Sonoita Elgin
Community Wildfire Protection Plan

Sonoita ▪ Elgin ▪ Canelo




- Community of Sonoita
- Community of Elgin
- Community of Canelo
- Sonoita Elgin Fire District
- Santa Cruz County, Arizona
- Pima County, Arizona
- Arizona State Land Department
- Audubon Society, Appleton-Whittell Research Ranch
- Bureau of Land Management, Gila District, Tucson Field Office
- United States Forest Service, Coronado National Forest, Nogales and Sierra Vista Ranger Districts

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Sonoita-Elgin Community Wildfire Protection Plan

Prepared by

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ACRONYMS AND ABBREVIATIONS

ADOT	Arizona Department of Transportation
ASLD	Arizona State Land Department
BA	Basal Area
BLM	Bureau of Land Management
CE	Categorical Exclusion
CNF	Coronado National Forest
CWPP	Community Wildfire Protection Plan
dbh	Diameter at breast height
drc	Diameter at root collar
EA	Environmental Assessment
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FRCC	Fire Regime Condition Class
FS	Forest Service
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
NFP	National Fire Plan
NWCG	National Wildfire Coordinating Group
PCOEM&HS	Pima County Office of Emergency Management & Homeland Security
SCCOEM	Santa Cruz County Office of Emergency Management
SECWPP	Sonoita-Elgin Community Wildfire Protection Plan
SEFD	Sonoita-Elgin Fire District
SEFT	Sonoita-Elgin Firewise Team
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 Sonoita-Elgin Community Wildfire Protection Plan (SECWPP) was developed for the at-risk communities and surrounding subdivisions and private inholdings located in and around the communities of Sonoita, Elgin, and the intermix community of Canelo, located in Santa Cruz County, Arizona (Figure 1.1). Sonoita is located at the crossroads of State Route (SR) 82 and SR 83. Elgin is located approximately 8 miles southeast of Sonoita. Canelo is located approximately 12 miles south of Elgin within the Coronado National Forest. The communities are accessible from SR 82 and SR 83 or from Elgin Road, Upper Elgin Road, and Elgin Canelo Road. The communities of Sonoita, Elgin, and associated intermix communities, engaged in the CWPP process in response to the Healthy Forests Restoration Act of 2003 (HFRA). This legislation established unprecedented incentives for communities to develop comprehensive wildfire protection plans in a collaborative, inclusive process. HFRA gives direction to the US Departments of the Interior (USDI) and Agriculture (USDA) to address local community priorities in fuel reduction treatments on federal and nonfederal lands. HFRA also 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). HFRA priority areas include the wildland-urban interface (WUI), municipal watersheds, areas affected by windthrow or insect or disease epidemics, and critical wildlife habitat that would be negatively affected by a catastrophic wildfire.

In compliance with Title 1 of HFRA, the CWPP requires agreement among local governments, local fire districts and 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 public lands adjacent to the at-risk communities.

The SECWPP was developed to assist federal, state, and local governments; the fire district; and residents identify 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 grassland health, supporting local industry and local economies, and improving public/firefighter safety and response capabilities.

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

A. Background

The Sonoita-Elgin Firewise Team (SEFT) was formed to create a CWPP that captures local interest and advanced understanding regarding the critical wildland fire issues. The SEFT is composed of representatives from the communities of Sonoita, Elgin and Canelo; the Santa Cruz County Office of Emergency Management (SCCOEM); the Pima County Office of Emergency Management (PCOEM); the Sonoita-Elgin Fire District (SEFD); the BLM Gila District; the Coronado National Forest (CNF); the Arizona

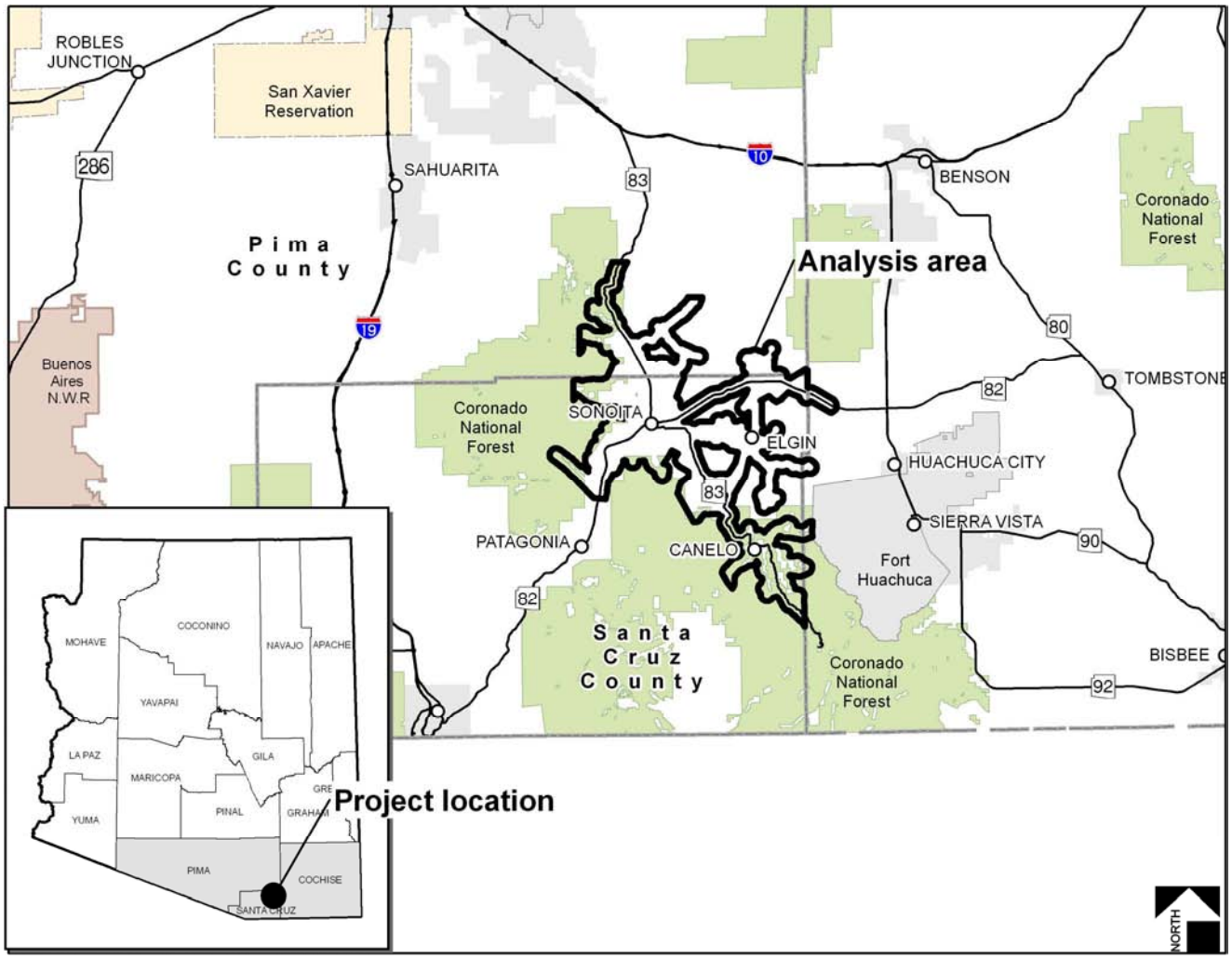

Figure 1.1. Analysis area

State Land Department (ASLD) Division of Forestry, Tucson District; the National Audubon Society Appleton-Whittell Research Ranch; Las Cienegas National Conservation Area (LCNCA); as well as representatives from local homeowners associations and other interested individuals from throughout the Sonoita-Elgin area. The SEFT has been the core of the public involvement process for this CWPP 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. Adhering to WFLC guidance criteria ensures that the SECWPP meets the principles of both the National Fire Plan (WFLC 2006) and the *Review and Update of the Federal Wildland Fire Management Policy* (USDI et al. 2001).

Within the planning area, both natural wildland fires and human-caused wildland fire starts have occurred in the vegetation zones surrounding the communities of Sonoita and Elgin. The most recent large landscape-level fire in proximity to the communities was the Ryan Fire in 2002, which burned over 38,000 acres. Both natural and human-caused fires are suppressed and contained each year on the lands

surrounding Sonoita and Elgin. Continued extreme weather conditions, dry fuels, and increasing fuel loading on federal and nonfederal lands, in conjunction with community development and growth within private lands, synergistically contribute to the potential for catastrophic wildland fires in and around the Sonoita-Elgin communities. As a result, the SEFD and governmental agencies have initiated fire preparedness and land treatment planning efforts to deal with the types and densities of natural fuels that significantly threaten the communities with potential catastrophic wildfire.

The SEFT developed this CWPP to increase preparedness, reduce hazardous wildland fuels, and increase communication with local, county, state, and federal emergency response personnel by determining areas of high risk from catastrophic wildland fire, developing mitigation measures to reduce hazardous wildland fuels, improving emergency response to unplanned wildfire, and reducing structural ignitability. Several of these goals can be achieved throughout the SECWPP area by implementing provisions from the SEFD strategic plan (2006), the Huachuca Area Fire Partners fire management plan (2005), and the USDI BLM Gila District resource management plan (1991) for the surrounding areas.

The SEFT 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 communities. Using the information gathered from these supporting documents, the Sonoita-Elgin Fire SEFD Chief, the ASLD, and the BLM TFO agreed that the communities of Sonoita-Elgin qualify as intermix communities (see *Federal Register* 2001a) at risk from wildland fire. The SEFT, therefore, will petition the Arizona State Forester to maintain the community of Sonoita and to include the community of Elgin and the intermix community of Canelo within the *Arizona Communities at Risk Matrix* (Arizona State Forester 2005) when next updated.

B. Wildland-Urban Interface (WUI)

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) (2004)—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* (2002)—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 historic wildland conditions in the WUI by empowering local communities and by authorizing expedited environmental assessments, administrative appeals, and legal review for qualifying projects on federal land.

The SECWPP process of delineating the WUI boundary involved collaboration between local, state, and federal governments; the Sonoita-Elgin fire chief, and the SEFT, which represents the public interest through participating government officials and community members. The identified WUI is the minimum area needed to provide protection to persons and property, to provide adequate evacuation, and to protect the communities and surrounding landscape from wildland fire. The lands that surround the communities are in a condition 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, fire history, vegetative fuels, and natural firebreaks
- Historical fire occurrence
- Community development characteristics
- Local firefighting preparedness
- Infrastructure and evacuation routes
- Existing fire management planning area boundaries

The final WUI boundary developed for the SECWPP includes 118,711 acres of lands administered by the BLM, the CNF, and private landowners (see Figure 1.2).

C. Goals

The SEFT agreed on nine primary goals of the SECWPP:

1. Improve fire prevention and suppression
2. Reduce hazardous wildland fuels on both public and private lands
3. Recommend measures to reduce structural ignitability in the SECWPP area
4. Promote community involvement and education
5. Restore grassland and riparian health
6. Encourage stability in the community through protection of the ecosystem
7. Identify funding needs and opportunities
8. Expedite project implementation
9. Identify strategies to reduce Insurance Services Office (ISO) ratings within the WUI boundary

In addition to the primary goals of the CWPP, short-range and long-range goals for community wildfire protection have been developed and are listed on the following page.

Short-range goals:

1. Continue to educate the community regarding awareness and provide interventions to help decrease risk and loss related to wildland fires
2. Continue to raise the level of preparedness through the following:
    - Residential and commercial inspections and ideas on improving safety regarding wildland fires;
    - Dispatching and alerting capability within the present radio system (911 tie-in pagers);
    - Improvement of service and access to the communities by
        - assisting homeowners with tips on how to make their water storages accessible to fire district vehicles;
        - identifying helicopter landing zones;
        - identifying areas for wildland fuel mitigation treatments;

- continuing to update mapping of the communities and surrounding areas;
- identifying hard-to-access areas

Long-range goals:

1. Help SEFD and Santa Cruz County develop an emergency notification and evacuation plan
2. Obtain funding/grants to secure the following:
   - Chipper/shredder
   - Permanent housing for emergency vehicles
   - New equipment and vehicles to be used in fire severity patrols and mutual aid assistance
   - Improvements to firefighting water supply and storage
3. Assist the BLM, the CNF, and TNC where possible with watershed-enhancement projects
4. Work with private landowners and surrounding public agencies to secure aboveground water storage facilities and to provide accessibility for fire suppression use

Although the goals of this CWPP, as determined by the SEFT, are mostly strategic in a planning sense, the action recommendations designed to reach these goals are more prescriptive. In developing this CWPP, the SEFT has not intended for each action recommendation to meet each goal; some action recommendations are specific to a single goal or a few goals. For instance, wildland fuel-reducing treatments in designated firebreak areas of the WUI will assist in meeting fire prevention and suppression goals but may not be designed to directly restore grassland and riparian health. However, the SEFT believes that the synergistic effect of implementing all action recommendations will eventually achieve the stated goals of the SECWPP.

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

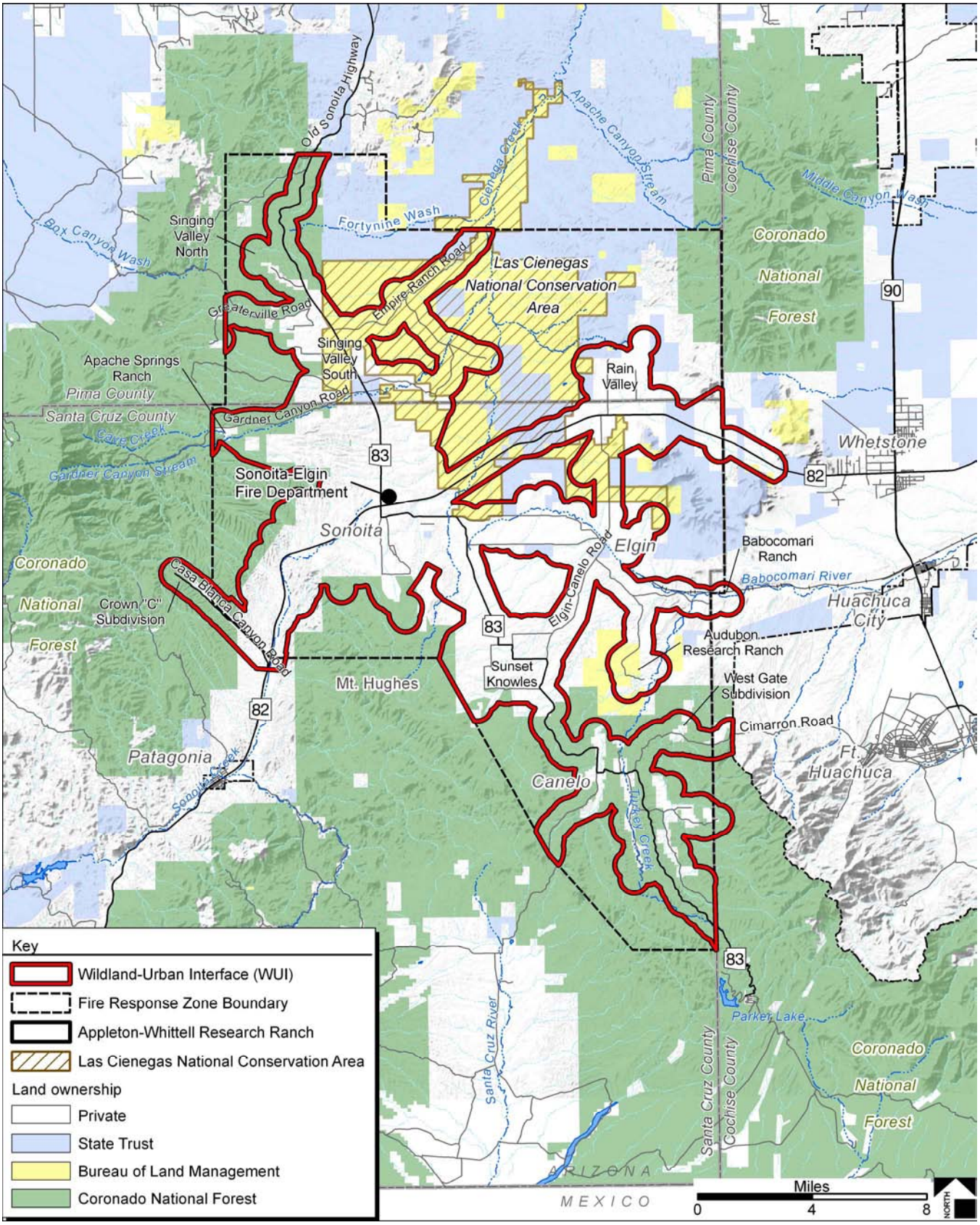

Figure 1.2. WUI land ownership

D. Desired Future Condition and Relevant Fire Policies

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. The desired future condition of nonfederal lands in the WUI is to have private landowners become aware of, and use, Firewise standards. Firewise Communities 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. The Arizona state forester administers the Firewise Communities USA certification program within Arizona. SEFT would like to make Firewise information available to the communities' citizens and to encourage its application. Residential and other structures that comply with these standards significantly reduce the risk of fire igniting in the communities and spreading to the surrounding habitat. Additionally, structures that comply with Firewise recommendations are much more likely to survive wildland fires that spread into the communities.

Federal wildfire reduction policy on public lands (i.e., BLM lands) is planned and administrated locally through the BLM TFO and the CNF, which are the management agencies for federal lands within the SECWPP 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 wildland 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 scrublands, vegetation associations within the WUI are classified as Allocation 1.

1. Local Community Efforts to Reduce Wildland Fire in the WUI

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

To date, Santa Cruz County has not developed community-based emergency evacuation plans. Limited access routes to rural communities within the county restrict planning options for residential evacuation. Plans outlining emergency procedures during an evacuation, essential items to take when evacuating, locations of registration/reception centers, transportation planning, home security, family communication, and animal and pet evacuation suggestions could be developed by individual communities in cooperation with Santa Cruz County in the future if initiated by the local communities.

2. Specific Community Fuels Mitigation Projects

Financial commitments required to reduce the risk of catastrophic wildfire can be extensive for the BLM, Forest Service (FS), and for small rural communities surrounded by public lands. The communities of Sonoita-Elgin, in cooperation with the BLM and the FS, would like to implement fuel mitigation projects for wildland fire suppression and are proposing to complete the wildland fuel mitigation projects described in Table 1.1.

Table 1.1. Sonoita-Elgin Fuels treatment projects and wildland fire grants received

Project area location	Treatment name	Description	Acres treated or Amount received
Fuels treatment projects and grants for fire protection in Sonoita-Elgin	Treatment #1	Karl firebreak	1 acre
	Treatment #2	Thuret firebreak	2 acres
	Treatment #3	Empire ranch firebreak	2 acres
	Treatment #4	Hummel House firebreak	0.5 acres
	Treatment #5	Home assessments resulting in HIZ fuels reduction	15-25 homes field visited and treated per year at 0.5 acres/each.
	Grant #1	2005 ASLD Rural Fire Assistance Grant for 300 gallon slide in unit for type 6 wildland engine, 4 radios and chargers and wildland fire training for 2 people.	$20,000.00

Source: BLM, SEFD

E. Planning Process

Several county, state, and BLM TFO planning documents and studies have incorporated wildfire management guidelines and standards for the SECWPP planning area. The goals, policies, and guidelines outlined in those documents, in addition to the public involvement process mentioned above, were all critical to the development of the SECWPP. The studies, plans, and documents reviewed include the following:

- *The Report of the: Governor's Arizona Forest Health Oversight Council 2006 Status Report and Recommendations* (2006)
- *Guiding Principles for Forest Ecosystem Restoration and Community Protection* (2003)
- *Gila District Resource Management Plan* (1991)
- *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)
- *Restoring Healthy Landscapes and Ecosystems, Fire Management Plan* (Huachuca Area Fire Partners 2005)
- *Upper San Pedro Watershed Wildfire Hazard Assessment and Mitigation Plan. Summary Report* (USDI BLM 2003a)
- *Federal Register* (2001a)

- *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)
- *Strategic Plan of the Sonoita-Elgin Fire District* (2006)
- *Santa Cruz County Multi Jurisdictional Hazard Mitigation Plan* (Santa Cruz County 2006)
- *Pima County Emergency Operations Plan* (Pima County 2006)
- *Pima County Multi-Jurisdictional Hazard Mitigation Plan* (Pima County 2006)
- *Cochise County Comprehensive Plan* (Cochise County 2006)
- *Approved Las Cienegas Management Plan and Record of Decision* (USDI BLM 2003b)

Successful implementation of the SECWPP will require a collaborative effort among multiple layers of government and the local communities. The SEFT must develop processes and systems that ensure recommended treatments and actions of the SECWPP 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 CWPP by the Sonoita-Elgin fire chief and Santa Cruz County Board of Supervisors and upon concurrence from the BLM TFO, the CNF, and the Arizona state forester, action recommendations of the SECWPP will be forwarded to the Arizona state forester, the BLM TFO, and the CNF supervisor for implementation of the priority action recommendations.

Figure 1.3 summarizes the process that the SEFT followed to produce the SECWPP. 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 SECWPP and serve as a guide for the rest of this document.

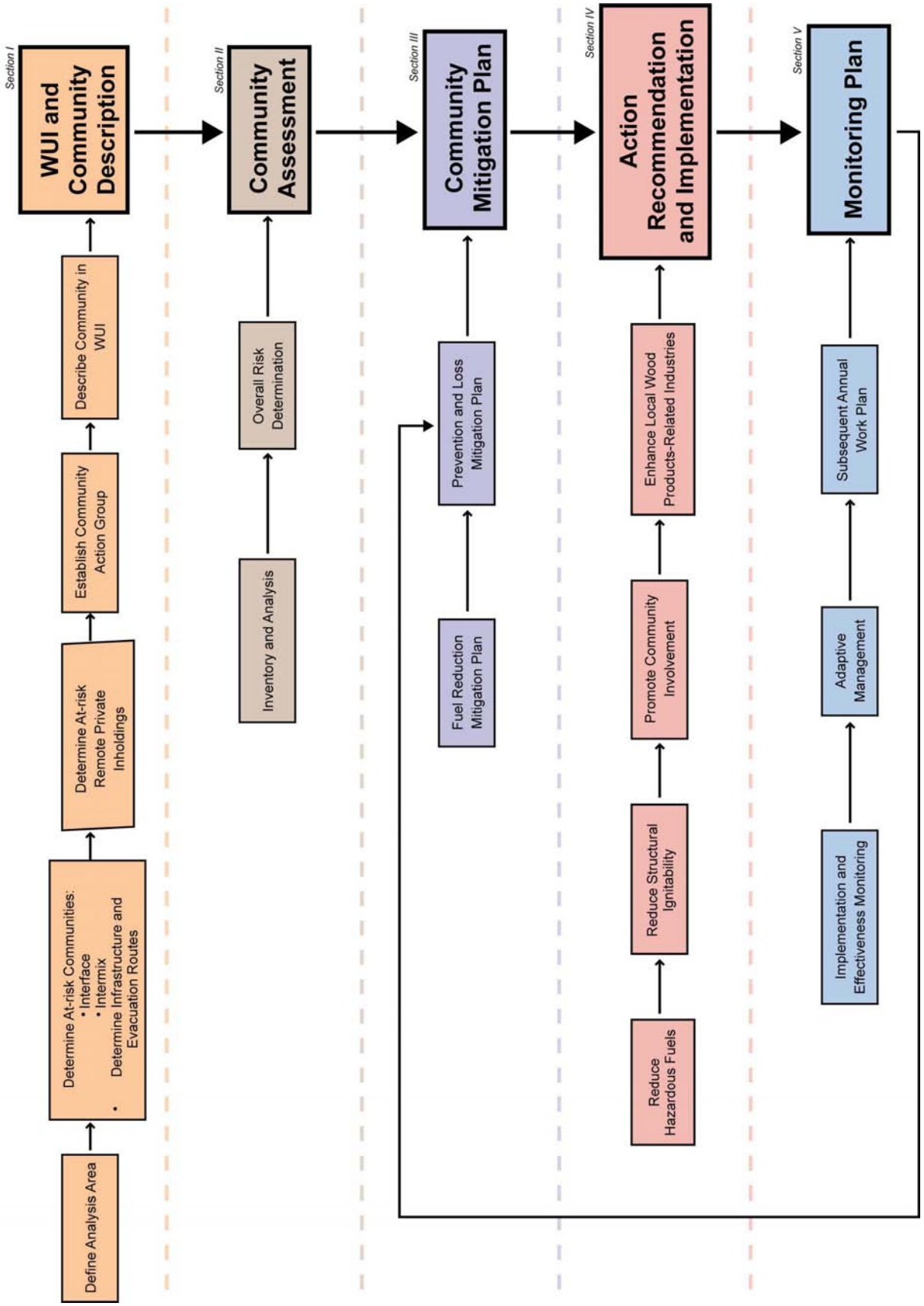

Figure 1.3. SECWPP process

II. COMMUNITY ASSESSMENTS

The community assessment is a risk analysis of the potential of catastrophic wildfire in the communities of Sonoita and Elgin and the outlying areas as identified by the SEFT. 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 the areas of concern. Areas of concern were identified for structures with limited access or a longer response time. Wildland fuel hazards, risk of ignition, wildfire occurrence, and recreational and community values were analyzed to determine areas of highest wildland fire risk.

A. Fire Regime and Condition Class

In accordance with HFRA, the SEFT evaluated the WUI's fire regime and condition class (FRCC). Before European settlement of North America, fire played a natural (historical) role on 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 the fire on the dominant overstory vegetation (FRCC 2003). These five regimes are described in Table 2.1.

Table 2.1. Fire regime information

	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 118,711acres. Lands analyzed within the WUI are consistent with Fire Regime II (81,800 acres) and Fire Regime 4 (36,911 acres) as described in *Development of Coarse-Scale Spatial Data for Wildland Fire and Fuel Management* (Schmidt et al. 2002). 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 system in its natural fire range and at low risk for losing ecosystem components from wildland fire. A 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 2005a). 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 2005b). Therefore, local agencies are asked to provide data for localized conditions. During SECWPP

meetings, the SEFT addressed this issue and discussed local conditions, including grassland and riparian areas that contain nonnative species and exhibit woody species invasions, which indicates that these vegetative types do not always conform to components of Condition Class I lands in broad areas of the WUI. The final determination was that within the WUI, 40,637 acres would be categorized as Condition Class I lands, while the remaining 78,074 acres would be classified as Condition Class II.

Based on this deviation from Condition Class I, the SEFT recommends 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 Finding of No Significant Impact (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. (2–3)

2. Riparian vegetation community desired future condition:

   Annual weed cover and density is controlled and ladder fuels and downed woody debris are limited or not present. Disturbances such as livestock grazing and mining and off road vehicle travel, that can potentially reduce natural vegetation cover and vigor, are managed to maintain adequate cover and mix of natural plant species. (2-4)

B. Fuel Hazards

The arrangement of fuel, relative flammability, and fire potential of vegetation varies in the WUI. Wildland fuel hazards depend on a specific composition, type, arrangement, and/or condition of vegetation 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 were identified and mapped using South West Regional Gap Analysis Project (SWReGAP) data (NatureServe 2004). 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 lands in the WUI was conducted through spatial analysis using geographic information system (GIS) technology in a series of overlays, which helped the SEFT to identify areas at risk from wildland fire. For the WUI, the vegetative type, density, and distribution were analyzed to help categorize areas of highest risk of fire ignition and spread due to wildland fuels. During SECWPP meetings, the SEFT addressed this issue in-depth by examining local vegetative types and verifying areas in question through field visits. The SEFT thoroughly reviewed fuel models and risk levels associated with each of the identified vegetative types, and arrived at the final vegetation map presented in Figure 2.1.

The majority of the Sonoita-Elgin WUI is located within the clay loam upland ecological site with associated loamy bottoms in the riparian corridors and limey uplands and loamy uplands associated with the adjacent pediments. The community of Sonoita lies within a loamy upland ecological site while the community of

Elgin lies primarily within the ecotone of the loamy bottom and clay loam uplands. The loamy upland and bottoms consist of deep unconsolidated materials and represent the areas richest soils. The WUI receives 12 to 16 inches of rainfall annually and consists of a variety of grasslands types, which includes historical climax plant communities, mesquite bosque with native grasses, sacaton grasses as well as areas of nonnative invaded grasslands, and woody species invasions within the riparian bottoms and alluvium. The rolling unbroken expanse of grasslands is the most striking ecological feature of the Sonoita-Elgin WUI (see http://websoilsurvey.nrcs.usda.gov/app/ for soils mapping and additional soils information).

The vegetative data presented is used to quantitatively predict wildfire behavior by developing descriptions of the 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 SECWPP are shown in Table 2.2. Vegetative and physical characteristics of the WUI include 18 vegetation associations. 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 help to predict wildfire behavior and thus proper suppression response (see Anderson 1982 for detailed fuel model descriptions).

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

Fuel type	Vegetation association	Fuel model	Wildfire risk rating[a]	Fire danger rating model[b]	Flame length (ft)	Fire intensity level (FIL)	Rate of spread ft/hr (ch/hr)	Acres
Grassland	Madrean Juniper Savanna	1 and 3	H	L and N	12–20	5–6	6,825 (104)	40
	Chihuahuan Sandy Plains Semidesert Grasslands	1	L	L and T	4–7	3	2,100–6,660 (32–100)	92
	Apacherian-Chihuahuan Semidesert Grassland and Steppe	1–3	H	L and N	12–20	6	6,825 (104)	59,104
Desert Scrub	Chihuahuan Mixed Desert and Thorn Scrub	2 and 6	L	F and T	6–32	4–6	2,300 (35)	15,550
	Chihuahuan Mixed Salt Desert Scrub	1 and 2	L	T	6	4	2,300 (35)	2,724
	Chihuahuan Succulent Desert Scrub	2 and 6	L	F and T	4-6	3	2,300 (35)	79
Shrubland	Apacherian-Chihuahuan Mesquite Upland Scrub	1 and 2	M	F and T	6	4	2,300 (35)	16,982
	Madrean Encinal	1 and 3	M	B and T	6	4	2,100 (32)	15,987
	North American Warm Desert Riparian Mesquite Bosque	2 and 3	H	E and T	6–12	4–6	2,100–4,950 (32–75)	15

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

Fuel type	Vegetation association	Fuel model	Wildfire risk rating[a]	Fire danger rating model[b]	Flame length (ft)	Fire intensity level (FIL)	Rate of spread ft/hr (ch/hr)	Acres
	North American Warm Desert Wash	2 and 3	M	F	6–12	4–6	2,100–4,950 (32–75)	1,172
	Mogollon Chaparral	1 and 6	M	F and T	6	4	2,100 (32)	3,534
Oak/Juniper/ Pinyon	Madrean Pine-Oak Forest and Woodland	4 and 6	M	E and T	19	6	400 (6)–4,950 (75)	109
	Madrean Pinyon-Juniper Woodland	4 and 6	M	E and T	19	6	65–2,100 (1-35)	2,816
Deciduous Southwest Riparian	North American Warm Desert Lower Montane Riparian Woodland and Shrubland	6 and 8	H	E and T	6–19	5	400–4,950 (6–75)	140
Other	Agriculture	NA	L	NA	NA	NA	NA	131
	North American Warm Desert Volcanic Rockland	NA	L	NA	NA	NA	NA	93
	North American Warm Desert Pavement	NA	L	NA	NA	NA	NA	26
	North American Warm Desert Bedrock Cliff and outcrop	NA	L	NA	NA	NA	NA	117
							Total	118,711

Source: National Fire Danger Rating System. (National Wildfire Coordinating Group 2002)
[a]"L= low", "M = medium", and "H = high".
[b]See Appendix B for the National Fire Danger Rating System definitions

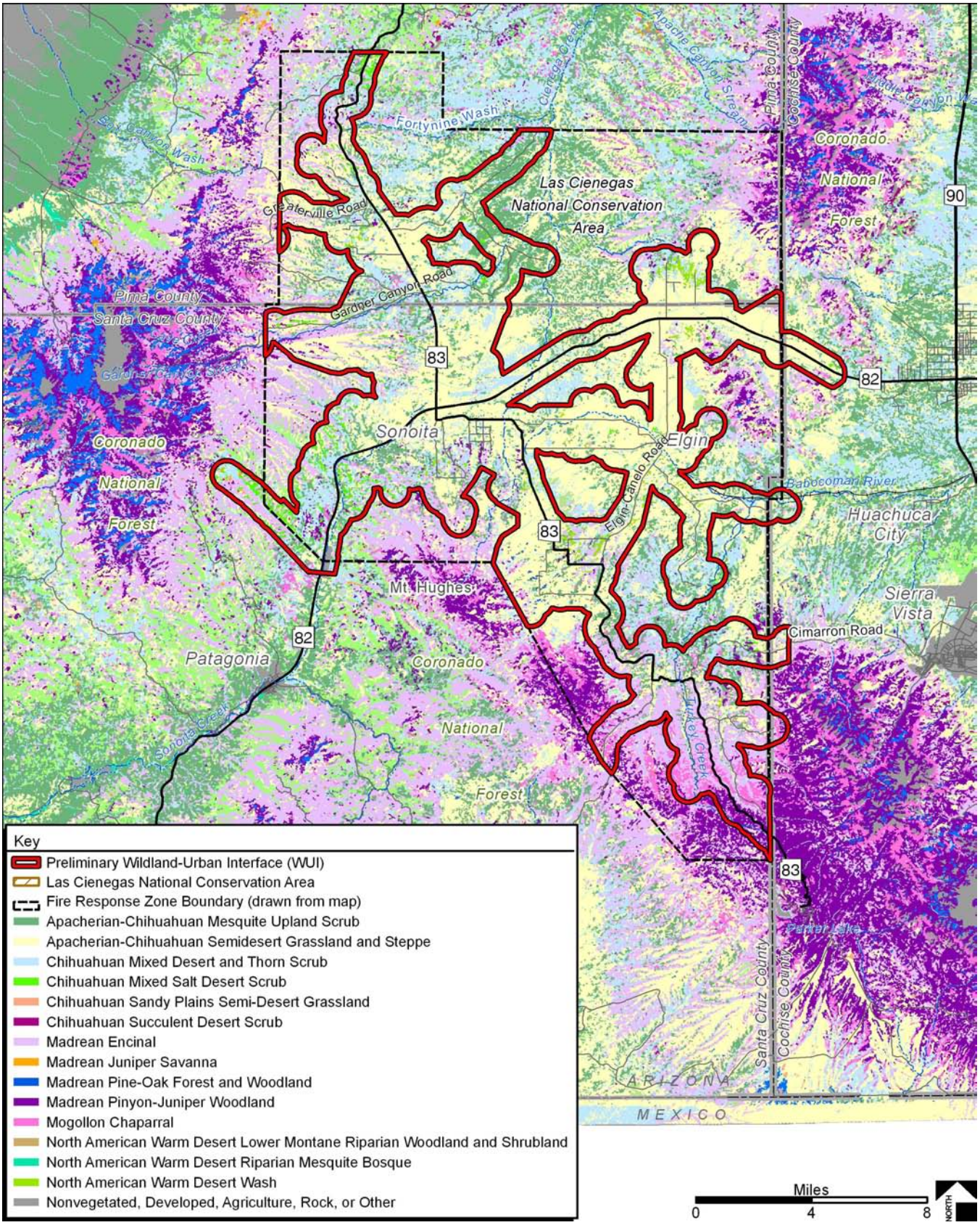

Figure 2.1. Vegetative types within the WUI

Desert grasslands, and mesquite upland shrub communities dominate the Sonoita-Elgin WUI. The major vegetative component within the Sonoita Elgin WUI is the Apacherian-Chihuahuan Semidesert Grassland and Steppe (50% of the WUI area). Other predominate vegetative types include Chihuahuan Mixed Desert and Thorn Scrub, Madrean Encinal, and Apacherian-Chihuahuan Mesquite Upland Scrub (combined total of 40% of the WUI. These 4 main vegetative types constitute 90% of the total WUI area, while 10 additional vegetative types make up the remaining 10%.

Descriptions of the different vegetative types can be found in Appendix A or on the SWReGAP data Web site (http://ftp.nr.usu.edu/swgap/legend_desc.html).

The grassland associations include 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 more than 50% (> 60,000 acres) of the WUI. Grassland associations found within the communities of the SECWPP are classified by Gori and Enquist (2003) as primarily native grasslands with less than 10% shrub cover. This type of grassland entirely or predominantly consists of a diversity of native perennial grasses and herbs with nonnative perennial grasses uncommon or absent. Sacaton riparian grasslands are found within the floodplain terraces of the LCNCA and riparian drainages, such as the Babocomari River near Elgin. Large areas of shrub-invaded grasslands are found along the SR 82 corridor between the communities of Sonoita and Patagonia. Historical fire frequencies in southeastern Arizona grasslands have been estimated to occur as frequently as every 3 years and as infrequent as every 22 years, most commonly occurring between 7 and 10 years (Huachuca Area Fire Partners 2005). Total wildland fuel load for grasslands in the WUI can exceed 3 tons per acre producing high flame lengths (12 feet) and high rates of spread (> 6,800 feet/hour). (Anderson 1982).

Photo 2.1. Grassland vegetation association

The desert scrub vegetation associations occur on dryer upland sites supporting a variety of grass, herbaceous, scrub, and shrub species also including areas of bare ground and rock (Photo 2.2). The desert scrub vegetation associations account for 18,353 acres, or 15% of total WUI acres. The shrubland vegetative communities include mesquite bosque, upland mesquite shrublands intermixed with grasslands, desert wash associations, and madrean encinal (dominated by evergreen oaks) associations and compose the second largest vegetation type within the WUI. The combined shrubland vegetation associations account for 37,690 acres (> 32% of WUI acres). The mesquite bosque associations vary from dense stands with canopies of 80% or higher to areas of mature trees with canopy cover of 35% to 60% (Photo 2.3). The understory of the bosque will vary from a mix of nonnative Lehmann to Johnson grass and pigweed, with some areas of native grasses depending on canopy closure. Areas of higher canopy closure (> 60%) support little herbaceous and perennial grass cover, which limits fine fuels needed for fire laddering and limits rate of spread. Stands of mature mesquite, which include trees with trunks and limbs greater than 6 inches diameter at breast height (dbh), that provide habitat for a variety of cavity-nesting bird species, occur within the mesquite bosque. The mesquite bosque areas within the WUI also provide recreational use, day use, and camping areas. The mesquite bosque association also 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 predominate graminoid layer creating areas of open woodlands and savannas to areas of high canopy closure.

Photo 2.2. Desert scrub vegetation association

Photo 2.3. Shrublands vegetation association

The oak/juniper/pinyon associations (Photo 2.4) occur throughout the foothill slopes and plateaus 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 scattered woodland shrubs with an associated graminoid layer.

Photo 2.4. Oak/juniper/pinyon vegetation association

The riparian mixed deciduous associations of cottonwood and willow can be intermixed with alkali sacaton grasslands associations. The riparian mixed deciduous association accounts for 140 acres of the WUI boundary. These areas contribute significantly to vegetation and wildlife biodiversity. Recreational bird

watching within the WUI often occurs within or near riparian areas. (Photo 2.5). The streamside, or riparian, habitat of cottonwoods and willows found along Sonoita Creek contains some of the richest habitat remaining in southern Arizona. More than 300 species of birds migrate, nest, and live in this critical habitat, and bird enthusiasts travel thousands of miles to this area just to catch a glimpse of some of them. The gray hawk, vermilion flycatcher, violet-crowned hummingbird, thick-billed kingbird, zone-tailed hawk, green kingfisher, white-throated sparrows (in winter) and black-bellied whistling duck are of particular interest to many visitors (http://www.patagoniaaz.com/discover.html).

Photo 2.5. Deciduous southwest riparian vegetation association

Several fuel hazards components, including vegetative 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, some areas of the WUI adjacent to the communities of Sonoita and Elgin, are heavily dissected, with a few areas that have slopes exceeding 20% and are heavily vegetated with grass and shrubs. Slopes greater than or equal to 20% in areas of high wildland fuels and having south-, southwest-, or west-facing slopes 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. Other untreated or unburned areas that fall under the category of moderate ground fuels and that 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.

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 hazards components

Fuel Hazards Components	Influence[a]
Vegetation type and density	
• Deciduous riparian, > 100/acre, semi desert grasslands in fuel models 3, and moderate risk vegetation associations in slopes ≥ 20%	H
• Mesquite associations in Fuel Models 1-2, chaparral and pinyon juniper in Fuel Models 6 and 9, and shrublands	M
• Desert scrub, sandy semidesert grasslands in fuel model 1 and other sparsely vegetated areas	L
Slopes ≥ 20%	H
Aspect (south-, southwest-, or west-facing slopes)	M
Wildlife Habitat/Recreation Areas	M
Treated areas	L

Source: Logan Simpson Design Inc.

[a] H = High, M = Moderate, L = Low

The greatest wildland fire threat to the communities is the surrounding grasslands. 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. The riparian vegetation associations of the WUI also contain highly flammable and volatile fuels. In riparian vegetation associations that have heavy nonnative species invasions, riparian mixed deciduous tree species, and dead fuels accumulating within the vertical plant column, total wildland fuels can exceed 20 tons per acre and produce flame lengths greater than 6 feet above the overstory with a rate of spread of over 500 feet per hour (8 chains per hour). Fortunately, these highly flammable riparian areas make up a relatively small portion of the WUI area.

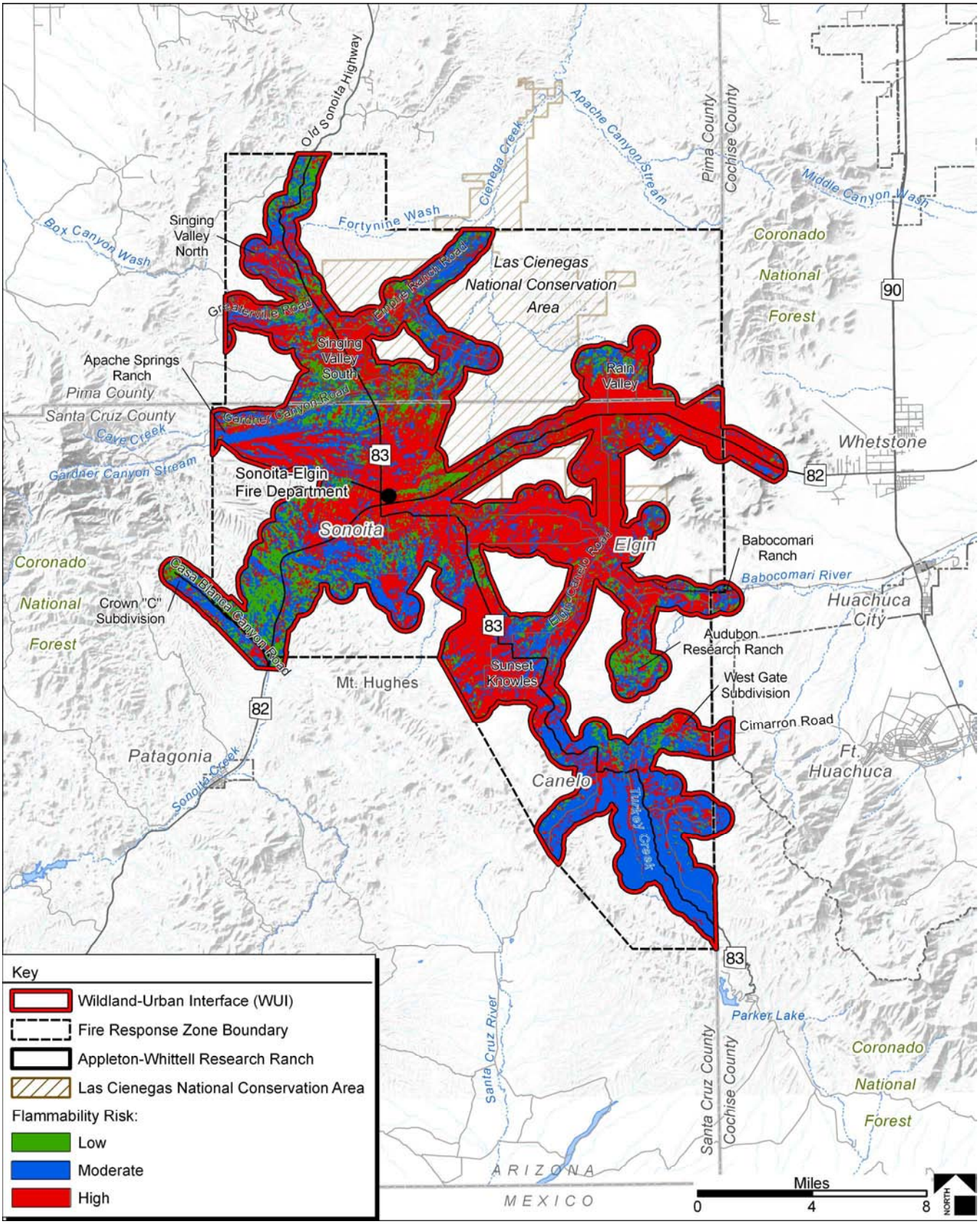

Figure 2.2. Fuel hazards within the WUI

Moderate wildland fuel risk is associated with the ecotone of the grassland, riparian and desert upland vegetation associations. In areas where mesquite canopy exceeds 35%, light fuels produced by the herbaceous understory are reduced due to overstory shading and competition from overstory shrub species. Under high to 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. The wildland fuel hazards component influence depicts areas of high, moderate, and low wildland fire potential based on vegetative type, density, and arrangement and shows areas with higher wildfire risk, which is the SEFT's principal concern. One local concern was the intermixing of a grassland component within some of the vegetation associations that are otherwise low to moderate. The SEFT asked if the higher-than-normal grass component would raise the risk levels in some of the low to moderate vegetative fuel types. Fuels specialists from the CNF and the BLM along with Logan Simpson Design Inc., staff conducted a field visit to some of the areas in question and determined that, overall, these areas are not generally at higher risk from fuels alone. The grass component is usually sparse enough, due to poor soils, grazing, or shade effect from shrub and scrub components, so that it will not carry a fire in the same way as a pure grass association. However, during periods of higher-than-normal moisture, these areas may exhibit higher-than-normal grass growth even in areas of poor soil, and local grazing efforts may not be able maintain acceptable wildland fuel conditions. During those periods, extra caution should be exhibited in areas typically at low to moderate risk, along with normal precautions taken in higher-risk areas. Although these areas are not generally at high risk from flammable vegetation, some of the low to moderate risk areas do have known access and response time issues. Many of the homes are located on single-access roads with only one way in and one way out. Some of the lowest risk areas are also located the farthest from the fire station. In these areas, reduction of response time, expansion of access roads, and additional placement of water sources could be a better course of action than fuels reduction efforts alone.

Table 2.4 details the high, moderate, and low positive-influencing values assigned to fire-start incidents. These include concentrated areas of lightning strikes overlaid with high public-use areas. High-potential areas have the greatest number of fire starts per 1,000 acres. Figure 2.3 shows ignition-point data for the WUI and details the extent of fires that have occurred within the WUI in the past several years. The combined potential of ignition of wildfire occurrence and fuel hazards is shown as fire potential in Figure 2.4. The areas with the greatest potential for fire ignition, either from natural or human (though unplanned) causes, are located in the Gardner Canyon, Empire Cienega, Parker Canyon Lake, and other public land access areas due to recreational activities. SR 82 and SR 83 highway corridors also have history of roadside fire starts due to vehicle traffic (dragging chains, cigarettes, and vehicles pulling off the road starting fires with catalytic converters.)

Table 2.4. Ignition history and wildfire occurrence (1986–2002)

Ignition history and wildfire occurrence components		Value
0–2	Fire starts/1,000 acres	L
2–4	Fire starts/1,000 acres	M
> 4	Fire starts/1,000 acres	H

Source: Data compiled by Logan Simpson Design Inc. from GIS data provided by BLM in October 2006.

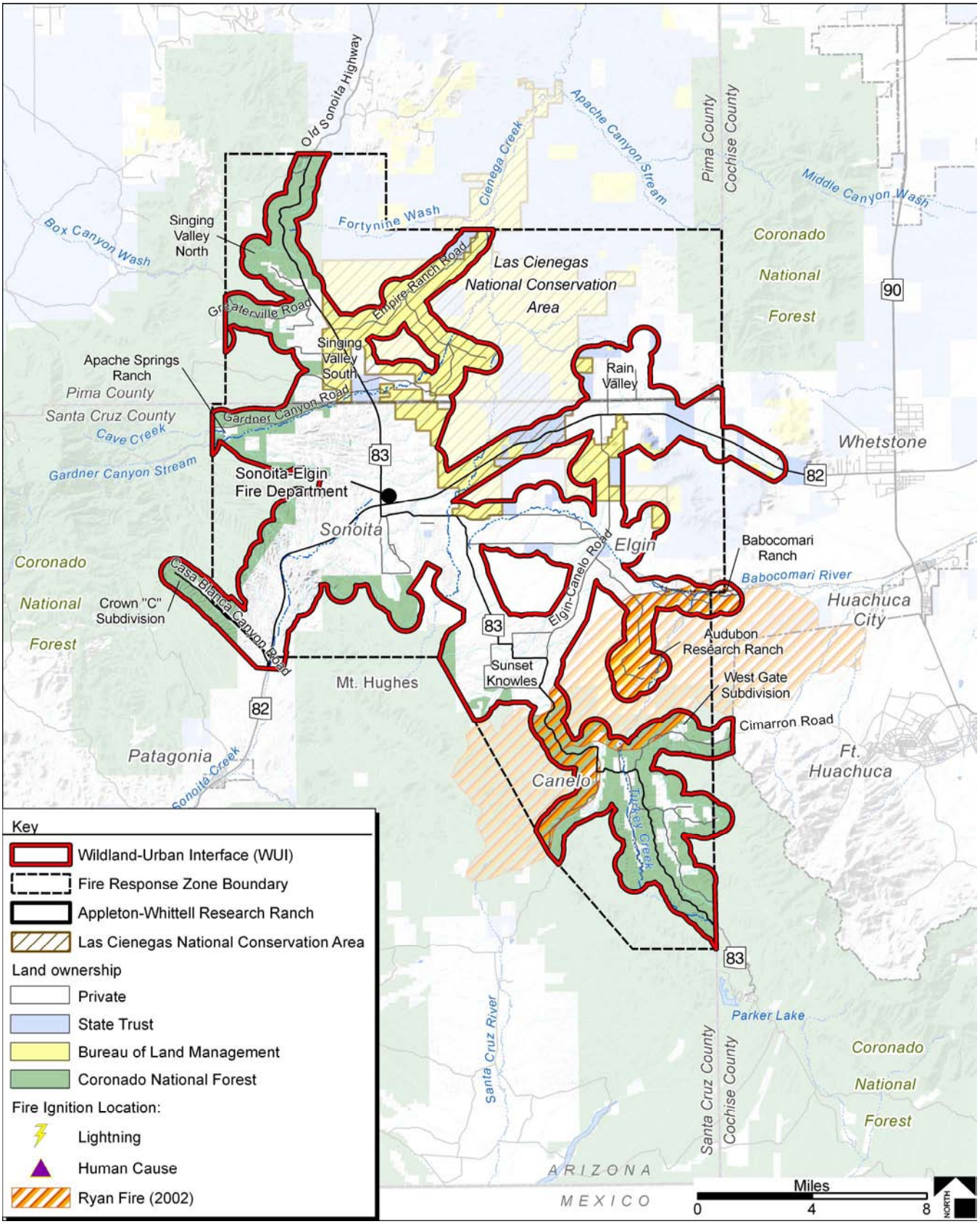

Figure 2.3. Ignition points and fire history

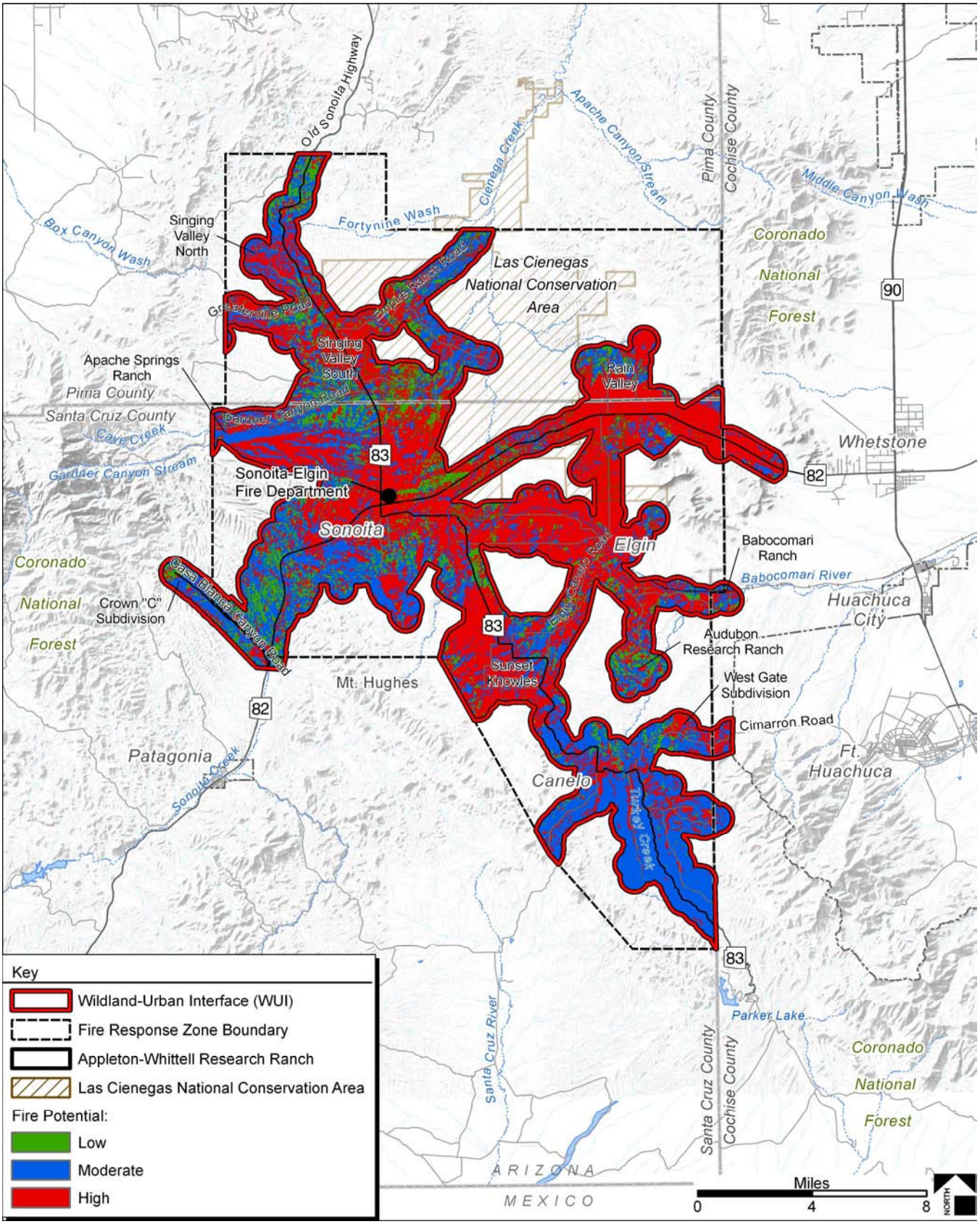

Figure 2.4. Fire potential

Generally the SECWPP is designed to assist in preventing the spread of wildland fires, high intensity wildfires which can result in firestorms, and interface or intermix fires. By designating a WUI boundary, this plan focuses on preventing the spread of wildland fires and high intensity fires into the communities and attempts to reduce the chance of an intermix fire becoming a larger-scale wildland or firestorm driven fire. Prescribed fires (Rx) in the context of this plan are discussed as a treatment option to reduce wildland fuels and therefore to reduce the other three types of fires.

C. Community Descriptions and Values at Risk

The communities consist of private lands, public lands administered by the BLM TFO and the CNF, and state trust land administered by the ASLD. The communities are composed of approximately 1,300 residential dwellings and approximately 66 associated unoccupied outbuildings, as well as additional dwellings and buildings currently under construction. The community centers of Sonoita and Elgin, and the different outlying subdivisions that make up the residential portions of the communities, are also within the WUI area.

The community of Sonoita has a small commercial area made up of the county fairgrounds, the SEFD, a border-patrol facility, numerous small businesses, lodging facilities, restaurants, schools, and church facilities. The Vera Earl Ranch and numerous subdivisions, including The Crown C, Casa Arroyos, Papago Springs, Tunnel Springs, Sonoita Hills and Sonoita Estates, encircle downtown Sonoita. The majority of these homes and the downtown are at moderate to high risk from wildland fire due to vegetative components. Many of the areas with roads have numerous access points and access to water sources within the downtown municipal area. However, they require improvements as they are dirt, making travel during poor weather challenging. There are also steep turns and narrow width or low height clearance, many without turnarounds for larger fire suppression vehicles. Response time in this area is generally lower, resulting in an ISO rating of 8.

To the north of Sonoita lie the Singing Valley North and Singing Valley South subdivisions as well as Greaterville/Madera Canyon, Empire Cienega, Gardner Canyon and the Apache Springs Ranch, Fish Canyon, Yucca Ash Lane, Curly Horse Road, and Santa Rita Road and the homes and outlying buildings associated with these areas. These areas are a mixture of moderate to high vegetation risk for wildfire. Compounded with vegetative issues, many of the structures and homes are located 5 to 10 miles from the fire station on single-access roads. Most of these structures and homes have an ISO rating of 8 and 9.

To the southwest of Sonoita lie Hog Canyon, Wood Canyon, Adobe Canyon, and Casa Blanca Canyon subdivisions and associated homes and outlying structures. These homes sit on larger lots with a low to moderate risk from wildland fire due to vegetative components only, but most of these homes lie on single-access roads and are located 1 to 5 miles from the fire station, which results in a slower response time and thus an ISO rating of 8.

Southeast from Sonoita along SR 83 is the community of Canelo. Canelo is made up of the West Gate subdivision, Lyle and Brushy Canyons, and the residences and structures associated with these communities. Most of the homes in this area are at a lower risk from wildland fire due to surrounding vegetation; however, the combination of proximity to national forest lands, numerous ignitions in the area

(likely from recreational use of the surrounding lands), and longer response times due to distance from the fire station (> 10 miles), and areas with slopes greater than 20% causes an elevated risk from wildland fire than would normally be present due to surrounding vegetation only. The residences in this area have an ISO rating of 10.

Located due east and slightly south of Sonoita is the community of Elgin. The combination of rich soil, temperature, and rainfall regimes create a favorable growing condition for the several vineyards that are located in the Elgin area. Elgin has become known throughout the state for its vineyards and wineries. The Babocomari River runs through the central portion of the community and presents a pleasant backdrop of cottonwoods along its banks. East and southeast of downtown Elgin lies the Babocomari Ranch and associated buildings. South of downtown Elgin lies the Appleton-Whittell Audubon Research Ranch, a significant community value known for grassland, avian, and fire research; numerous students visit this ranch to conduct their field research.

Located southwest of downtown Elgin and southeast of downtown Sonoita is the Sunset Knowles subdivision along SR 83. This subdivision generally has adequate response time from the SEFD and numerous roads in and out of the area, but it still has a high to moderate risk of wildland fire due to surrounding vegetation. Generally homes in this area have an ISO rating of 9.

To the north of Elgin and northeast of Sonoita lies the Rain Valley subdivision. Rain Valley is a mix of low to moderate to high cumulative risk located mostly 5 to 10 miles from the fire station. Response time is generally adequate since the majority of travel from the fire station is on the well-maintained SR 82. Most of these homes and associated structures have an ISO rating of 9.

The SECWPP is designed to improve community wildland fire protection and firefighter and public safety. The different communities recognize that firefighter and public safety are the first priority in all fire management events. The communities further recognize the value of reestablishing the natural fire regime to minimize the potential of catastrophic wildland fire. The SECWPP is also intended to assist with the alignment of wildland fire response and habitat component impacts so that response and impacts are consistent with the resource values at risk, while striving for cost-effective firefighter and public safety.

The SEFD provides the primary response to wildland fire, structure fire, and rescue and medical emergencies for the communities. The SEFD services a population of approximately 3,000 individuals distributed over 900 square miles in two towns, residential clusters, and rural holdings. The SEFD provides service to a large number of visitors and commercial truckers who travel through the area. The SEFD maintains mutual-aid contracts with neighboring fire districts and departments, extending service to surrounding communities and to governmental agencies that manage the surrounding public lands adjacent to the communities. The SEFD maintains 42 volunteers, including nationally and state-certified paramedics and emergency medical technicians, state-certified firefighters, and internally trained dispatch, support, and auxiliary personnel. The SEFD responds to structural, wildland, and vehicular fires. They provide emergency medical services, rescues, coordinate both ground and air-flight patient transportations, and respond to all vehicle incidents. Fire-safety evaluations are offered without cost to residential and commercial property owners to help identify dangers and to offer intervention suggestions for mitigating those dangers. Fire-safety education is provided to the local school children and community members year-round. The SEFD supervises controlled burns and administers burn permits for Santa Cruz

and Pima County areas within their district boundaries. (http://www.azfoundation.org/projects/org.xpl?org_id=12622). Several county personnel have completed coursework as specified by the Wildland and Prescribed Fire Qualification System Guide (National Wildland Fire Coordinating Group 2000). They have completed required training necessary for compliance with the Federal National Incident Management System. The SEFD is a highly motivated and dedicated resource to the community. They recognize limited capability to respond to catastrophic wildland fire events. SEFD is a combination fire response organization using both paid and volunteer staff. Many of the volunteers are employed outside the area, which makes it challenging to respond to fire incidents occurring during daytime hours of the workweek.

Cumulative at-risk community resources include private and community structures, communication facilities, power lines, high pressure gas lines, water supply locations, local recreation areas, cultural and historic areas, sensitive wildlife habitat, watersheds, natural resources, and air quality. SR 83 and SR 82 intersect in Sonoita. Vehicles carrying produce, cattle, retail goods and hazardous materials internationally use these two highways. As agreed to by the SEFT, developed land and other infrastructures within the area of highest flammability were given the highest priority for protection by the SEFD. Table 2.5 identifies the different values given to these various community values components. Community values are displayed graphically in Figure 2.5. In areas where community values occur within or adjacent to areas of high risk from the fuel hazards of vegetation associations, a cumulative risk from catastrophic wildland fire has been created.

Table 2.5. Community values and structure density

Community value component	Value
Housing and business structures and infrastructure at high risk, > 5 structures per 20 acres	H
Housing and business structures and infrastructure at medium risk, 2.1–5 structures per 20 acres	M
Housing and business structures and infrastructure at low risk, 0–2 structures per 20 acres	L
Recreation areas	M
Wildlife habitat	M
All other areas	L

Source: Logan Simpson Design Inc.

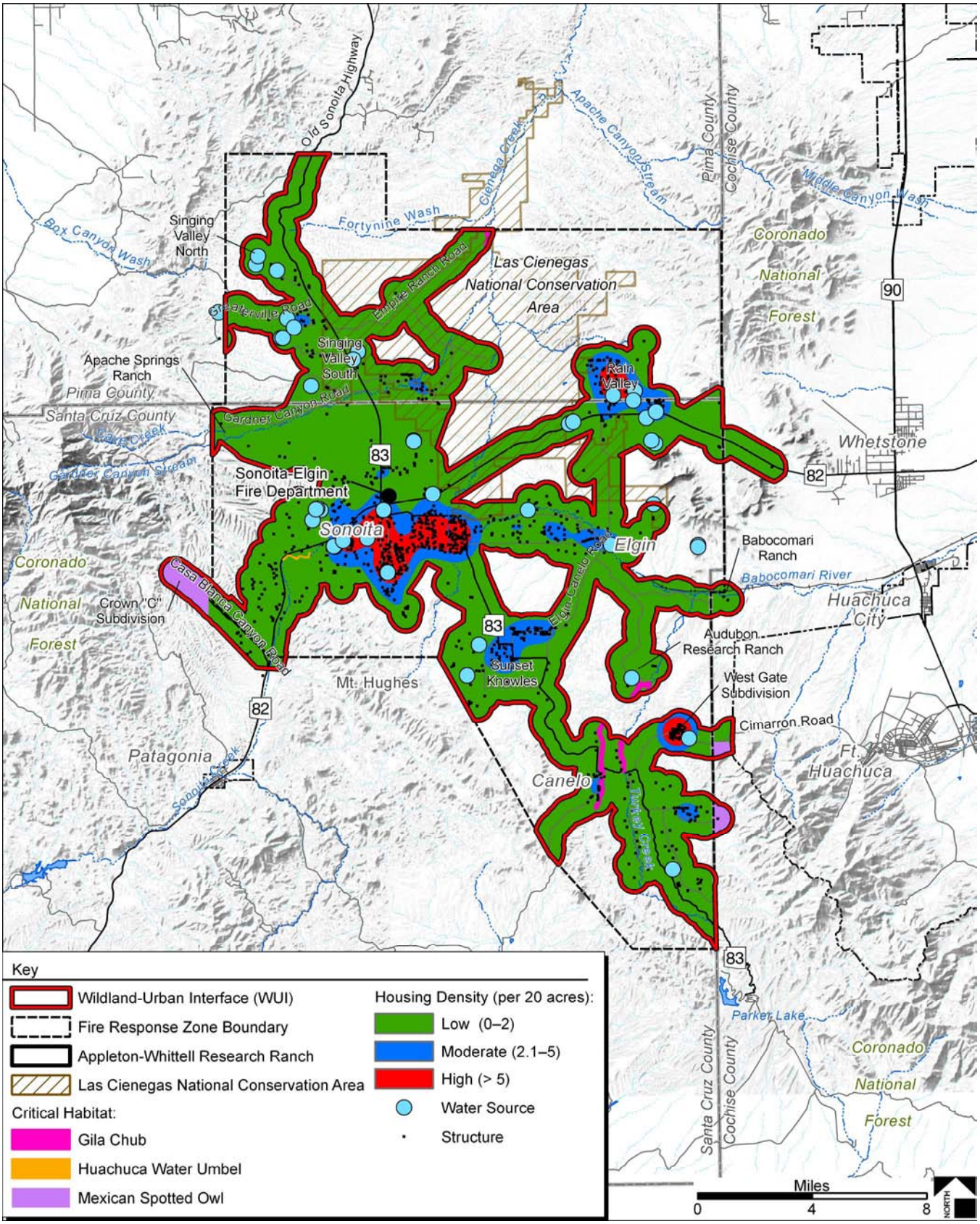

Figure 2.5. Community values and structure density

These areas of cumulative risk are of greatest concern to the community. In addition, areas of the communities that are at lower risk from fuel hazards but at higher risk due to limited access or a long response time were identified as areas of elevated concern and designated by the SEFT as part of the overall cumulative risk analysis.

The SEFT is recommending an array of treatments, including wildland fuels treatments. The major concerns of the SEFD include (1) delayed response time in outlying areas and by available mutual-aid fire districts and departments; (2) obtainment of additional firefighting equipment, such as fittings for existing water storage facilities and a more permanent structure for housing vehicles and equipment in Elgin; (3) recruitment and retainment of qualified volunteer firefighters; and (4) insufficient dispatch and communication technical capabilities. Additionally, many residences in the identified WUI were not designed with adequate general 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. These areas have been identified in the cumulative analysis as areas of elevated concern due to access or a delayed response time.

A short-range goal of the SEFD, in conjunction with the SEFT, is the completion of individual wildland fire home assessments through the use of computer software programs, such as 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 placing identification placards or road signs where needed.

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

The SEFT identified high-risk areas, including the economic corridors lining SR 82 and SR 83 and Lower Elgin Road 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 SEFT has also identified significant infrastructures, such as the fairgrounds, schools, and other community facilities, located within the designated WUI and recommends fuel modification treatments that will reduce the threat of wildland fire. Transportation corridors between WUI communities that will serve as evacuation routes and resource distribution corridors during a wildland fire have been identified by the SEFT. The SEFT also recommends fuel modification treatments for evacuation corridors that will provide safe evacuation from WUI communities in the event of a catastrophic wildland fire.

2. Recreation Areas/Wildlife Habitat

Recreational features, including Greaterville/Madera canyon, the LCNCA, Gardner Canyon, FS lands en route to Parker Lake, the Babocomari River, Canelo Springs, and the Appleton-Whittell Audubon Research Ranch, are located on federal, state, municipal, and private lands within the WUI. These features are

environmental, economic, and aesthetic resources for the surrounding communities. These areas have been analyzed as a community value because of the benefits that these recreation areas provide to the local citizens and community visitors.

The WUI includes critical and potential habitat areas for several species listed as threatened or endangered under the ESA and for species designated as sensitive by the BLM and the State of Arizona. According to Linda Kennedy, the area's native grasses "provide a continual flow of food sources for all sorts of wildlife, from the Montezuma quail to the black-tailed jackrabbit" (As referenced in Kloor 2003:78). In addition, critical habitat for the Gila Chub is found along Turkey Creek and the riparian areas near Canelo. Critical habitat for the Huachuca Water Umbel is located west of Sonoita along Sonoita Creek. Critical habitat for the Mexican spotted owl is located at the far end of the arm of the WUI along Cimarron Road, at the far end of the arm beyond Brushy Canyon, and at the far end of Casa Blanca Canyon Road along the western edge of the WUI. Areas of critical habitat present extraordinary circumstances requiring an EA to document findings of wildland fuel mitigation treatments on federal lands prior to implementation. Treatment of private properties in areas of critical habitat should be performed with extreme caution and in consultation with wildlife officials to prevent negative impacts to threatened and endangered species or their habitats. The SEFT supports wildland fuel mitigation treatments which help preserve sensitive riparian and grassland habitats and wildlife species in accordance with Section 102.a.5.B of HFRA. The SEFT also supports such wildland fuel mitigation treatment to protect recreational values associated with natural systems by local residents and visitors.

3. Local Preparedness and Protection Capability

For many years, the 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. Five factors 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. For the SECWPP, the ISO is based on proximity to the SEFD station. All residences within 5 miles of the station have an ISO rating of 8. Residences and structures between 5 and 10 miles from the station have an ISO rating of 9; all residences and structures greater than 10 miles from the station have an ISO rating of 10. The ISO ratings for the SEFD have not changed over the past 9 years. Reducing the ISO ratings within the planning area is one of the goals of the SECWPP.

Agencies responding to wildland and structure fires within the SECWPP area include the SEFD, the CNF, the BLM, and the ASLD. The SEFD maintains contracts with the above agencies as well as:

- Tubac Fire Department
- Fry Fire Department
- Sierra Vista Fire Department
- Whetstone Fire Department
- Huachuca City Fire Department

- Corona De Tucson Fire Department
- Patagonia Fire Department
- Rio Rico Fire Department
- Nogales Suburban Fire Department
- City of Nogales Fire Department
- Santa Cruz County
- Rural Metro Fire and Ambulance

D. Cumulative Risk Analysis and Summary of Community Assessment

The cumulative risk analysis synthesizes the risk associated with fuel hazards, ignition and wildfire occurrence, and community values. These different components were analyzed spatially, and an overall cumulative risk for the WUI was calculated. Table 2.6 and Figure 2.6 display the results of the cumulative risk analyses, identifying the areas and relative percentages of WUI areas of high, moderate, and low wildland fire risk.

Table 2.6. Cumulative risk levels by percentage of the WUI area

	High risk (%)	**Acres**	**Moderate risk** (%)	**Acres**	**Low risk** (%)	**Acres**	**Total acres**
SECWPP analysis area	57	68,045	33	39,357	10	11,309	118,711

Source: Logan Simpson Design Inc.

Overall community risk is highest to the northeast of Sonoita because of the highly flammable grassland vegetation, associated southern or southwestern aspects, and proximity to LCNCA. The community centers of Sonoita and Elgin are also at high risk from nearby flammable vegetation components as well as the proximity to numerous community values. High-risk areas should be constantly monitored for needed wildland fuels reduction actions and reduced structural ignitability recommendations. The areas to the southwest and southeast of Sonoita have a moderate to low wildland fire risk due to vegetative components, but because of single-access roads and longer response times, these areas have 1/8-mile elevated concern buffer around residences and outbuildings. The focus for these areas is reducing structural ignitability, especially around homes, to produce a survivable wildland fire situation for residents. To better protect the communities of Sonoita and Elgin and the surrounding intermix subdivisions, a community mitigation plan has been outlined in Section III of this CWPP.

In addition to the computer-driven risk assessment, SEFD specific concerns generated from on-the-ground knowledge and response to past fire incidents include:

Canyons on SR 82 West and 83 North:

Casa Blanca, Wood, Adobe, Hog, Crown C, Gardner Canyon, Singing Valley, Singing Hills, Greaterville/Madera

1. Single ingress/egress dirt roads
2. Dead end driveways
3. Mesquite crown fires
4. Homes built on hill slope with trees and narrow road access
5. Chimney effects of canyons and wildfire heat/spread

Turkey Creek Area (SR 83):

1. Homes in the oak, juniper, and pines
2. Distance of travel from station/responding agencies
3. Steep slopes >20%
4. Large fuel loads near Rarker Canyon Lake areas

Casas Arroyos, Papago Springs, Tunnel Springs

1. Narrow/steep road access, low tree clearance proximal to road
2. Homes build in treeline (juniper & scrub oak)
3. Structure engine challenge for access to some homes
4. Navigation of dirt roads and gates can lengthen time of arrival even though distance is less than 5 miles

In addition to the specific area concerns listed above, the threat of drug traffickers wielding lethal weapons or using them against field responders is a major concern for the entire rural border area. This affects all emergency responders, especially in remote areas where wildland fires occur.

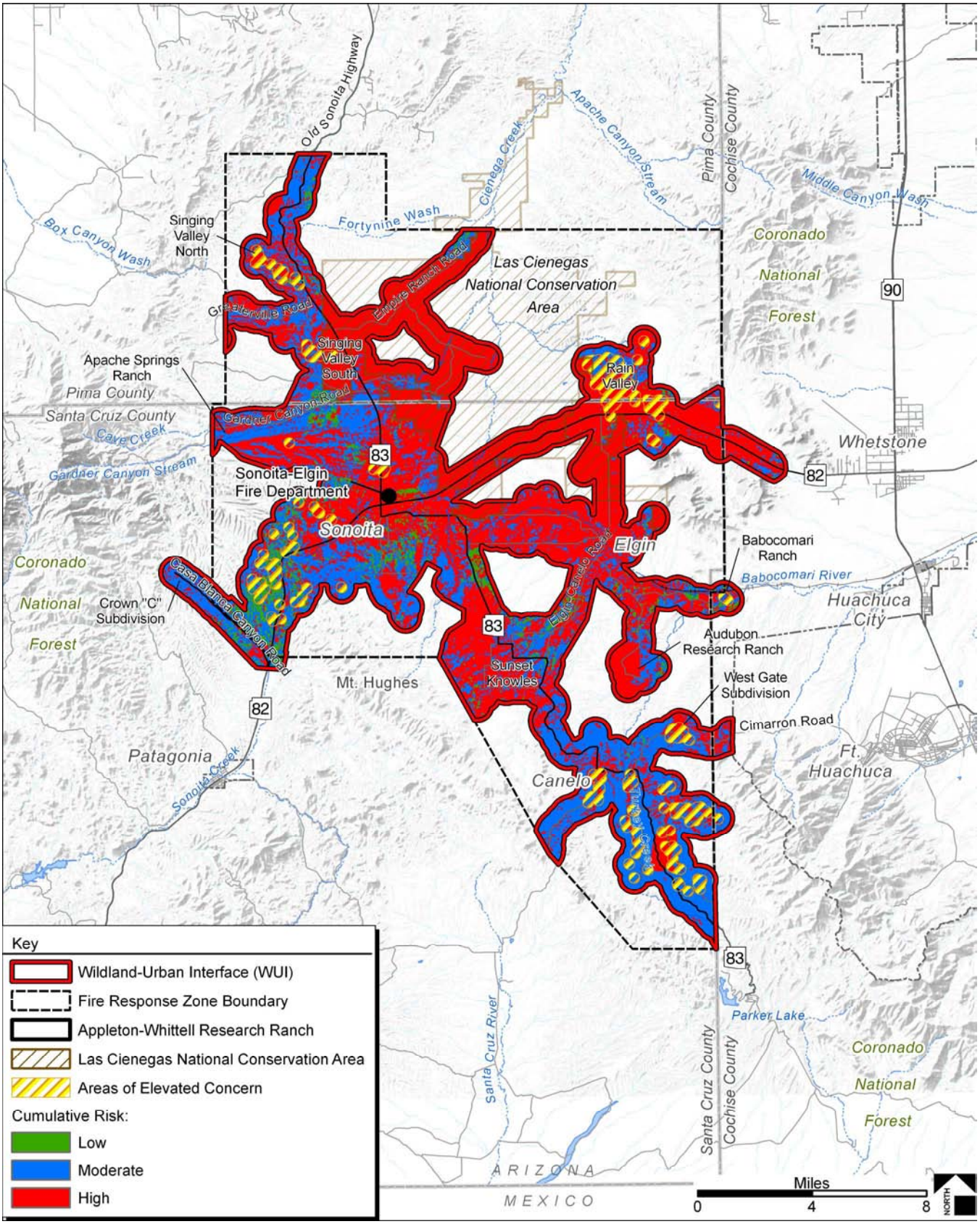

Figure 2.6. Cumulative risk analysis

III. COMMUNITY MITIGATION PLAN

This section outlines the SEFT's priorities for wildland fuels treatments as well as its recommended methods of treatment and management strategies for mitigating the potential spread of catastrophic wildland fire throughout the WUI. In addition, this section presents Sonoita and Elgin's recommendations for enhanced wildland fire protection capabilities and public education, information, and outreach.

A. Fuel Reduction Priorities

After determining the areas at greatest risk for wildland fire (Section II of this CWPP), the SEFT has developed a series of proposed actions, including residential treatments, a series of firebreaks appropriate for the wildland fuel type and fuel mitigation treatments for broader landscapes.

The BLM Gila District and the SEFT have proposed wildland fire mitigation projects for public or private lands determined as "at risk," with priority emphasis placed on lands located within a quarter-mile buffer of BLM lands. The mitigation efforts are designed to reduce home ignitions, to reduce risk to firefighters, to provide communities with financial and educational assistance, and to improve efficiency of fire operations. The BLM plans to assist these homeowners with the establishment of firebreaks around their homes and will complete the necessary environmental documentation before completing HFRA work. Initially, the BLM will help establish firebreaks as budgets and workloads allow, then it will assist homeowners with cost-share to maintain the firebreaks. In addition to home firebreaks, the BLM will help improve escape routes for landowners who only have one-way out through BLM public lands during wildfire events. These proposed actions are recommended to prevent wildfire spread from public lands to private land. Conversely, firebreaks will 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 focus on the protection of life and property from wildland fire. These recommendations will allow fire managers to reduce wildfire hazard through the reduction of hazardous wildland fuels so that firebreaks can be continuous across property boundaries, allowing for the most effective protection from wildfires. These firebreaks will complement fuel hazard reduction work that individual landowners have undertaken.

Hazardous fuels reduction on BLM-administered land varies by firebreak size and length or by broader land treatment applications for wildland fuel reduction and habitat restorations within the WUI. Additional firebreaks or hazardous fuels reduction projects may be developed over time and will conform to the types of treatment recommendations developed by the SEFT. The firebreak model used for lands within the Sonoita-Elgin area is 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). (Appendix B.)

The SEFT developed firebreak recommendations for non-BLM administered lands to address fire-brand movement during peak fire season and normal vegetation conditions by slope and fuel type. The recommended land treatments and fuel breaks (Table 3.1) will provide for community protection, restoration of native vegetation, and wildlife habitat needs. The recommended firebreak and wildland fuel mitigation measures and stipulations meet the SECWPP goals of reducing hazardous wildland fuels on

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 firebreaks on federal or state land within 0.5 mile of private land		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**	**Landscape treatment outside of firebreaks**	**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 to a 4-inch stubble.	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 to a 4-inch stubble.	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 at 80–100 trees/acre *or* average density of 100 trees/acre). Grasses and forbs may be cut with a mower to a 4-inch stubble.	For natural areas, thin selectively and remove highly flammable vegetation. Carefully space trees; choose Firewise plants.[a]	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 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 to 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 a 4-inch stubble. Ensure that removal of vegetation within a designed firebreak of no more than 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 PS 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 firebreaks 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 20- to 35-foot minimum to promote (1) wildlife habitat while breaking horizontal fuel loading, which allows 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) can be used to reduce vegetative fuels and move stands toward potential natural vegetation groups as described in the *FRCC Interagency Handbook* (2005a). 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 identified in Appendix B.	Woodland and shrub trees < 8 inches drc will be thinned or burned to a spacing of 15 feet between trees or prescribed fire applied 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 and to aid in fire suppression. 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 identified in Appendix B.
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 so that 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 may be hand-piled and ignited, with prescribed fire as 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).

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

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 Mesquite removal (federal and nonfederal lands)	10 Grazing	
Treatment category	**Federal, state, or private lands**	**Federal, state, or local government where designated as escape route**	**Federal or state lands**	**Firebreaks on private lands**	**Federal, state, or private lands**	**Federal, state, or private lands**	**Federal or state lands**	**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 as 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 (USDI USDA, et al. 2005) 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 inches drc may be cut to reduce safety hazards, 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, would 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 B. Grasses and forbs may be cut with a mower to a 4-inch stubble.	Riparian treatments will be limited in scope. The majority of riparian areas that fall within 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 PS trees, including snags, will be targeted for retention. Restrict the removal of the vegetative overstory in the riparian areas to October 15–March 31 to prevent the disturbance of any nesting by neotropical migrant bird species. Fuels reduction between October 15–March 31 in riparian areas, as long as fire danger is not extreme. Emphasis will be placed on removing species listed in Appendix B.	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 district standards. Perform treatments October–March annually.	This prescription includes 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 district policy provisions will determine suppression response.	Areas of monotypic mesquite, or mesquite mixed 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–January is preferred. Mechanical whole-tree extraction may be considered a preferred treatment. Low-volume oil-based herbicide applications in late spring to early fall would be considered for control. 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. Treatments within the LCNCA will need to adhere to any existing environmental regulation documents such as a pesticide use document, EA, or CE.	Grazing of livestock on federal lands can be used as a tool to reduce grassland and shrubland fuel loadings. However, care should be exercised when using this treatment since it can result in what Kennedy calls a “steady creeping of woody plants and trees onto the grassy plains” (Kloor 2003) The objective of this treatment should be fuels reduction and promotion of overall riparian and rangeland health. Grazing can occur seasonally since late-season grazing will reduce standing fuel, while early season grazing can be used to reduce growing-season production. When using grazing, other fuel reduction methods (such as chaining, hand removal, or herbicide use) should be employed to combat nonbrowsed woody species invasion. Grazing on public lands must occur on designated grazing allotments and follow recommendations in existing grazing and resource management plans. Grazing may be especially useful on lands bordering private property as a fuelbreak between different land ownerships.	Grazing of livestock on private properties may be used to reduce grassland and shrubland fuel loadings. However, the same care exercised on federal and state lands needs to be taken. Another grazing method known as “goat on a rope” could be especially useful to smaller private property owners or a collection of owners. Smaller quantities or types of livestock can be employed to browse specific areas (such as the 0- to 600-foot home ignition zone) to reduce fuel loading. Care should be taken to continually move the livestock as vegetation supplies decrease to prevent overgrazing and thus soil loss.
Slash	Slash, jack piles, and 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 moves 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: BA = basal area; Ps = Presettlement; drc = diameter at root collar; EA =environmental assessment; CE= Categorical exclusion

both public and private lands, improving fire prevention and suppression, restoration of ecosystem health, community involvement, ecosystem protection and expedited project implementation. The wildland fire potential within the WUI has been identified, analyzed, and categorized according to potential risk from wildfire. The analyses of community values and fuel hazards were compiled into a single map depicting the WUI boundary and proposed fuel treatment management units described in Figure 3.1. For each management area, the SEFT has proposed a treatment, or a variety of treatments, that will best help to reduce the risk from wildfire and to enhance private property protection. Treatment management units with their corresponding treatments are listed in Table 3.2.

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 SEFD. Piling and burning cut trees and slash is not permitted on BLM lands under the CE for hazardous fuels reduction; therefore, vegetation will be cut, removed, or chipped and transported to a disposal site. The SEFT also recommends that fallow agricultural lands be restored by planting native vegetation species in accordance with the *National Conservation Practice Standards, Range Planting, Code 550* (Natural Resources Conservation Service 2002). The SEFT also recommends that firebreaks constructed on both public and private lands be maintained in accordance with the above mitigation measures and stipulations in a rotating 2- or 3-year interval 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 utilization) 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 $5,000.00/acre on small land parcels consisting mostly of individual plant treatments within the riparian corridor (USDA FS and NMSFD 2005) and as high as $580.00/acre in upland areas. For private land treatments to be both fiscally reasonable and timely, the SEFT investigated costs associated with the use of the ASLD Fire and Fuels Crew through the established agreement with the ASLD Division of Forestry. The average acres of wildland fuel reduction treatments conducted by a ASLD crew during an eight-hour on site work day is presented in Table 3.3. The estimates of daily costs, which include a full 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

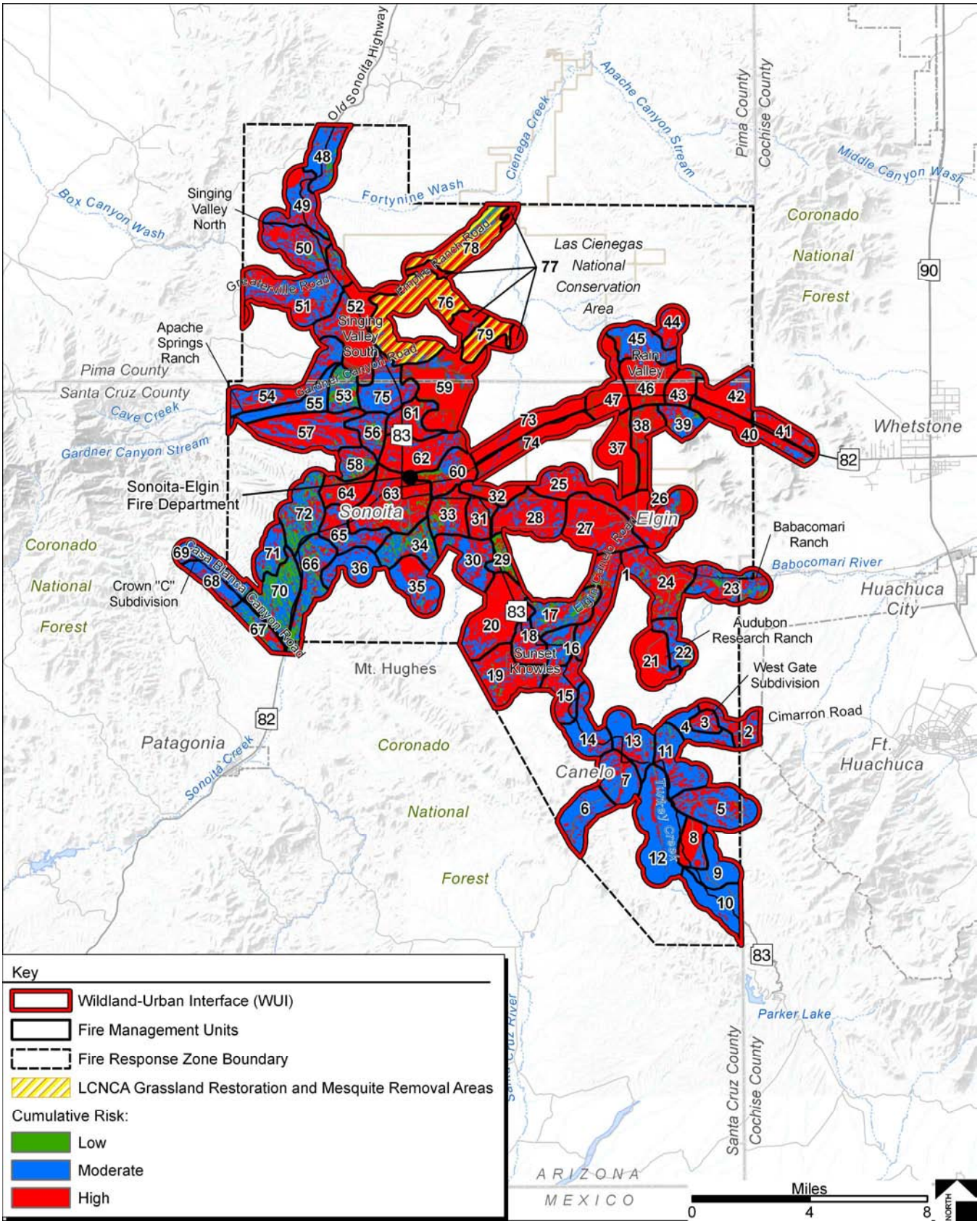

Figure 3.1. Treatment management units

Table 3.2. Identified treatment management units with recommended treatments

Treatment management unit map ID	Risk value[a]	Location and description	Recommended treatment[b]	Total acres	Federal acres	Nonfederal acres
1	H	Mostly grasslands surrounding Elgin; Canelo Road between Elgin and SR 83, excluding the Sunset Knowles subdivision	3,6,10	1,575	0	1,575
2	H	Mostly grasslands to the east of the West Gate subdivision along Cimmaron Road	3,6,10	1,007	709	298
3	H	West Gate subdivision	1, 2, 3, 6, 10	410	244	166
4	M	Lands to the west of West Gate subdivision	3,6,10	875	875	0
5	M–H	Homes and surrounding vegetation in the Brushy Canyon area	1,2,	2,115	1,433	682
6	M	Lands south of Canelo along Canelo Pass Road	3,6,10	1433	1,358	75
7	M–H	Canelo	1,2,6	1,322	872	450
8	H	Homes south of Canelo in the Lyle Canyon area	1,2,4,6,10	894	547	347
9	M	Outlying homes and surrounding vegetation along Lyle Canyon and SR 83	1,2,4,6,10	1,064	942	122
10	M	Southeastern most tip of the WUI; mostly pinyon-juniper vegetation along SR 83 on the way to Parker Lake	4,5,6	1,407	1,407	0
11	M–H	Lands North of Brushy Canyon extending north toward the Westgate subdivision	1,2, 3,4,6,10	1,668	1,444	224
12	M	Homes and lands south of Canelo along Turkey Creek, south of SR 83	1,2,4,6,7	3,037	2,442	595
13	M–H	Homes to the north of Canelo and along Turkey Creek, north of SR 83	1,2,4,6	1,488	909	579
14	M	Lands north along SR 83 between the Sunset Knowles subdivision and Canelo	3,4,6,10	1,380	1,327	53
15	H	Scattered homes and lands to the far southeast of Sunset Knowles subdivision	1,2,3,6,10	1,293	341	952
16	M	Undeveloped lands directly southeast east of Sunset Knowles subdivision	2,3,4,6,10	814	0	814
17	L–H	Sunset Knowles subdivision north along Sunset Knoll and Hillcrest Ridge Roads	1,2,3,4,6,10	1,504	0	1,504
18	H	Sunset Knowles subdivision along Vaughn Loop Road	1,2,3,6	904	0	904
19	H	Outlying homes and lands southwest of Sunset Knowles subdivision	1,2,3,6,10	1,975	436	1,539
20	H	Outlying homes and lands to the northwest of Sunset Knowles subdivision	1,2,3,6,10	2,649	419	2,230
21	H	Appleton-Whittell Research Ranch lands and ranch buildings	1,2,3,5,6	1,430	1,038	392
22	M	Private lands and structures east of the Appleton-Whittell Research Ranch	1,2,3,5,6,7	887	35	852
23	L–H	Lands along the Babocomari River to the west of and surrounding the Babocomari Ranch	1,2,3,6,7	1,794	0	1,794

Table 3.2. Identified treatment management units with recommended treatments

Treatment management unit map ID	Risk value[a]	Location and description	Recommended treatment[b]	Total acres	Federal acres	Nonfederal acres
						Continued
24	H	Lands southeast of Elgin before the Babocomari and Appleton Whittell Ranches	3,6,7	2,226	7	2,219
25	H	Elgin lands and structures to the north of Lower Elgin Road	1,2,3,6,7	2,066	39	2,027
26	H	Eastern Elgin	1,2,3,6,10	1,564	255	1,309
27	H	Elgin main street and surrounding homes	1,2,3,6,7	2,474	0	2,474
28	H	West Elgin, not including Sonoita Estates	1,2,3,6,7	2,016	38	1,978
29	L	Area to the southeast of Sonoita Estates	4,6	606	0	606
30	M	Lands south of Sonoita Estates	1,2,3,4,6,7	1,538	0	1,538
31	H	Sonoita Estates	1,2,3,6	781	7	774
32	H	Land north of Sonoita Estates	3,6,10	743	501	242
33	H	Sonoita Hills subdivision and homes along Los Encinos Road	1,2,3,6	1,209	0	1,209
34	L–M	Casas Arroyos and Tunnel Springs	1,2,3,6	1,363	208	1,155
35	M–H	Homes and surrounding land along Papago Springs Road	1,2,3,4,5,6,10	1,521	1,155	366
36	M	Casas Arroyos West	1,2,4,6,10	1,127	596	531
37	H	Lands north of Elgin and west of Upper Elgin Road	1,2,3,5,510	1,557	1,245	312
38	H	Lands north of Elgin and east of Upper Elgin Road	3,4,5,6,10	1,198	554	644
39	M–H	Homes and lands south of SR 82 and east of Upper Elgin Road	1,2,3,4,10	791	128	663
40	H	Lands at the far eastern edge of WUI boundary, south of SR 82 and east of Whetstone	1,2,3,6,10	1,497	103	1,394
41	H	Lands at the far eastern edge of WUI boundary, north of SR 82 and east of Whetstone	3,6,10	879	0	879
42	H	Lands near eastern edge of WUI, east of Rain Valley and north of SR 82	1,2,3,4,10	1,304	0	1,304
43	H	Housing cluster of southeast Rain Valley	1,2,3,6,10	806	0	806
44	H	Outlying houses and lands to the north of Rain Valley	1,2,3,6,10	747	0	747
45	M	Rain Valley, north	1,2,6,8	1,332	90	1,242
46	H	Rain Valley, south	1,2,3,6	1,594	50	1,544
47	H	Lands and scattered homes west of Rain Valley	1,2,3,6,10	1,392	180	1,212
48	M	Lands on the northernmost arm of the WUI along SR 83	4,6,10	1,403	1,367	36
49	M–H	Land to the north of Singing Valley North subdivision	3,4,5,6,10	1,586	1,586	0
50	M–H	Lands surrounding Singing Valley North subdivision	1,2,3,4,6,10	1,782	1,465	317

Table 3.2. Identified treatment management units with recommended treatments

Treatment management unit map ID	Risk value[a]	Location and description	Recommended treatment[b]	Total acres	Federal acres	Nonfederal acres
51	M–H	Lands along Greaterville Road extending east to a small portion of the LCNCA	1,2,3,4,6,10	3,444	2,249	1,195
52	H	Lands along E. Beatty Ranch Road and Singing Valley South	1,2,3,6	2,775	2,051	724
53	L	Fish Canyon	1,2,6,8	907	188	719
54	M–H	Apache Spring Ranch and lands on north side of Gardner Canyon Road	1,2,4,6,10	1,970	1,444	526
55	M	Lands on south side of Gardner Canyon Road	6,8	1,178	785	393
56	M	Lands north of Santa Rita Road	8	846	9	837
57	H	Lands north of Vera Earl Drive	1,2,3,6,10	2,581	690	1,891
58	L–M	Lands near Vera Earl Ranch	1,2,4,8	818	80	738
59	H	Lands between Curly Horse Road and Yucca Ash Farm Road along the border with the LCNCA	1,2,3,4,6,10	3,094	2,132	962
60	L–H	Eastern end of Sonoita, including Star View	1,2,3,4,6	1,209	184	1,025
61	H	Land south of Yucca Ash Road, west of Treatment Management Unit 59	1,2,3,4,6	1,023	2	1,021
62	H	Homes and land along Curly Horse Road	1,2,3,6	1,910	118	1,792
63	H	Area surrounding and including downtown Sonoita	1,2,3,6,7	2,851	0	2,851
64	H	Homes and lands west of Sonoita along Foothills Ct.	1,2,3,4	1,060	0	1,060
65	M–H	Lands to the southwest of downtown Sonoita	1,2,4,6,7	1,336	0	1,336
66	M	Lands southwest of Sonoita, south of SR 82, east of Sonoita Creek	1,2,4,6,7	1,902	0	1,902
67	M	Lands west of SR 82 and south of Casa Blanco Canyon Road	4,6,8	775	238	537
68	M	Interior of Casa Blanco Canyon Road	3,5,6,8,10	1,337	1,123	214
69	L	Far west portion of Casa Blanco Canyon Road adjacent to the FS boundary	3,5,6,8,10	473	467	6
70	L–M	Lands between Wood Canyon and Adobe Canyon Roads	1,2,4,6	1,997	37	1,960
71	M	Lands at the western end of Adobe Canyon Road	1,2,4,6,10	950	438	512
72	M	Lands surrounding Hog Canyon Road	1,2,3,4,6,10	1,884	761	1,123
73	H	Lands north of SR 82 and east of Sonoita	3,6,10	1,366	725	641
74	H	Lands south of SR 82 and east of Sonoita	3,6,10	1,442	755	687
75	M	Lands surrounding SR 83 between Gardner Canyon Road and Santa Rita Road	3,4,6,10	1,662	29	1,633
76	H	Western portion of the LCNCA along Empire Ranch Road and Yucca Ash Farm Road	1,2,3,4,5,6,9,10	3,527	2,738	789

Table 3.2. Identified treatment management units with recommended treatments

Treatment management unit map ID	Risk value[a]	Location and description	Recommended treatment[b]	Total acres	Federal acres	Nonfederal acres
77	H	Lands of the LCNCA that are not a portion of the grassland restoration and mesquite removal units	1,2,3,7	1,452	1,398	53
78	H	Far northeastern arm of the LCNCA within the WUI	5,9,10	2,010	1,511	499
79	H	LCNCA lands northeast of Treatment Management Area 59 that are designated for grassland treatment and mesquite removal	1,2,9,10	905	905	0

[a] H = high, M = moderate, L = low
[b] For recommended treatment codes, see Table 3.2

Table 3.3. Acres of wildland fuels mitigation treatment conducted by ASLD Fire and Fuels Crew during an 8-hour on-site workday

Vegetation 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 associations	1 to 2 acres per day (depending on fuel loading)
Grassland associations	2 to 4 acres per day (depending on grass type and fuel loading)

The SEFT recommends wildland fuel modification projects be contracted to the ASLD to ensure treatments are conducted in a timely fashion and at a reasonable cost. Cost estimates for treatments in the WUI are based on the estimates provided by the ASLD Forestry Division for the ASLD fire and fuel inmate crew costs for both federal and nonfederal land treatments. The SEFT recommends that private landowners who wish to adopt fuel modification plans other than those described in Table 3.2 should have the 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-quarter mile of private land may be prepared for wildlife and watershed benefits, including the retention of large snags of high wildlife value, in areas more than 600 feet from private lands where fire resiliency is not impaired and 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 vegetative fuels on the properties in a timely and effective manner
- Elements of removal of slash, snags, and vegetation that may grow into overhead electrical lines; the removal of other ground fuels, ladder fuels, and diseased, dying, and dead trees; and the 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, 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 an appropriate NEPA assessment be conducted and that collaboration be maintained. To meet conditions established by the Healthy Forest Initiative, the USDA and the USDI adopted two new CEs from the normal review steps of an NEPA 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 NEPA 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 the use of pesticides, 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 SECWPP have been developed in accordance with federal land management preferred actions and are intended to be compliant with CE 10, Fuel Reduction. The purpose of CE 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 SECWPP will be used as a resource to assist in the coordination of long-term interagency mitigation of catastrophic wildfire events in the communities. The prevention and loss mitigation objectives of the SECWPP are to:

- improve fire prevention and suppression to protect private property
- construct a series of fuelbreaks to disrupt continuous hazardous wildland fuels adjacent to private lands
- promote community involvement and education
- recommend measures to reduce structural ignitability in the SECWPP area
- preserve the aesthetics and wildlife values of the Babocomari and Sonoita Creek 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 SECWPP 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 communities of Sonoita and Elgin have made the following action recommendations:

1. Improved Protection Capability and Reduction in Structural Ignitability

The communities consider the risks of wildland fire igniting and spreading throughout the WUI a serious threat. The SEFD, the BLM Gila District, and the SEFT believe that 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 communities of Sonoita and Elgin:

a. Jointly conduct additional comprehensive and frequent training for firefighters by the Southeast Zone, ASLD; the Santa Cruz County Fire Association; the BLM Gila District; and the SEFD. 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. Continuing WUI fire suppression training must be made available to volunteer firefighters of the SEFD.
b. Obtain a chipper/shredder for use by the SEFD for wildland fuel mitigation projects.
c. Obtain a new type 6 engine for wildland fire response by the SEFD.
d. Construct a permanent structure for housing SEFD firefighting equipment and engines.
e. Retrofit wells for SEFD use, maintain helicopter landing sites, and update mapping capabilities of the SEFD.
f. Improve dispatch and alerting capabilities by enhancing the existing radio system; this should be jointly investigated by the County, the communities, and federal and state agencies. The alerting system could additionally include the development of a “phone tree” community warning system.

g. Develop and deploy firehouse message signs, including current fire danger signs, bilingual wildfire caution signs for camping areas within the riparian corridor, and roadside identification and directional signage to residences, water sites for firefighting use, and helicopter landing sites.

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

The County and communities 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 and grassland systems through restoration management and rapid response to wildland fire. The SECWPP is intended to be a long-term strategic instrument containing prescriptive recommendations to address hazardous wildland fuels. A grassroots collaborative structure of individual citizens, supported by local governments as full partners, will provide the most effective long-term means to achieve these goals and to maintain community momentum. Additional education resources are listed in Appendix D of this CWPP. The components of such a structure include the following recommendations:

a. Expand the use of current public information tools for Firewise residential treatments as an immediate action step. This will be accomplished through information mailers to homeowners, presentations by the SEFD, continued use of the BLM Fire Prevention Public Information trailer (Photo 3.1) at community events, and the development of specific promotional materials. 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 assisting with 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. Community outreach efforts should include existing fire awareness outreach efforts, such as the Billy Brushwacker fire mitigation program for school age children. In addition to mailings and community presentations, the SEFT has recommended the implementation of a fire management exhibit similar to the ones in Tucson, Benson, and Sierra Vista, as well as the installation of a firebreak demonstration sign designed for public use and general wildland fire education signage throughout the SEFD response zone.
b. Complete wildland fire home assessments (Photo 3.2) through the use of existing Redzone or similar software and submit wildland fire hazard mitigation strategies for each private property to landowners.
c. Establish and maintain roadside fire danger signs along major roads.
d. Place and maintain bilingual wildfire caution signs within camping areas and along access routes in the riparian corridor of the WUI.

Photo 3.1. BLM Firewise trailer

Photo 3.2. Residents participating in a home assessment

3. Encourage Utilization of Woody Material from WUI Fuel Mitigation Programs.

The County and communities will continue to support and promote private contractors who perform fire-safe mitigation work. The communities will continue to support and promote new businesses involved in the wildland fuel reduction market. The communities of Sonoita and Elgin are 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 communities include the following:

a. Bagged mesquite BBQ wood for sale to visitor and larger community markets as “campfire cooking” for commercial or personal culinary uses
b. Marketing of firewood to local residents, visitors, and adjacent communities
c. Marketing of mesquite wood for artwork, furniture, and other specialty wood products

IV. SECWPP PRIORITIES: ACTION RECOMMENDATIONS AND IMPLEMENTATION

The SECWPP communities have developed action recommendations (see Section III of this CWPP) 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 SEFT. A unified effort to implement this collaborative plan requires timely decision making at all levels of government.

To meet SECWPP objectives, the SEFT developed the following action recommendations. At the end of the fiscal year, projects implemented from these action recommendations will be monitored for effectiveness of meeting SECWPP objectives. For the life of the SECWPP, 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 to implement and monitor the action recommendations of the SECWPP. Establishing a unified effort to collaboratively implement the SECWPP embraces adaptive management principles that enhance decision making and reduce inconsistency at all levels of government.

Therefore, the SEFT recommends that the SEFD fire chief will be responsible for administering the communities' recommendations for outreach, structural ignitibility and fuel hazard removal on private lands within the WUI, while the BLM will be responsible for fuel mitigation projects on BLM lands within the WUI. The CNF will be responsible for continuing to use and manage grazing as a primary fuel reduction tool on Forest Service properties within the WUI boundary. The SEFD will submit requests for HFRA grant funds through the Arizona State Forester Fire Assistance Grant Program and through other appropriate funding opportunities to implement the action recommendations for private land treatments, mitigation measures for reduced structural ignitability, firefighting response, and public outreach. The BLM will pursue funding to cost share with private landowners the construction of Home Ignition Zone (HIZ) firebreaks within six priority treatment areas of the WUI. Monitoring and reporting the action items identified in the plan will provide information on additional measures necessary to meet SECWPP goals. The SEFT encourages a community-driven Firewise group be formed to engage continued community participation when implementing yearly fuels mitigation projects and during the effectiveness monitoring and reporting of the plan.

B. Priorities for Construction of HIZ Firebreaks

1. BLM Priorities

The BLM in conjunction with the SEFT has developed six treatment areas for which the BLM will pursue funding to cost share implementation of HIZ firebreaks on private lands within one-quarter mile of BLM properties within the WUI. The BLM plans to use HIZ firebreaks, which are cleared areas around homes or structures to help slow or prevent the spread of fire across property lines. Before- and after-construction

images of a firebreak can be seen in Photos 4.1 and 4.2. BLM firebreaks will include: limbing of trees, removal of dead material, leaving of main tree stems and thinning of mesquites to 15' spacing to allow for fire equipment access and to widen HIZ firebreak. The BLM priority treatment areas are displayed graphically in Figure 4.1. Each of the BLM treatment areas is listed and described in Table 4.1.

Photo 4.1. Public land adjacent to private home site before treatment- north boundary of property

Photo 4.2 Public land adjacent to private home site after treatment- west boundary of property. Firebreak is mowed grass to protect fence line and to widen existing HIZ firebreak.

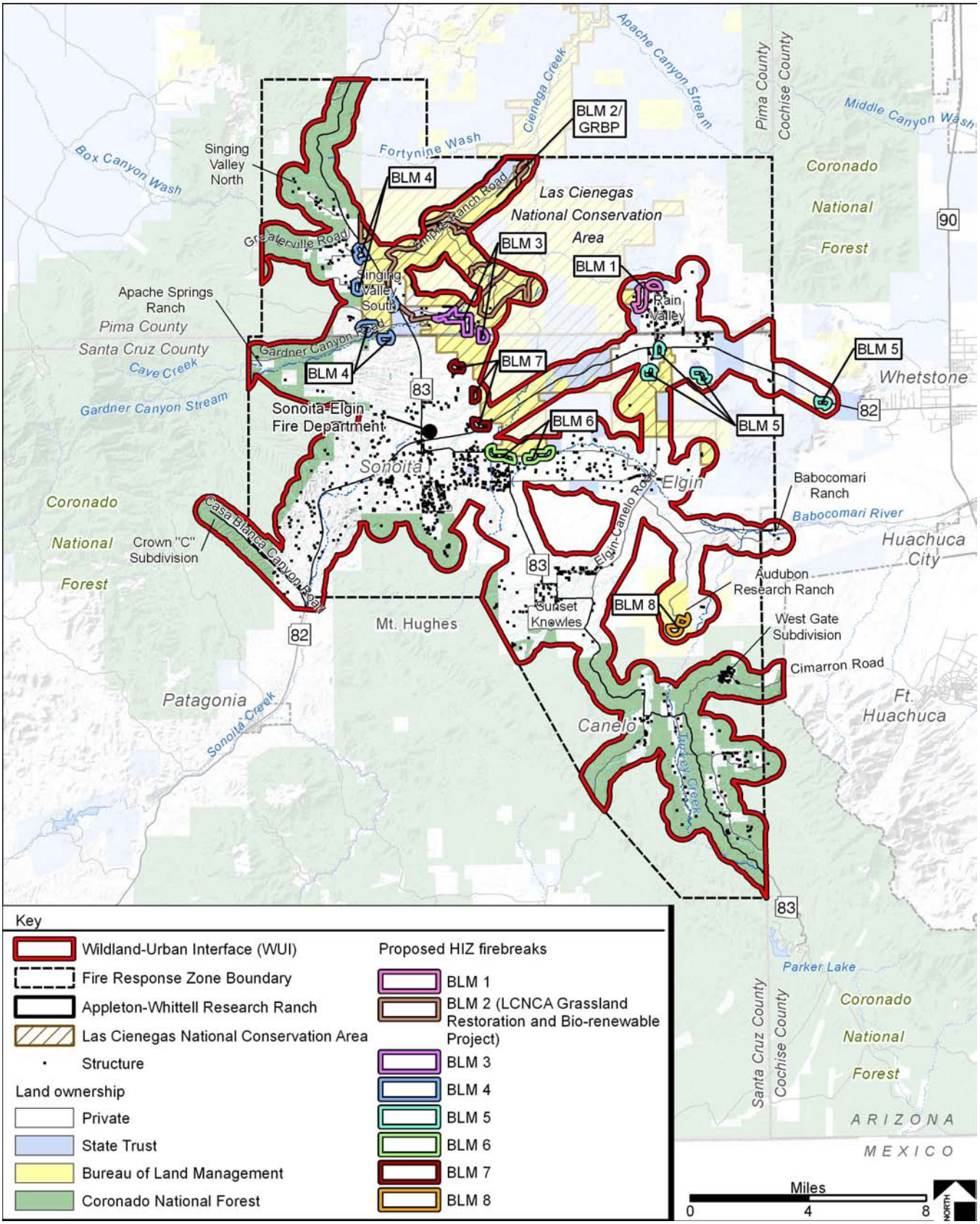

Figure 4.1. BLM priority treatment areas

Table 4.1. BLM priority action recommendations for construction of firebreaks

Firebreak area	Treatment management unit	Location and description	Project partners	Estimated treatment cost
BLM HIZ Firebreak Area #1	45, 46, 47	Fuel reduction around homes within the one-quarter-mile buffer of BLM LCNCA lands, including portions of the northwest corner of the Rain Valley subdivision	BLM, LCNCA, SEFD, and private landowners	7 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$1,616.42**
BLM HIZ Firebreak Area #2	76	Fuel reduction around homes along Yucca Ash Farm Road within the grassland restoration area of the LCNCA and within the one-quarter-mile buffer of the BLM LCNCA property	BLM, LCNCA, SEFD, and private landowners	22 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$5,080.17**
BLM HIZ Firebreak Area #3	59, 75	Fuel reduction around homes along Yucca Ash Farm Road outside the grassland restoration area of the LCNCA, but still within the one-quarter-mile buffer of the BLM LCNCA property	BLM, LCNCA, SEFD, and private landowners	11 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$2,540.08**
BLM HIZ Firebreak Area #4	51, 52, 53, 54, 75	Fuel reduction around homes along the western edge of the BLM LCNCA, including portions of Singing Valley South subdivision and homes along Fish Canyon Road within the BLM one-quarter-mile buffer zone	BLM, LCNCA, SEFD, and private landowners	14 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$3,232.83**
BLM HIZ Firebreak Area #5	37, 38, 39, 40	Fuel reduction around homes along the BLM one-quarter-mile buffer in the area south of Rain Valley and north of Elgin, extending east to the outlying structures south of SR 82 at the very eastern edge of the WUI	BLM, SEFD, and private landowners	9 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$2,078.25**
BLM HIZ Firebreak Area #6	28, 31, 32, 33	Fuel reduction around homes within the one-quarter-mile BLM buffer, including portions of Sonoita Hills and Sonoita Estates subdivisions and homes along Lower Elgin Road	BLM, SEFD, and private landowners	22 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$5,080.17**
BLM HIZ Firebreak Area #7	59, 60, 61, 62	Fuel reduction around homes east of SR 83 and north of SR 82 along the southwestern edge of the BLM LCNCA	BLM, LCNCA, SEFD, and private landowners	4 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$923.67**
BLM/Audubon HIZ Firebreak Area #8	21	Fuel reduction around homes adjacent to the BLM/Audubon Appleton-Whittell Research Ranch within the one-quarter-mile buffer	BLM, Audubon, SEFD, and private landowners	3 HIZ firebreaks to be treated at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$692.75**
Firebreak maintenance	21, 28, 31, 32, 33, 37, 38, 39, 40, 41, 45, 46, 47, 51, 52, 54, 59, 60, 61, 62, 75, 76	HIZ firebreaks maintenance performed by landowners at least once a year following treatment	Private landowners	Up to 92 HIZ firebreaks installed for a total cost of **$21,244.34.** Maintenance at least once a year.

2. CNF Priorities

The CNF at the recommendation of the SEFT identified priority treatment areas where it plans to partner with the SEFD to perform public outreach to contact and educate landowners and recreational users about the importance of Firewise construction, landscaping and fire-safe practices to protect homes and properties throughout the WUI area. CNF priority areas are designated by each ranger district. The Nogales Ranger District identified three priority areas, while the Sierra Vista Ranger District identified one priority area within the WUI. Although these areas are designated as priorities within the WUI by the CNF, the CNF will need to balance these priorities with the overall priorities for each of its districts. The CNF is highly supportive and encourages homeowners that share the forest boundary to be proactive in keeping vegetation around their homes up to Firewise recommendations. The CNF plans to continue the use of grazing as a fuel reduction tool within the National Forest boundary. When working with the SEFD to coordinate outreach efforts, the CNF will be responsible for managing internal CNF priorities while working to accomplish the SECWPP action items and objectives. Any fuels reduction efforts that occur on Forest Service lands as a result of contact with local landowners by the CNF and SEFD staff will be tracked by the CNF. The different CNF priority outreach areas are displayed graphically in Figure 4.2 and are listed and described in Table 4.2.

3. SEFD Priorities

The SEFD has identified priority treatment areas for contacting landowners to perform home assessments, to provide recommendations to landowners as to how to use Firewise practices around their homes, and to provide recommendations on the construction of HIZ firebreaks. The SEFD fire chief, in coordination with CNF fire prevention staff will be responsible for administering the outreach efforts in these treatment areas, as well as for documenting any fuels reduction efforts that are a result of contact with landowners in the different treatment areas. Landowners will be contacted through an interagency effort to reduce redundancy and to provide a unified message of fire protection, safety, and education within the SECWPP WUI area. Figure 4.3 displays the SEFD priorities for public outreach and consultation regarding Firewise messaging and areas recommended for HIZ firebreaks. Photos 4.3 and 4.4 display HIZ Firewise treatments and construction. Table 4.3 lists and describes each of the SEFD priority areas.

Photo 4.3 HIZ Firewise treatment and clearing around home

Photo 4.4 Firewise block construction, metal roof, and clearing around home

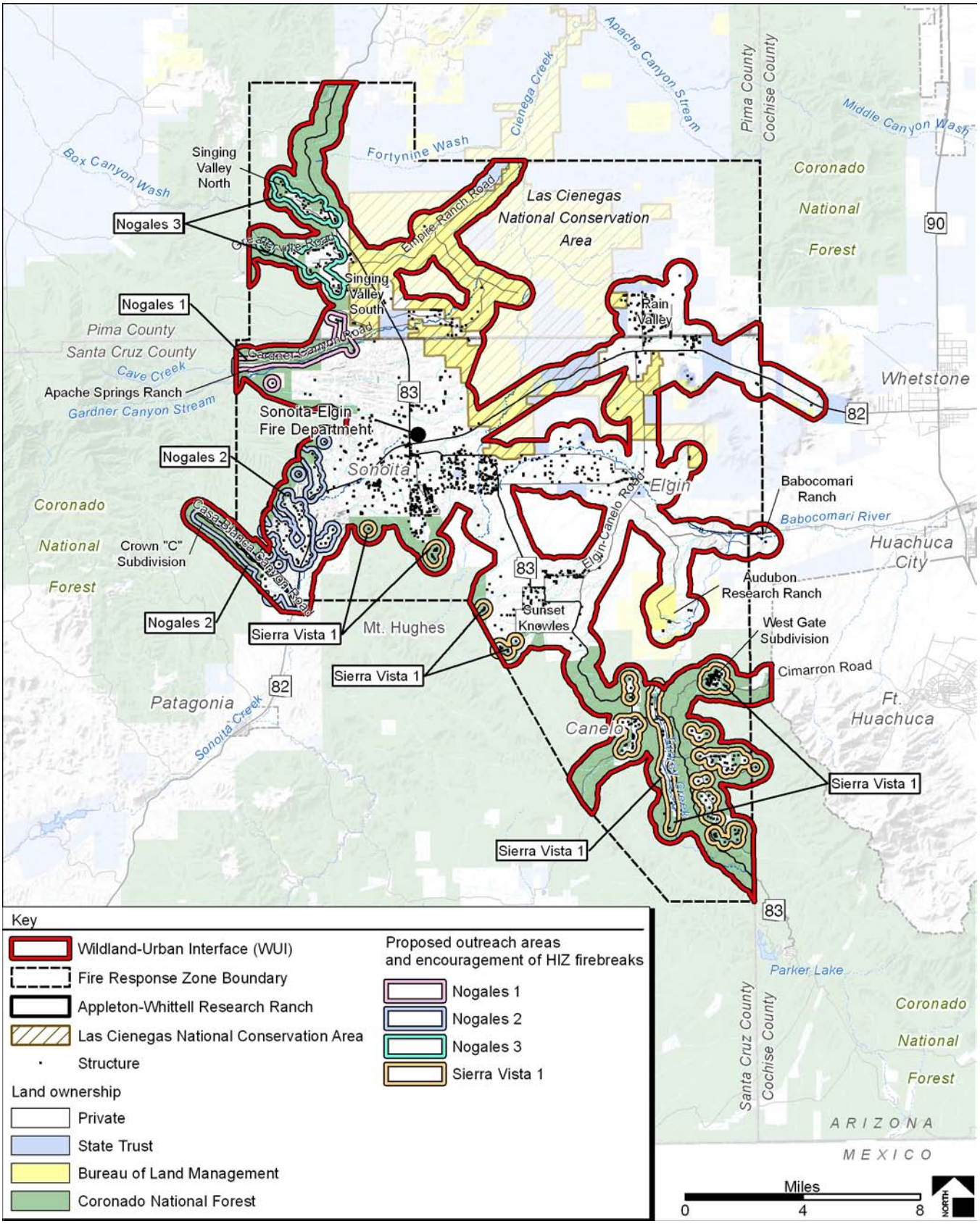

Figure 4.2. CNF priority areas for outreach and encouragement of HIZ fuelbreaks

Table 4.2. CNF priority action recommendations for outreach efforts and HIZ firebreaks

Firebreak area	Treatment management unit	Location and description	Project partners	Estimated treatment cost
CNF Nogales District, Public Outreach, and HIZ Firebreak Area #1	53, 54, 55	Homes structures and recreation areas southwest of BLM Firebreak Area #2, focusing outreach efforts to landowners and recreational users in the Gardner Canyon area	CNF Nogales District, SEFD, and private landowners	8 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$1,847.33**
CNF Nogales District, Public Outreach, and HIZ Firebreak Area #2	67, 68, 69, 70, 71, 72	Homes and structures along Adobe Canyon, Hog Canyon, Wood Canyon, and Casa Blanca roads, including the Crown "C" subdivision	CNF Nogales District, SEFD, and private landowners	43 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$9,929.42**
CNF Nogales District, Public Outreach, and HIZ Firebreak Area #3	50, 51, 52	Homes and structures along Greaterville Road and Singing Valley North and Singing Valley South subdivisions, west of BLM Firebreak Area #2	CNF Nogales District, SEFD, and private landowners	47 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$10,853.08**
CNF Sierra Vista District, Public Outreach, and HIZ Firebreak Area #1	19, 20, 2, 3, 4, 5, 8, 9, 10, 11, 6, 7, 12, 13	Homes and structures along the CNF boundary south of downtown Sonoita, west of Sunset Knowles subdivision, and the homes and structures surrounding Canelo, Turkey Creek, and Lyle and Brushy canyons	CNF Sierra Vista District, SEFD, and private landowners	168 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$38,794**
Firebreak maintenance	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 19, 20, 50, 51, 52, 53, 54, 55, 67, 68, 69, 70, 71, 72	HIZ firebreak maintenance performed by landowners at least once a year following treatment	Private landowners	Up to 266 HIZ firebreaks installed for a total cost of **$61,423.83**; maintenance at least once per year.

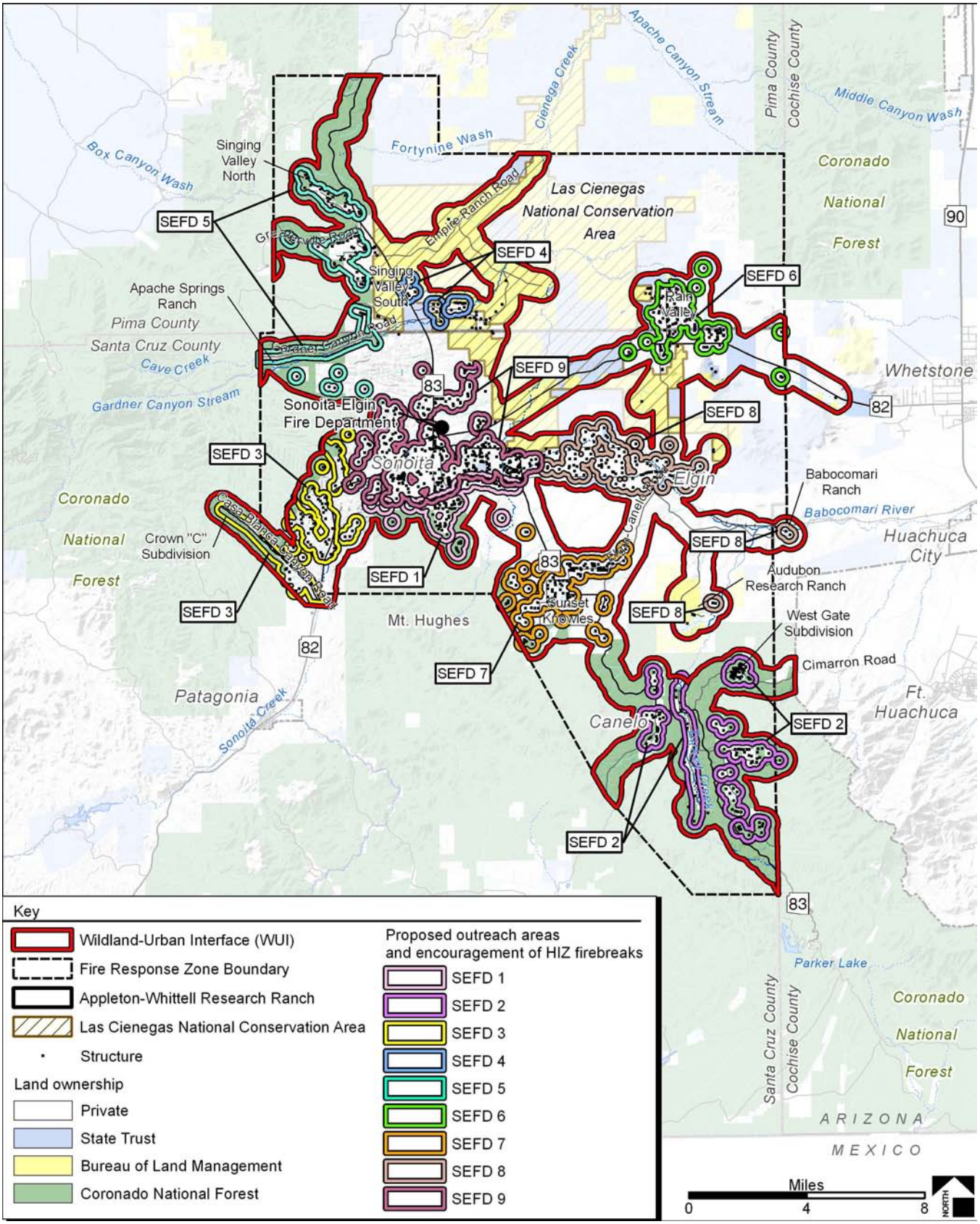

Figure 4.3. SEFD priority areas for outreach and encouragement of HIZ fuelbreaks

Table 4.3. SEFD priority action recommendations for outreach efforts and HIZ firebreaks

Firebreak area	Treatment management unit	Location and description	Project partners	Estimated treatment cost
SEFD Outreach and HIZ Firebreak Area #1	30, 31, 33, 34, 35, 36, 65, 66	Homes and structures south of downtown Sonoita, along edge of Forest Service boundary and between SR 82 and SR 83	SEFD, CNF Sierra Vista District, and private landowners	134 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$30,942.83**
SEFD Outreach and HIZ Firebreak Area #2	3, 4, 5, 6, 7, 8, 11, 12, 13,	Homes and structures surrounding Canelo, Turkey Creek, the West Gate subdivision, and Lyle and Brushy canyons	SEFD, CNF Sierra Vista District, and private landowners	148 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$34,175.67**
SEFD Outreach and HIZ Firebreak Area #3	64, 65, 67, 68, 69, 70, 71, 72	Homes and structures along Casa Blanca Canyon, Hog Canyon, Adobe Canyon, and Wood Canyon roads west of SR 82	SEFD, CNF Nogales District, and private landowners	43 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$9,929.42**
SEFD Outreach and HIZ Firebreak Area #4	59, 75, 76	Homes and structures east of SR 83 and west of the LCNCA not included in the BLM priority firebreak areas	SEFD and private landowners	20 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$4,618.33**
SEFD Outreach and HIZ Firebreak Area #5	50, 51, 52, 53, 54, 55,	Homes and structures west of SR 83, including Singing Valley North, homes and structures along Greaterville Road, Singing Valley South, and homes and structures along Gardner Canyon Road and Santa Rita Road	SEFD and private landowners	59 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$13,624.08**
SEFD Outreach and HIZ Firebreak Area #6	43, 44, 45, 46, 47	Homes and structures in the Rain Valley subdivision not included in the BLM priority treatment area	SEFD and private landowners	134 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$30,942.83**
SEFD Outreach and HIZ Firebreak Area #7	16, 17, 18, 19, 20	Homes and structures surrounding the Sunset Knowles subdivision and extending to the CNF boundary to the west	SEFD and private landowners	104 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$24,015.33**

Continued

Table 4.3. SEFD priority action recommendations for outreach efforts and HIZ firebreaks

Firebreak area	Treatment management unit	Location and description	Project partners	Estimated treatment cost
SEFD Outreach and HIZ Firebreak Area #8	25, 26, 27, 28, 32	Homes and structures surrounding Elgin.	SEFD and private landowners	91 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$21,013.42**
SEFD Outreach and HIZ Firebreak Area #9	31, 33, 34, 56, 58, 60, 61, 62, 63, 64, 65	Homes and structures surrounding downtown Sonoita north of SEFD Outreach and HIZ area #1, west of SEFD outreach and HIZ area #8, and northeast of SEFD outreach and HIZ area #3.	SEFD and private landowners	361 homes to be contacted with potential HIZ firebreaks treatments at a cost of $692.75/day, completing 3 HIZ firebreaks/day for a total cost of **$83,360.92**
Firebreak maintenance	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 19, 20, 50, 51, 52, 53, 54, 55, 67, 68, 69, 70, 71, 72	HIZ firebreak maintenance performed by landowners at least once a year following treatment.	Private landowners	Up to 1,094 HIZ firebreaks installed for a total cost of **$252,622.83**

Collectively, implementation of outreach efforts and HIZ firebreak installation across all landownership within the WUI will reduce the risk of wildfire potential to the communities. All HIZ firebreaks have “high” valuations for reducing risk. In total, 1,186 homes are targeted for outreach. If all landowners within the WUI follow Firewise recommendations and implement HIZ firebreaks around their homes and structures, the total cost estimate would be $273,867.17.

C. Priorities for Protection Capability and Reduced Structural Ignitability

The SECWPP communities will evaluate, maintain, and, where necessary, upgrade community wildfire preparation and response facilities, capabilities, and equipment. Table 4.4 lists those priority action recommendations.

Table 4.4. Action recommendations for wildland fire protection and reduced ignitability

Partners	Project	Equipment/expenses	Timeline
SEFD and private landowners	Retrofit existing wells for SEFD/CNF/BLM use and maintain well sites	Standpipe installation and site maintenance: $4,000.00 annually.	Begin in FY 2007 Maintain annually
BLM and SEFD	Obtain one industrial-sized chipper	Portable manual-feed chipper: $25,000.00.	Acquire in FY 2007 Implement use in FY 2007/2008
AZ state forester, Santa Cruz County, and SEFD	Obtain one fully functional type 6 engine	Type 6 fire-response brush engine: $60,000.00.	Acquire in FY 2007 Implement use in FY 2007/2008
AZ state forester, Santa Cruz County, and SEFD	Construct garage and housing facility for fire engines and response equipment in Elgin	Four metal bay, concrete floor maintenance building: $110,000.00.	Construct in FY 2007/08
AZ state forester, Santa Cruz County, BLM, and SEFD	Enhance dispatch and alerting capabilities	Enhancement of existing radio repeater for alert-paging capabilities. Coordinate and research with Santa Cruz County for potential use of Communicator software.	Assess costs in FY 2007 Install in FY 2007/08
Southwest Zone, ASLD; Santa Cruz County; BLM; and SEFD	Provide enhanced and coordinated firefighting training	Annual refresher and enhancement training and equipment for individual firefighters and annual multiagency training exercise: $10,000.00 annually.	Training for 10 firefighters annually beginning in FY 2007/08
SEFD, CNF, BLM, ASLD, Santa Cruz County, Pima County, and private landowners	Determine need for additional water storage tanks and siting for potential locations	Staff time and interagency coordination efforts. Additional costs for tank installation to be determined.	Begin in FY 2007/08, Request funding for additional tanks in FY 2008/2009, Installation in FY 2010.

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

The SEFD 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 4.5 displays the SECWPP 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.

Community bulletins and other public service announcements concerning wildfire threats and preparedness should be developed with assistance from the Office of the State Forester and the Tucson District Office.

Table 4.5. Action recommendations for enhanced public education, information, and outreach

Partners	Project	Equipment/expenses	Timeline
SEFD, Santa Cruz County, Pima County, ASLD, CNF, and BLM	Create and distribute community bulletin/newsletter and develop local Firewise brochure	Development, printing, and distribution costs: $5,000.00	Develop in FY 2007 Distribute continually
SEFD, BLM, CNF, and ASLD	Complete home fire assessment using Redzone or similar software and implement fire-safe recommendations	Assessment completion: $2,000.00	Complete assessments in FY 2007 Implement recommendations in FY 2007/08
SEFD, Santa Cruz County, Pima County, Arizona Department of Transportation, BLM, and CNF	Establish and maintain roadside fire danger warning signs and other informational and directional road signs along major roads	Construction and placement: $5,000.00	Construct and implement in FY 2007/08
SEFD, Santa Cruz County, Pima County, University of ASLD, CNF, and BLM	Encourage private businesses that perform fire-safe land treatments; encourage market development of by-products of WUI vegetative fuel mitigation programs	Marketing plan to be developed	Initiate community marketing planning meetings in FY 2007

E. Requested Funding for Implementation of the SECWPP

Table 4.6 summarizes the total costs to implement the SECWPP action recommendations.

Table 4.6. SECWPP proposed budget

SECWPP objectives	Estimated costs
Wildland fuel mitigation through HIZ firebreaks	$273,867.17
Wildland fire protection and reduced ignitability	$209,000.00
Public education, information, and outreach	$12,000.00
Total requested implementation funds	**$494,867.17**

V. MONITORING PLAN

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

In accordance with Section 102.g.5 of HFRA, the SECWPP communities will participate in a multiparty monitoring program to assess progress toward meeting SECWPP objectives. This authority to participate in multiparty monitoring will be vested in the SEFD chief, the BLM fire mitigation specialist, Santa Cruz County Emergency Services coordinator, and the SEFT as the SECWPP administrators responsible for implementing and monitoring the SECWPP. The SECWPP 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 SECWPP projects. Monitoring will include assessing and evaluating the success of individual SECWPP project implementation and the success of a given project's effectiveness in furthering SECWPP objectives.

A. Administrative Oversight, Monitoring, and SECWPP Reporting

The SEFD chief is the primary responsible party for monitoring the community recommendations for fuels reduction projects on nonfederal lands (fuel hazard removal on private lands within the WUI), reduction in structural ignitability, and public education and outreach. The BLM is responsible for the establishment of fuel mitigation projects on BLM-administered lands and for lands identified 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 SEFD annually to implement the action recommendations for private land treatments, mitigation features for reduced structural ignitability, firefighting response, and public outreach. For BLM-administered HIZ firebreaks, the BLM will pursue funding to cost share construct firebreaks with private landowners 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 chief will perform monitoring and reporting of the SECWPP on an annual basis to provide information on additional measures necessary to meet SECWPP goals, to review priority action items, and to document completed projects.

The SECWPP administrators will be mutually responsible for implementing and monitoring the SECWPP action recommendations. The SECWPP administrators should also help federal and state agencies and private landowners identify appropriate grant and other funding mechanisms necessary to implement the action recommendations of the SECWPP. Grant information should be routinely searched to identify updated grant application cycles. SEFD should coordinate with ASLD to assist in locating grant information. The following is a list of federal, state, and nongovernmental Web sites that should also 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 SECWPP administrators should include successful grant awards received for implementing the action recommendations of the SECWPP. The SECWPP administrators will produce a report on a three-year basis, detailing the success of SECWPP project implementation and overall progress toward meeting SECWPP goals.

The administrators will present any SECWPP updates to the signatories for their agreement and then will submit those updates to the SEFD chief and Santa Cruz County for agreement and to the Arizona state forester, the BLM, and the CNF for their concurrence. The administrators will also submit the action recommendations of the updated SECWPP for funding through all appropriate funding sources. This review and update of the SECWPP will ensure timely decision making at all levels of government, and will provide the input necessary for the development of an updated SECWPP work plan including current prioritization of project recommendations for the next SECWPP cycle.

B. Effectiveness Monitoring

Table 5.1 shows the performance measures the SECWPP administrators will use to assess SECWPP performance against the plan's goals. To assist in tracking vegetative fuel treatments being planned and completed through Arizona fire assistance grant programs, the SECWPP administrators will cooperate with the Arizona State Forester's State Fire Mapping program by providing detailed mapping information as requested.

In addition to monitoring performance measures annually, the SECWPP administrators should assess the current status of wildland fuel hazards and look for any new or developing issues not covered by the SECWPP. 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 SECWPP. As part of effectiveness monitoring, the SECWPP administrators should review existing treatment units and make recommendations for adding any new areas of concern and for reducing the risk level in any newly treated areas. These recommendations will be included in their 3-year report.

Table 5.1. Performance measures to assess SECWPP progress

Goal	Performance measure
Identify areas of fire risk and recommend treatment and mitigation strategies; install firebreaks to protect community values	Prepare report every third year to identify areas of reduced risk due to implementation of SECWPP 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, the BLM will visually inspect firebreak construction on BLM properties or on lands within the one-quarter-mile buffer to determine success of reducing fuel loading. Landowners will be responsible for annually monitoring 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 unit 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 and number of HIZ firebreaks of nonfederal WUI lands that are in Condition Class 2 or 3, are identified as high priority by the SECWPP communities, or are moved to Condition Class 1 or another acceptable level of wildland fuel. • Gather and report total acres and number of HIZ firebreaks 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* (2005b).
Promote community involvement and education	Ensure community involvement in fire planning and decision making: • Adopt and use Firewise standards. • Record the number of home fire assessments completed in relation to the number of pamphlets distributed or the number of participating homeowners. • Determine if a fire evacuation plan for the communities of Sonoita and Elgin has been prepared by Santa Cruz County. • Determine if annual fire safety and fire training programs have been conducted for community members 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 on previous efforts. Initiate community outreach programs: • Ensure individual home assessments have been completed and entered using Red Zone or similar software. • Determine if progress has been made with Santa Cruz County to implement evacuation plans for identified high-risk areas. • Determine number of handouts issued by Santa Cruz County's Planning and Zoning office.
Improve fire prevention and fire suppression efforts and recommend measures to reduce structural ignitability in the SECWPP area	Enhance current fire suppression efforts, staff levels, and protection capabilities: • Determine additional needs for SEFD training. • Upgrade 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 and 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 SEFD. • Develop an emergency response plan with Santa Cruz 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

Manuel Ruiz
Chair, Santa Cruz County Board of Supervisors — Date: 7/25/07

Richard Elias
Chair, Pima County Board of Supervisors — Date: 7/6/07

Joseph De Wolf
Chief, Sonoita-Elgin Fire District — Date: 7/6/07

Concurrence

Kirk Rowdabaugh
Arizona State Forester — Date: 12-5-07

Bonnie Winslow
Bureau of Land Management, Gila District Manager (Acting) — Date: 10-23-07

Jeanine Derby
Forest Supervisor, Coronado National Forest — Date: 9/20/07

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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, 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 district 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 SWReGAP 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* (NatureServe 2004). The following includes the vegetation associations composing the wildland-urban interface of the Sonoita-Elgin 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

S115 Madrean Juniper Savanna

Concept Summary:

This Madrean ecological system occurs in lower foothills and plains of southeastern Arizona, southern New Mexico extending into west Texas and Mexico. These savannas have widely spaced mature juniper trees and moderate to high cover of graminoids (> 25% cover). The presence of *Madrean Juniperus spp.* such as *Juniperus coahuilensis*, *Juniperus pinchotii*, and/or *Juniperus deppeana* is diagnostic. *Juniperus monosperma* may be present in some stands, and *Juniperus deppeana* has a broader range than this Madrean system and extends north into southern stands of Southern Rocky Mountain Juniper Savanna and Woodland (CES306.834). Stands of *Juniperus pinchotii* may be short and resemble a shrubland. Graminoid species are a mix of those found in Western Great Plains Shortgrass Prairie (CES303.672) and Chihuahuan Piedmont Semi-Desert Grassland (CES302.735), with *Bouteloua gracilis* and *Pleuraphis jamesii* being most common. In addition, these areas include succulents such as species of Yucca, Opuntia, and Agave. Juniper savanna expansion into grasslands has been documented in the last century.

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 Desert.

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 SHRUB 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.

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 a strong cacti component.

SHRUBLANDS 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 desert scrub.

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.

S098 North American Warm Desert Riparian Mesquite Bosque

Concept Summary:

This ecological system consists of low-elevation (<1100 m) riparian corridors along intermittent streams in valleys of southern Arizona and New Mexico, and adjacent Mexico. Dominant trees include *Prosopis glandulosa* and *Prosopis velutina*. Shrub dominants include *Baccharis salicifolia, Pluchea sericea*, and *Salix exigua*. Vegetation, especially the mesquites, tap groundwater below the streambed when surface flows stop. Vegetation is dependent upon annual rise in the water table for growth and reproduction.

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.*

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 a*nd *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.

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.

S112 Madrean Pinyon-Juniper Woodland

Concept Summary:

This system occurs on foothills, 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. 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 ASSOCIATIONS

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 and reproduction.

ADDITIONAL SPARSELY VEGETATED AND NON VEGETATED ASSOCIATIONS

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.

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.

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*.

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.

APPENDIX B. CATEGORICAL EXCLUSION

This categorical exclusion (CE) is to be used for BLM properties or projects implemented with federal funds within the SECWPP WUI area. Table 3.1 contains all treatment types recommended by the SEFT, which incorporates the requirements of this CE for each treatment. The application of any treatment type from Table 3.1 not only meets the requirement of this CE on federal properties and for federally funded projects but also serves as an appropriate form of treatment.

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 K. Mahigan **Date:** 2-2-07

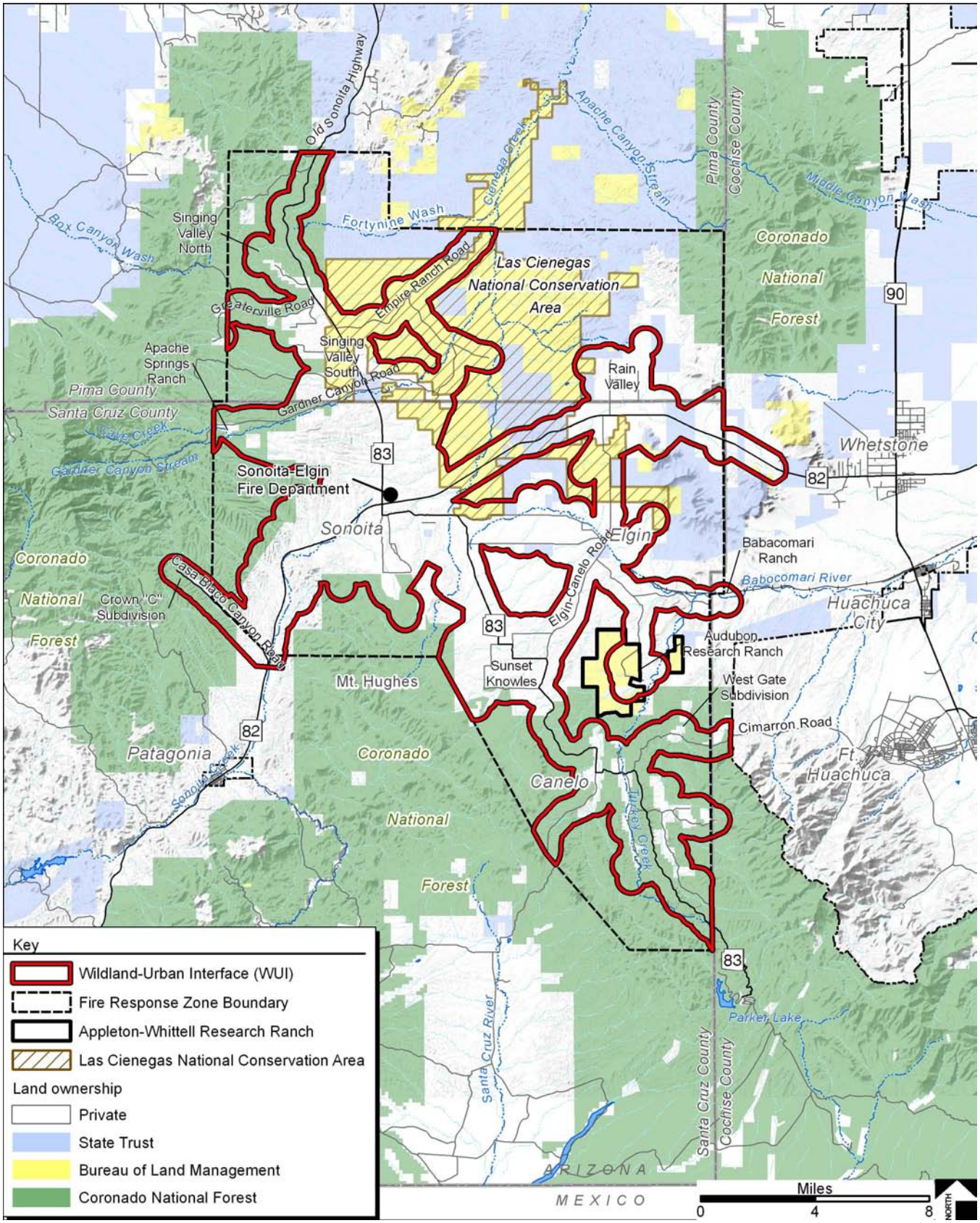

Figure B1. LCNCA and Sonoita Elgin CWPP WUI boundary

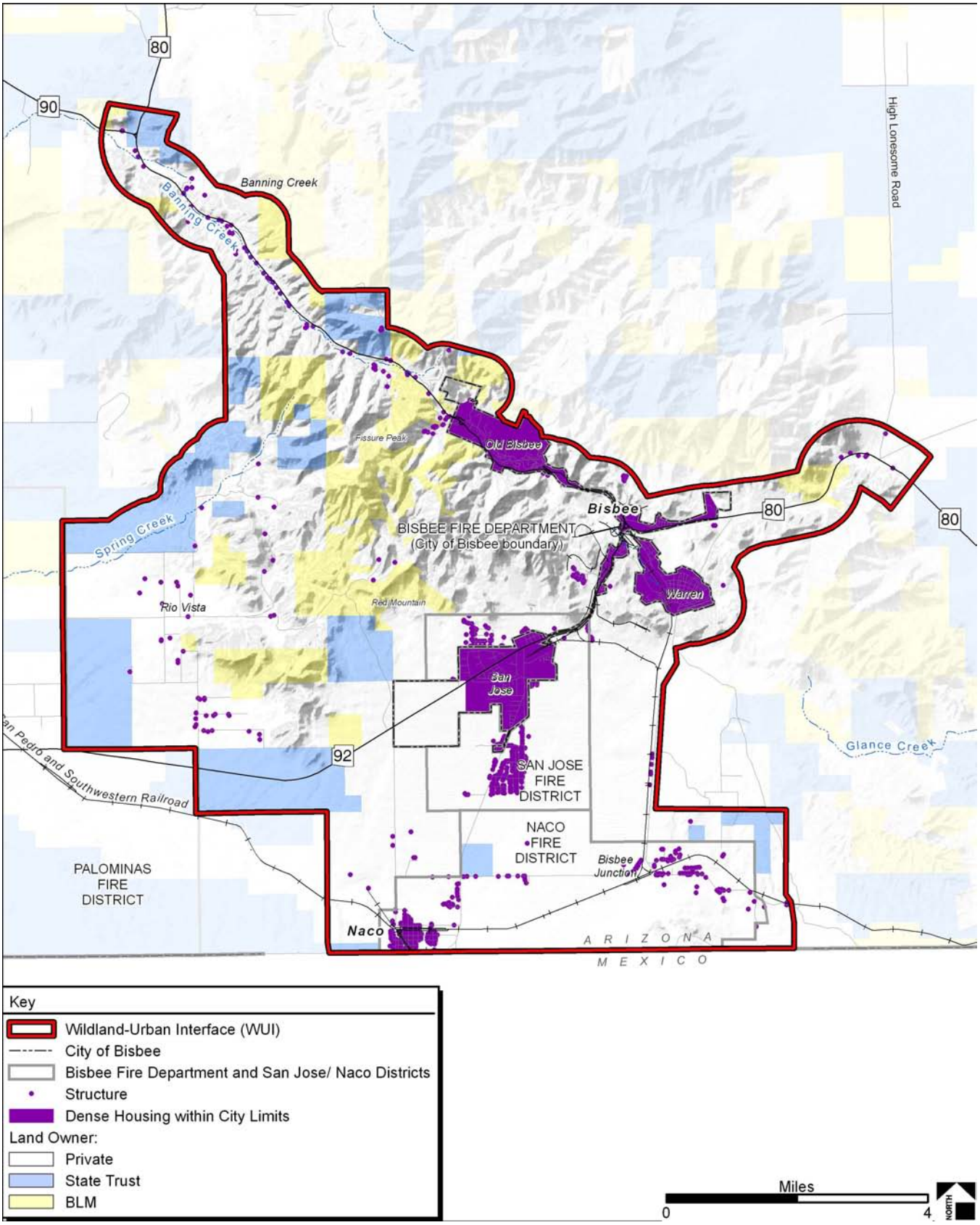

Figure B2. Bisbee CWPP WUI boundary

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

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

A. Overstory of conifers occupies more than one-third of the site

Model Q

B. 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. Open overstory of conifer and/or hardwoods

Model C

B. 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. Grasses and forbs are primarily perennials

Model L

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

A. Average height of woody plants is 6 feet 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 feet

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. Grasses and forbs are primarily annuals

Model A

b. Grasses and forbs are primarily perennials

Model L

V. Trees predominate

A. Deciduous broadleaf species predominate

1. Area has been thinned or partially cut, leaving slash as the major fuel component

Model K

2. Area has not been thinned or partially cut

a. Overstory is dormant; leaves have fallen

Model E

b. 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. Understory burns readily

      1) Western United States

         Model T

      2) Eastern United States

         a) Understory is more than 6 feet tall

            Model O

         b) Understory is less than 6 feet tall

            Model D

   b. Understory seldom burns

      Model H

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

   a. Overstory is over mature and decadent; heavy accumulation of dead debris

      Model G

   b. Overstory is not decadent; 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) Needles are less than 2 inches long

         Model H

VI. Slash is the predominate fuel type

A. Foliage is still attached; little settling

1. Loading is 25 tons/acre or greater

   Model I

2. Loading is less than 25 tons/acre but greater than 15 tons/acre

   Model J

3. Loading is less than 15 tons/acre

   Model K

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

1. Loading is 25 tons/acre or greater

   Model J

2. Loading is less than 25 tons/acre

   Model K

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.