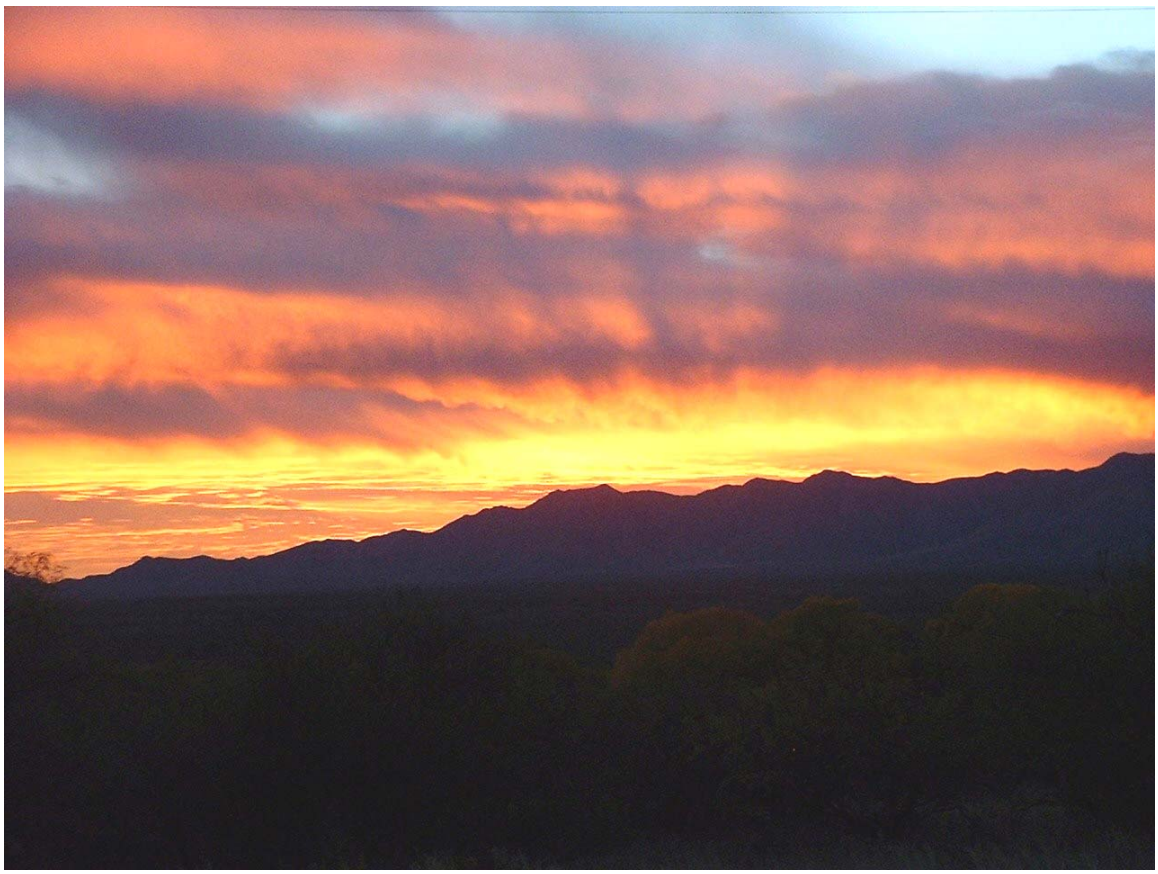
UPPER SAN PEDRO COMMUNITY WILDFIRE PROTECTION PLAN



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PURPOSE

This document has the following primary purposes:

1. To combine the 7 Wildfire Hazard Assessment and Mitigation Plans created in 2003.
2. To provide a comprehensive, scientifically-based analysis of wildfire related hazards and risks in the Wildland Urban Interface (WUI) areas of the Upper San Pedro Watershed, and specifically within seven assessment areas adjacent to the San Pedro Riparian National Conservation Area: Tombstone, St. David, Babocomari, Lewis Springs, Palominas, Hereford, and rural areas.

3. Using the results of the analysis, generate recommendations designed to prevent and/or reduce the damage associated with wildfire to WUI values in the Upper San Pedro study area.

4. Create a Community Wildfire Protection Plan (CWPP) document for Upper San Pedro which conforms to the standards for CWPPs established by the Healthy Forest Restoration Act (HFRA).

INTRODUCTION

The Upper San Pedro CWPP is a result of a community-wide planning effort including extensive field data gathering, compilation of existing documents and GIS data, scientifically based analyses and recommendations designed to reduce the threat of wildfire related damages to values at risk. This document incorporates new and existing information relating to wildfire which will be valuable to citizens, policy makers, and public agencies in and adjacent to the Upper San Pedro area. This document meets the requirements of the federal Healthy Forest Restoration Act of 2003 for community fire planning.

The assessment portion of this document estimates the hazards and risks associated with wildland fire in proximity to WUI areas. This information, in conjunction with identification of the values at risk, defines “areas of concern” and allows for prioritization of mitigation efforts. From the analysis of this data, solutions and mitigation recommendations are offered that will aid local fire departments, homeowners, land managers, community forestry organizations, and other stakeholders in developing short-term and long-term fuels and fire management plans.

Wildfire hazard data is derived both from the Community Wildfire Hazard Rating system (WHR) and from the analysis of Fire Behavior Potential, which are extensive and/or technical in nature. Detailed findings and methodologies for these analyses are included in their entirety in appendices rather than the main report text.

For the purposes of this report the following definitions apply:

Risk is considered to be the likelihood of an ignition occurrence. This is primarily determined by the fire history of the area.

Hazard is the combination of the WHR ratings of the Wildland-Urban Interface (WUI) neighborhoods and the analysis of Fire Behavior Potential, as modeled from the fuels, weather, and topography of the study area. Hazard attempts to quantify the severity of undesirable fire outcomes to the values at risk.

Values at Risk are the intrinsic values identified by the citizens as being important to the way of life in the study area (e.g., life safety, property conservation, access to recreation, and wildlife habitat).

THE NATIONAL FIRE PLAN AND THE HEALTHY FOREST RESTORATION ACT

In the year 2000, more than eight million acres burned across the United States, marking one of the most devastating wildfire seasons in American history. One high-profile incident, the Cerro Grande fire at Los Alamos, NM, destroyed more than 235 structures and threatened the Department of Energy's nuclear research facility.

Two reports addressing federal wildland fire management were initiated after the 2000 fire season. The first report, prepared by a federal interagency group, was titled "Review and Update of the 1995 Federal Wildland Fire Management Policy" (2001). This report concluded, among other points, that the condition of America's forests had continued to deteriorate.

The second report, titled "Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000", was issued by the Bureau of Land Management (BLM) and the United States Department of Agriculture Forest Service (USFS). It became known as the National Fire Plan (NFP). This report, and the ensuing congressional appropriations, ultimately required actions to:

- Respond to severe fires
- Reduce the impacts of fire on rural communities and the environment
- Ensure sufficient firefighting resources

Congress increased its specific appropriations to accomplish these goals. 2002 was another severe season: more than 1,200 homes were destroyed and over seven million acres burned. In response to public pressure, congress and the Bush administration continued to designate funds specifically for actionable items such as preparedness and suppression. That same year, the Bush administration announced the HFRA initiative, which enhanced measures to restore forest and rangeland health and reduce the risk of catastrophic wildfires. In 2003, that act was signed into law.

Through these watershed pieces of legislation, Congress continues to appropriate specific funding to address five main sub-categories: preparedness, suppression, reduction of hazardous fuels, burned-area rehabilitation, and state and local assistance to firefighters. The general concepts of the NFP blended well with the established need for community wildfire protection in the study area. The spirit of the NFP is reflected in the Upper San Pedro CWPP.

This CWPP meets the requirements of HFRA by:

1. Identifying and prioritizing fuels reduction opportunities across the landscape (see *Landscape Scale Fuels Modification FMU* beginning on page 41of this document).
2. Addressing structural ignitability (see *Home Mitigation FMU* on page 38 - 40
3. Assessing community fire suppression capabilities (see *Local Preparedness and Firefighting Capabilities FMU* on page 34).
4. Collaborating with stakeholders (see **Appendix E**).

GOALS AND OBJECTIVES

Goals for this project include the following:

1. Enhance life safety for residents and responders.
2. Mitigate undesirable fire outcomes to property and infrastructure.
3. Mitigate undesirable fire outcomes to the environment, watersheds, and quality of life.

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

1. Establish an approximate level of risk (the likelihood of a significant wildfire event in the study area).
2. Provide a scientific analysis of the fire behavior potential of the study area.
3. Group values at risk into “communities” that represent relatively similar hazard factors.
4. Identify and quantify factors that limit (mitigate) undesirable fire effects to the values at risk (hazard levels).
5. Recommend specific actions that will reduce hazards to the values at risk.

OTHER DESIRED OUTCOMES

1. **Heightened community awareness:** Quantifying the community's hazards and risk from wildfire will facilitate public awareness and assist in creating public action to mitigate the defined hazards.
2. **Improved wildfire prevention through education:** Community awareness, combined with education, will help to reduce the risk of unplanned human ignitions.
3. **The facilitation and prioritization of appropriate hazardous fuel reductions:** Organizing and prioritizing hazard mitigation actions into Fire Management Units (FMUs) will provide stakeholders with social and fire-management perspectives, allowing them to make better decisions about their future efforts.
4. **Improved levels of response:** The identification of areas of concern will improve the focus and accuracy of pre-planning, and facilitate the implementation of cross-boundary, multi-jurisdictional projects.

COLLABORATION: COMMUNITY/AGENCIES/FIRE SAFE COUNCILS

Representatives involved in the development of the Upper San Pedro CWPP are included in the following table. Their names, organizations, and various roles and responsibilities are indicated in **Table 1**.

Table 1: CWPP Development Team

Name	Organization	Roles / Responsibilities
David Peters, Fire Mitigation Specialist	USDI, Bureau of Land Management	Contract Representative, Firewise Liaison. Local information and expertise. Development of community protection priorities. Implementation of fuels treatment projects.
Chris White, CEO Marc McDonald, WUI Manager Mark McLean, GIS Project Manager Rod Moraga, Fire Behavior Analyst and Managing Partner	Anchor Point Group, LLC Consultants	Development of the CWPP document. Scientific analysis of fire behavior, community hazard and risk. Development of hazard mitigation actions and priorities. Establishment of fuels treatment project areas and methods.
John Winchester	Hydrosphere Resource Consultants	Co-developer of original Upper San Pedro Wildfire Hazard and Mitigation Plan

STUDY AREA OVERVIEW

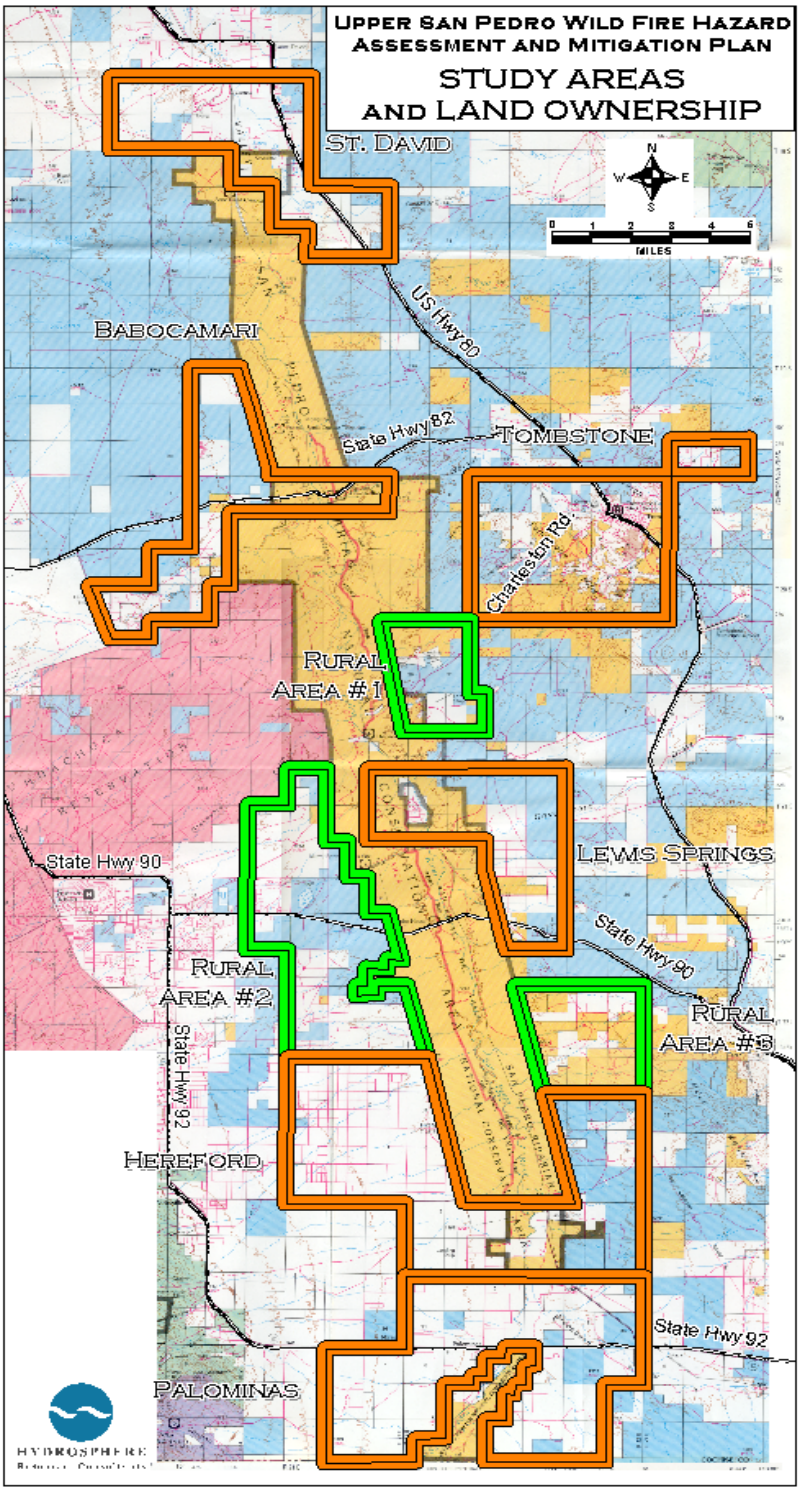
The San Pedro Riparian National Conservation Area (SPRNCA) is located in the southeast corner of the State of Arizona. The Conservation Area is located approximately 70 miles southeast of Tucson, encompasses 56,000 acres (22,600 Ha) and has an average elevation of approximately 4,600 feet (1409 m). There are several population centers included in the project area, including the cities of Sierra Vista, St. David, Tombstone, and Palominas.

The study area covers the SPRNCA including the developed lands of the surrounding communities. The study area is approximately 173 square miles (44,800 hectares) in size.

The San Pedro River flows north from Mexico into the United States. The SPRNCA is designated as a national conservation area due to the high number of animal species found in the area. These include both resident species as well as a high number of migratory birds.

Figure 1 shows the areas that define the WUI study area.

Figure 1: General Location Map



Study Areas:

St. David

Babocomari

Tombstone

Rural Area #1

Lewis Springs

Rural Area #2

Herford

Rural Area #3

Palominas

VALUES AT RISK

LIFE SAFETY AND HOMES

The Upper San Pedro study area in Cochise County, Arizona, is home to a growing population of residents as well as several military establishments. The town of Tombstone is a Registered Historic National Landmark that thrives today as popular tourist destination.

According to the 2006 Census[1], there were 127,757 people, 56,247 households, and 30,768 families residing in the county. According to the 2000 Census the population density was 19 people per square mile (7/km²). There were 51,126 housing units at an average density of 8 per square mile (3/km²).

Wildfire in or around the SPRNCA is not uncommon. Ignition usually results from natural causes, although the percentage of human-caused ignition is high due to the undocumented immigrants (UDI) traffic along the river corridor.

Wildland fire risk is also increased due to the removal of livestock from the Conservation Area. The cessation of grazing has promoted the growth of grasses that result in a high fuel load of fine, flashy fuels.

COMMERCE AND INFRASTRUCTURE

The major industries in the Upper San Pedro study area are farming, ranching, tourism, and military.

The 2004 Census states that the median income for a household in Cochise County was $36,585.

RECREATION AND LIFE STYLE

Cochise County is a popular destination for vacationers and outdoor enthusiasts. Hiking, camping, bird watching, and historical landmarks and legends draw many visitors to the area.

ENVIRONMENTAL RESOURCES

The San Pedro Riparian area is one of the most fragile and ecologically sensitive conservation areas in the country. It covers approximately 40 miles (56,000 acres) along the San Pedro River, which flows north from near Cananea, Mexico to the Gila River. This riparian habitat is rare in the desert Southwest. It's a place where plants and animals thrive because of the availability of water, either at or near the surface of the soil. The river can be spotted from far off because of the band of cottonwood trees that grow densely along its shores, drawing migrating birds and other wildlife. The SPRNCA is designated as a national conservation area due to the high number of animal species found in the area. These include both resident species as well as a high number of migratory birds.

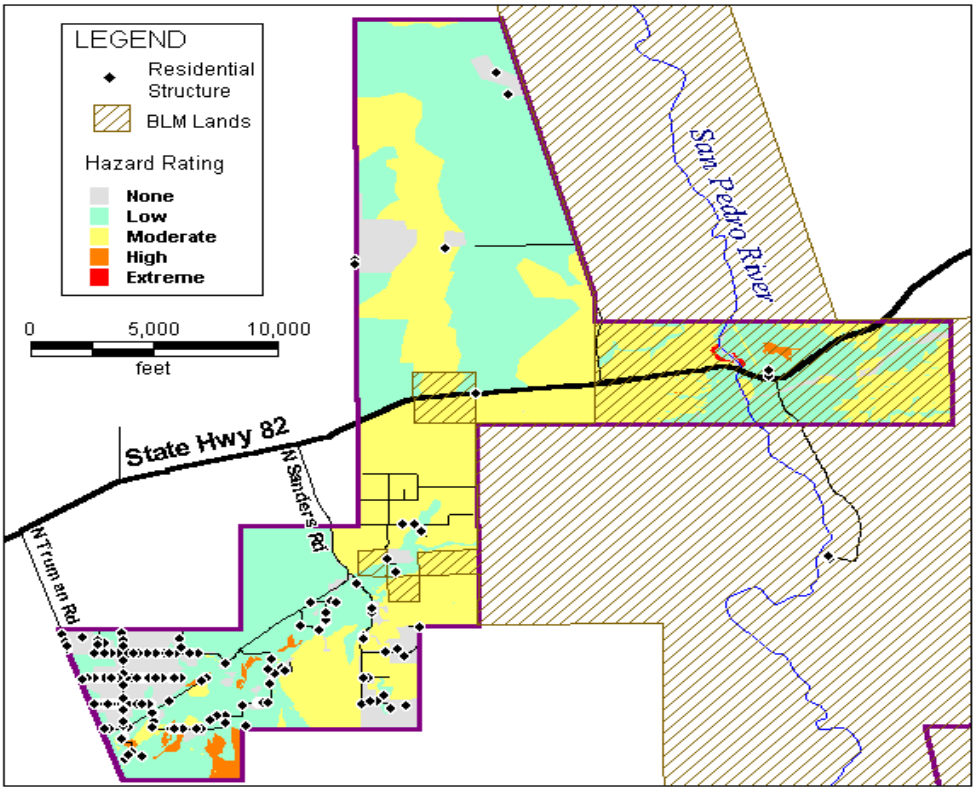
[1] http://www.census.gov/census2006/states/az.html

ASSESSMENT

The Structures per Square Mile Theme shows the results of our Values at Risk assessment. This theme represents an evaluation of the values at risk based only on the presence and location of structures within the analysis area. Possible additional resources / values such as timber resources, wildlife habitat, recreation potential, etc., were not included within the present assessment due to resource restraints. Such additional resources / values could be included in an expanded analysis of the values at risk. This classification represents only an assessment of the resources / values at risk. It does not include the wildfire hazard assessment, i.e., the level of hazard for the location. Some sites with a high number of values at risk may, in fact, have a low hazard and vice versa. In addition, an evaluation of the probability of occurrence (actual level of risk) of a wildfire event was not performed due to lack of data required to support such an analysis.

The Values at Risk assessment was based upon the density of structures estimated from developed parcels. The Values at Risk classification is shown in Figure 2.

Figure 2: Wildfire Hazard Map



EVALUATION OF THE ENTIRE SAN PEDRO RIVER STUDY AREA: communities of: Babocamari, Hereford, Lewis Springs, Palominas, Rural Area #1, 2 & 3, St. David and Tombstone.

Table 2: Values at Risk

Wildfire Hazard - Values at Risk Evaluation of the Entire San Pedro River Study Area

HOME SURVEY QUESTIONS AND ANSWERS			
	Homes		**Homes**
VISIBLE ADDRESS:		**DANGEROUS TOPOGRAPHY:**	
Not Present	100	Not Applicable	364
Present, Not Reflective	97	< 150 feet	49
Present and Reflective	245	Not Assessed	31
Unanswered	2	>100 ft to <500 ft	
		>30 ft to <100 ft	
ROOFING MATERIAL:		>500 ft	
Asphalt	281		
Metal	138	**UTILITY LINE:**	
Wood	2	Below Ground	69
Tile	16	Above Ground	202
Unanswered	7	Unanswered	11
		One Above / One Below	162
SIDING MATERIAL:			
Non-Flammable	264	**COMBUSTIBLE MATERIAL:**	
Wood Sheathing	157	None Present	
Log (6" tip minimum)		Shrubs	
Mixed Stone and Wood	16	Light Flashy Vegetation	
Unanswered	7	Multiple Items Above	
		Trees	
EAVES:		Trash	
Enclosed	208		
Not Present	142	**VEGETATION NEAR ROOF:**	
Not Enclosed	87	Not Applicable	276
Unanswered	7	Branches / Limbs within 5 feet	86
		Unanswered	3
DRIVEWAY GRADE:		Overhanging Branches / Limbs	79
Flat (0% - 5%)	395	Leaf & Needles on Roof / Gutters	
Low (6% - 8%)	29		
Moderate (9% - 12%)	10	**ROAD WIDTH:**	
Steep (>12%)	7	Less than 20'	229
Unanswered	3	Between 20' and 24'	104
		Greater than 24 feet wide	109
DRIVEWAY LENGTH:			
<300 ft.	358	**FUEL TYPE:**	
>300 ft.	83	Grass w / downed Stem Wood (FM2)	
Unanswered	3	Litter (FM8)	
		Grass (FM1)	
TURNAROUND:		Unanswered	2
Yes	353	Litter (FM7)	
No	88	Tall Grass (FM3)	
Unanswered	3	Shrub (FM4)	
		Litter (FM9)	
VERTICAL CLEARANCE:		Shrub (FM5)	
Yes	430	Light:	202
No	12	Moderate:	179
Unanswered	2	Heavy:	61

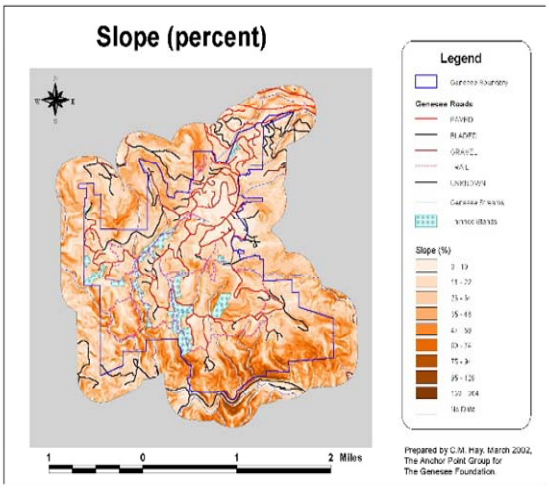
GATED ACCESS:		FUEL CONTINUITY:	
Yes	185	> 30 feet but < 60 feet	
No	257	< 30 feet WITHOUT defensible space	
Unanswered	12	>200 feet	
		>60 feet but <200 feet	
ASPECT:		< 30 feet WITH defensible space	
East (NE <-E-> SE)	9		
South (SE <-S-> SW)	28	**DEFENSIBLE SPACE:**	
North (NW <-N-> NE)	28	Non-Conforming	203
West (SW <-W-> NW)	6	None	53
Flat (0% - 5%)	370	Conforming	184
Unanswered	3	Unanswered	4
SEASONAL WATER SOURCES:		**INGRESS / EGRESS:**	
No	144	One Road In / Out	332
Yes	6	Two or more roads in / out	110
Unanswered	261	Unanswered	2
Unknown	33		
		PROPANE PROXIMITY:	
ON-SITE WATER:		More than 50 feet downhill	
None	393	less than 50 feet downhill	
Cistern	4	less than 50 feet uphill / even	
Unanswered	4	more than 50 feet uphill / even	
Pond	10	Not Applicable	
Swimming Pool	18		
Stream (w / dry hydrant)	14	**PROPANE LOCATION:**	
Pressurized Hydrant	1	D Side (right)	
		C Side (rear)	
OVERALL SLOPE:		A Side (front)	
Low (8% to 20%)	48	B Side (left)	
Flat (<8%)	372		
High (31% to 75%)	3	**SERVICE PANEL:**	
Moderate (21% to 30%)	18	C Side (rear)	
Extreme (>75%)		A Side (front)	
Unanswered	3	D Side (right)	
		B Side (left)	
VEGETATION / TYPE:			
GRASS with scattered trees or brush		**DRIVEWAY WIDTH:**	
Moderately Dense CONIFERS or BRUSH		1 Engine (8 - 22 feet)	248
GRASS or GRASS with aspen trees		Not Applicable (<50ft)	145
Willows		Inaccessible	1
Dense Continuous CONIFERS and / or Thick BRUSH		2 Engines (>22ft)	41
Thinned CONIFERS (10 feet spacing)		Pullouts Exist (min 22x30 ft)	7
		Unanswered	2
BALCONIES:			
Not Enclosed to Grade			
Enclosed to Grade			
Not Present			

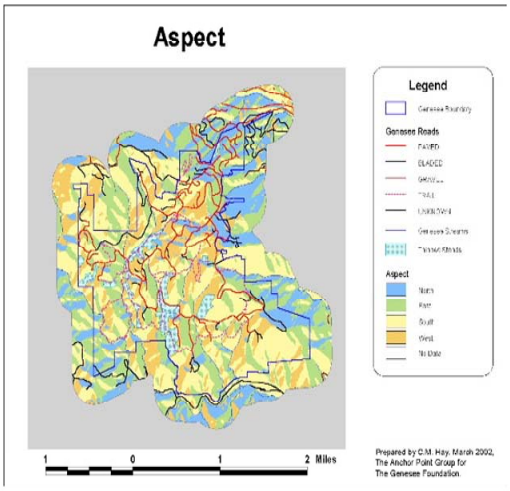
CURRENT RISK SITUATION

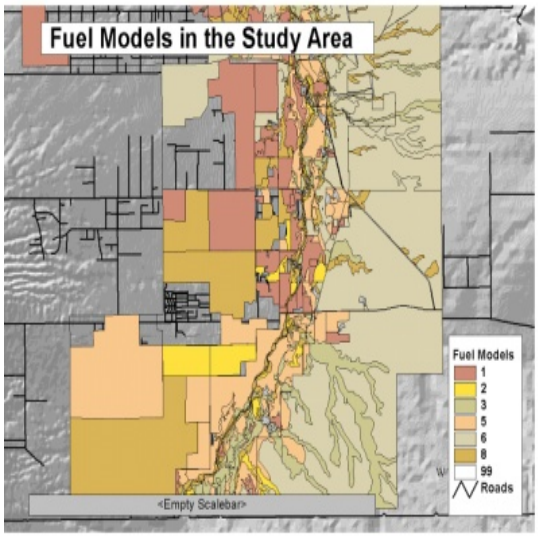
For the purpose of this report the following definitions apply: **Risk** is considered to be the likelihood of an ignition occurrence. This is primarily determined by the fire history of the area. **Hazard** is the combination of the wildfire hazard ratings of the Wildland Urban Interface (WUI) communities and fire behavior potential, as modeled from the fuels, weather and topography of the study area.

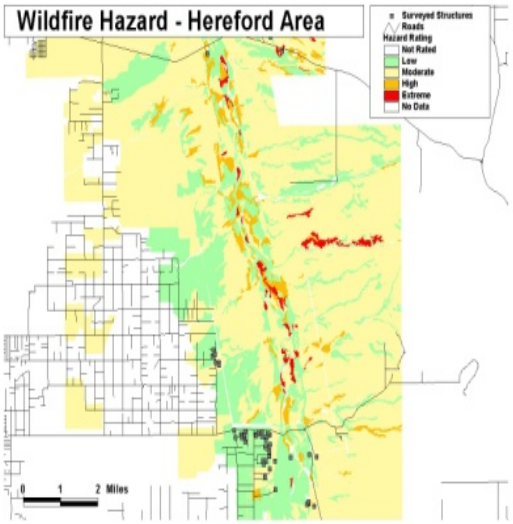
To determine hazard level, we consider slope, aspect and fuels.

Figure 3: Slope + Aspect + Fuel = Hazard



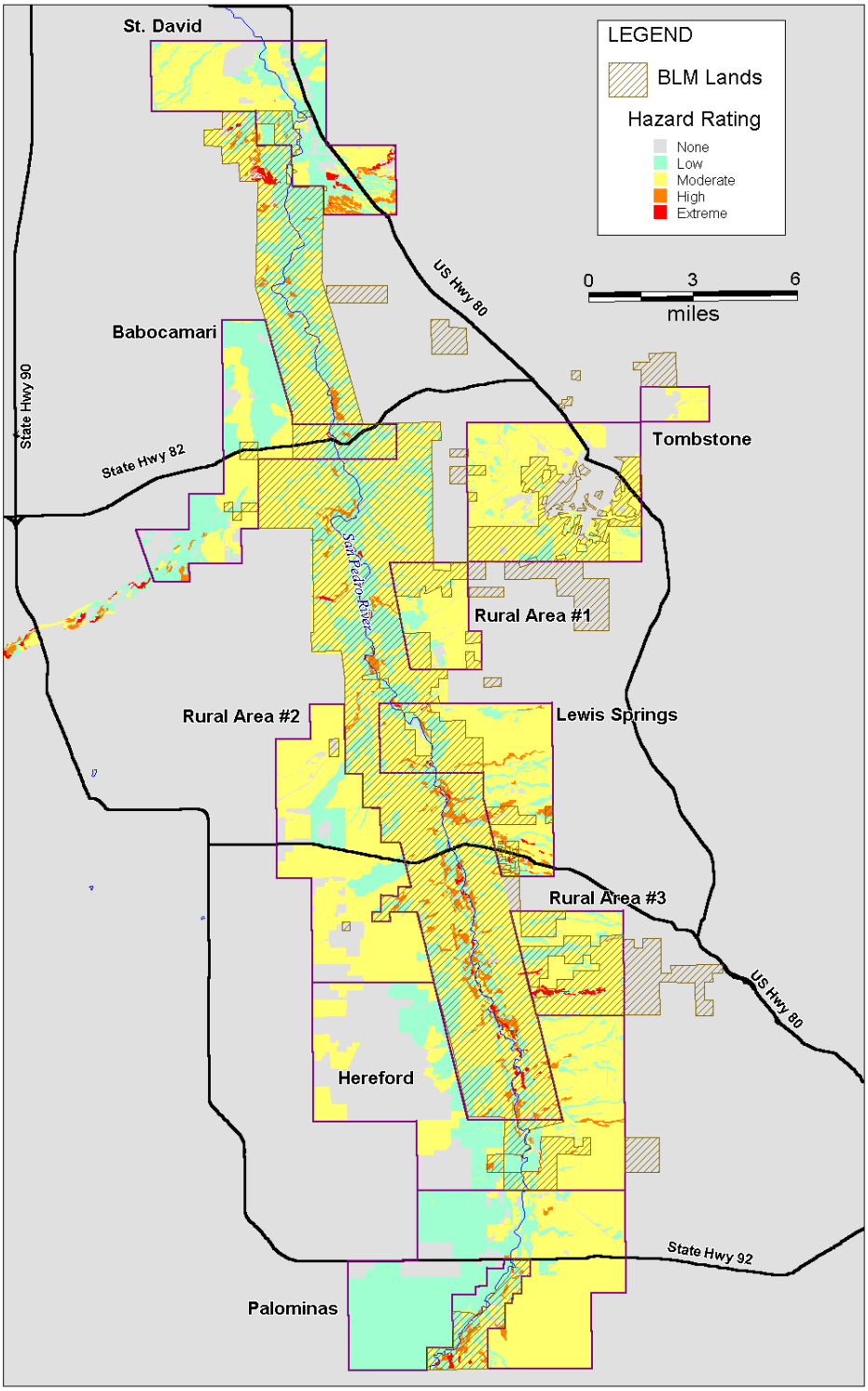






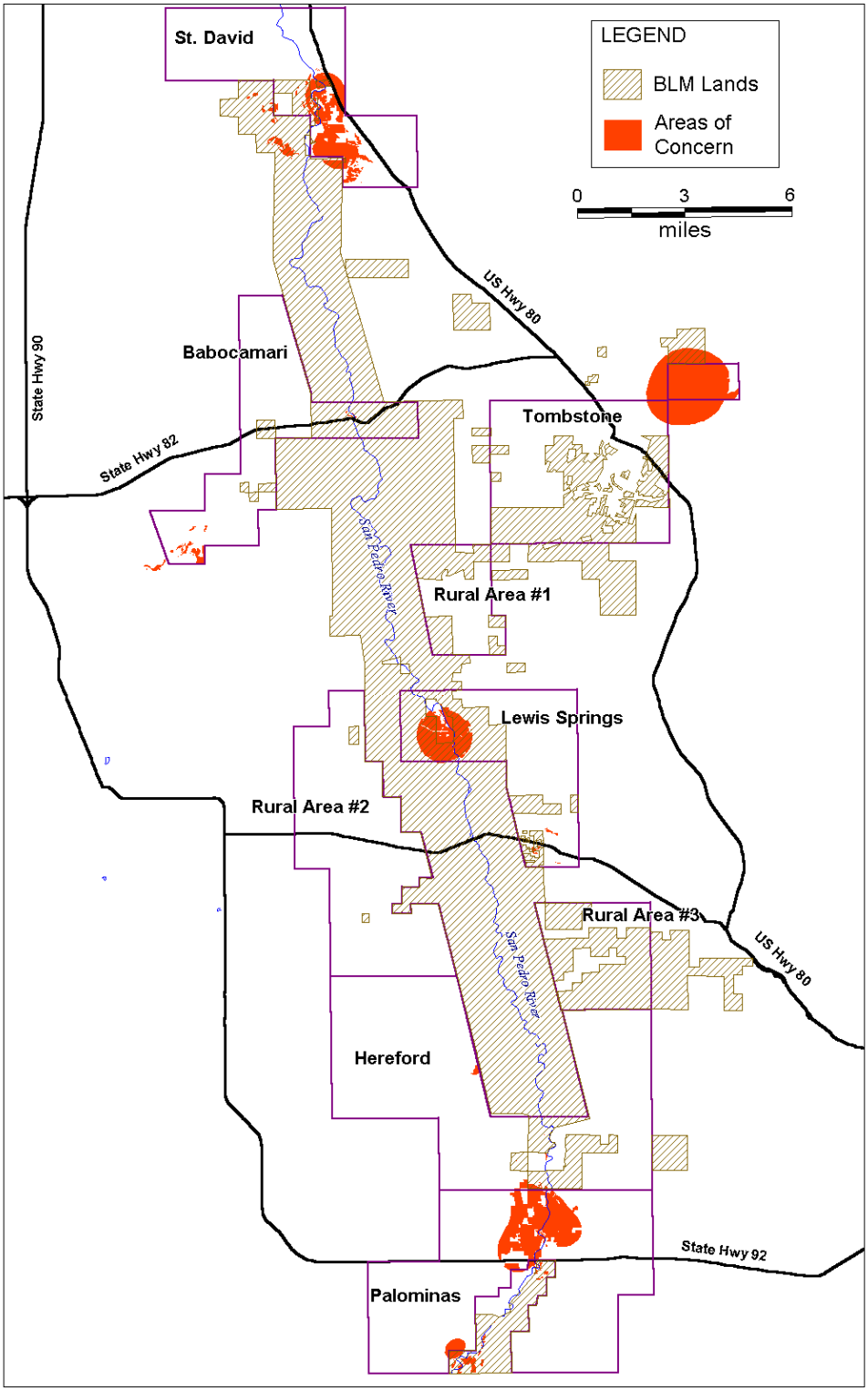
A Wildfire Hazard-Risk analysis was completed for each of the six communities and three rural areas, and each area was classified by Wildfire Hazard level. Figure 4 represents the hazard rating for the Upper San Pedro study area.

Figure 4: Wildfire Hazard Rating



From this, Areas of Concern were defined based upon wildfire hazard level and community specific evaluations. This was used to generate maps showing the areas where wildfire mitigation would have the greatest impact at reducing wildfire hazard.

Figure 5. Areas of Concern for Upper San Pedro Study Area



In addition to community level surveys, individual home assessments were completed for a total of 441 structures located within the SPRNCA study area boundaries. The results of these surveys were incorporated into a RedZone software database. The data stored by the software can be used for preplanning purposes, planning during a wildfire event, or to provide homeowners with information about what they can do to reduce their risk of loss from wildfire.

Table 3 summarizes the results of the hazard assessment.

Table 3: Summary of Wildfire Assessment

	Fire Behavior Index Hazard			Areas of Concern Level		
Hazard Level	**Acres**	**Hectares**	**# Structures**	**Acres**	**Hectares**	**# Structures**
Low	449	181	109	3569	104	14
Moderate	3070	1242	121	265	765	70
High	248	100	0	1889	665	100
Very High	3166	1281	37	1644	621	242
Extreme	2029	821	220	1534	25	58
Sum	8962	3627	487	8962	2183	484

FIRE REGIME CONDITION CLASS

The risk of wildfire is dependent on many factors, including fuels, weather, topography, and sources of ignition. These factors vary in both space and time.

Fire Regime Condition Class (FRCC) is a landscape evaluation of expected fire behavior as it relates to the departure from historic norms. The data used for this study is from a national level map. The minimum mapping unit for this data is one square kilometer.

FRCC should not be confused with the BEHAVE and FlamMap fire behavior models (detailed in **Appendix A**), which provide the fire behavior potential analysis for expected flame length, rate of spread, and crown fire development. Rather, FRCC is an expression of the current condition's departure from the historical fire regime. It is used as a proxy for the probability of severe fire effects: for example, the loss of key ecosystem components such as soil, vegetation structure, and/or species; or alteration of key ecosystem processes such as nutrient cycles and/or hydrologic regimes. Consequently, FRCC is an index of hazards to the status of many components, such as water quality, fish status, wildlife habitats, etc.

Figure 6 shows the fire regimes of the Upper San Pedro Watershed, as compiled by the Nature Conservancy. This figure shows the types of fires likely to occur in the watershed, based on fuels and topography. Because of fuel type and loadings, the most sever fires are likely to occur along the west side of the river, where, coincidently, the housing density in the valley is higher.

Figure 7 shows the fire starts reported by fire agencies for 1995-1999, broken down by type. This map shows several areas with higher incidences of fire starts. These include the mountains to the west of the valley, where the predominant fire start mechanism is lightning, and two on the San Pedro River, one just to the south of the main SPRNCA boundary and one just to the north of Escapule. The fires in these areas are primarily due to human causes, quite possibly UDIs moving through the area along the river.

Figure 6: Fire Regimes of the Upper San Pedro Watershed

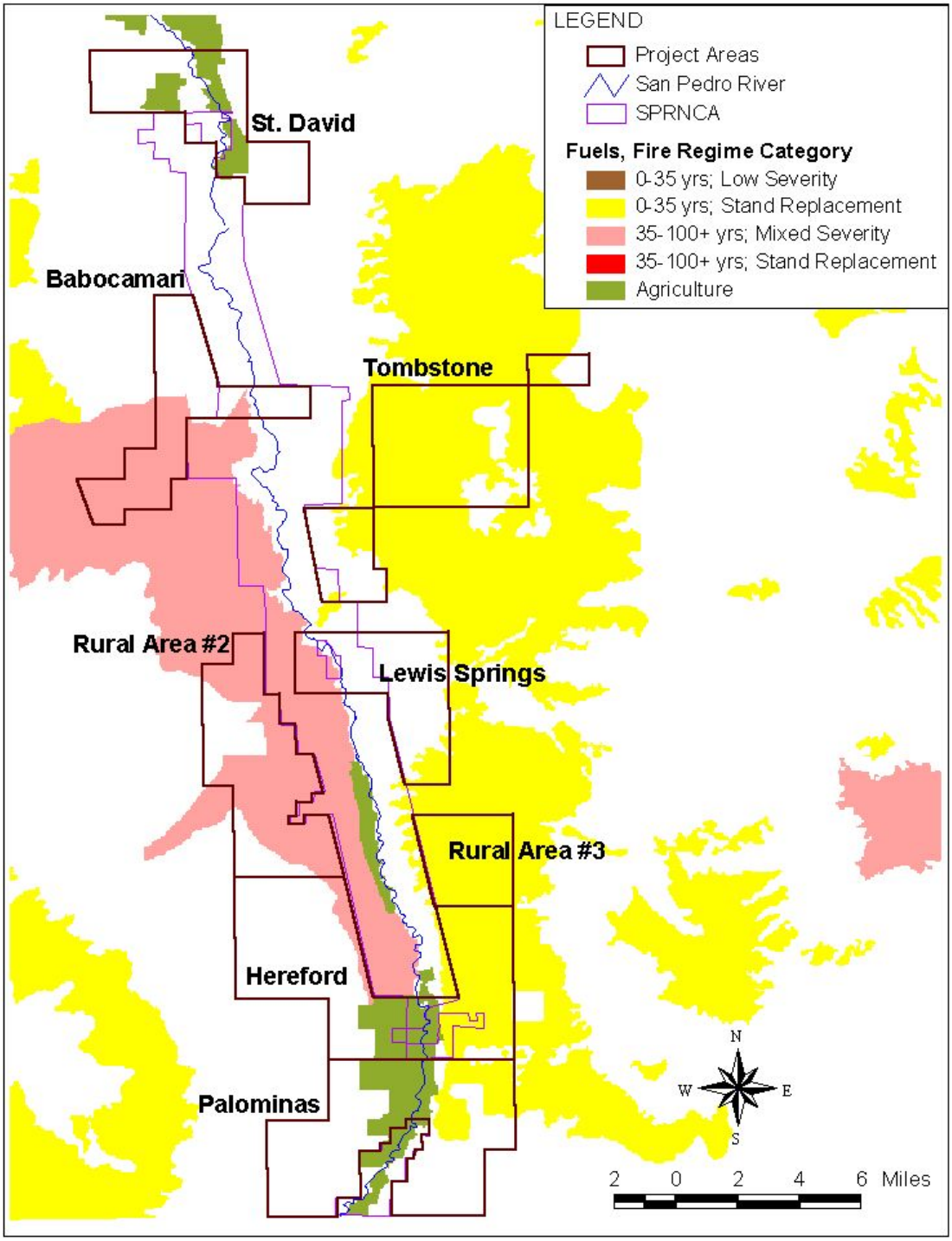
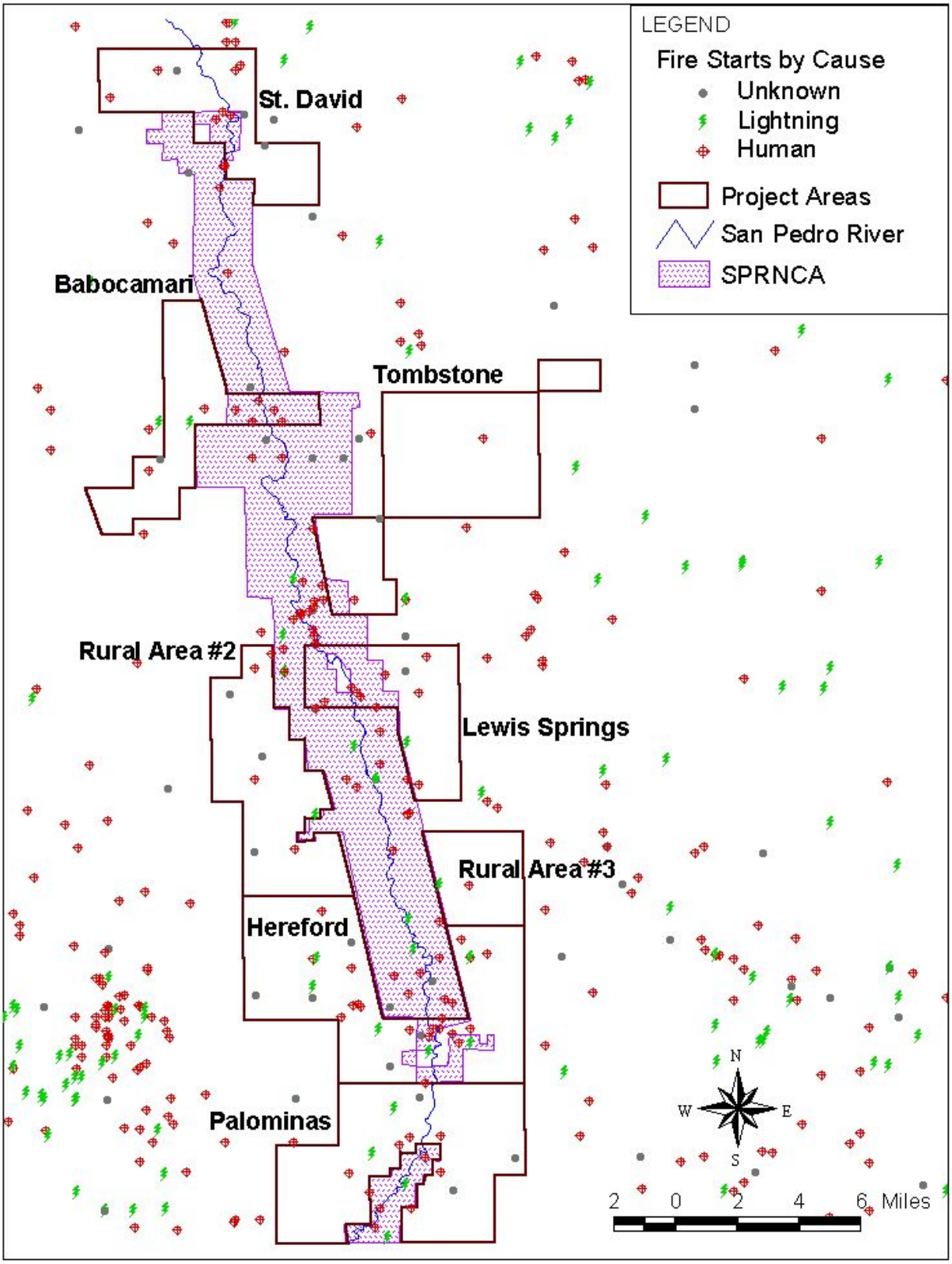


Figure 7: Fire Starts in the Upper San Pedro Watershed, 1995-1999



To derive FRCC, current conditions are compared to an estimate of the historical range that existed prior to substantial settlement by Euro-Americans. The current condition's departure from the historical baseline serves as a proxy to likely ecosystem effects. When applying the condition class concept, it is assumed that historical fire regimes represent the conditions under which the ecosystem components within fire-adapted ecosystems evolved and have been maintained over time. Thus, if it is projected that fire intervals and/or fire severity have changed from historical conditions, one expects that fire size, intensity, and burn patterns will likewise be altered if a fire occurs. Furthermore, it is assumed that if these basic fire characteristics have changed, it is likely that there would be subsequent effects to those ecosystem components that had adapted to the historical fire regimes. As used here, the potential of ecosystem effects reflect the probability that key ecosystem components would be lost if a fire occurred within the study area. Key ecosystem components can be represented by virtually any attribute of an ecosystem (for example, soil productivity, water quality, floral and faunal species, large-diameter trees, snags, etc.).[2]

The following categories of condition class are used to qualitatively rank the potential of effects to key ecosystem components:

Table 4. Condition Class Descriptions

Condition Class	Condition Class Description
1	Fire regimes are within their historical range. The risk of losing key ecosystem components as a result of wildfire is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Fire effects should be similar to those expected under historic fire regimes.
2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components as a result of wildfire is moderate. Fire frequencies have changed by one or more fire-return intervals (either increased or decreased). Vegetation attributes have been moderately altered from their historical range. It is therefore likely that wildfires will be larger and more severe, and have altered burn patterns from those expected under historic fire regimes.
3	Fire regimes have changed substantially from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have changed by two or more fire-return intervals. Vegetation attributes have been significantly altered from their historical range. It is therefore likely that wildfires will be larger and more severe, and have altered burn patterns from those expected under historic fire regimes.

[2] Fire Regime Condition Class, website, http://www.frcc.gov/, July 2005.

FIRE BEHAVIOR POTENTIAL

Fuel Models and Fire Behavior

Fire behavior modeling is done by generalizing fuel types found in the field into fuel model types. The area in and around SPRNCA are comprised several fuel models, each with its own characteristics. The Fuel Models identified for this project were:

- **Fuel Model 1**: Short grass, less than 1 foot high. Fire occurs at the surface and moves rapidly through the cured grass and associated material.
- **Fuel Model 3**: Tall grass, averaging 3 feet high, though considerable variation may occur. Fires in this fuel type are the most intense of the grass group and displays high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water.
- **Fuel Model 5**: Continuous stands of low brush, with heights not exceeding six feet. Fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material.
- **Fuel Model 6** represents dormant brush and hardwood slash, generally not exceeding 6 feet in height. Fires carry through the shrub layer where the foliage is more flammable than Fuel Model 5, but this requires moderate winds, greater than 8 miles per hour at mid flame height. Fire will drop to the ground at low wind speeds or at openings in the stand.
- **Fuel Model 8**: Closed timber litter, which is comprised mainly of needles, leaves, and occasionally twigs, with little undergrowth. Fires are generally slow-burning ground fires with low flame lengths, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up.

BEHAVE model runs were completed using the following parameters:

Fuel Moisture by Fuel Type			Slope
10-hr Fuels	100-hr Fuels	Herbaceous	
5%	6%	100%	10%

Fuel models are a set of numbers that describe the fuel in terms that a fire spread model can use. It uses 7 characteristics to categorize them.

- Fuel Loading
- Size and Shape
- Compactness
- Horizontal Continuity
- Vertical Arrangement
- Moisture Content
- Chemical Content
- Description

The **BEHAVE** Fire Behavior Prediction and Fuel Modeling System was utilized to help determine the wildfire hazard for the SPRNCA Community. The system gathers available fire models into a system that is driven by direct user input. It has been used for a variety of applications including projection of an ongoing fire, prescribed fire planning, fuel hazard assessment, initial attack dispatch, fire prevention planning, and training. **BEHAVE** is run by user-supplied input. Requested values depend on the modeling choices made by the user. For example, fuel model, fuel moisture, wind speed and direction, terrain, and slope are used to calculate rate of spread, flame length, and intensity. Other outputs that can be derived from the model include:

- Surface fire spread, intensity, flame length
- Area and perimeter of a point source fire
- Spotting distance
- Probability of ignition
- Scorch height
- Tree mortality

The SPRNCA area is represented by several fuel models. Each is described below with a table showing a range of fire behavior based on the **BEHAVE** system.

FUEL MODEL 1 - Short Grass

Figure 8. Fuel Model 1 - Short Grass

Characteristics[3] --Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations.

Common Types / Species -- Annual and perennial grasses such as Lehman's Lovegrass, Spiny Aster, Tobosa are included in this fuel model.

Fire Behavior -- Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area.

[3] Anderson, Hal. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station 22 p. (NFES 1574).

Table 5. Rate of spread in chains/hour (1 chain=66 ft) for Fuel Model 1

		Mid-flame Wind Speed					
Fine Dead Fuel moisture %		2.0	4.0	6.0	8.0	10.0	12.0
	2.0	28.8	92.9	203.6	362.4	570.1	665.6
	4.0	22.0	71.1	155.7	277.0	345.1	345.1
	6.0	19.4	62.4	136.8	243.4	270.1	270.1
	8.0	16.7	53.9	118.1	198.7	198.7	198.7
	10.0	11..0	35.6	64.8	64.8	64.8	64.8

Table 6. Flame Length in Feet for Fuel Model 1

		Mid-flame Wind Speed					
Fine Dead Fuel moisture %		2.0	4.0	6.0	8.0	10.0	12.0
	2.0	3.0	5.1	7.3	9.6	11.8	12.7
	4.0	2.4	4.1	5.9	7.8	8.6	8.6
	6.0	2.2	3.8	5.5	7.1	7.5	7.5
	8.0	2.0	3.4	4.9	6.3	6.3	6.3
	10.0	1.4	2.4	3.2	3.2	3.2	3.2

FUEL MODEL 3 - Tall Grass

Figure 9. Fuel Model 3 - Tall Grass

Characteristics -- Stands are tall, averaging about 3 feet (1 m) but considerable variation may occur. Approximately one-third or more of the stand is considered dead or cured and maintains the fire.

Common Species / Species-- Various Tall grass species such as Sacaton, Sacaton/Tobosa, and Johnson Grass.

Fire Behavior -- Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water.

Table 7. Rate of spread in chains/hour (1 chain=66 ft) for Fuel Model 3

		Mid-flame Wind Speed					
Fine Dead Fuel moisture %		2.0	4.0	6.0	8.0	10.0	12.0
	2.0	61.7	139.3	230.4	331.6	441.1	557.6
	4.0	48.6	109.7	181.5	261.2	347.4	439.2
	6.0	40.2	90.7	150.0	215.9	287.1	363
	8.0	34.8	78.6	130.0	187.1	248.9	314.7
	10.0	31.4	70.8	117.2	168.7	224.4	283.6

Slope 10%

Table 8. Flame Length in Feet for Fuel Model 3

		Mid-flame Wind Speed					
Fine Dead Fuel moisture %		2.0	4.0	6.0	8.0	10.0	12.0
	2.0	3.0	5.1	7.3	9.6	11.8	12.7
	4.0	2.4	4.1	5.9	7.8	8.6	8.6
	6.0	2.2	3.8	5.5	7.1	7.5	7.5
	8.0	2.0	3.4	4.9	6.3	6.3	6.3
	10.0	1.4	2.4	3.2	3.2	3.2	3.2

FUEL MODEL 5 - Low Brush

Figure 10. Fuel Model 5 – Low Brush


Characteristics -- This model consists of continuous stands of low brush. Generally, heights do not exceed six feet. The stands will have a grass or scattered grass understory. Usually shrubs are short and almost totally cover the area.

Common Types / Species -- Young, green stands with no dead wood would qualify: Mixed Forbs, Mixed Upland Scrub, and Whitethorn. Mountain grasses are also associated with this type.

Fire Behavior -- The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. Cured leaves retained on shrubs can cause greater intensities.

Table 9. Rate of spread in chains/hour (1 chain=66 ft) for Fuel Model 5

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	9.7	22.5	38.2	56.2	76.0	97.5
4.0	8.7	20.1	34.2	50.3	68.1	87.3
6.0	7.5	17.5	29.8	43.8	59.2	76.0
8.0	5.5	12.7	21.6	31.8	43.1	55.2
10.0	2.7	6.4	10.8	15.9	21.5	21.8
12.0	2.6	6.1	10.4	15.3	20.1	20.1

Table 10. Flame Length in Feet for Fuel Model 5

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	4.3	6.4	8.1	9.7	11.2	12.5
4.0	3.9	5.8	7.4	8.8	10.1	11.4
6.0	3.5	5.1	6.5	7.8	8.9	10.0
8.0	2.6	3.8	4.9	5.8	6.7	7.5
10.0	1.4	2.0	2.6	3.1	3.5	3.6
12.0	1.3	2.0	2.5	3.0	3.4	3.4

FUEL MODEL 6 - Dormant Brush, Hardwood Slash

Figure 11. Fuel Model 6 - Dormant brush, hardwood slash

Characteristics -- The shrubs are mature and usually do not exceed 6 feet in height. Additionally, fuel model 6 contains a dead vegetative component that contributes to its flammability.

Common Types/Species -- A broad range of shrub conditions is covered by this model. Fuel situations to be considered include Mesquite, Saltcedar, and mixed upland scrub. Even hardwood slash that has cured can be considered.

Fire Behavior -- Fires carry through the shrub layer where the foliage is more flammable than Fuel Model 5, but this requires moderate winds, greater than 8 miles per hour (13 km/h) at midflame height. Fire will drop to the ground at low wind speeds or at openings in the stand.

Table 11. Rate of spread in chains/hour (1 chain=66 ft) for Fuel Model 6

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	17.2	38.5	63.9	92.4	123.5	156.8
4.0	13.9	31.1	51.7	74.8	99.9	126.9
6.0	11.7	26.2	43.5	62.9	84.1	106.8
8.0	10.2	22.9	38.1	55.0	73.6	93.4
10.0	9.2	20.7	34.4	49.7	66.5	84.4
12.0	8.5	19.1	31.7	45.9	61.4	77.9

Table 12. Flame Length in Feet for Fuel Model 6

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	5.0	7.3	9.2	10.9	12.4	13.9
4.0	4.3	6.2	7.8	9.3	10.6	11.8
6.0	3.8	5.5	6.9	8.2	9.3	10.4
8.0	3.4	5.0	6.3	7.4	8.5	9.5
10.0	3.2	4.7	5.9	7.0	8.0	8.9
12.0	3.1	4.4	5.6	6.7	7.6	8.5

FUEL MODEL 8 - Closed timber litter

Figure 12. Fuel Model 8 - Closed Timber Litter


Characteristics -- Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand.

Common Types / Species -- Mature Mesquite, Cottonwood, and Willow

Fire Behavior -- Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidity, and high winds do these fuels pose fire hazards.

Table 13. Rate of spread in chains/hour (1 chain=66 ft) for Fuel Model 8

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	1.1	2.3	3.9	5.7	7.8	10.1
4.0	0.9	1.9	3.2	4.7	6.4	6.9
6.0	0.7	1.6	2.6	3.9	4.9	4.9
8.0	0.6	1.4	2.3	3.4	3.8	3.8
10.0	0.6	1.2	2.0	3.0	3.1	3.1
12.0	0.5	1.1	1.8	2.7	2.7	2.7

Table 14. Flame Length in Feet for Fuel Model 8

Fine Dead Fuel moisture %	Mid-flame Wind Speed					
	2.0	4.0	6.0	8.0	10.0	12.0
2.0	0.9	1.3	1.7	2.0	2.3	2.6
4.0	0.8	1.1	1.4	1.7	2.0	2.0
6.0	0.7	1.0	1.2	1.5	1.7	1.7
8.0	0.6	0.9	1.1	1.3	1.4	1.4
10.0	0.6	0.8	1.0	1.2	1.3	1.3
12.0	0.6	0.8	1.0	1.2	1.3	1.3

FIRE BEHAVIOR MODELING LIMITATIONS AND INTERPRETATION

This evaluation is a prediction of likely fire behavior, given a standardized set of conditions and a single point-source ignition. It does not consider cumulative impacts of increased fire intensity over time and space. One should remember the minimum mapping unit used for fire behavior modeling is one acre, so fine-scale fire behavior and effects are not considered in the model. These calculations may be conservative (under-predict) compared to observed fire behavior.

Weather conditions are extremely variable, and it is not possible to account for all combinations. These outputs are best used for pre-planning and not as a stand-alone product for tactical planning. If this information is used for tactical planning, it is recommended that fire behavior calculations be done with actual weather observations from the fire. For greatest accuracy, the most current Energy Release Component (ERC) values should be calculated and distributed during the fire season for use as a guideline for fire behavior potential. A more complete discussion of the fire behavior potential methodology can be found in Appendix A.

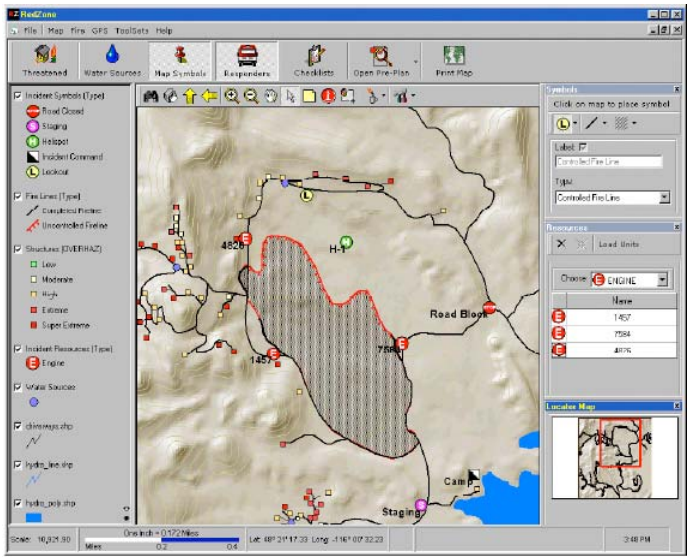
SOLUTIONS AND MITIGATION

PRE-ATTACK PLAN AND RECOMMENDATIONS

A comprehensive pre-attack plan was completed for this project within a quarter-mile buffer zone of the SPRNCA. RedZone Software was utilized to organize and display both individual structure assessments and infrastructure identification. This tool allows the user to collect, maintain and use preplanning data. This data includes information concerning homes, roads and other GIS data. It can be utilized to assist with fire education, developing and prioritizing future projects and to support an incident in size-up, stabilization, property conservation and fire control. The software is designed specifically for firefighters in the field.
The software package utilized in the assessment and provided to the BLM has three distinct elements.

The project field staff utilized comprehensive field surveys, which were integrated into a Personal Digital Assistant (PDA). Diverse types of preplanning data were collected.

Figure 13: Example of RedZone Software Interface



The Utilities program allows RedZone to not only collect information, but also maintain it over time. The program provides tools to update field data customize and print maps, analyze homes based on hazard criteria, and many other tools.

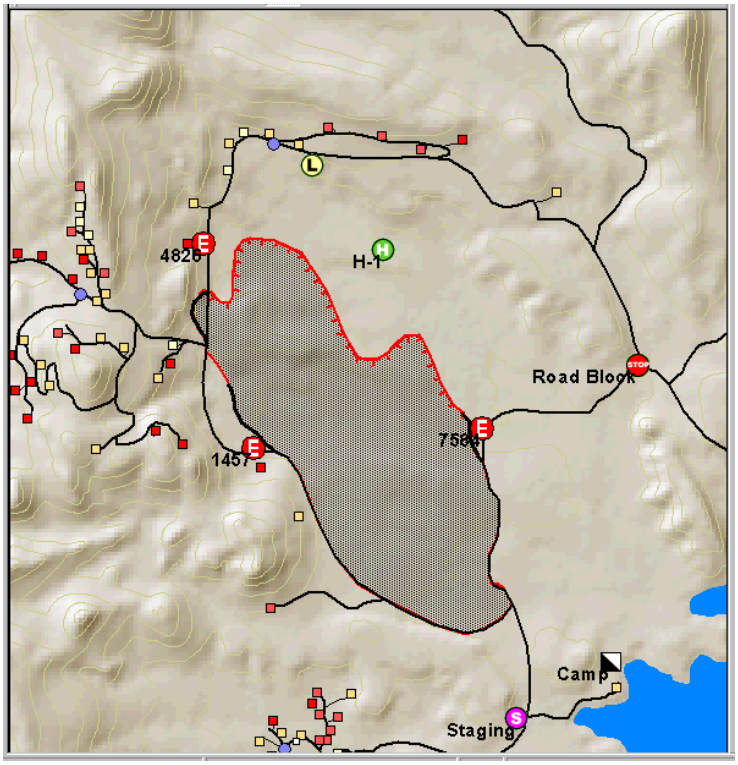
One exceptional feature of Utilities is the ability to instantly generate a mitigation report for any home surveyed.

Data Elements Collected

Data collected for individual home surveys included:

- Topography
- Aspect Class (N-S-E-W)
- Survivable Space
- Vegetation / Fuel Types
- Predominant fuel model class
- Flammable materials storage
- Determination of vegetation near Chimney or Stovepipe
- Street address
- GPS of house pad location
- Photographs of structure
- Roofing material classification
- Balcony & Deck classification
- On-site Access classification
- Water supply
- Off site Access: Ingress / egress to the driveway, road width, maximum grade

Figure 14: Example of RedZone FireDirect Screen



During fires, the FireDirect program is an invaluable tool for providing spatial data. From access restrictions to water availability for individual structures, it provides critical information to firefighters in the field. FireDirect also has the capability of tracking responding engines and crews, importing fire perimeters and create standard ICS maps and forms. The software has been populated with a comprehensive database specific to the SPRNCA. It is configured to accept increasing and wide-ranging database information.

RECOMMENDATIONS

- The BLM with input from the representative fire district should continue to update and increase the data available to the software.
- Future fire perimeters and confirmed starts should be recorded to develop trends.
- New water supply installations should be noted and marked on the GIS.
- New homes and completed mitigation efforts should be recorded.
- The software should be updated through RedZone as new versions are available.

ESTABLISHING AND PRIORITIZING FIRE MANAGEMENT UNITS (FMUS)

An efficient way to prioritize work efforts is through the creation Fire Management Units (FMUs). FMUs should be created prior to planning or initiating fuels management projects and other mitigation. There are unique vegetation and/or mitigation management activities recommended for each unit. Units may be functional or geographic. The local land management and fire management agencies (ideally with the input of the citizen's advisory council) must determine priority actions. The following FMUs have been identified for the study area, and a situational analysis and recommendations are provided for each. **FMUs are not ranked by priority**, but priority recommendations have been provided for specific tactical mitigation actions, where appropriate, within FMUs.

- Access and Evacuation FMU
- Public Education FMU
- Local Preparedness and Firefighting Capabilities FMU
- Home Mitigation FMU
- Fuels Modification Projects FMU
- Water Supply FMU

ACCESS AND EVACUATION FMU

Many of the communities at risk in the study area have limited ingress and egress routes. The community of Escapule has only one primary road in and out of the community. Some roads are poorly maintained and impassable after flooding. If separate ingress and egress routes are not established and utilized in an emergency, a critical traffic flow issue will be created. Vehicle congestion and even full occlusion of roadways is very possible.

Comprehensive fuels reduction projects for egress and access routes may not be feasible due to complex land ownership and the scope of the effort. It is however possible to reduce the fine fuel loading along critical roadways. Mowing within the road right-of-way, approximately 10 feet off of the edge of the road is recommended. This applies for all roads that represent the only access and egress route into a community.

Staging areas

It is also recommended that maximizing the primary vehicle escape and access routes for these communities be accomplished through implementing multiple citizen staging areas.

The use of a safety zone / staging area should also be considered for all communities. These pre-planned safety zones are large enough to accommodate both citizens and staged fire apparatus. These areas are designated as a meeting place where citizens could get more direction and updates before implementing a full evacuation. It is imperative that citizens get approval before evacuating to avoid getting trapped by the fire on a road, or creating hazardous road traffic for incoming apparatus. The concept of citizen staging areas can be applied to subdivision or community levels as well. Local landowners and the local fire department should determine the best sites.

RECOMMENDATIONS

- Post placards clearly marking "fire escape route" and "emergency staging area". This will provide functional assistance during an evacuation, and communicate a constant reminder of wildfire to the communities. Signage should be mounted on non-combustible poles.
- Install a direct 911 call box at the staging areas. This phone would give the citizens direct, priority contact with Cochise County Emergency Services (911) dispatch to obtain clear directions for recommended evacuation procedures.
- Maintain the staging area either by xeriscaping, mowing or a combination strategy. Keep the area clear of all materials, especially hazardous and flammable ones.
- New road construction should be required to create fire safe access, including fuels reduction along the roadway.
    - A pre-plan and a fuel modification project should be implemented for all new roads.
    - Thinning or mowing along critical new road corridors should be completed prior to home construction.

Shelter In-Place

Shelter in-place means to remain inside a home, business, or other permanent building. Shelter in-place may be recommended when there is not enough time to evacuate. It is imperative that structures be mitigated to provide this option.

RECOMMENDATIONS

The following is suggested public education elements to be provided to all potential "shelter in-place" communities:

- If you are outdoors, go inside immediately.
- Bring pets inside if possible but do not risk your safety for your pets.
- Turn on a local Emergency Alert System radio or television station (KTAN 1420 AM, KWCD 92.3 FM, KAVV 97.7, KZMK 100.0 FM) for official information.
- Close all windows, doors, and vents.
- Turn off heaters, air conditioners, and exhaust fans.
- Close as many internal doors as possible and move to the most central, windowless, above-ground room in the building.

- Wet towels, plastic sheeting, or an airtight material can be used to seal gaps where smoke could enter the room.
- Do not attempt to pick up children from school or day care until directed to do so. School officials plan to care for children in emergencies, and they may already be evacuated, or sheltered. (Before an emergency occurs, learn about emergency plans at schools or day care centers.)
- Stay inside until officials say it is safe to leave.

Citizen Notification

Establishing a citizen notification procedure is essential in promoting coordinated evacuation.

RECOMMENDATIONS

- Develop a reverse 911 system for efficient notification
- Utilize local television and radio stations
- Expand any existing disaster notification systems to include wildfire notifications.

PUBLIC EDUCATION FMU

As a whole, the fire protection districts, fire departments, and the communities they serve have a practical understanding of the natural world around them and their community. The community prides itself for living in a high desert environment and values the small town lifestyle. There is varied understanding of the intrinsic hazards associated with the "wildlands" they live in. A well-rounded approach to wildfire education, including public, private and district level input is valuable. Combining the values of the community encompassing - quality of life, property value, the ecosystem, wildlife and safety, will greatly increase the receptiveness of the message.

RECOMMENDATIONS

Provide citizens with the findings of this study including:

- Individual home assessments with recommended mitigation actions.
- Levels of risk and hazard.
- Value of fuels reduction programs.
- Environmental and wildlife values of prescribed fire and fuels management.
- Consequences and results of inaction for planned and unplanned ignitions within Cochise County.
- Utilize these web sites for a list of Public Education Materials and for general homeowner education:
  http://www.nwcg.gov/pms/pubs/pubs.
  http://www.firewise.org/.
- See pages 58 - 60 for additional resources.
- Create a WUI citizen advisory council.

This council would provide peer level communication for their community. The citizen advisory council should be integrally involved in current and future public education outreach programs. The committee can also function as a voice for the community in the county planning process

for significant future developments in the area. A community WUI council / group can assist in the development of future land use regulations and help to ensure that local values are considered and maintained when County level requirements are developed. An initial action for the advisory council could be to assist the BLM to prioritize the value of the recommendations considered later in this report.

Palominas has created a Firewise council and has completed a Community Wildfire Protection Plan for their area. (See appendix F)

Communications Plan

Several communications techniques are available to the BLM Gila District Fire Management Program Area to convey the results and findings of this study to the citizens, stakeholders and adjacent Fire Protection Districts.

RECOMMENDATIONS

Web site

- Create a new Wildfire Mitigation web site and have links to the web site placed on:
    - Existing local BLM web site. http://azwww.az.blm.gov/azso.htm
    - Chamber of Commerce home page http://www.sierravistachamber.org/
    - Cochise County home page http://www.co.cochise.az.us/ccwebsite/Default.asp
    - Southern Arizona Chapter of the Red Cross http://www.tucson-redcross.org/CochiseCounty
- Include the results of this study with maps and a summary of individual structure ratings.
- Create a File Transfer Point (FTP) site where individual home analysis and recommendations can be posted and viewed by the resident upon request.
- Create links to the Arizona State Forestry Division, Arizona Game and Fish Department, USDA Forest Service, USDI Fish and Wildlife Service, USDOD Fort Huachuca Military Reservation, Firewise, state and local Fire Departments and other partner's homepages.

Power Point Slide show

- A presentation has been developed which represents this project.
    - Post the presentation on the new web page.
- Utilize the presentation for::
    - Internal BLM briefings.
    - Annual community meetings.
    - A presentation at the local and or state Fire Marshall's meeting.

News releases and direct mailings

- A direct mailing was sent to the local residence at the start of this project.

    - Send a second mailing to announce the completion of the project.
    - Include the new web site address.
- Contact Federal Emergency Management Agency (FEMA) local office to present the efforts and successes on behalf of the local Fire Departments.

Public meetings

- Meetings were conducted in April, 2003 and again in December, 2007.
    - Display the results of the hazard and risk assessment.
    - Invite key stakeholders, press, citizens, Cochise County commissioners and local cooperators.
    - Capture and record questions, comments and concerns from the citizens.
- Utilize these meetings to establish the WUI citizen advisory council.

Newsletter

- Create a newsletter from the WUI council detailing the project and community meetings.
    - Produce an annual newsletter with updates on projects and accomplishments.

Publications

- Disseminate wildfire education materials to the following locations.
    - R.V. Parks
    - Trail heads
    - SPRNCA Nature Center
    - Fire Stations
    - Chamber of Commerce
        - Include in visitor packets

LOCAL PREPAREDNESS AND FIRE FIGHTING CAPABILITIES FMU

The National Fire Protection Agency (NFPA) has established time objectives for fire response:

NFPA 1710 requires:

1. Turnout time of one minute.
2. Four minutes or less for the arrival of the first arriving engine company at a fire suppression incident and/or eight minutes or less for the deployment of a full first alarm assignment at a fire suppression incident.[4]

If turnout time of one minute is met, and average driving speed is 30 MPH, then the engine company will be able to drive two miles in the four minutes established by NFPA 1710. Therefore, communities with mean distances greater than two miles from a fire station were given a weighted increase in their hazard rating.

The Fire Departments and Fire Districts within the study area of Cochise County include:

- St. David Fire District
- Tombstone Fire Department
- Babocomari Fire District
- Huachuca City Fire Department
- Fry Fire District
- Sierra Vista Fire Department
- Palominas Fire District
- PBW Fire Department

These districts and departments have been very involved in wildfire suppression, both in-district and as a mutual aid agency for adjacent districts. Many of the Districts provide fire suppression, rescue and EMS services for the surrounding communities.

Training

Firefighters are called upon to suppress both structural and wildland fire. Continuing education in both structural and wildland fire suppression tactics, equipment and safety is essential. Without this training, firefighters face and increased risk of fire-related injuries and fatalities. The Fire departments and Districts within Cochise County should organize their Wildland Fire training into three different levels.

[4] http://72.14.253.104/search?q=cache:u8XMw9ZRQUYJ:www.pcpages.com/fireman02169/1710.pdf+NFpa+1710&hl=en&ct=clnk&cd=1&gl=us , Section **5.2.3.1.1,** page 11.

RECOMMENDATIONS

- Basic Level Training
    - S-130/190
    - S-215 Fire in the Interface
    - I- 200 Basic ICS
- Supervisory Training
    - S-290 Intermediate Fire Behavior
    - I-300 - Intermediate ICS
- Specialized Training.
- Fire Prevention and Education.
- Awareness / functional level education for the utilization of RedZone Software.
- Prescribed fire implementation and planning.
    - Rx 234
- BLM should facilitate the involvement of local Fire Departments in “cross training” opportunities. This would include joint pre-planning sessions with the BLM and local fire departments to communicate what each entity expects from the other during wildfire events. This will reduce that number of surprises that occur when one entity does or does not do something the other entity expects.
- Provide training opportunities on weekends and evenings to accommodate volunteers.
    - Increase the opportunity for Fire Departments to participate in prescribed fire events.
    - Conduct more prescribed fires on weekends.
    - Require the adherence to NWCG standards to participate.
    - Expand the roll of the fire departments beyond holding and structure protection at fire events, both planned and unplanned.
    - Encourage the utilization of task books to document experience.

Equipment

Fires in the WUI usually require that some firefighters are dressed in wildland PPE while others wear structural PPE. Rapidly changing fire conditions require that firefighters, if on engines, have the ability to change into the appropriate PPE. To do less puts the firefighter at risk.

RECOMMENDATIONS

- Adhere to NFPA 1977 Standard on protective clothing and equipment for wildland fire fighting. This standard specifies the performance and design requirements for wildland fire PPE.
- Provide minimum wildland PPE for all firefighters.
    - Refer to NFPA 1977 for specific requirements.

- Provide *gear bags* for both wildland and bunker gear to be placed on engines responding to fire calls. This will help ensure that responding firefighters have both bunker gear and wildland PPE available when the fire situation changes.
    - Firefighters can keep both sets of PPE in “quick don” bags; the appropriate PPE can be donned for the fire call while the other bag can be quickly placed on the engine.
- Provide and maintain a 10-person wildland fire cache in addition to the tools on apparatus.
    - This will promote successful, rapid initial attack of all wildfires.
- Establish and standardized hose and water supply fitting specifications for all departments within Cochise County and BLM resources.
    - Obtain adapters to conform to new standards
- Rural Fire Departments can apply for Rural Fire Assistance (RFA) funds annually to help them acquire up-to-date PPE and equipment.

WUI Coordination Group

The most innovative and successful WUI programs are multi-jurisdictional in nature. For a successful wildland urban interface / fuels management program to succeed, the fire departments must partner with the BLM, local mutual aid agencies and the communities of Cochise County as a whole. Citizens must hear and see coordinated collaboration from both the ecological and emergency service perspective.

RECOMMENDATIONS

- Improve coordination with municipal and state / federal fire suppression and disaster services organizations.
    - Initiate the development of a WUI Coordination Group
        - This Group should contain, at a minimum, representation from all stakeholder groups, including:
            - BLM
            - Local fire department(s)
            - Cochise County Office of Emergency Management (OEM)
            - Red Cross
            - Fort Huachuca
            - San Pedro NRCD
            - Sheriff and Police
        - This Group can be formed as a “focus” committee under the Cochise County Fire Association.

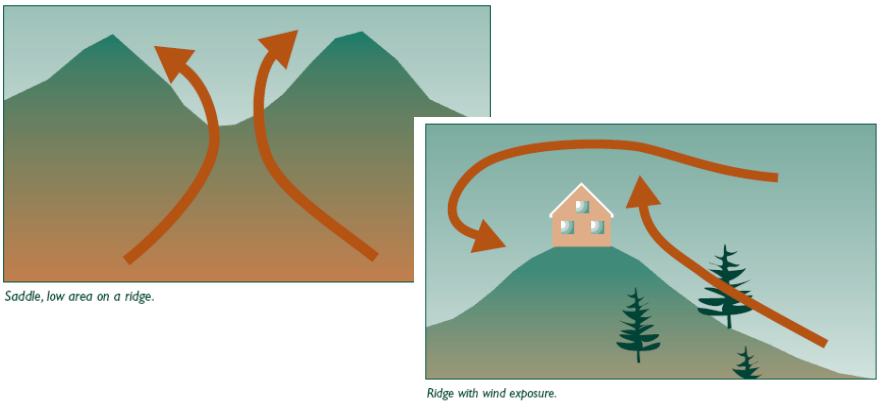
- Initial actions can include strategies for the implementation of recommendations in this report.

- o Initiate the development of a formal Type 3 incident management team.
- o Conduct annual tabletop exercises to simulate fire incidents with a focus on:
  - Citizen notification
  - Evacuation
  - Re-entry of citizens post evacuation
  - Transitions from initial attack to Type 3 / 2 teams
  - Initiation of unified command structure
  - Establish post incident critique format

HOME MITIGATION FMU

Community responsibility for self-protection from wildfire is essential. Educating homeowners is the first step in promoting shared responsibility. Part of the educational process is defining the hazard and risks both at the community level and the parcel-level. Survivable space planning, maintenance, ignition-resistant construction, and preventative landscaping techniques are critical to the mitigation of the loss of life and property during wildfire events. However, the most important element for the improvement of life safety and property preservation is for every home in the study area to have compliant, effective survivable space. This is especially important for homes with wood roofs and homes located on steep slopes, in chimneys, saddles, or near any other topographic feature that contributes to fire intensity (see **Figure 16**).

Figure 15: Saddle & Ridge Top Development[5]



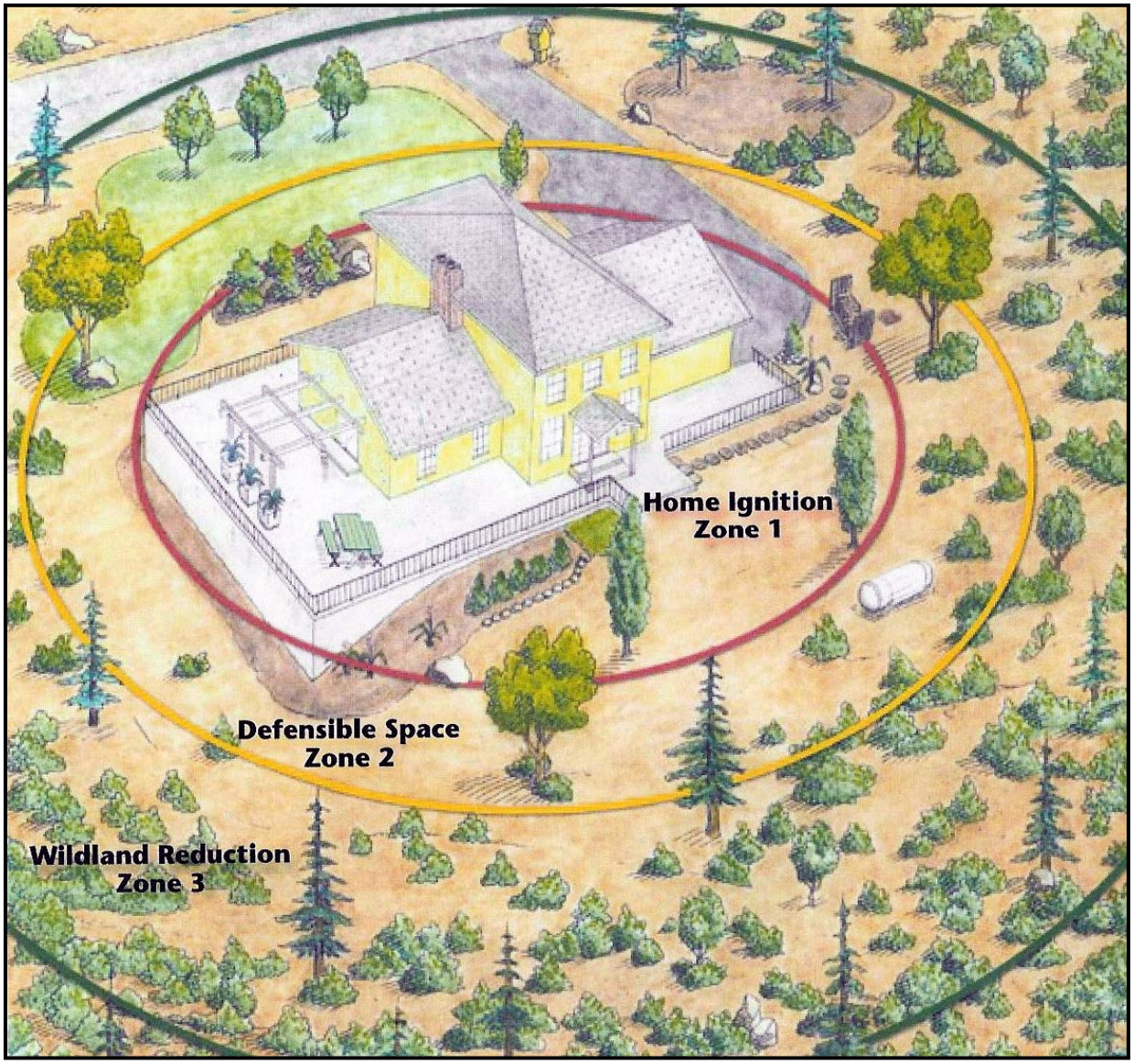
When designing survivable space treatments, there is no question that any type of dense/flammable vegetation should be removed from around a home in order to reduce the risk of structural ignition during a wildfire. The question is how much should be removed. The basic rule is to eliminate all flammable materials (fire-prone vegetation, wood stacks, wood decking, patio furniture, umbrellas, etc.) from within 30 feet of the home. For structures near wildland

[5] *Firewise Construction*, Peter Slack, Boulder Colorado

open space, an additional 70 feet should be modified in such a way as to remove all dead wood from shrubbery, thin and trim trees and shrubs into "umbrella" like forms (lower limbs removed), and prevent the growth of weedy grasses (see **Figure 17**). Steep slopes and/or the presence of dangerous topographic features as described above may require the survivable space distances to be increased.

The term “clearance” leads some people to believe all vegetation must be removed down to bare soil. This is not the case. Removing all vegetation unnecessarily increases erosion, and will encourage the growth of weeds in the newly-disturbed soil. These weeds are considered “flashy fuels,” which actually increase fire risk because they ignite so easily. Survivable space must be ecologically sound, aesthetically pleasing and relatively easy to maintain. Only then will the non-prescriptive use of fuels reduction around homes become commonplace.

Figure 16: Survivable Space Zones6



[6] *A Homeowner’s Guide to Fire Safe Landscaping* (2005) www.FireSafeCouncil.org

RECOMMENDATIONS

Findings of the 444 homes surveyed in 2003:

Access

197 homes surveyed do not have reflective, visible address signage.

- Facilitate address signage for all 197 and all new home construction.

12 homes surveyed did not have adequate vertical clearance for fire apparatus.

- Identify these homes and recommend minimum clearance be established.
    - This can be a simple mitigation effort to ensure adequate access.

185 homes surveyed have a gated access

- Notify home owners of the delay that locked gates may impose on structure protection.

88 homes surveyed do not have adequate Fire Department turnarounds.

- Provide these homeowners with the turnaround specifications in Appendix C
- Inform homeowners of the value of a turnaround from both a suppression and safety perspective.

2 homes surveyed have wood roofs

- Inform the homeowners to contact their insurance companies for cost share assistance on replacement costs.

165 homes surveyed have vegetation either overhanging or within 5 feet of the home

- Facilitate community wide limbing and chipping programs in these areas.

203 homes surveyed have non-conforming survivable space

53 homes surveyed have no survivable space

- Focus initial efforts on the 53 homes with no survivable space
- Continue the survivable space program in cooperation with the local Fire Department
- Assist homeowners with on site recommendations for survivable space.

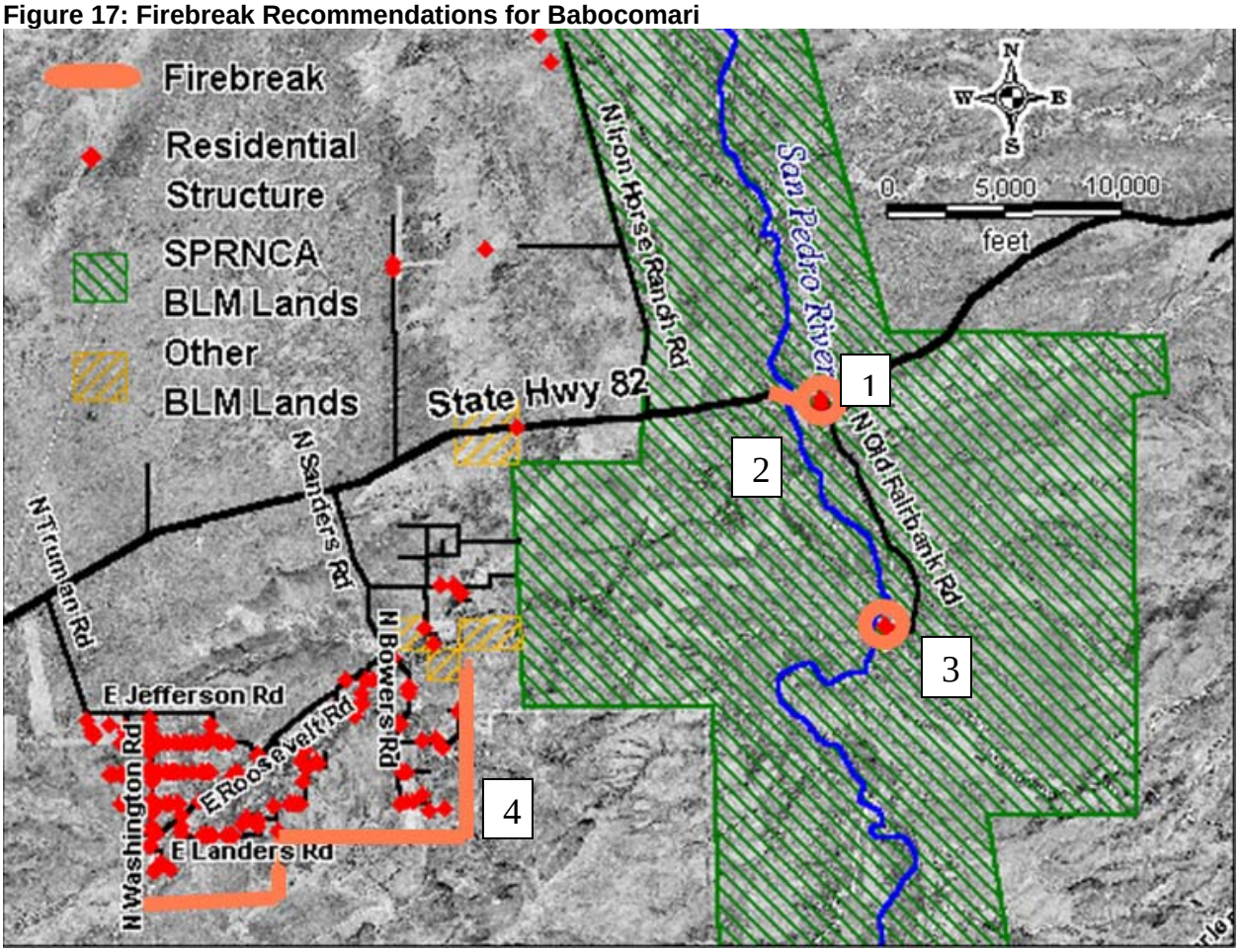
Utilize neighborhood public meetings to determine common mitigation requirements for the community

- It is often possible to obtain discounts for volume efforts.
- Facilitate neighborhood fuels reduction projects through:
    - Cost share grants
    - Utilization of cost share chipping programs.

LANDSCAPE SCALE FUELS MODIFICATIONS FMU

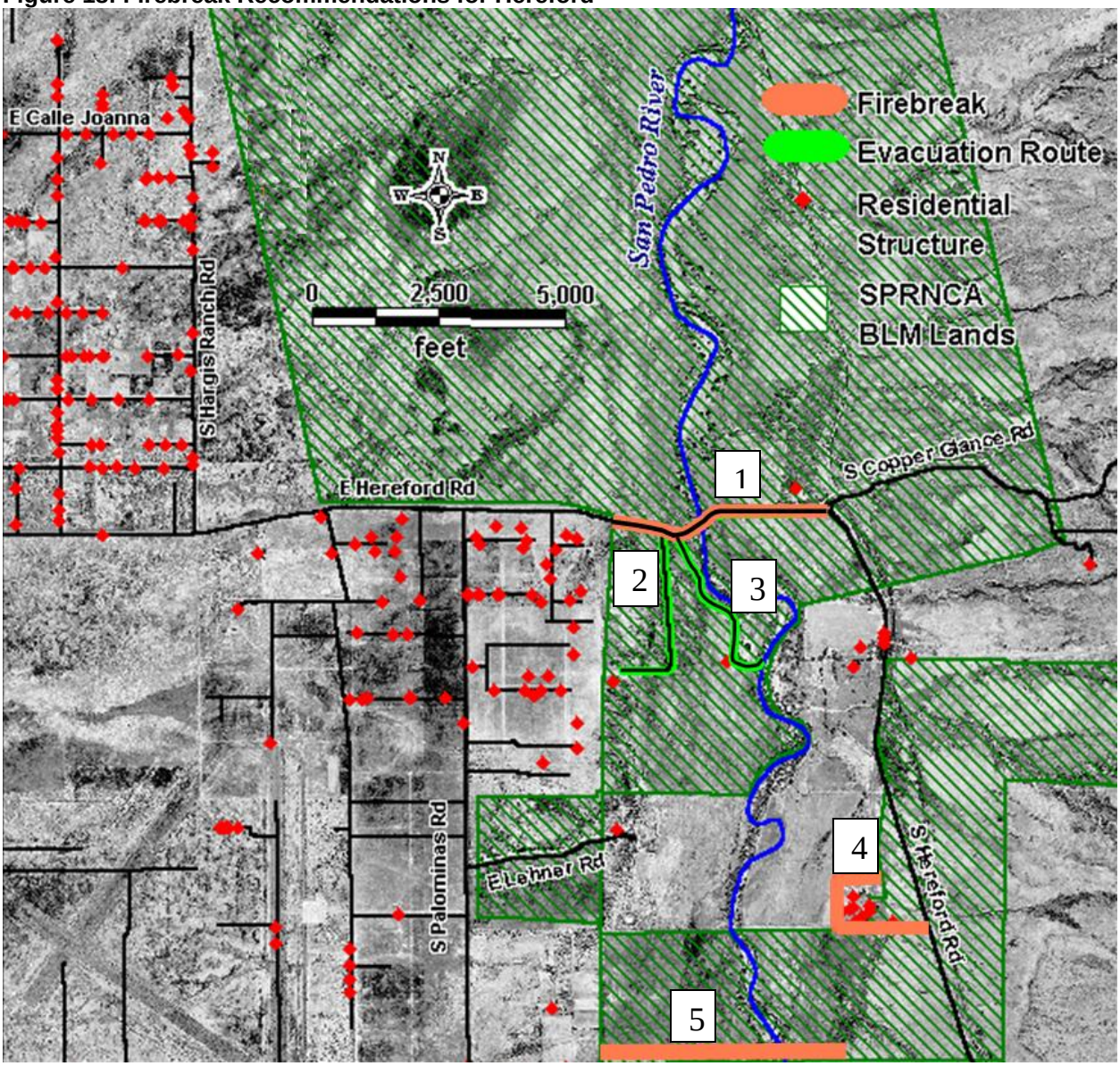
One of the most effective forms of landscape scale fuels modification is the Firebreak (sometimes referred to as “shaded Firebreak”). A Firebreak is an easily accessible strip of land of varying width, depending on fuel and terrain, in which fuel density is reduced, thus improving fire control opportunities. Vegetation is thinned by removing diseased, fire-weakened, and most standing dead trees. Thinning should select for the more fire resistant species. Ladder fuels, such as low limbs and heavy regeneration, are removed from the remaining stand. Brush, dead and down materials, logging slash and other heavy ground fuels, are removed and disposed of to create an open park-like appearance. The use of Firebreaks under normal burning conditions can limit uncontrolled spread of fires and aid firefighters in slowing the spread rate. Under extreme burning conditions where spotting occurs for miles ahead of the main fire and probability of ignition is high, even the best Firebreaks are not effective.

Figure 17: Firebreak Recommendations for Babocomari



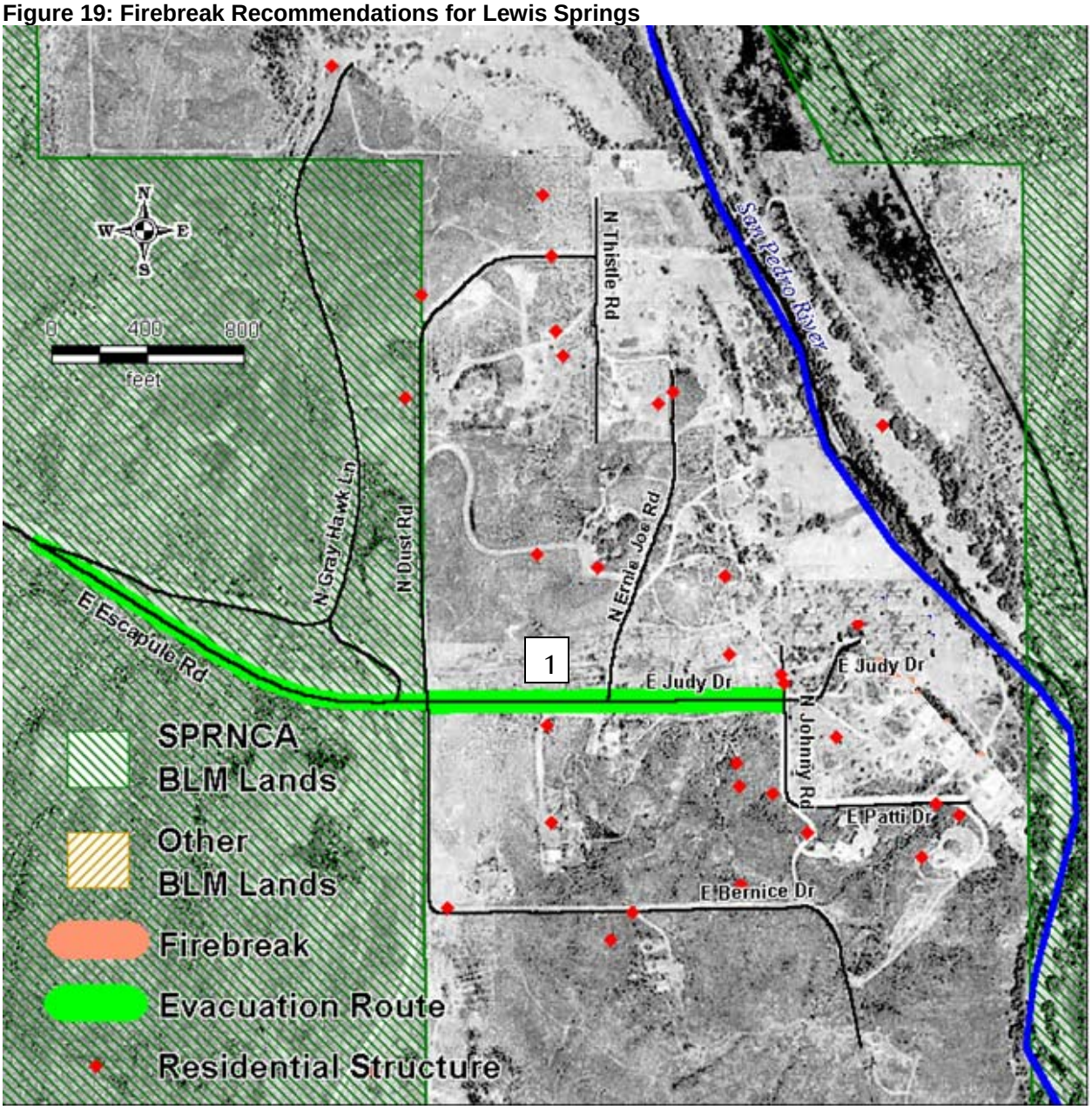
1. **Fairbank**
2. **Fairbank Bridge**
3. **Boquillas Ranch**
4. **East Landers and North Bowers Road**

Figure 18: Firebreak Recommendations for Hereford



1. **E. Hereford road**
2. **Boucher**
3. **Cobb Lane**
4. **S. Hereford road**
5. **North Gap**

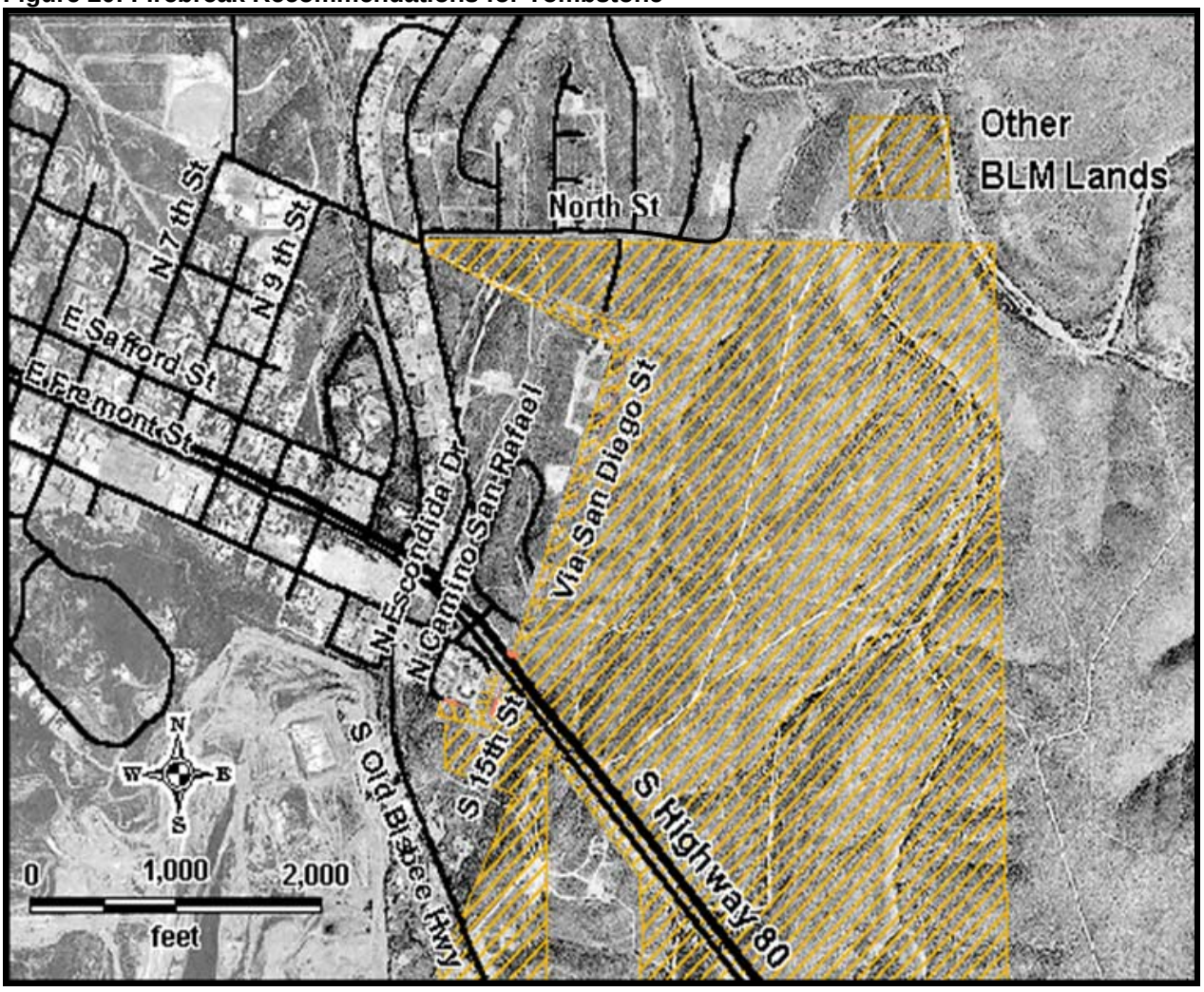
Figure 19: Firebreak Recommendations for Lewis Springs



1. **E. Escapule road**

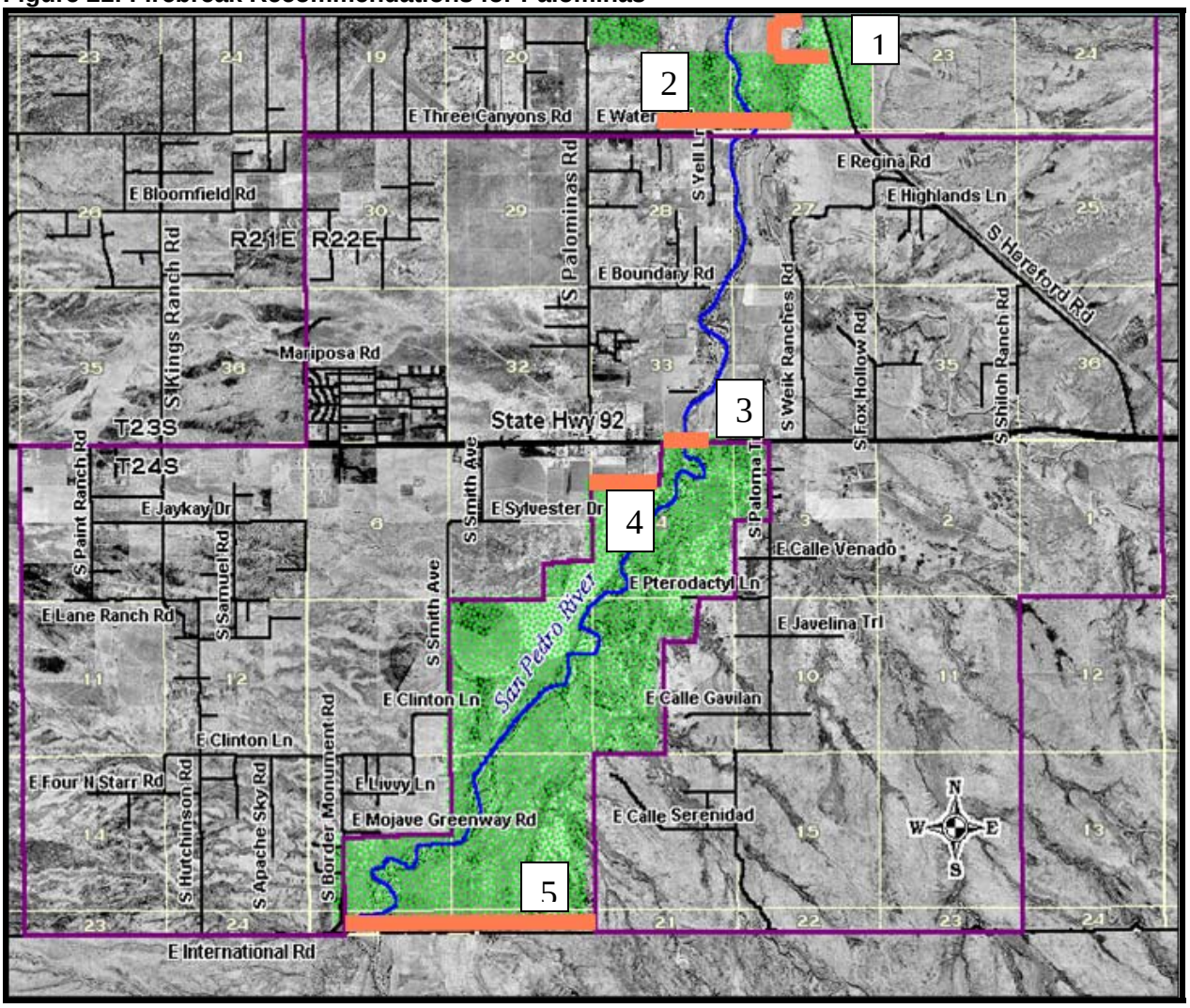
Home Ignition Zone Firebreaks offered to all homes in community

Figure 20: Firebreak Recommendations for Tombstone



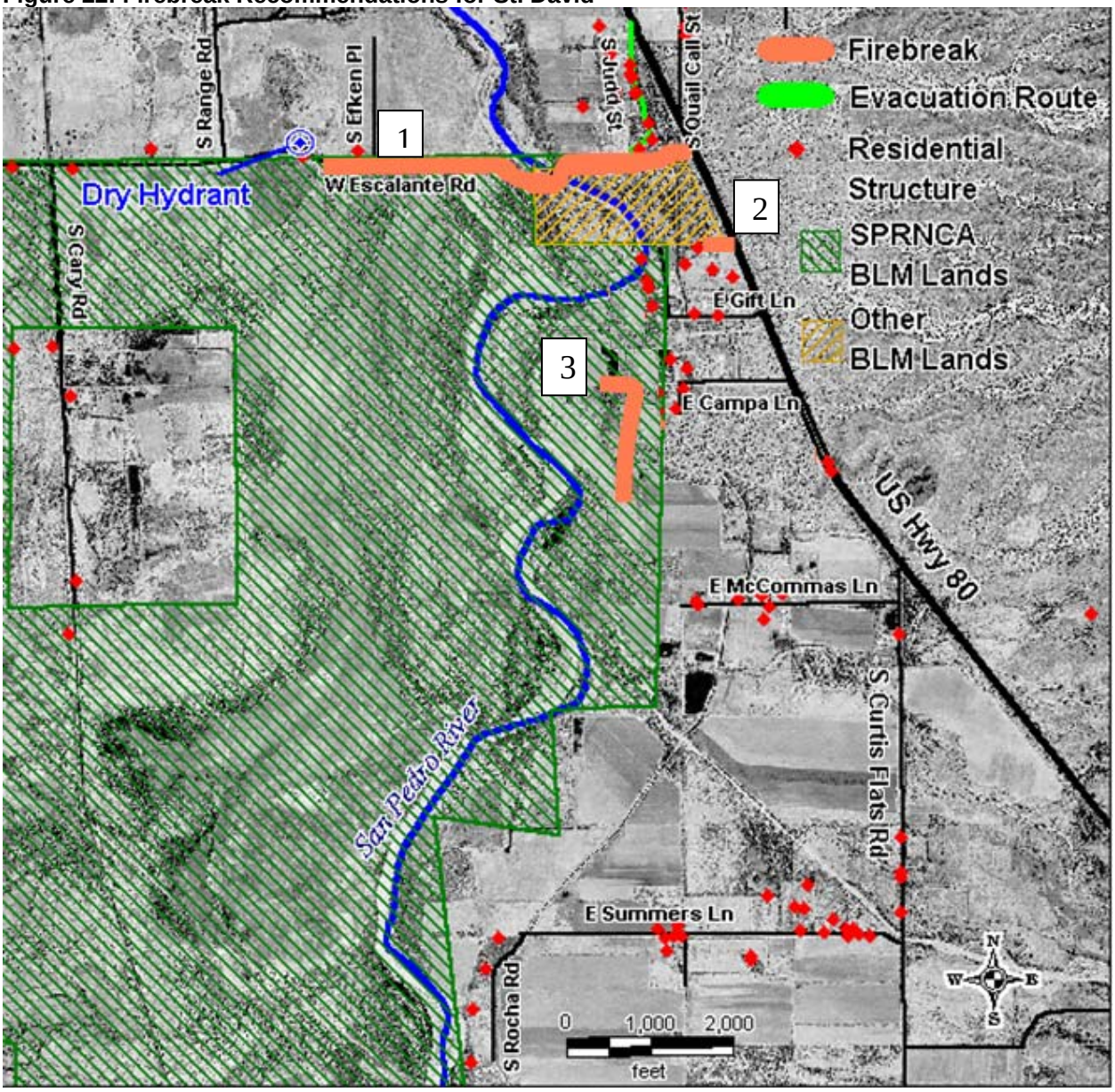
Home Ignition Zone firebreaks available to homeowners within ¼ mile boundary of BLM

Figure 21: Firebreak Recommendations for Palominas



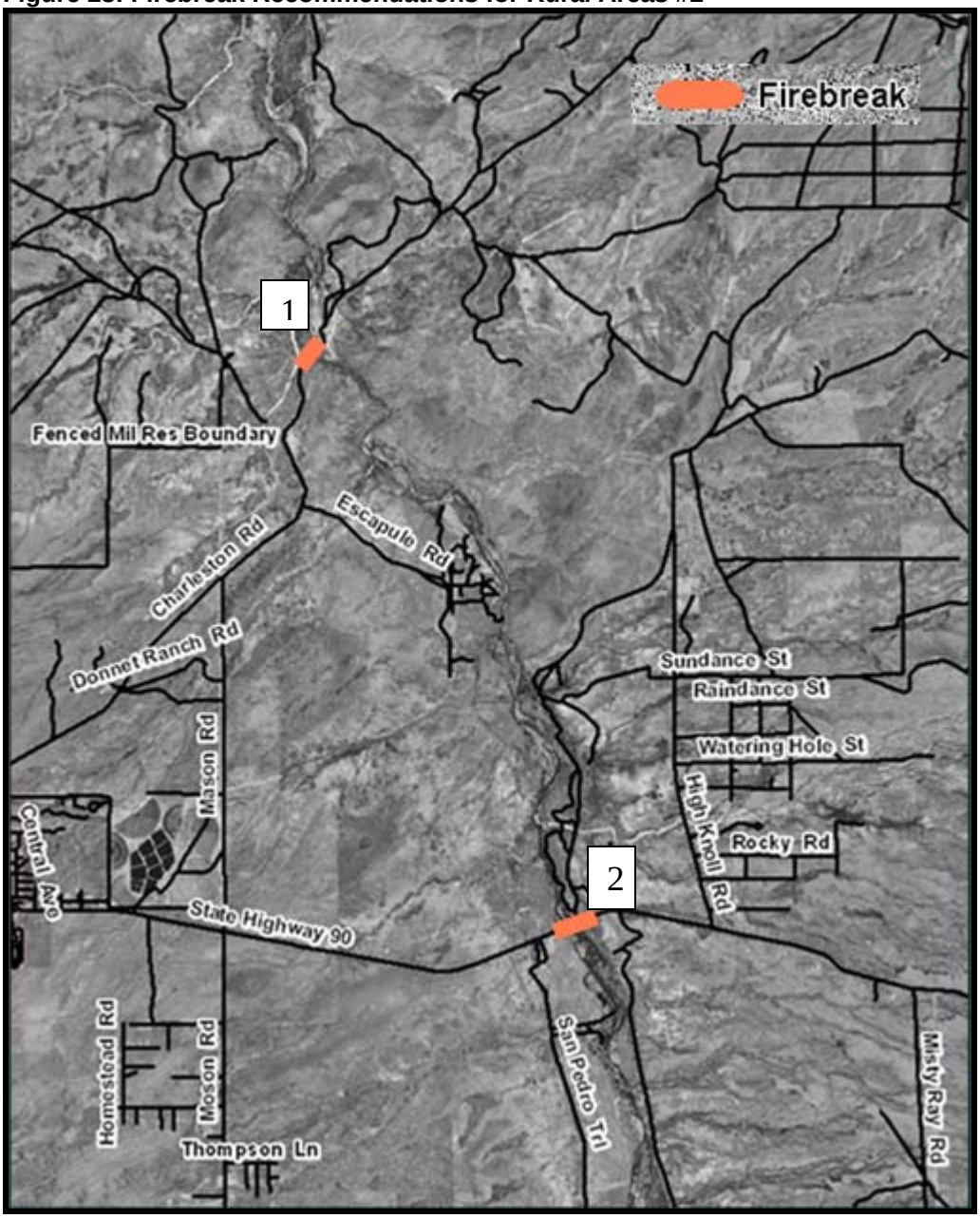
1. **S. Hereford road**
2. **North Gap**
3. **Palominas Bridge**
4. **S. Palominas**
5. **International Border**

Figure 22: Firebreak Recommendations for St. David



1. **W. Escalante**
2. **Fortner**
3. **E. Campa Lane**

Figure 23: Firebreak Recommendations for Rural Areas #2



1. **Charleston Bridge**
2. **San Pedro Bridge**

Firebreaks should always be connected to a good anchor point like a rock outcropping, river, lake, or road. The classic location for Firebreaks is along the tops of ridges to stop fires from backing down the other side or spotting into the next drainage. This is sometimes not practical from a WUI standpoint because the structures firefighters are trying to protect are usually located at the tops of ridges or mid-slope. Mid-slope positioning is considered the least desirable for Firebreaks, but this may be easiest to achieve as an extension of survivable space work or an extension of existing roads and escape routes. One tactic is to create Firebreaks on slopes below homes located mid-slope and on ridge tops so that the area of continuous fuels between the survivable space of homes and the Firebreak is less than ten acres. Another commonly used tactic is to position Firebreaks along the bottom of slopes. (Note: In most of the study area this would require the cooperation of many individual landowners.) In some areas the only way to separate residences from fuels is to locate the Firebreak mid-slope above homes. This would provide some protection from backing fires and rolling materials. It may be reasonable to locate Firebreaks mid-slope below homes, where this is possible, to break the continuity of fuels into the smaller units mentioned above. Even though this position is considered the least desirable from a fire suppression point of view, it is sometimes the most effective approach.

Firebreaks are often easiest to locate along existing roadbeds. The minimum recommended Firebreak width is usually 200 feet. As spread rate and intensity increases with slope angle, the size of the Firebreak should also be increased, with an emphasis on the downhill side of the roadbed or centerline. The formulas for slope angles of 30% and greater are as follows: below road distance = 100' + (1.5 x slope %), above road distance = 100' – slope % (see **Table 15**). Firebreaks that pass through hazardous topographic features should have these distances increased by 50%.[7] Since Firebreaks can have an undesirable effect on the aesthetics of the area, crown separation should be emphasized over stand density levels. Isolating groupings rather than cutting for precise stem spacing will help to mitigate the visual impact of the Firebreak. Irregular cutting patterns that reduce canopy and leave behind islands with wide openings (known as mosaic cuts) are effective in shrub models.

Table 15. Recommended Treatment Distances For Mid-Slope Roads

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

[7] Frank C. Dennis, "Fuelbreak Guidelines for Forested Subdivisions" (Colorado State Forest Service, Colorado State University, 1983), p. 11.

OTHER FUELS MODIFICATION

Livestock grazing, development and past land management decisions have significantly changed the fire return interval and the overall fuel profile of the area. Fire should be re-introduced as a natural process in the shrub and grasslands of the SPRNCA community to help maintain and restore native plant communities.

Under ideal conditions, grassland diversity is maintained by a fire interval of historically every 3-5 years. Shrub species have varied fire intervals from 5-35 years. The health of these ecosystems has been declining for years due to fire suppression and competition from exotic grasses and forbs. Burning has a stimulating effect on the growth and competitive vigor of native grasses and shrubs. Plants in recently burned areas start growth earlier in the spring, develop faster, and produce more herbage than plants in unburned areas.

Prescribed burning has many benefits both ecological and economic; however, there are risks and costs involved. A good prescribed burn program should build on a foundation of safe and effective fire practices which help to build trust in the community. Smoke impacts to people, roads and homes must be considered.

There are many areas that would benefit from fire in the SPRNCA community. Specific burn plans should be developed on a case by case basis with priorities being set by the BLM and stakeholders.

RIPARIAN FMU

A stream or river corridor functions as a dynamic crossroads in the landscape. Water and other materials, energy and organisms meet and interact within the corridor. A stream corridor is an ecosystem that usually consists of three major elements:

- Stream channel
- Floodplain
- Transitional upland fringe

Together they function as a dynamic and valued element in the landscape. This interaction provides critical functions essential for maintaining life such as cycling nutrients, filtering contaminants from runoff, attenuating floodwaters, maintaining wildlife habitats, recharging ground water, and maintaining stream flows.

From a fire management perspective, healthy riparian stream corridors can function as Firebreaks as seasonal moisture allows. Effectively managing stream corridors and “linking” them to other functional Firebreak areas can help to create a non-continuous fuel profile. Along the San Pedro River, there is very strong correlation between the health of the stream corridor and its long-term ability to function as an effective Firebreak. In this area, the riparian area FMA is typically a corridor 100 feet wide along the river bottom.

RECOMMENDATIONS

- Facilitate the creation of an "Adopt-A-Stream" program for individual groups or neighborhoods. Empower them with the ability to enhance the health, restoration and fire function of the stream corridor.
    - The focus of these efforts should be on the mechanical removal of dead and down fuels in stream bank areas.
        - Appropriate fuels reduction will facilitate the utilization of prescribed fire and create an effective Firebreak between the east and west side of the river bottom.
    - Partnering efforts with BLM fuels reduction crews will enhance the effect and efforts of this work
- Develop a master plan to integrate healthy, restored, riparian corridors into an overall Firebreak design.

TIMELINE AND COSTS OF MITIGATION

Given the variability of labor, equipment, operator skill, vegetation density, it is still possible to make some generalizations about fuels mitigation costs. Considering the types of vegetation and terrain, costs were developed for four methods of fuels reduction.

Roller chopping is frequently applied to shrubs and pinon/juniper stands with stem diameters eight inches or less in diameter. It is very effective for knocking down brush and trees and chopping up the slash. Roller chopping can be done when the soil is firm and dry enough to support the heavy equipment. Roller chopping costs about $60-$80 per acre and can treat 13-20 acres per day.

The Hydro axe, also known as a Hydro mower, is typically a rubber-tired, articulated tractor with a mower/mulcher mounted on the front of the machine. The mower/mulcher is between 8 and 9 feet wide. The Hydro axe can navigate through stands in order to treat selected areas. The machine clips and mulches plant debris within 4 to 10 inches above the ground. Hydro-axing typically costs $70 per acre and can treat 6 to16 acres per day.

Mowing is typically done with a small farm tractor equipped with a flail mower such as a Brush Hog. Mowing is limited to areas that are relatively smooth and free from rocks projecting more than 4 to 6 inches above the ground. The effectiveness of mowing is somewhat dependant on the operator’s ability to maneuver around obstacles without damaging the equipment. Mowing costs typically vary from $30-$60 acre.

Prescribed fire costs can range greatly, from $20-$1,200 per acre. Costs are difficult to predict for a generic site because burning is dependent on many factors, such as proximity to structures, access to the site, fuel type and the total acreage.

BLM offers 25 Home Ignition Zone (HIZ) 50% cost share firebreaks in Palominas, Tombstone, St. David, Escupule, Sonoita, Cascabel and Bisbee per year. This is done in partnership with fire departments, Firewise groups and planning departments. Other homes in the USP CWPP area will qualify if they are within a ¼ mile of BLM land.

GLOSSARY

The following definitions apply to terms used in the Upper San Pedro Wildfire Protection Plan.

1 hour Timelag fuels: Grasses, litter and duff; <1/4 inch in diameter

10 hour Timelag fuels: Twigs and small stems; ¼ inch to 1 inch in diameter

100 hour Timelag fuels: Branches; 1 to 3 inches in diameter

1000 hour Timelag fuels: Large stems and branches; >3 inches in diameter

Active Crown Fire: This is a crown fire in which the entire fuel complex – all fuel strata – become involved, but the crowning phase remains dependent on heat released from the surface fuel strata for continued spread (also called a Running Crown Fire or Continuous Crown Fire).

ArcGIS 9.x: This is Geographic Information System (GIS) software that is designed to handle mapping data in a way that can be analyzed, queried, and displayed. ArcGIS is in its ninth major revision and is published by the Environmental Systems Research Institute (ESRI).

Crown Fire (Crowning): The movement of fire through the crowns of trees or shrubs, which may or may not be independent of the surface fire.

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 of minimum of 30 feet around a structure that is cleared of flammable brush or vegetation. (see Survivable Space)

Energy Release Component: An index of how hot a fire could burn. ERC is directly related to the 24-hour, potential worst case, total available energy within the flaming front at the head of a fire.

Extended Survivable Space (also known as Zone 3): This is a defensible space area where treatment is continued beyond the minimum boundary. This zone focuses on forest management with fuels reduction being a secondary consideration.

Fine Fuels: Fuels that are less than ¼ inch in diameter such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash which, when dry, ignite readily and are consumed rapidly.

Fire Behavior Potential: The expected severity of a wildland fire expressed as the rate of spread, the level of crown fire activity, and flame length. This is derived from fire behavior modeling programs using the following inputs: fuels, canopy cover, historical weather averages, elevation, slope, and aspect.

Firebreak: 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 Danger: In this document we do not use this as a technical term due to various and nebulous meanings that have been historically applied.

Fire Hazard: Given an ignition, the likelihood and severity of Fire Outcomes (Fire Effects) that result in damage to people, property, and/or the environment. The hazard rating is derived from the Community Assessment and the Fire Behavior Potential.

Fire Mitigation: Any action designed to decrease the likelihood of an ignition, reduce Fire Behavior Potential, or to protect property from the impact of undesirable Fire Outcomes.

Fire Outcomes (aka Fire Effects): This is a description of the expected effects of a wildfire on people, property and/or the environment based on the Fire Behavior Potential and physical presence of Values-at-Risk. Outcomes can be desirable as well as undesirable.

Fire Risk: The probability that an ignition will occur in an area with potential for damaging effects to people, property, and/or the environment. Risk is based primarily on historical ignitions data.

Flagged Addressing: A term describing the placement of multiple addresses on a single sign, servicing multiple structures located on a common access.

FlamMap: A software package created by the Joint Fire Sciences Program, Rocky Mountain Research Station. The software uses mapped environmental data such as Elevation, Aspect, Slope, and Fuel Model, along with fuel moisture and wind information, to generate predicted fire behavior characteristics such as Flame Length, Crown Fire Activity, and Spread Rate.

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.

FMU (Fire Management Unit): A method of categorizing and prioritizing fire mitigation work efforts. Units can be defined by function (e.g., public education efforts) or geography (e.g., fuel reduction projects in a given area).

Fuelbreak: A natural or constructed discontinuity in a fuel profile used to isolate, stop, or reduce the spread of fire. Fuelbreaks may also make retardant lines more effective and serve as control lines for fire suppression actions. Fuelbreaks in the WUI are designed to limit the spread and intensity of crown fire activity.

ICP (Incident Command Post): The base camp and command center from which fire suppression operations are directed.

ISO (Insurance Standards Office): A leading source of risk (as defined by the insurance industry) information to insurance companies. ISO provides fire risk information in the form of ratings used by insurance companies to price fire insurance products to property owners.

Jackpot Fuels: a large concentration of fuels in a given area such as a slash pile.

Passive Crown Fire: a crown fire in which individual or small groups of trees torch out (candle), but solid flaming in the canopy fuels cannot be maintained except for short periods.

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

Spotting: Refers to the 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.

Structural Triage: The process of identifying, sorting, and committing resources to a specific structure.

Surface Fire: This is a fire that burns in the surface litter, debris, and small vegetation on the ground.

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)

Timelag: Time needed under specified conditions for a fuel particle to lose about 63% of the difference between its initial moisture content and its equilibrium moisture content.

Values-at-Risk: People, property, ecological elements, and other human and intrinsic values within the project area. Values-at-Risk are identified by inhabitants as important to the way of life of the study area and are susceptible specifically to damage from undesirable fire outcomes.

WHR (Community Wildfire Hazard Rating. AKA Community Assessment): A sixty-point scale analysis designed to identify factors that increase the potential for and/or severity of undesirable fire outcomes in WUI communities.

WUI (Wildland Urban Interface): The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. This is sometimes referred to as Urban Wildland Interface, or UWI.

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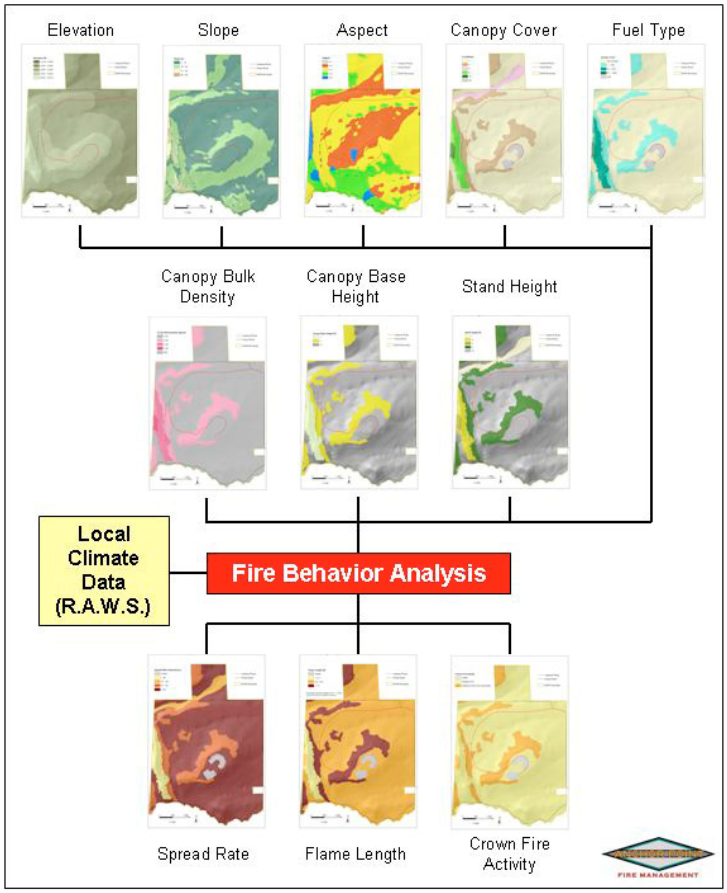
APPENDIX A: FIRE BEHAVIOR POTENTIAL ANALYSIS METHODOLOGY

PURPOSE

The purpose of this document is to describe the methodology used to evaluate the threat represented by physical hazards—such as fuels, weather and topography—to values at risk in the study area, by modeling their effects on fire behavior potential.

Flow Chart



The fire behavior potential analysis reports graphically the probable range of spread rate, flame length, and crown fire potential for the analysis area, based upon a set of inputs significant to fire behavior. The model inputs include aspect, slope, elevation, canopy cover, fuel type, canopy bulk density, canopy base height, stand height, and climate data. The model outputs are determined using FlamMap[8], which combines surface fire predictions with the potential for

[8] Mark Finney, Stuart Brittain and Rob Seli., The Joint Fire Sciences Program of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana), the Bureau of Land Management and Systems for Environmental Management (Missoula, Montana).

crown fire development. Calculations for surface fire predictions (rate of spread and flame length) are based on the USDA Forest Service's BEHAVE[9] model.

BEHAVE

The BEHAVE fire behavior prediction and fuel modeling system was employed to determine surface fire behavior estimates for this study. BEHAVE is a nationally recognized set of calculations used to estimate a surface fire's intensity and rate of spread given certain conditions of topography, fuels, and weather. The BEHAVE modeling system has been used for a variety of applications, including prediction of an ongoing fire, prescribed fire planning, fuel hazard assessment, initial attack dispatch, and fire prevention planning and training. Predictions of wildland fire behavior are made for a single point in time and space, given simple user-defined fuels, weather, and topography. Requested values depend on the modeling choices made by the user.

Assumptions of BEHAVE:

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

[9] Patricia L. Andrews, producer and designer, Collin D. Bevins, programmer and designer, The Joint Fire Sciences Program of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana) and Systems for Environmental Management (Missoula, Montana).

APPENDIX B: STRUCTURAL TRIAGE AND PREPARATION

SIZE UP CONSIDERATIONS

- What is the current and expected weather?
- Are fuels heavy, moderate, or light? What is the arrangement and continuity of fuels?
- Note any hazardous topography.
- What have fires in this area done before?
- What is the fire's current and expected behavior?
  - What is the rate and direction of spread?
  - What is the potential for spotting and firebrands?
  - Will topographical features or expected weather changes affect the rate of spread?

- What are the number and density of structures threatened?
- What are the available resources?
- Will you have to evacuate people or animals?
  - Are there residents who will not evacuate?
- How hazardous is the structure?
  - What is the roofing material?
  - Are the gutters full of litter?
  - Are there open eaves and unscreened vents?
  - Does the structure have wooden decking?
  - Is there survivable space?
  - Are there large windows with flammable drapes or curtains?
  - What is the size and location of propane tanks and/or fuel storage tanks?

FIRE FIGHTER SAFETY

- What are the routes of egress and ingress?
  - What is the largest engine that can access the structure safely?
  - Are the roads two-way or one-way?
  - Are there road grades steeper than 8%?
  - Are the road surfaces all-weather?
  - Are there load-limited bridges?
- Are there anchor points for line construction?
- Are there adequate safety zones?
- What are the escape routes?
- Are there special hazards such as hazardous materials, explosives, high-voltage lines, or above-ground fuel tanks?
- Are communications adequate?

SAFETY ZONE GUIDELINES

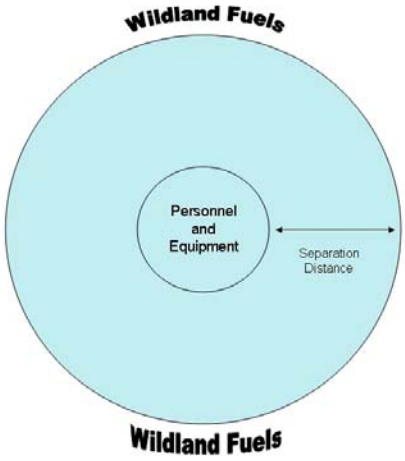
• Avoid locations that are downwind from the fire.
• Avoid locations that are in chimneys, saddles, or narrow canyons.
• Avoid locations that require a steep uphill escape route.
• Take advantage of heat barriers such as lee side of ridges, large rocks, or solid structures.

• Burn out safety zones prior to flame front approach.

• For radiant heat only, the distance separation between the firefighter and the flames must be at least four times the maximum flame height. This distance must be maintained on all sides, if the fire has ability to burn completely around the safety zone. **Convective heat from wind and/or terrain influences will increase this distance requirement.**

CALCULATIONS ASSUME NO SLOPE AND NO WIND

Flame Height	Distance Separation (firefighter to flame)	Area in Acres
10 feet	40 feet	1/10 acre
20 feet	80 feet	1/2 acre
50 feet	200 feet	3 acres
75 feet	300 feet	7 acres
100 feet	400 feet	12 acres
200 feet	800 feet	50 acres
(1 acre = 208 feet x 208 feet, or the approximate size of a football field)		



Distance Separation is the radius from the center of the safety zone to the nearest fuels. When fuels are present that will allow the fire to burn on all sides of the safety zone, this distance must be doubled in order maintain effective separation in front, to the sides, and behind the firefighters. Area in Acres is calculated to allow for distance separation on all sides for a three person engine crew. One acre is approximately the size of a football field or exactly 208 feet x 208 feet.[10]

Structural Triage Categories

Sort structures into three categories:
1. Stand Alone or **Not Threatened**
2. Defendable
3. Not Defendable

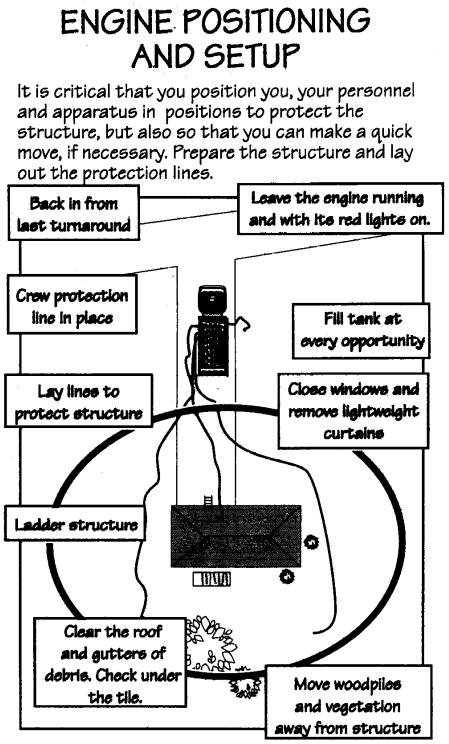
- Factors that may make an attempt to save a structure too dangerous or hopeless:
  - The fire is making sustained runs in live fuels and there is little or no defensible space
  - Spot fires are too numerous to control with existing resources
  - Water supply will be exhausted before the threat has passed
  - The roof is more than ¼ involved in flames
  - There is fire inside the structure
  - Rapid egress from the area is dangerous or may be delayed

10 http://www.nwcg.gov/pms/pubs/nfes1077/nfes1077.pdf

Common Ignition Points (remember, in windy conditions, firebrands can enter almost any opening)

- Flammable roof coverings and debris
- Unscreened vents, windows, or holes
- Open doors, windows, or crawl spaces
- Wooden decks, lawn furniture, stacked wood, and trash piles
- Openings under porches or patio covers

Apparatus Placement Considerations



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11 Teie,William C.,1995, Firefighter's Guide, Urban/Wildland Situations. Deer Valley Press

APPENDIX C: ACCESS SPECIFICATIONS AND DESIGNS

RECOMMENDED ACCESS GUIDELINES

Introduction

This appendix has been designed with public education in mind, and is intended to help familiarize the public with the general principles of the access and water supply needs of firefighters. The recommendations in this section are based on proven practices. However, they are not meant to be a substitute for locally adopted codes.

Emergency response personnel do their best to respond to calls in a timely manner, often while negotiating difficult terrain. Planning for access by emergency equipment allows for a more efficient response, improving safety for residents and their families, as well as that of the firefighters and emergency medical technicians that will arrive on scene. This is especially important in rural areas, where response times may be considerably longer than in cities.

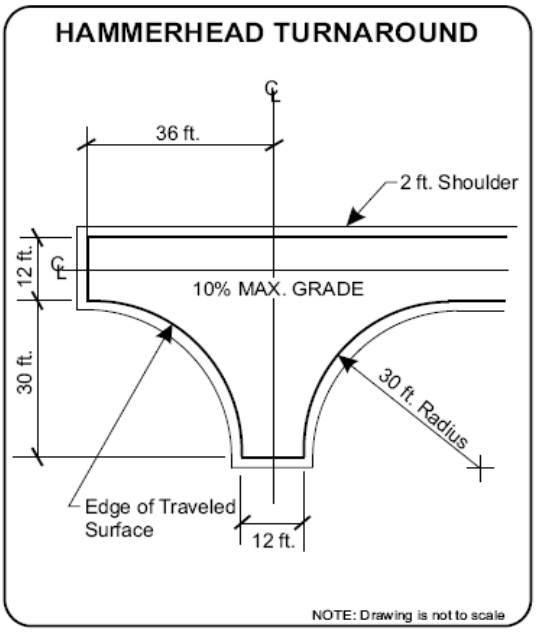
Access Guidelines

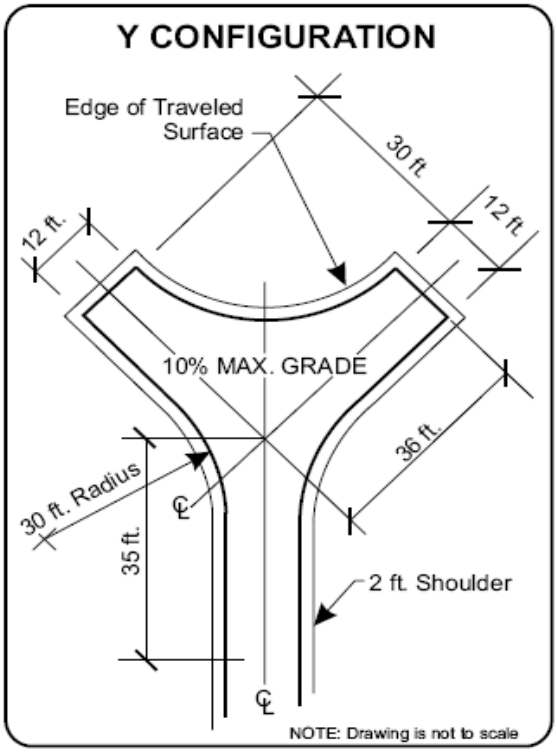
Driveway Turnarounds

Turnarounds unobstructed by parked vehicles should be located at the end of every driveway. They should be designed to allow for the safe reversal of direction by emergency equipment. The "Y" and "Hammerhead" turnarounds shown below are preferred because they provide the necessary access, while minimizing disturbance to the site.

Driveway Width and Height

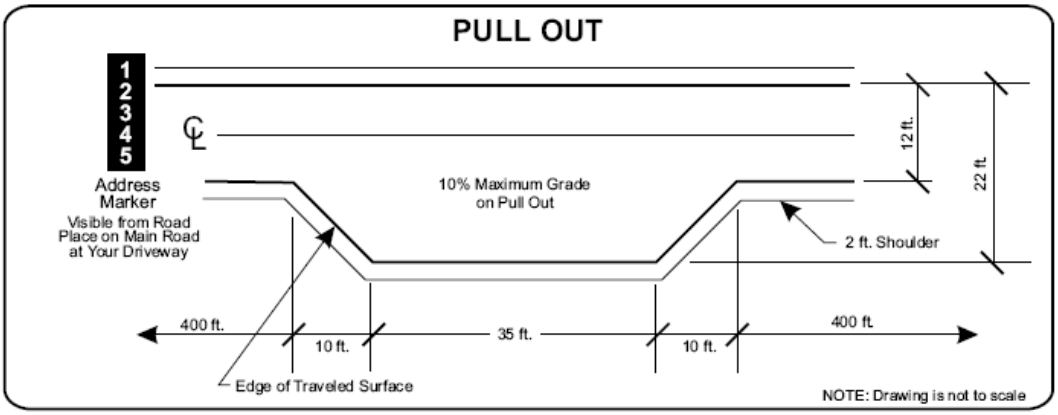
Driveways should have an unobstructed vertical clearance of 13 feet 6 inches. Trees may need to be limbed and utility lines relocated, to provide the necessary clearance. Driveways should have a 12 foot-wide drivable surface and 14 feet of horizontal clearance.





Driveway Pullouts

Driveway pullouts should be designed with sufficient length and width to allow emergency vehicles to pass one another during emergency operations. These features should be placed at 400-foot intervals along driveways and private access roads (community driveways). The location of pullouts may be modified slightly to accommodate physical barriers such as rock outcroppings, wetlands, and other natural or manmade features.



Address Markers

Every building should have a permanently posted, reflective address marker mounted on a non-combustible pole. The sign should be placed and maintained at each driveway entrance. Care should be taken to ensure that the location will not become obscured by vegetation, snow, or other features, whether natural or manmade. It is critical that the location and markings be adequate for easy night-time viewing. It is preferable to locate markers in a consistent manner within each community. A good guideline for this practice is to place the markers five feet above ground level on the right side of every driveway. Where access to multiple homes is provided by a single driveway, all addresses accessed via that driveway should be clearly listed on the driveway marker. Where multi-access driveways split, each fork should indicate all residences accessed by that fork, and the proper direction of travel to arrive at a given address. It is not adequate simply to mark addresses on a common pole in the center of the fork. Further, residential homes should have an additional reflective address marker permanently attached to the home, in clear view of the driveway or access road. Homes that are marked by lot number while under construction should have the lot number removed and a permanent address marker posted before granting a certificate of occupancy.

Bridge Load Limits

Bridge load limits should be posted with a permanently mounted, reflective marker at both entrances to the bridge. Care should be taken to ensure that these markers will not become obscured by vegetation, snow, or other features, whether natural or manmade. It is critical that the location of the markings and the markings themselves be adequate for easy night-time viewing.

APPENDIX D: SUMMARY OF PUBLIC SURVEYS (2003)

As part of the wildfire hazard assessment, comments and suggestions were solicited from fire officials, emergency personnel, government workers and the general public regarding their concerns about wildfire in the upper San Pedro watershed. This process was three-fold. First, questionnaires were sent out to fire personnel and other officials with districts around the SPRNCA. Next, interviews were held with key fire officials from departments who deal directly with the SPRNCA lands. Third, public meetings were held to solicit concerns from the general public.

In addition to conducting personal interviews with the St. David, Tombstone, Fry and Palominas fire chiefs; we mailed surveys to members of the Cochise County Fire Chiefs Association. This included the state and county health department, the Cochise County communications supervisor, and city and county planning departments. Responses were obtained from 27 of the 43 people contacted about completing a survey. The following are the concerns expressed by this group.

1. There was no consensus on what area had the highest wildfire risk. Answers included the grasslands outside the riparian zone to the cottonwoods within the zone, and ranged from the Mexican border to St. David. Neither was there consensus about where there was less risk. This group was asked to rate the fire hazard to residences on a scale from low to high. Of the 16 that answered the question, 38% (6) said High, 44% (7) said Moderate to High, 12% (2) said Moderate, and 6% (1) said Low to Moderate. None said Low.

2. Fire and other officials were asked what they thought would be the most effective way to mitigate or reduce the wildfire hazards (fuels reduction, building codes, prescribed fire, etc). Of the 20 that responded to the question, 60% (12) said fuels reduction (prescribed fire and mechanical thinning), 10% (2) said grazing, 20% (4) said additional public education (both on creating survivable space, and on fire prevention and awareness), and 10% (2) said to do something to reduce the UDI traffic along the riparian corridor.

3. The respondents were asked what the BLM could do to assist in reducing the risk to these high hazard areas. Of the 19 that answered the question, 53% (10) said fuels reduction, 16% (3) said establishing firebreaks between public and private land, 16% (3) said supply additional equipment and manpower, 11% (2) said provide additional education to homeowners about their responsibility for creating survivable space, and 4% (1) said to work on better interagency cooperation.

4. Respondents were asked what type of fire education programs they had been involved in. Several of the local fire departments conduct outreach to residents in their districts about wildfire hazards and the need to create survivable space. These were done primarily by local firefighters on volunteer time. Some used education in the public schools to provide material to the children, which was to be taken home. There was some mention of using Firewise literature.

5. The question was asked, "Are there locations or properties that have high environmental, cultural or economic value that should be a priority for fire risk reduction?" Property-specific answers included:

a. The railroad (historic and economic)

b. Ramsey, Ash and Miller canyons (environmental)

c. Fairbank (historic)

d. Whetstone landfill (hazmat)

e. Gas pipelines (explosion hazard)

f. Properties where the BLM owns conservation easements alongside the SPRNCA (environmental)

g. Archeological and paleo sites along San Pedro Corridor, e.g. Lewis Springs (historic cultural resource)

h. Historical buildings east of Sierra Vista, e.g., railway station, stage coach stop (historic cultural resource)

i. The monastery on highway 80 (historic cultural resource)

j. Coronado National Memorial (historic cultural resource)

k. Old Bisbee, a National Historic Site (historic cultural resource)

l. Boquillas Ranch (historic cultural resource)

6. Of the 16 responses to the question "Do you feel your community is adequately prepared to combat wildland urban interface fires, 31% (5) said yes, 25% (4) said no, and 44% (7) said somewhat. Of the "No's," the most common reason cited was the limited nature of resources, including volunteer time, equipment, and water, all of which contribute to long response times.

7. Fire officials were asked what they thought would be the most beneficial towards improving fire-fighting capability. Of the 16 who answered, 25% (4) said more training, 19% (3) said additional water supplies, 19% (3) said additional or better equipment, 13% (2) said additional staffing, 12% (2) said additional funding (non specific about use), 6% (1) said better communications (specifically new radios), and 6% (1) said more pre-planning.

8. A summary question was asked about concerns the respondent felt had not been addressed by any of the previous questions. Answers included:

a. "Improving communications"

b. Standardizing the incident command system between departments

c. "Policy issues"

d. Getting homeowners to take more responsibility for making their homes fire safe.

e. Increasing funding.

9. Lastly, this group was asked if they knew of any ordinances, covenants or codes that would prohibit wildfire mitigation work. Affirmative answers included,

    a. Lakeside Resort at Parker Canyon had a covenant that prohibited the removal of native vegetation.

    b. "Getting permission to burn because of air quality is sometimes an issue." (Although, from an interview with an employee of the Cochise County Health Dept., there are no restrictions on burning for air quality reasons.)

    c. Endangered species: Southwestern Willow Flycatcher, Huachuca Water Umbel (aquatic plant). San Pedro is also critical habitat for the Spikedace and the Loach Minnow, though none are found there currently.

APPENDIX E: COMMUNITY COLLABORATION / COOPERATION

Three public meetings were held on December 12 and 13, 2002, one each in St. David, Tombstone, and Palominas. The following represent the primary concerns expressed by the general public.

1. All of the residents who spoke expressed a concern about wildfire, and strongly encouraged the BLM to reduce the risk of wildfire. Particularly in the southern study areas, there was the sentiment that the BLM had made commitments to reduce fuels in the past and had not followed through with those commitments. The members of the public who spoke at the meetings were open to fuels reduction via burning, grazing or mechanical removal. While there were some who preferred one method over others, no one expressed opposition to any of these methods.

2. Some members of the public expressed interest in being allowed to reduce fuels on BLM land adjacent to their private property for a distance of 50 or 100 feet. This included both mowing of grass and cutting of larger fuels. This specific issue is still being considered / discussed.

3. All the public comments received about the local fire departments were positive. The public was generally very satisfied with the level of service that they felt they were receiving for the amount of support they gave the fire department.

Both fire officials and the public mentioned fires started by UDI's. The riparian corridor is a heavily preferred route for people crossing the U.S.-Mexico border. It is not uncommon for UDI's to build campfires when they stop, and leave them unattended when they continue their travels. Everyone who spoke about the UDI's seemed resigned that realistically there was nothing that could be done to reduce this risk.

Three public meetings were held on December 15, 2007, one each in St. David, Tombstone, and Palominas. The following represent a summary of comments and concerns expressed at these meetings.

All Area General Themes:

- Arizona Firewise is looking for more wildland and structural firefighters to become
  - Firewise Advisors
    - (S-130, S-190, S-215, S-290, Home Assessment (or equiv.) course and field observation of fire behavior in grass, brush, and/or timber fuel types)
  - Firewise Assessors (Home Assessment, Firewise or Home Ignition Zone training).

Go to www.AzStateFire.org for more information on this program. Classes being taught at the Arizona Wildfire Academy in Prescott, March 2008)

- Training is available throughout the AZ State Forestry Division.
- Sustainability of fuels reduction projects at the local level is essential.

Hereford / Palominas

- 3 Years behind scheduled burn plan
    - Need permit and burn plan approval earlier in year to maximize available burn windows.
- Have 50/50 cost share available but can't generate required matching dollars.
- Not in the loop on grants and grant cycles
    - Want a list of grants and contact info
- Fire Department is designating a Firewise Coordinator
    - Palominas Firewise Community board needs to influence and help prioritize his job responsibilities
- F.D. needs equipment to participate with BLM's offer to contract for Home Ignition Zone projects.
- Lots of horses in area, need animal evacuation plan.
- 100' road (AKA – a Firebreak) has been installed as a part of the international boundary fence project. Road is complete on the eastern side of Palominas and continuing west.
- 9 strategic firebreaks installed in the Hereford and Palominas CWPP areas, but plan on only maintaining 8 of them, since South Hargis had minimal fuels, access problems, and can be addressed with Home Ignition Zone firebreaks and prescribed burning.

St David

- Offered to hire them to maintain strategic fire breaks in community and to establish HIZ firebreaks in community with BLM cost share.
- Will work with local Boy Scout troop on placing fire interpretation sign, firebreak work, wood chip and firewood fund raising.

Tombstone/Lewis Springs

- Working with Tombstone in early 2008 to establish second general fire mitigation and prevention sign in town.
- Establish a Fire Management Exhibit similar to Benson's in the downtown area.
- If funding is available ($15K), will go door to door to homes within a quarter mile of BLM public land, to offer 50% cost share HIZ firebreak program and to drop off door hangers.
- Will continue work with Tombstone VFD in the Escapule community, which is part of the Lewis Springs CWPP, to create HIZ firebreaks.
- Still open to idea of creating firebreak planned in CWPP, but to date this has not occurred.
- Will know very soon if the Fire Danger sign the Tucson Electric Power Company is donating to BLM, in 2008, will be put up in Tombstone or in another location on the Gila District.

Babocomari

- ASLD established East Landers firebreak, though not exactly as planned on map.
    - They have not been able to maintain it.
- BLM has established and is maintaining 3 firebreaks in the area.
- Have not worked with PBW VFD.

APPENDIX F: PALOMINAS CWPP, 11/10/2004

INTRODUCTION

What

The Firewise Community Program is intended to help communities deal with fires in the wild land/urban interface. Palominas with its increasing population and large lot residential development is an example of this wild land /urban interface. The Firewise program is a federally based effort by the National Wildfire Coordinating Group to lessen the impacts of wildfire on developed areas. The coordinating group consists of the agencies that are responsible for wild land fire management all over the United States.

Arizona Firewise is guided by the Arizona Interagency Coordinating Group, a partnership of federal and state organizations. In the Palominas area, BLM, the Forest Service, the University of Arizona, Cochise County and local fire districts are all part of the state effort. As part of the state effort, a Wildfire Hazard Assessment and Mitigation Plan was developed by BLM during 2003. This plan assessed the type of wildfire fuels in our area and related this to the location of residences, water supplies and fire fighting resources. The plan came up with a wildfire hazard rating and a risk assessment for the Palominas area. The plan identified Areas of Concern in which fuels and risk combine to pose a significant threat to life and property. This plan and its assessment of the Areas of Concern was the primary motivation for the formation of a local Firewise Community.

The Firewise Community program enables local groups to come together to address the problem of wildfire with an approach tailored to the particular area. A Firewise Community group may apply for funding of its efforts through federal sources. These federal dollars are to be used to assist the local community in mitigating and preparing for wildfire events. This group may operate independently from other governments or agencies.

Who

A group of seven Palominas residents who share a common interest in addressing local wildfire risks have joined together to establish the Palominas Firewise Community (PFC). Informal meetings have been held to discuss the problem of wildfire in our area and how or if Firewise Community status who help. Several members attended Firewise workshops in Tucson and Sierra Vista. The local federal advisor, David Peters, Fire Mitigation Specialist at the Bureau of Land Management gave a presentation to group and answered questions about what might be appropriate for the Palominas area.

Where

The focus of the Palominas Firewise Community has been along the San Pedro River corridor between the Mexican border on the south and Hereford Road on the north. This area encompasses the Areas of Concern identified in the BLM plan. A map of the proposed area is included in this report. Within this area the Palominas Firewise Community may provide assistance and funding for wildfire mitigation and preparation.

Over the last few years the San Pedro River corridor has experienced several large range fires. These fires have been both human caused and natural. While property damage and loss of life has been minimal, several residences have been close to destruction and one was lost in the area. The BLM Wildfire Hazard and Mitigation Plan (WHAMP) and CWPP (completed March 2008) identifies significant potential for property loss and for loss of life, both human and livestock in our area.

To address wildfire concerns at a national level the federal government along with state governments, insurance companies and private organizations have initiated the Firewise program. Grants and funding are available for any community which cares enough about wildfire risks to form an alliance. This money can be used to purchase equipment, conduct awareness programs, plan responses to fire events, improve preparedness and develop mitigation strategies. The Palominas Firewise Community seeks to improve the areas fire response and lessen the impact of future fires in the area.

BACKGROUND

Location

The Palominas Firewise community is located approximately 18 miles Southeast of Sierra Vista off of Highway 92 and adjacent to the U.S. and Mexico border to the south. The Palominas's primary access north of Highway 92 is Hereford Road and Palominas Road. South of Highway 92 much of the area is accessed via Smith Road. There are many residential secondary roads both to the north and south of Highway 92. The Palominas Firewise Community consists primarily of the area on both sides of the San Pedro River from the Border north to Hereford Road.

Ownership

Most of the land in the Community is privately owned. However the BLM owns or manages a significant amount of land adjacent to the San Pedro River and the state has about one and a half sections near the junction of Hereford road and highway 92. Many of the privately held residential lands consist of parcels four acres and smaller. A few larger residential and ranch parcels are scattered throughout the area but predominately to the south of highway 92.

Cultural Resources

The Palominas area has several locally significant historic sites. There are several Clovis and later archeological sites. The well known Lehner Mammoth site is off Palominas Road and the Bead Hill and Kidney Village site are near the Hereford Bridge. Native Americans in the area included the HoHokam and Salado. The San Pedro River is the route of the Coronado Expedition during its search for the fabled Seven Cities of Gold. On the border is the Los Corrales site which was important during the cattle ranching heyday of the 1870's. The area near the Hereford road bridge is the site of historic Hereford. Hereford was a rail stop on the line between Benson and Naco.

Cattle from the several large ranches in the area were loaded here. The town had several buildings and at one time a school and post office. South of the river crossing on Hereford road was a rich farming area and site of the Hereford Dairy farm. The dairy supplied milk that was delivered fresh daily to Bisbee miners, families, and businesses.

Just south of the highway 92 bridge is the river crossing used by the Mormon Battalion in December of 1846. Today the area is best known for the San Pedro Riparian National Conservation Area (SPRNCA). The SPRNCA includes 58,000 acres of public land between the Mexican border and St. David, Arizona. The area is a rare remnant of the desert riparian ecosystem, a trace of the extensive network of similar riparian systems that once existed throughout the Southwest. The San Pedro River is the first internationally recognized bird migration corridor. It is a significant wildlife corridor and is famous as one the leading bird viewing areas in the United States.

Land Form

The Palominas Firewise Community is located entirely in the valley of the San Pedro River. The valley is formed by fault- block drop typical of the Arizona basin and range topography. Slopes average less than five percent and a few washes cross the area leading to the river. Most of the Firewise Community is between 4200 and 4400 feet in elevation. This flat topography and seasonal strong winds increases the danger that wild land fire will spread and move quickly.

Climate

The Palominas climate is typical of the high desert grassland found in southeast Arizona. Temperatures are moderate and comparable to nearby Sierra Vista. Rain fall averages 15 inches per year with about half occurring during the summer monsoons from July to mid September. The local temperature range along the San Pedro River tends to be warmer in the summer and colder in the winter. Windiest months averaging over 8 miles per hour are in the spring, usually from the southwest which corresponds with the driest fire season.

Biotic Communities

The San Pedro river corridor within the PFC has been nationally recognized for its biotic diversity and importance. In 1988 Congress established the San Pedro River Riparian National Conservation Area to protect the plant, animal, human and water resources of the area.

The Palominas area is predominately semidesert grassland. The dominate species are Tobosa, gramma, three awn, cottontop, vine mesquite and buffalo grass. Mesquite, yucca, hackberry, acacia and creosote are the dominate shrubs in the area. The San Pedro River riparian area has numerous cottonwoods, willows, walnut and other deciduous riparian trees. Within and adjacent to the riparian zone are numerous tall grass (Sacaton) meadows. Rare plants such as the Huachuca water umbel can be found in the riparian area. The San Pedro River corridor with the PFC contain a linear stand of large cotton wood trees (Fremont Cottonwood) which can carry a crown fire great distances in a short time.

The animal community is very diverse due to the river corridor. More than 10 federally listed as threatened or endangered animals are found in the area. These include fish such as the Yaqui Chub, birds - Aplomado Falcon and mammals - Ocelot. Deer, badger, bobcat, jack rabbit, collared peccary and small burring rodents are common throughout the Palominas area. Occasional sightings of mountain lion are reported. The best known component of the local fauna is the diverse bird life found along the river and in the adjacent grasslands. Over 350 species of birds have been observed.

Fuels and Fires

Past and present land use practices have changed the historical fire regime and the resultant fuel profile in the Palominas area. Patchy fuel continuity and ground fuels pose a moderate problem with slash, vegetation and ladder fuels. Vegetation in the area contains a low slash component. The area contains dense vegetation and has a moderate ladder fuel component. The fuels are characterized by dense shrubs with a moderate to high grass under story. The BLM lists the Palominas area as a class 2 condition area. This means that the fire regime is moderately altered from the historical range. The risk of loss from fire is increased due to the change in fire size, frequency, intensity and severity.
According to the Upper San Pedro Watershed, Fire Mitigation Survey the predominate fuel types are Anderson's Fuel Model 1 and 6.

> Fuel Model 1 is short grass, less than 1 foot high. Fire occurs at the surface and moves rapidly through the cured grass and associated material.
>
> Fuel Model 6 represents dormant brush and hardwood slash, generally not exceeding 6 feet in height. Fires carry through the shrub layer where the foliage is more flammable than Fuel Model 5, but this requires moderate winds, greater than 8 miles per hour at mid-flame height. Fire will drop to the ground at low wind speeds or at openings in the stand.

Many of the fires in the area begin as grass or range fires which can move quickly. Once these fires reach the river or residential areas they encounter woody vegetation. These landscape items along with the presence of propane tanks can intensify the fire. Along the river the mature cottonwoods have dropped many limbs which serve as ladder fuels. The downed wood within the cottonwood forest also acts to retain fires in stumps and large wood piles. The cottonwoods can become totally involved (a crown fire) usually killing the trees.

Less of the area is grazed than in the past thereby increasing the density of the grass cover and fuel loading. Nonnative species such as Johnson grass, Lehmans lovegrass, salt cedar and Arundo have proliferated and pose an increased fire hazard. Late winter and spring are when the most dangerous and destructive fires have occurred. In many areas limited road access and lack of nearby water hamper suppression of the fires.

Large areas within the Palominas Firewise Community have been identified as Areas of Concern in the Upper San Pedro Watershed, Fire Mitigation Survey. Areas of Concern arise when the hazard classification combined with values at risk show continuity. Simply put, when areas of high fuel loading are intermixed with structures and people there is a concern for fire safety. Much of the area north of highway 92 and between Palominas and Hereford Roads is classified as an area of concern. An additional Area of Concern is to the south of Clinton Road near the river. These areas contain many residences and the school site at the corner of highway 92 and Palominas road.

The primary agency responsible for fire suppression in the area is the Palominas Fire District (PFD), an all volunteer organization. The 28 people in the PFD receive training on a regular basis to improve their wild land and structure fire fighting skills. The district works regularly with adjoining and distant fire districts (Bisbee and Fry). Additionally the PFD must work with federal land management agencies which are responsible for fire suppression on their lands. There is a fine line which the district must observe when working with BLM or US Forest Service on wild

land fires. Forest Service and BLM tend to view fires as a tool to replenish the land. The PFD views a wild fire as a threat to structures.

The PFD is primarily an organization that battles wild land fires. The fighters have less experience and equipment needed for structure fire fighting. In 2003 the Palominas Fire District (PFD) responded to 90 fire calls. 25 of these, about 30 percent, were wild land fires. This is compared to six structure fires in the same period. The fire district depends on grants and property taxes to pay for its equipment. The district has adopted a five year goal which includes additional equipment for fighting wild land fires. Due to the rapid urbanization within the fire district is in need of more equipment that can be used to combat fire in the wild land/urban interface.

Population

A population estimate was made based on information from the Cochise County Planning Department using maps that show roads and indicated addresses. The number of homes and commercial buildings in the area was determined. This number was multiplied by 2.5 to give an estimate of the number of people in the area. The total of 350 addresses suggests a population of 875 within the Palominas Firewise Community.

Preparedness

All primary fire services in the area are provided by 28 the local volunteers of the Palominas Fire District. Within the Palominas Firewise area is one fire station, one mile north on Palominas road. Another fire station is located just to the east off highway 92. The district is in need of additional equipment to fight fires in the wild land/urban interface.

The Bureau of Land Management and State of Arizona are responsible for fire suppression their lands, but are often not the first to respond.

The majority of the private roads in the PFC are of substandard design and construction. Most are long dead-end roads without adequate turn-around space. Signage is planned 20 miles away in Sierra Vista to indicate fire danger and evacuation routes.
Water supplies in the area are adequate but in all most all cases require transportation to the fire site.

Generally, public readiness for a wild land fire emergency is low especially among the many newer residents. However, residents who have lived in the area for a few years are aware through personal observation of the potential of wild land fire. The objectives of the PFC include raising community awareness, and increasing their preparedness.

PALOMINAS FIREWISE COMMUNITY BOARD: ACTION PLAN 8/4/4

GOALS

1. To protect private property from wildfire and related damages in the area.
2. To preserve the aesthetics and wildlife within the riparian area.
3. To partner with the BLM and other public and private entities in managing fire risk in and around the SPRNCA.

OBJECTIVES

(Objectives to meet goals were developed & prioritized through education, consultation, brainstorming and multi-voting processes. Ongoing SWOT analysis of objectives helps identify what projects to pursue.)

1. REDUCE FUELS

   Projects in Place/ In Progress:
   BLM Firebreaks & Prescribed Burns Plan
   Highway 92 bridge firebreak partnership

   Remaining Needs:
   Roadside mowing program (see WHAMP)
   Community chipper & mower acquisition
   Fuel reduction in riparian "Gap" (private land)

   Opportunities:
   Partner with BLM & others
   Grants & grant writer

   Barriers:
   Environmental Assessments
   Landowner apathy

2. OBTAIN EQUIPMENT

   Projects in Place/ In Progress:

   Remaining Needs:
   Community chipper & mower
   Palominas Fire Department equipment
   Generators for water pumping (PFD & private)

   Opportunities:
   Computers & Red Zone software for PFD
   New technologies (such as foams, home sprinklers, etc.)
   Grants & grant writer

   Barriers:
   Lack of information on PFD needs

3. BURY POWER & TELEPHONE LINES

Projects in Place/ In Progress:
APS line upgrade & substation projects
Cell tower installation at Valley View School

Remaining Needs:
Bury utilities within PFC boundaries

Opportunities:
Grants & grant writer

Barriers:
Lack of information on feasibility & cost

4. PLAN EMERGENCY RESPONSE

Projects in Place/ In Progress:
Cochise County emergency response plan

Remaining Needs:
See list from brainstorming session

Opportunities:
Computer & Red Zone software for PFD
Signage grants (see WHAMP) & grant writer

Barriers:
Lack of information on county plan R/T identified needs

5. IDENTIFY WATER SOURCES

Projects in Place/ In Progress:

Remaining Needs:
See WHAMP recommendations

Opportunities:
Flyover survey
Grants & grant writer

Barriers:
Landowner willingness & cost
Impact of “Water Wise” program

6. PROVIDE HOMEOWNER ASSISTANCE

Projects in Place/ In Progress:
Home fire audits completed for WHAMP
Recent educational opportunities

Remaining Needs:
Chipper & mower availability
Work crews

Opportunities:
Grants & grant writer

Barriers:
Landowner apathy
Lack of landowner finances, time, physical ability, equipment
Large properties

7. INCREASE COMMUNITY AWARENESS

Projects in Place/ In Progress:
Home fire audits for WHAMP 2003
Educational mailings to landowners for WHAMP 2003
Community meetings for WHAMP 2003
Arizona Firewise Communities workshops, Tucson 2003 & Sierra Vista 2004
Formation of Palominas Firewise Community Board 2003

Remaining Needs:
100% home fire audits in area
Children's program for Palominas School

Opportunities:
Firewise Trailer
Signage grants & grant writer

Barriers:
Landowner apathy

8. RECOMMEND FIRE ORDINANCES IN COUNTY CODE

Projects in Place/ In Progress:

Remaining Needs:
Evacuation & firefighter access per WHAMP

Opportunities:
Partnership with Huachuca Mountain Fire Management Group
Existing professional standards & community examples
Government & community attitudes post recent fires

Barriers:
Historical government & community attitudes R/T regulations

CURRENT PROJECTS *Completed since CWPP

(See Project Worksheets for details on specific projects.)

1. Highway 92 Bridge Firebreak
2. Fire Education Signage
3. Roadside Mowing Program
4. Community Chipper & Mower Acquisition
5. Meet with PFD Chief re: equipment needs (Sept.)
6. Utility Lines Research
7. Meet with County Emergency Services Director re: county plan (Oct.)
8. South Palominas Firebreak
9. North Gap Firebreak
10. South Hereford Road
11. East Hereford Road
12. Boucher Road
13. Cobb Lane

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