire/index.cfm*

National Wildfire Coordinating Group. Fire Prevention and Education, Wildland-Urban Interface guides, documents, videos and other resources. *http://www.nwcg.gov/pms/prev_ed_wui.htm*

National Wildland Fire Coordinating Group. Home Protection and Firewise- website with many links to fire education *http://www.nwcg.gov/teams/wfewt/biblio/hprotect1.html*

New Mexico State Forestry Division website: publications, fire assistance grants, and other state resources, links to additional information sources.
http://www.emnrd.state.nm.us/EMNRD/forestry/index.htm information

Partnership Resource Center. Joint project of the FS and National Forest Foundation for partnerships and collaboration. *http://www.partnershipresourcecenter.org*

PBS NOVA—*"Fire Wars." http://www.pbs.org/wgbh/nova/fire*

Red Lodge Clearing house- information on funding sources, grant writing, training opportunities and links to technical assistance. *http://www.redlodgeclearinghouse.org/resources/index.html*

SAFECO Corporation, *The Fire Free Program, Reduce Your Risk of Wildfire*.
http://www.safecoplaza.com/safecoplaza/salesandmarketing/promotions/relations/firefree.pdf

SAFECO Corporation *The Natural Disaster Safety Guide.*
http://www.safecoplaza.com/safecoplaza/salesandmarketing/promotions/relations/disaster.pdf

San Juan Public Lands Center, fire information clearinghouse website:
http://www.SouthwestColoradoFires.org

Slack, P., sponsored by the Colorado State Forest Service (CSFS) and the Federal Emergency Management Agency (FEMA). *Firewise Construction Design and Materials Publication, An excellent publication providing homeowners and builders with design and techniques that offer more protection from wildland fire. http://csfs.colostate.edu/library/pdfs/fire/construction_booklet.pdf*

Southwest Area Forest, Fire, and Community Assistance Grants. This Web site lists grants that are available to communities to reduce the risk of wildfires in the urban interface.

http://www.SouthwestAreaGrants.org

Southwest Community Forestry Caucus- establishes a coordinated communication network about community forest restoration in the southwestern states of Arizona, Colorado, New Mexico and Utah. *http://ocs.fortlewis.edu/SWCommunityForestry/default.asp*

Southwest Coordination Center. Provides incident information, safety, software and training. *http://gacc.nifc.gov/swcc/*

The Nature Conservancy, Forest Service and the U.S. Department of the Interior. *Global Fire Initiative.* Information on training and networking. *www.tncfire.org/training_usfln.htm*

University of Arizona. *Arizona Wildfire and the Environment Series*: *Forest Home Fire Safety; Fire-Resistant Landscaping; Creating Wildfire-Defensible Spaces for Your Home and Property; Homeowners' "Inside and Out" Wildfire Checklist; Firewise Plant Materials for 3000 Feet and Higher Elevations; Soil Erosion Control After a Wildfire; Recovering from Wildfire; A Guide for Arizona's Forest Owners; Wildfire Hazard Severity Rating Checklist for Arizona Homes and Communities.* *http://cals.arizona.edu/pubs*

USDA Forest Service. Fire Education Materials. *http://www.symbols.gov*

USDA Forest Service, Forest Products Laboratory, 2007 Woody Biomass Grants *http://www.fpl.fs.fed.us/tmu/grant-2007/biomass-grant.html*

USDA Forest Service, Southwest Region Partnerships. Information on national and regional agreements, links for partners. *http://www.fs.fed.us/r3/partnerships/*

USDA Forest Service. Stewardship and Landowner Assistance Programs. *http://www.fs.fed.us/spf/coop/programs/loa/*

US Department of Homeland Security, fire website *http://www.ready.gov/america/beinformed/fires.html*

US Department of Interior agencies (Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, National Park Service), the USDA Forest Service, and state land departments. *Living with Fire- A Guide for the Homeowner*. This is one of the most detailed pieces of Firewise information for landowners to reference when creating survivable space around their homes. *http://www.fs.fed.us/r3/publications/documents/livingwithfire.pdf*

US Fire Administration, and Assistance to Firefighters Grant Program. *http://www.usfa.dhs.gov/; http://www.usfa.dhs.gov/grants/*

Western States Wildland Urban Interface Grants. Funds allocated to 17 western states distributed through a competitive process administered by the Western States Fire Managers, a working group established by the Council of Western State Foresters.

CD ROM

Arizona Firewise Communities Educator's Workshop, Payson, AZ, February 18–19, 2003.

Burning Issues, Florida State University and the USDI Bureau of Land Management, 2000.
Interactive multimedia program for middle and high school students to learn about the role of fire in the ecosystems and the use of fire managing rural areas.

Wildland Fire Communicator's Guide.
This interactive CD-ROM compliments the book.

Other Publications

It Can't Happen to My Home! Are You Sure? A publication by the USDA Forest Service, Southwestern Region, 12 page document.

Wildfire Strikes Home! It Could Happen to You, How to Protect Your Home! / Homeowners Handbook, from the USDI Bureau of Land Management, the USDA Forest Service and state foresters (publication nos. NFES 92075 and NFES 92074).

Everyone's Responsibility: Fire Protection in the Wildland Urban Interface, NFPA, 1994.This National Fire Protection Association book shows how three communities dealt with interface problems.

Is Your Home Protected from Wildfire Disaster? A Homeowner's Guide to Wildfire Retrofit, Institute for Business and Home Safety, 2001. This book provides homeowners with guidance on ways to retrofit and build homes to reduce losses from wildfire damage.

Road Fire Case Study, NFPA, 1991. Stephen Bridge. Provides information to assist planners, local officials, fire service personnel, and homeowners.

APPENDIX E. FIREWISE CONSTRUCTION EXAMPLE

The following information and pictures describe the materials used to construct a Firewise home within the Bisbee WUI. Additional information on Firewise construction can be found online at http://www.nwcg.gov/teams/wfewt/biblio/hprotect2.html.

Construction of the studio (Photo E.1) is mostly finished; the house (Photo E.2.) is still under construction. Both buildings are constructed from Rastra block (http://www.rastra.com/wi_ra.htm), an insulating concrete form (ICF) with a 4-hour fire rating. The Rastra block is covered with stucco.

Photo E.1. Firewise studio

Photo E.2. Firewise home construction

The rooftops are made of steel (no sky lights) and aluminum to cover the fasciae (1-inch black strips). The soffit (or underside of the roof) is also aluminum (Photo E.3) The soffit vents are vinyl and situated next to the fascia. Fire retardant was applied to all the eave wood before enclosing with metal soffit and fascia. All vents and roof ventilation (ridge vents) have one-quarter-inch or less screening. The chimney has a spark arrestor.

Photo E.3. Firewise rooftop and soffit

The windows are aluminum-clad wood, with dual pane low E (a clear, low-emission coating applied to one side of the glass) tempered glass. The doors in the studio are 1.5-hour fire rated. The house has metal and tempered-glass doors (Photo E.4.).

Photo E.4. Firewise windows, door, and soffits

The house is designed so that the most vulnerable elevation has very little glass. Glass block was used where possible to provide the best fire protection. Original home design included a wood deck, but when the homeowners learned about Firewise construction, they built a nonwood terrace instead.

The final step in Firewise construction was to modify the wildland home ignition zone around the structures.