Central Utah

Regional Wildfire Protection Plan

Covering Juab, Millard, Piute Sanpete, Sevier and Wayne Counties

State of Utah
Division of Forestry, Fire & State Lands

May 11, 2007

FINAL

CENTRAL UTAH

REGIONAL WILDFIRE PROJECT PLAN

Prepared by

Portage

1075 S. Utah Ave. Ste 200
Idaho Falls, ID 83402
208-27-1362

SWCA Environmental Consultants

257 E. 200 S., Suite 200
Salt Lake City, UT 84111
801-322-4307

5647 Jefferson St. NE
Albuquerque, NM 87109
505-254-1115

Wildland Fire Associates

118 W Main St.
Rangely, CO 81648
970-675-2225

May 4, 2007

EXECUTIVE SUMMARY

Wildfire has always been a natural part of the ecosystems of Utah. Historically, fires were predominantly low intensity surface fires that thinned fuel accumulations on a regular basis, with occasional, intense, stand-replacement fires in patchy areas or under extreme fire conditions. Over the last century, land management policies have emphasized fire suppression in order to protect human assets and interests. In forests where wildfire has been repeatedly suppressed, saplings, brush and shrubs, grass, needles, and leaves have built up to unprecedented levels, and forest stands have become denser. Such forests form huge reservoirs of fuel awaiting ignition, and resulting wildfires are often hotter, and more difficult and dangerous to control. Additionally, a rapidly developing wildland-urban interface (WUI) has increased the number of residents and structures at risk from wildfire.

To address these issues, a group of multi-jurisdictional agencies (federal, state, and local), organizations, stakeholders, and residents have developed the Central Utah Regional Wildfire Protection Plan. This RWPP is one of five regional plans covering each of the wildfire planning and protection regions of Utah. The goal of each RWPP is to assist the region and its counties, communities, and government agencies in reducing the risk of catastrophic wildfire within the region.

The Central Utah RWPP emphasized public participation among all collaborating entities and makes recommendations for fuel reduction treatments and educational outreach activities for 16 project areas. The recommendations are based on a wildfire risk assessment that considered fuel hazards, wildland urban interface areas, and fire history; input from public scoping meetings, and the considerable expertise of the planning team.

The Central Utah RWPP recommendations are general in nature to provide high levels of flexibility in the implementation phase. The suggested list is not all-inclusive, and other communities could benefit from similar types of recommendations. The RWPP is a living document and should be revised as environmental conditions change or social issues arise. Implementation and monitoring of the RWPP will be the responsibility of the Local Interagency Fuels Committee.

The wildfire threat to residents and communities of Central Utah is manageable if multi-jurisdictional agencies continue to work together in cooperation with community and county representatives. Local and state fire agencies, as well as community fire protection groups, are excellent resources for information and assistance. A combination of homeowner and community awareness, public education, and agency collaboration and treatments will assist in reducing wildfire risk. These elements are essential components of the Central Utah Regional Wildfire Protection Plan and will be important in maintaining the goals and priorities of the plan in the future.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 1. Introduction

Wildfire has always been a natural part of the ecosystems of Utah. Historically, fires were predominantly frequent surface fires of low intensity that thinned fuel accumulations in forests, with occasional, intense, stand-replacement fires in patchy areas or under extreme fire conditions. Over time, these periodic, natural fires created a mosaic pattern of different vegetation types and ages.

Over the last century, as populations have increased dramatically throughout the West, land management policies have emphasized fire suppression in order to protect human assets and interests. Although the policy of wildfire suppression has indeed protected human populations throughout the West, it has also disrupted the natural fire regimes that once existed. Wildfire readily and thoroughly consumes flammable materials such as understory, saplings, brush and shrub growth, grass, needles, and leaves. In forests where wildfire is suppressed year after year, these flammable materials build up to unprecedented levels, and the stands become much denser. Such forests form huge reservoirs of fuel awaiting ignition, and pose a particularly significant threat when drought is also a factor (USFS 2005). As a result, wildfires are not so much suppressed as delayed, and when they occur, they are often hotter, more difficult to control, more destructive, and more dangerous to fight. As more and more communities develop and grow in areas that are adjacent to fire-prone lands, in what is known as the wildland-urban interface (WUI), wildland fires pose an increasing threat to people and their property (NFP 2001).

The Central Utah Regional Wildfire Protection Plan (RWPP) is one of five regional plans covering each of the wildfire planning and protection regions of Utah. The goal of each RWPP is to assist the region and its counties, communities, and government agencies in reducing the risk of catastrophic wildfire within the region.

1.1 Overview of the RWPP

In response to the risk to people and property, a number of planning strategies have been implemented in recent years to address the conflicting needs of managing wildland fire to reduce threats to human development and maintaining, managing, and/or restoring fire's natural function in the ecosystem. The National Fire Plan (2001) and the 10-Year Comprehensive Strategy Implementation Plan (2002) both emphasize a need for a collaborative approach among federal land managers, states, and local communities in reducing fire hazards and impacts to communities. The Healthy Forests Initiative of 2002 (USFS and BLM 2004) and the Healthy Forests Restoration Act of 2003 (USFS and BLM 2004) also emphasize overall restoration of fire-prone ecosystems on federal, state, tribal, and private lands, in forests and rangelands, with the intent of reducing the risks that severe wildfires pose to people, communities, and the environment.

The HFRA contains a variety of provisions to expedite hazardous-fuel reduction and forest-restoration projects on federal lands that are at risk of wildland fire or insect and disease epidemics. The goals of the HRFA are to:

- strengthen public participation in developing high-priority forest health projects;
- reduce the complexity of environmental analysis, allowing federal land agencies to use the best science available to actively manage lands under their protection;
- provide a more effective appeals process that encourages early public participation in project planning; and
- issue clear guidance for court action against forest health projects (The White House 2007).

A key component of the HFRA is the development of **Community Wildfire Protection Plans (CWPPs)** as mechanisms of public input and prioritization of fuels reduction projects. A CWPP is a required prerequisite for receiving hazardous fuels reduction funding under the HFRA. As defined by the HFRA, the minimum requirements of a CWPP are:

1. Collaboration
2. Prioritized fuel reduction
3. Treatment of structural ignitability

The Central Utah RWPP has been developed to meet and exceed the above minimum requirements of a CWPP, as specified in the HFRA:

1. This RWPP used a collaborative process involving federal agency and local government representatives to:
    - identify high-risk areas across the Central Utah region, and
    - set broad priorities for recommendation and actions to reduce the risk to human life and property due to catastrophic wildland fire in the WUI of the state-identified "communities at risk" (CARs).[1]
2. This RWPP contains prioritized recommendations to:
    - reduce hazardous forest fuels,
    - restore forest/watershed health,
    - promote community involvement,
    - increase communities' abilities to prepare for and respond to wildland fires,
    - reduce structural ignitability, and
    - increase wildfire awareness and education.

[1] Following Congressional direction, each state compiled a list of communities in the vicinity of federal lands determined by wildland fire officials to be at risk from wildland fire. An Overall Score was given to each community identified throughout the State of Utah, representing the sum of multiple risk factors analyzed for each community, including fire history, local vegetation, and firefighting capabilities. The Overall Score ranges from 0 (No risk) to 12 (Extreme risk). As of 2005, Utah had identified almost 600 communities at risk (CARs). 49 of those communities are within the Central Utah Region (Appendix A).

This RWPP serves as a comprehensive, programmatic plan for counties and communities in the Central Utah region as they prepare to develop their own CWPPs. The intention of the RWPP is to provide all counties and communities in the Central Utah project area with a landscape-level overview of factors to consider in wildfire planning, to provide general recommendations for each county in the Central Utah region, and to identify local communities where additional community fire planning may be needed. At the local level more detailed CWPPs may be needed to identify and address specific local issues and to provide opportunities for input from the local public. Appendix A provides copies of the completed CWPPs in the Central Utah region.

1.2 RWPP PLANNING PROCESS

To provide communities with guidance in developing a CWPP, the Society of American Foresters (SAF), in collaboration with National Association of Counties, National Association of State Foresters, Western Governors' Association, and the Communities Committee developed a handbook entitled "*Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities*" (SAF et al. 2004). This document outlines eight steps (listed below), for developing a CWPP and served as the guide for preparing the Central Utah RWPP.

Table 1. Eight Steps for Developing a CWPP

Step One:	Convene Decision-makers. Form a core team composed of representatives from the appropriate local governments, local fire authorities, and state agencies responsible for forest, fire, and hazard management.
Step Two:	Involve Federal Agencies. Identify and engage local representatives of the USFS and Bureau of Land Management (BLM). Contact and involve other federal land management agencies as appropriate.
Step Three:	Engage Interested Parties. Contact a broad range of interested organizations and stakeholders and encourage their active public involvement in plan development.
Step Four:	Establish a Community Base Map. Work with decision-makers and stakeholders on a baseline map of the region that depicts the communities' WUIs, other inhabited areas at risk, forested areas that contain critical human infrastructure, and forested areas at risk of large-scale fire disturbance.
Step Five:	Develop a Community Risk Assessment. Work with partners to develop a community risk assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other community values at risk (CVARs); and local preparedness capability. Rate the level of risk for each factor and incorporate into the base map as appropriate.
Step Six:	Establish Community Priorities and Recommendations. Use the base map and risk assessment to identify local priorities for fuels treatments, opportunities to reduce structural ignitability, and other issues of interest. Clearly indicate whether priority projects are directly related to 1) protection of communities and essential infrastructure or 2) reduction of wildfire risks to other CVARs.

Table 1. Eight Steps for Developing a CWPP

Step Seven:	Develop an Action Plan and Assessment Strategy. Develop a detailed implementation strategy to accompany the RWPP, as well as a monitoring plan that will ensure its long-term success.
Step Eight:	Finalize RWPP. Finalize the RWPP and communicate the results to regional and community leaders, decision-makers, and key partners.

Source: SAF et al. 2004.

SWCA Environmental Consultants, Portage Environmental and Wildland Fire Associates were contracted to facilitate planning meetings, conduct the risk assessment, plan and facilitate public meetings and compile public comments, and write the planning document.

1.2.1 CORE TEAM

The first step in the RWPP process was to invite stakeholders representing agency, county, private and tribal interests to form a Core Team. The stakeholders that responded to that invitation are listed in Table 2. The group met for the first time on June 15, 2006. Subsequent meetings were held on a monthly basis to set the direction for the plan and process. Although not all stakeholders attended all monthly meetings, those responding to the initial invitation received project updates and the opportunity to provide input via email.

Table 2. Stakeholders Represented on Core Team

State of Utah Forestry, Fires and State Lands (Fire Management Officer and/or county fire wardens)
County Planning and Zoning (representatives from each county)
Six County Association of Governments (6 County AOG)
BLM Richfield and Fillmore Field Offices
USFS; Fishlake and Manti-La Sal National Forests
Utah Division of Wildlife Resource (UDWR)
Natural Resource Conservation Service (NRCS) Panoramaland Resource Conservation & Development (RC&D)
Capitol Reef National Park

1.2.2 PROJECT BOUNDARY

The original intent of the State of Utah and the BLM was to organize the five regional plans by Interagency Fire Center coverage area. To facilitate county or community funding requests, the Core Teams of each of the five regions reconfigured project boundaries to match county boundaries (Figure 1); thus the Central Utah region encompasses the counties of Juab, Millard, Piute, Sanpete, Sevier, and Wayne in their entirety, although portions of Sanpete and Wayne counties are served by the Moab

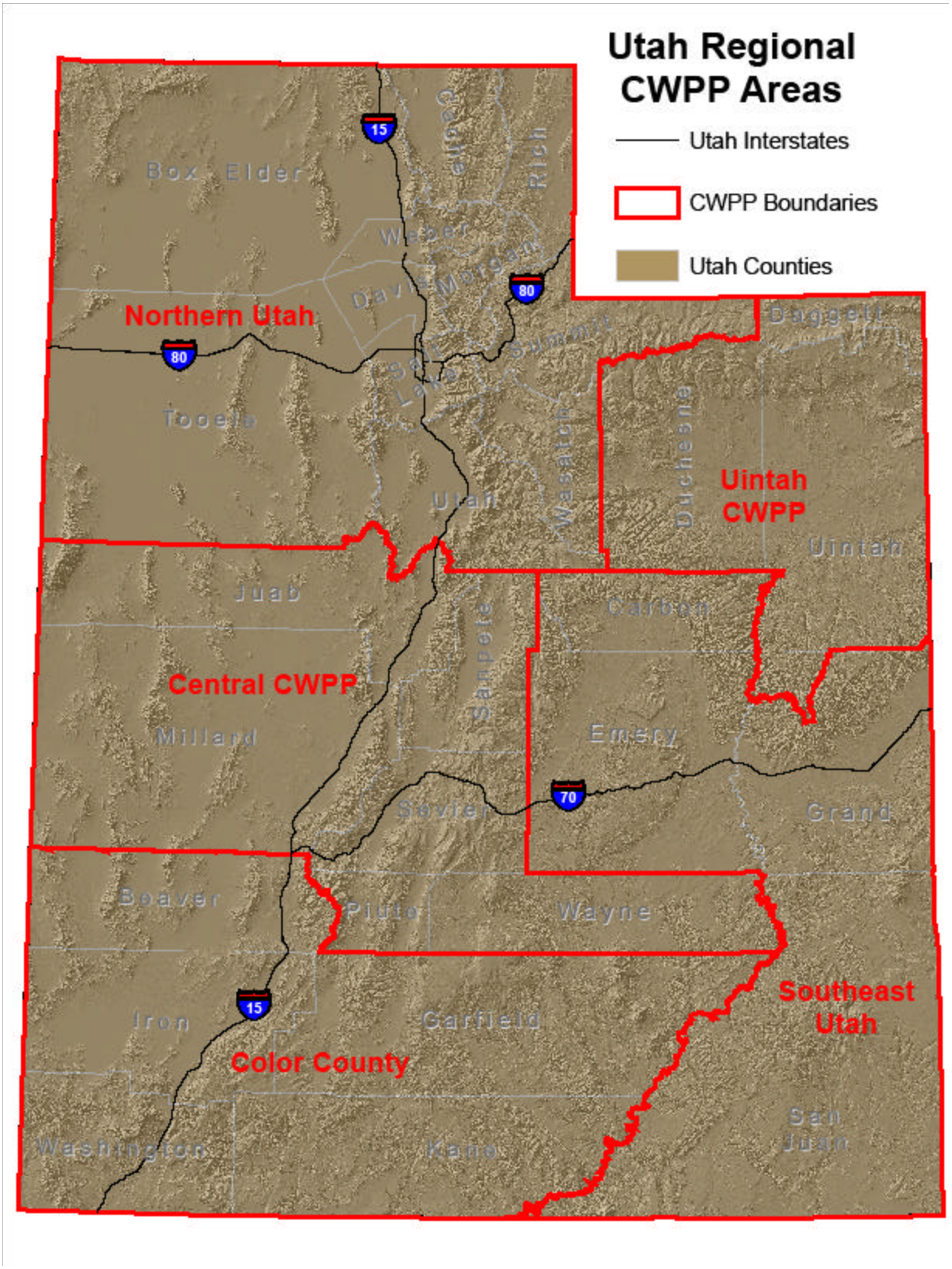

Figure 1. Boundaries for the five Utah RWPPs.

Interagency Fire District. A small portion of the Goshute Indian Reservation is also included in the Central Utah region, although the majority of the reservation, including its tribal headquarters, is in the Northern Utah region (Figure 2).

1.2.3 PUBLIC INVOLVEMENT

To engage interested organizations and stakeholders and to encourage active involvement in plan development, a press release was issued in October 2006 announcing the formation of the planning teams for the 5 regions and providing a contact name and phone number for each region (see Appendix B). A link to the regional plans was placed on the www.utahfireinfo.gov website to assist individuals in obtaining information about the project.

Six "open house" public meetings were held to educate the public about the goals of the plan and to solicit input from the community regarding wildfire issues and concerns. These meetings were advertised, promoted, and conducted at the county seats of each of the counties covered by the RWPP. Additional information regarding meeting format, materials, and advertising venues, as well as a summary of the public comments received, are included in Appendix B.

1.2.4 DEFINITION OF WUI IN THE PLANNING REGION

The discussions in this document of natural fire regimes and mimicking them or incorporating them into future land use policies do not preclude the fact that *any* kind of wildfire, however large or small, poses a threat to human life and property. Wildland fires pose the greatest threat to community residents, property, and firefighters when they occur in or spread into the WUI, commonly defined as the geographic area where human habitation and developments intermix with wildland or vegetative fire. As a result, national legislation such as the National Fire Plan, the Ten-Year Comprehensive Strategy, and the HFRA places a priority on defining risk in this area. Under the HFRA, at least 50% of all funds appropriated for projects must be used within the WUI.

In the context of the HFRA, the WUI is defined as follows:

1) an area extending 1/2 miles from a boundary of an "at risk community"[2]; or
2) an area within 1-1/2 miles of the boundary of an at-risk community, including any land that (a) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community; (b) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or (c) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; or

[2] "Community" is defined as "is an interface community defined in the Federal Register notice of January 4, 2001 (66 FR 753), or a group of homes and other structures with basic infrastructure and services (such as utilities and collectively maintained transportation routes) in or adjacent to Federal Land." Section 101 (1) of HFRA Section 101 (1) of HFRA.

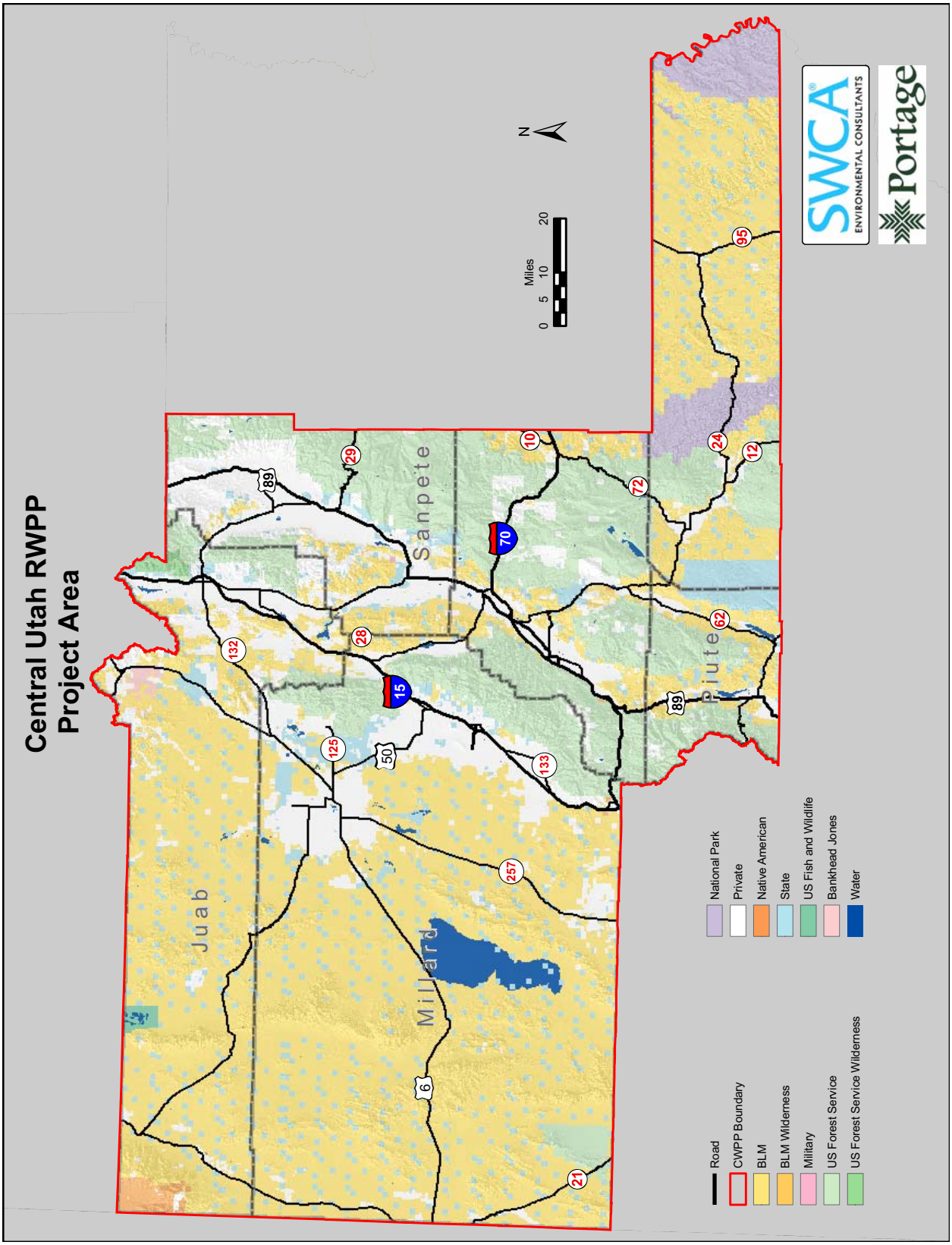

Figure 2. Central Utah RWPP project area boundary and land ownership.

3) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuels reduction to provide safer evacuation from the at-risk community" (HFRA 2003).

Partly due to the landscape-level scale and scope of this RWPP, and partly to encourage the development of more detailed county and local CWPPs, this RWPP uses the narrowest definition from the HFRA, "an area extending 1/2 miles from a boundary of a [community at risk]" (Figure 3).

For existing and future CWPPs, this WUI should be further defined or expanded, based on local conditions and CVARs. One of the benefits a CWPP offers to CARs is the opportunity to establish a localized definition and boundary for the WUI, using elements such as fuel hazards, local topography, fire history, vegetation, community characteristics, watershed protection, and fire-fighting preparedness.

1.2.5 COMMUNITIES AT RISK

Using National Fire Plan guidelines, the Utah Division of Forestry, Fire, and State Lands (UDFFSL) has worked with national and local wildland fire officials to create a statewide list of CARs. As of 2005, there were over 600 communities listed and 49 were located in the Central Utah region.

Each community was given a score ranging from 0 (no risk) to 12 (extreme risk) based on the sum of multiple risk factors (e.g., fire history, local vegetation, firefighting capabilities) analyzed in every area. The scoring system allows Utah's fire prevention program officials to assess the relative risk in a given area of the state and open communication channels with these communities to help them better prepare for wildfire (see Figure 3). A list of the CARs specific each county in the Central Utah region can be found in Appendix A.

1.2.6 COMMUNITY VALUES AT RISK

CVARs are a way to measure people, property, natural resources, and other resources that, if lost in a wildfire event, would be a collective loss to the community. Examples of CVARs include the following:

- Housing
- Business and infrastructure (including utilities, trails, and roads)
- Natural resources (including wildlife and water resources)
- Cultural resources
- Tribal concerns and values
- Recreation areas and open space
- Scenic resources (including significant landscapes)

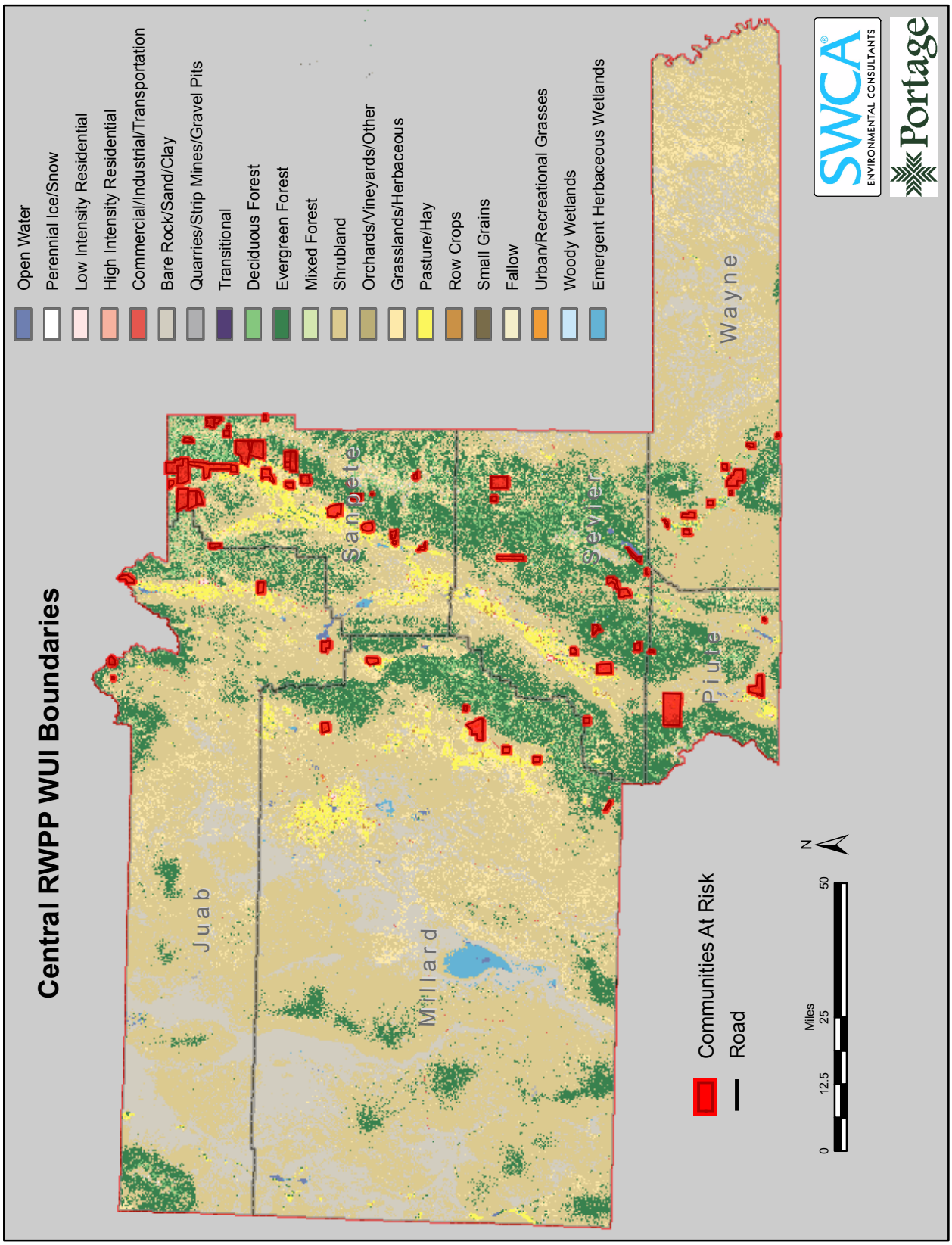

Figure 3. Central Utah RWPP WUI boundaries.

Because of the regional nature of this plan, the county descriptions included in the next section only briefly outline some of the major resources and values that may be at risk. CVARs should be more specifically defined in county and local CWPPs.

Chapter 2. Background

2.1 Fire Management History and Ecology

As long as vegetation has covered the landscape, fire has been there to help regulate species type, occurrence, composition, and patterns of succession. Lightning during spring and summer thunderstorms was the primary source of ignition. These historical wildfires acted as natural thinning agents by removing unhealthy trees and dead snags, consuming downed branchwood and needle litter, and thinning dense young trees and shrubs, thereby reducing laddering potential. As most of these early fires largely remained surface fires, they killed few mature trees and kept destructive, stand-replacing crown fires to a minimum.

Fires that do not kill a tree often leave a scar that is recorded in the tree's annual growth ring. Examination of fire scars in the annual growth rings of individual trees, compared to established tree ring chronologies, can help determine the year and sometimes the season in which a fire burned (Climas 2002). Of course, not all trees are scarred during fires, so existing scars represent at best an incomplete record of fire history, but the analysis of collective fire scars on multiple trees within a stand or watershed can help establish the mean fire return interval (MFI), or the average number of years between recorded fires. These return intervals are important in developing treatment strategies.

Fire exclusion, as well as past logging practices and past grazing patterns, have collectively precipitated the decline of forest health in Utah and resulted in forests that are denser and less diverse. Today's forests have a greater abundance of late successional species and a large accumulation of woody debris and increased fuel loads. Drought conditions have exacerbated these conditions. Consequently, Utah's forests have become more susceptible to intense wildfire, insects and diseases (UDNR) et al. 2003).

2.2 Changes to Historic Fire Regime

By the late 1890s and early 1900s, as human occupation and land use increased, there was a call for suppression of all wildfires. Since their inception, most Federal land management agencies have adopted fire suppression as the primary way to protect people and property from damage due to wildfire. Consequently, for the majority of the last century wildfires were aggressively suppressed. Once the fuels-consuming and thinning effects of natural wildland fires disappeared, so began the trend toward the type of fires we face today. Forest stands began to overcrowd, heavy fuels accumulations were appearing across the landscape, and fire-adapted species compositions became less diverse and unhealthier. Insects and disease found easy hosts in over-stressed forest stands, creating more debris available for combustion. Over a 60-80 year period, fires have become much larger, more intense, and catastrophic in effect, much more difficult to control, and have killed or injured increasing numbers of firefighters. Severe wildfires

have frequently resulted in rapid reductions in vegetative cover, which leads to increased water runoff and soil erosion. Extended drought across the west has exacerbated the problem, placing many communities at greater risk.

Fire suppression is still a commonly used wildfire management tool, however as scientists and wildfire managers have recognized the necessary role fire plays in these ecosystems they have increasingly turned to prescribed fire and wildfire use, where appropriate, as a means to manage wildfire risk and protect people and property. Despite the relatively recent turn toward using fire as a management technique, the history of fire suppression has created notable changes in the historic fire regime of the region. With emphasis on fire suppression particularly in pinyon-juniper woodlands, ponderosa pine forests, and drier mixed conifer forests, fire regimes have shifted from frequent, low-intensity surface fires to stand-replacing, high-intensity fires as a result of fuels buildup. Further, the absence of periodic fires has resulted in many aspen stands becoming decadent and more prone to high intensity fires on a more frequent basis.

Where fire has been suppressed, insects and disease have become more common. Community members often express concern about increased wildfire risk due to beetle infestation. However, based on land management experience and knowledge, local forest officials for the Central Region have concluded that there is not currently a fire risk resulting from beetle infestation.

2.3 CURRENT VEGETATION TYPES AND FIRE ECOLOGY

To gauge fire occurrence and likelihood in the Northern Utah RWPP project area, one of the essential tasks was to identify the general types, locations, and extents of vegetation communities using Southwest Regional Gap Analysis Project (ReGAP) data (USGS 2004). Table 3 and Figure 4 provide an overview of the vegetation types in the region and their respective acreages. In keeping with the broader, landscape-level analysis of fire behavior in this document, some cover types treated as separate types under ReGAP have been judiciously grouped together in this document for ease of analysis.

2.3.1 MID-ELEVATION SAGEBRUSH AND GRASSES

Mid-elevation sagebrush and grassland cover types compose 27% of the planning area and are characterized by the species listed in Table 3. Grasslands are included in this section since a considerable portion of the acreage listed under perennial grasslands (native) may be considered as representing the early seral component of sagebrush communities (BLM 2005a).

This vegetation type occurs at elevation ranges from 5,500 to almost 10,000 feet. Big sagebrush (*Artemisa tridentata*) dominates the vegetation in this community type (Figure 5). The extent of sagebrush has been greatly reduced due to urbanization, irrigated agriculture, livestock grazing, as well as cheatgrass conversion and juniper encroachment. Recent drought conditions have also contributed to dramatic reductions of sagebrush cover across portions of the state.

Table 3. Vegetation Types, Acreages, and Percentages Found in the Central Utah Region

Vegetation Type	SW ReGAP Analysis Vegetation Cover	Planning Area Acres	% Planning Area[1]
Mid-elevation Sagebrush/Grasses	Inter-Mountain Basins Big Sagebrush Shrubland Inter-Mountain Basins Semi-Desert Grassland Inter-Mountain Basins Semi-Desert Shrub Steppe Southern Colorado Plateau Sand Shrubland Colorado Plateau Mixed Low Sagebrush Shrubland Great Basin Xeric Mixed Sagebrush Shrubland Inter-Mountain Basins Big Sagebrush Steppe Invasive Annual and Biennial Forbland Invasive Annual Grassland Invasive Perennial Grassland	**2,960,967**	**27%**
Desert Shrub	Inter-Mountain Basins Greasewood Flat Inter-Mountain Basins Mat Saltbush Shrubland Inter-Mountain Basins Mixed Salt Desert Scrub Colorado Plateau Blackbrush-Mormon-tea Shrubland	**2,422,053**	**22%**
Pinyon-Juniper	Great Basin Pinyon-Juniper Woodland Recently Chained Pinyon-Juniper Areas Colorado Plateau Pinyon-Juniper Shrubland Colorado Plateau Pinyon-Juniper Woodland	**1,779,233**	**16%**
Mountain Shrub/Oak	Rocky Mountain Bigtooth Maple Ravine Woodland Rocky Mountain Gambel Oak-Mixed Montane Shrubland Inter-Mountain Basins Montane Sagebrush Steppe Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland Southern Rocky Mountain Montane-Subalpine Grassland	**1,132,514**	**10%**
Barren	Inter-Mountain Basins Shale Badland Inter-Mountain Basins Volcanic Rock and Cinder Land Inter-Mountain Basins Active and Stabilized Dune Colorado Plateau Mixed Bedrock Canyon and Tableland Rocky Mountain Alpine Bedrock and Scree Rocky Mountain Cliff and Canyon Inter-Mountain Basins Cliff and Canyon Inter-Mountain Basins Playa	**1,088,052**	**10%**
Mixed Conifer/Aspen	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland Rocky Mountain Subalpine Mesic Meadow	**791,320**	**7%**

Table 3. Vegetation Types, Acreages, and Percentages Found in the Central Utah Region

Vegetation Type	SW ReGAP Analysis Vegetation Cover	Planning Area Acres	% Planning Area[1]
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex Rocky Mountain Aspen Forest and Woodland Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland Rocky Mountain Lodgepole Pine Forest Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland Rocky Mountain Ponderosa Pine Woodland** Rocky Mountain Dry Tundra		
Other	Recently Burned Disturbed, Oil well Recently Logged Areas Recently Mined or Quarried Open Water Developed, Medium - High Intensity Developed, Open Space - Low Intensity Agriculture	**611,686**	**6%**
Riparian/ Wetland	Rocky Mountain Subalpine-Montane Riparian Shrubland Invasive Southwest Riparian Woodland and Shrubland Rocky Mountain Alpine-Montane Wet Meadow Rocky Mountain Lower Montane Riparian Woodland and Shrubland North American Warm Desert Riparian Woodland and Shrubland North American Arid West Emergent Marsh Rocky Mountain Subalpine-Montane Riparian Woodland Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	**83,729**	**1%**
Total		**10,869,554**	**100%**

[1] Due to rounding errors, percentages may not add up to 100%.

Note: SW ReGAP Analysis vegetation data were intended to be used for depicting the distribution of the state's various vegetation types at scales of 1:100,000 or smaller. While adequate for characterizing vegetation over large areas, this data is less accurate when viewed for smaller project areas.

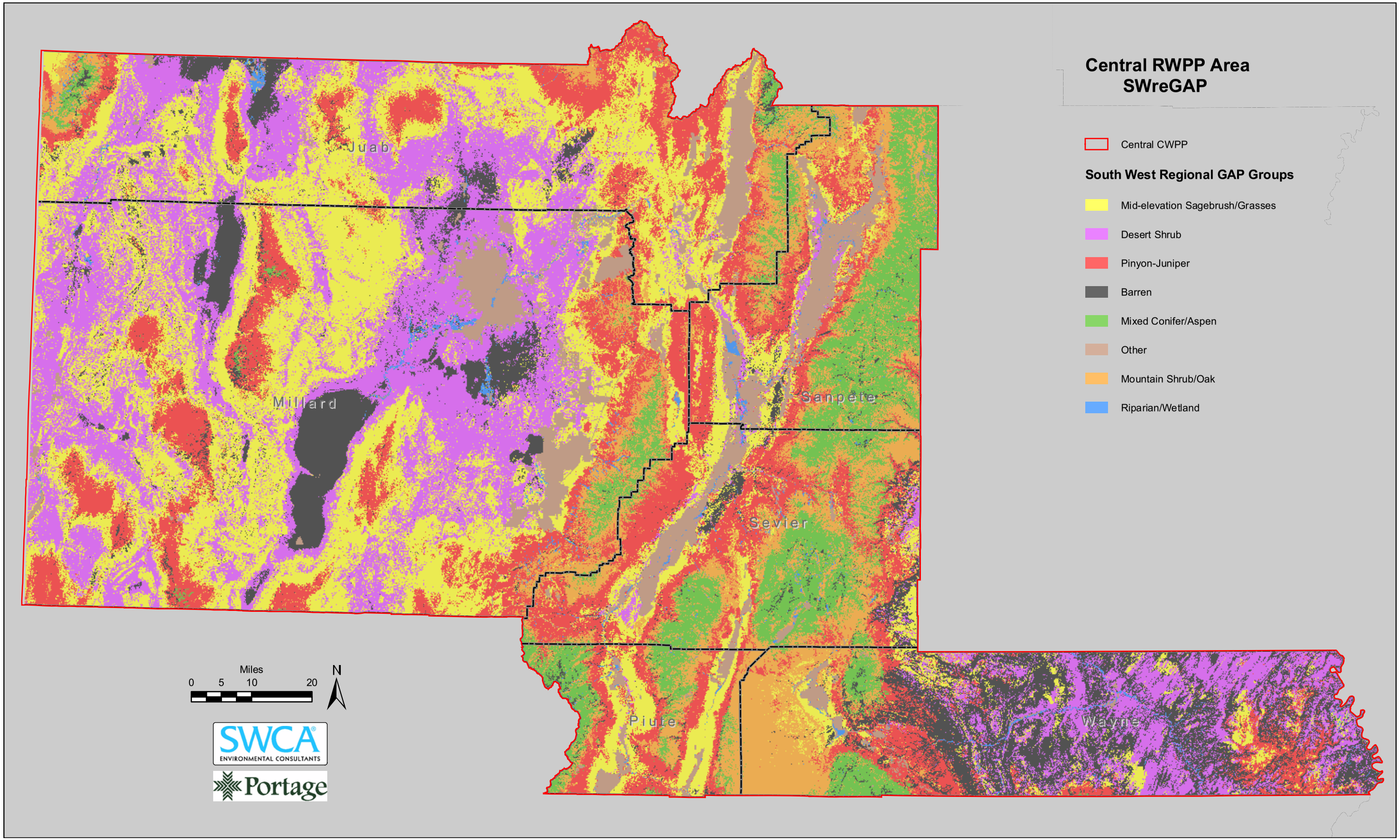

Figure 4. Southwest Regional GAP vegetation data for the Central Utah region.

THIS PAGE INTENTIONALLY LEFT BLANK

Figure 5. Example of mid-elevation sagebrush vegetation.

Fire Ecology. Fire frequency varies for the different sagebrush species and subspecies, but is considered to be between 10 and 110 years depending on precipitation, elevation, species, and associated vegetation. Most sagebrush species (including all three subspecies of big sagebrush common throughout Utah) do not sprout after fire and are killed by low- to high-severity fires. Sagebrush is a prolific seeder, however, and if a seed source is present, re-establishment is quite rapid and dominance will occur within 20 years. Because sagebrush seeds generally are not transported far from the parent, unburned areas within large burn areas are often the most important source of seed material for natural recruitment and re-establishment of sagebrush (BLM 2005a).

Noxious weeds are included in this category and are an increasing problem. Invasive and noxious weeds rapidly displace desirable plants that provide habitat for wildlife and food for people and livestock (Harvey and Ruyle 2002, as cited in BLM 2005a). Species include those such as cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*) and account for approximately 2.5% of the vegetation in this category. The high growth rate and flammability of weeds tend to increase the risk of wildfire to the vegetation community and structures in the WUI (Arno and Wakimoto 1987, as cited in BLM 2005a). They also provide flammable fuels between the interspaces among shrubs that allow the fire to carry in an unnatural manner (McAuliffe 1995, Brown 2000, as cited in BLM 2005a).

Cheatgrass is a late winter annual grass that originated in Europe and Asia and established in the Central Utah region by the late 1800s. Cheatgrass is unpalatable to livestock. By spring, cheatgrass is maturing its seeds, and unlike native bunchgrasses, usually dies by the end of July, avoiding the hottest and driest part of summer. Dead cheatgrass burns easily, causing many large and rapidly spreading wildfires that tend to damage or kill native grasses. It is also outcompeting native plant communities for available water and thus becoming dominant in many locales.

2.3.2 DESERT SHRUB

This vegetation type accounts for 22% of the cover in the Central Utah region and includes desert shrub and semi-desert shrub land cover types listed in Table 3, including salt tolerant succulent shrubs such as greasewood (*Sarcobatus vermiculatus)*, Mormon tea (*Ephedra* spp.*)*, shadscale (*Atriplex confertifolia)*, four-wing saltbush (*Atriplex canescens)* and threadleaf rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *consimilis*). Common grasses include inland saltgrass (*Distichlis spicata*), alkali sacaton (*Sporobolus airoides*), bottlebrush, squirreltail (*Elymus elymoides*) and Indian ricegrass (*Stipa hymenoides*) (Figure 6; BLM 2005b, Chronquist et al.1982). These areas receive relatively low annual precipitation (5 to 10 inches), which results in very little soil moisture available for plant growth. Elevations range from 4,000 to 5,400 feet. The soils that support members of the saltbush zone are also often highly saline and extremely susceptible to wind and water erosion. These factors limit this vegetation's ability to recover following surface disturbance.

Figure 6. Example of desert shrub vegetation.

Fire Ecology. Fire frequency in the desert shrub vegetation type has been estimated at 35 to more than 300 years (FEIS 2004, cited in BLM 2005a). Fire-adapted plants are generally not found in these communities as these vegetation types have not burned enough historically to support them. Further, most desert shrub species do not readily regenerate following fire. Large, fast moving fires now occur more regularly in these communities as a result of cheatgrass invasion, which provides sufficient fuel to sustain fires. Where cheatgrass has invaded, native desert shrub communities have been lost or are at high risk of loss. Further expansion of invasive species (cheatgrass, tall peppergrass [*Lepidium virginicum* var. *pubescens*] and Russian knapweed [*Acroptilon repens*]) following fire is a major concern for these communities (BLM 2005a).

2.3.3 PINYON-JUNIPER WOODLAND

Pinyon-juniper woodland accounts for approximately 16% of the cover in the Central Utah region and grows at elevations between 4,700 and 8,600 feet where precipitation totals 12 to 18 inches per year. Dominant tree species include pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Figure 7). Pinyon-juniper woodlands are characterized by trees that are generally less than 33 feet tall and comprise a closed or an open woodland. Undergrowth is variable and dependent upon canopy closure, soil texture, elevation and aspect (Welsh et al. 1993, as cited in BLM 2005a). This is the most extensive forest type in Utah exceeding, in acreage, all other forests combined (Lanner 1984, as cited in BLM 2005a).

Juniper tends to grow at lower elevations and in more arid areas as its scaled foliage allows it to conserve water more effectively than pinyon pine). Juniper-dominated woodlands tend to include open savannas of scattered trees without a significant shrub component, except in areas where big sagebrush has become dominant as a consequence of overgrazing (Grahame and Sisk 2002). On lower edges of the woodland zone, Utah juniper is frequently the only tree species (BLM 2005b).

Pinyons dominate at higher elevations, and tend to form more closed canopied stands. There is commonly a significant shrub component. Colorado pinyon occurs in most of the state except in western Utah, where it is replaced with single-leafed pinyon *(Pinus monophylla)* (Grahame and Sisk 2002).

Figure 7. Example of pinyon-juniper vegetation.

Fire Ecology. Historically, fire burned every 15-20 years in the area where pinyon-juniper woodland currently dominates (Kitchen 2004, Miller and Tausch 2001, as cited in BLM 2005a). In fact, fire was the major cause of mortality, historically, for young juniper trees. On the other hand, adult juniper trees in mature stands are difficult to burn since the

understory is usually sparse. Winds greater than 35 miles per hour are necessary to carry wind through the canopy of pure juniper stands (*Vegetation Types of the Wasatch-Cache National Forest* 1991, as cited in BLM 2005a).

With the absence of recurring stand regulating fires today, pinyon-juniper cover has increased and it is estimated that pinyon-juniper woodland have increased ten-fold over the past 130 years throughout the Intermountain West (Miller and Tausch 2001, as cited in BLM 2005a). Following high intensity wildfires, the primary invader species is often cheatgrass.

2.3.4 Mountain Shrub and Oak

Mountain shrub and oak account for approximately 10.4% of cover in the Central Utah region. This vegetation type consists of variety of shrubs including: Gambel oak (*Quercus gambelii)*, maple (*Acer* spp). mountain mahogany (*Cercocarpus montanus)*, and mixed mountain shrub (a diverse community made up of chokecherry [*Prunus virginiana*], serviceberry [*Amelanchier utahensis* and *Amelanchier alnifolia*], currant (*Ribes* spp.), snowberry [*Symphoricarpos* spp.], elderberry [*Sambucus* spp.], bitterbrush [*Purshia tridentata*], mountain sagebrush [*A. tridentata* ssp. *Vaseyana*], ninebark [*Physocarpus* spp.], buckbrush [*Ceanothus* spp.], and others) (Figure 8). These species are found at moderately high elevations (7,000 to 8,500 feet) on mainly north and east slopes above the pinyon–juniper zone and below the conifer zone (BLM 2005b).

Figure 8. Example of mountain shrub and oak vegetation.

Fire Ecology. Fire frequency for the mountain shrub and oak species ranges from 25 – 100 years. Return intervals vary widely depending on elevation, aspect, site moisture, and associated woodland type. Most species re-sprout after low- to moderate-severity fires. Sprouting mountain shrub are generally fire-tolerant and generally recover following a fire. Bitterbrush and mountain sagebrush do not re-sprout and may be completely removed from the site depending on the intensity of the fire (Wasatch-Cache National Forest 1991, as cited in BLM 2005a).

2.3.5 BARREN AREAS

Barren areas account for about 10% of the Central Utah region. Southwest ReGAP Analysis data describes Barren lands as "areas of bedrock, desert pavement, scarps, talus, slices, volcanic material, glacial debris, sand dunes, strip mines, gravel pits…vegetation accounts for less than 15% of the total cover." Specifically for the Central Utah region, the area includes cliffs, badlands, dunes, bedrock and playa type communities, listed in Table 3. Because of the lack of vegetation in these areas, there is little risk of wildfire.

2.3.6 MIXED CONIFER AND ASPEN

Mixed conifer and aspen communities account for approximately 7% of the Central Utah region. Mixed conifer forests occur at elevations from about 8,000 to 10,000 feet and include species such as douglas-fir (*Pseudosuga menziesii*), white fir (*Abies concolor*), and lodgepole pine (*Pinus contorta*) (Figure 9) (UDNR et al 2003). Aspen (*Populus tremuloides*) is commonly found between 7,500 and 10,500 feet and is often valued for its landscape diversity, aesthetics, and wildlife habitat (UDNR et al 2003). Major forest community types of mixed conifer are included in Table 3. Ponderosa Pine (*Pinus ponderosa*) is also included in this category due to its relatively low occurrence in the Central Utah region; however it is generally discussed as a separate category because fire management for this species tends to differ from mixed conifer and aspen. Ponderosa pine communities are typically open and savannah-like with widely spaced large trees and open understories that are periodically cleared by low-severity groundfires. Aspen occur as pure stands or in association with conifers. Conifer invasion may be a natural pattern in aspen stands, however long-term fire suppression has resulted in increased representation and dominance by conifer in aspen stands (BLM 2005b).

Figure 9. Example of mixed conifer vegetation.

Fire Ecology. The fire return interval in mixed conifer communities ranges from 100 to 300 years. Fire regimes are a combination of understory fires and complete stand replacement fires (Arno 2000, as cited in BLM 2005a). A mosaic stand structure and fuels pattern results from the mixed severity fire regime of these communities. Further, past stand burn mosaics tend to increase the probability that subsequent fires will also burn in a mixed pattern (Arno 2000, as cited in BLM 2005a). Dead woody fuels often accumulate on the ground in a haphazard manner; the greatest fuel loadings tend to occur on the most productive sites, which are predominantly stand-replacement fire regimes.

For ponderosa pine communities fire frequency ranges from 10 to 40 years with low- to mixed-severity fires (FEIS 2004, as cited in BLM 2005a). Ponderosa pine forests in Utah are classified as Fire Regime I and FRCC 3. These forests could be at risk for cheatgrass invasion or crown fire as a result of having missed between five and ten fire cycles in the years of fire suppression. Otherwise, the understory species typically associated with these stands exclude cheatgrass. Proper management can reduce the risk of cheatgrass invasion and crown fire. The thick bark of Ponderosa pines protects them from serious damage from surface fires making them the most fire-adapted conifer in the West (Bradley et al. 1992, as cited in BLM 2005a).

For aspen fire frequency ranges from 25 to 100 years with mixed severity fires (Gruell and Loope 1974, as cited in BLM 2005a). Aspen stands often act as natural fuel breaks during wildfires because they do not easily burn. Unless there is a large amount of understory fuel, fires in young aspen stands tend to be low-intensity surface fires. Abundant fuels can result in high intensity fires in older stands, especially during the warmest and/or driest months of the year. Decadent aspen stands and other areas with thin, acidic soils may be less vigorous at regenerating via suckering and may tend to support conifers even after fire (USDA 2002i, as cited in BLM 2005a).

2.3.7 RIPARIAN/WETLAND COMMUNITIES

Riparian/Wetland communities also accounted for a minimal portion of the Central Utah region (0.77%). Specific vegetation types found in these communities are listed in Table 3. Due to their relatively low numbers and vegetation composition they are not generally considered a significant fire risk. However, invasive species such as salt cedar (*Tamarix* spp.), tall whitetop (*Lepidium latifolium*) and Russian olive (*Elaeagnus angustifolia)* have become well established in the riparian communities and are slowly replacing the native vegetation across much of Utah. Tamarisk is especially problematic as it is much more flammable than the native vegetation that it replaces (BLM 2005a).

2.3.8 "OTHER" NON-VEGETATION COMMUNITIES

Other, non-vegetation communities (Table 3) represent approximately 6% of the planning area and include recently burned, disturbed (refers to oil wells), recently logged, recently mined or quarried, open water, developed, and agricultural areas. Developed areas are the main concern in this category.

2.4 CENTRAL UTAH ECOREGIONS

The Central Utah region can be divided into 3 distinct physiographic provinces or ecoregions: the Central Basin and Range, the Wasatch and Uinta Mountains and the Colorado Plateau (Figure 10). Ecoregions are areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components (Woods et al. 2001).

The western half of the project area is part of the Central Basin and Range ecoregion (see Figure 10). The central and northeastern portions of the Project Area are part of the Wasatch and Uinta Mountains ecoregion, and the southeastern portion of the project area lies within the Colorado Plateau ecoregion.

2.4.1 CENTRAL BASIN AND RANGE ECOREGION

2.4.1.1 TOPOGRAPHY AND CLIMATE

The Central Basin and Range Ecoregion is characterized by wide desert valleys bordered by parallel mountain ranges generally oriented north-south. Areas lower than about 5,200 feet elevation were once inundated by Pleistocene Lake Bonneville. Extensive playas occur and are nearly flat, clayey, and salty. In general, this ecoregion is dry and lacks extensive, dense forests (Woods et al. 2001).

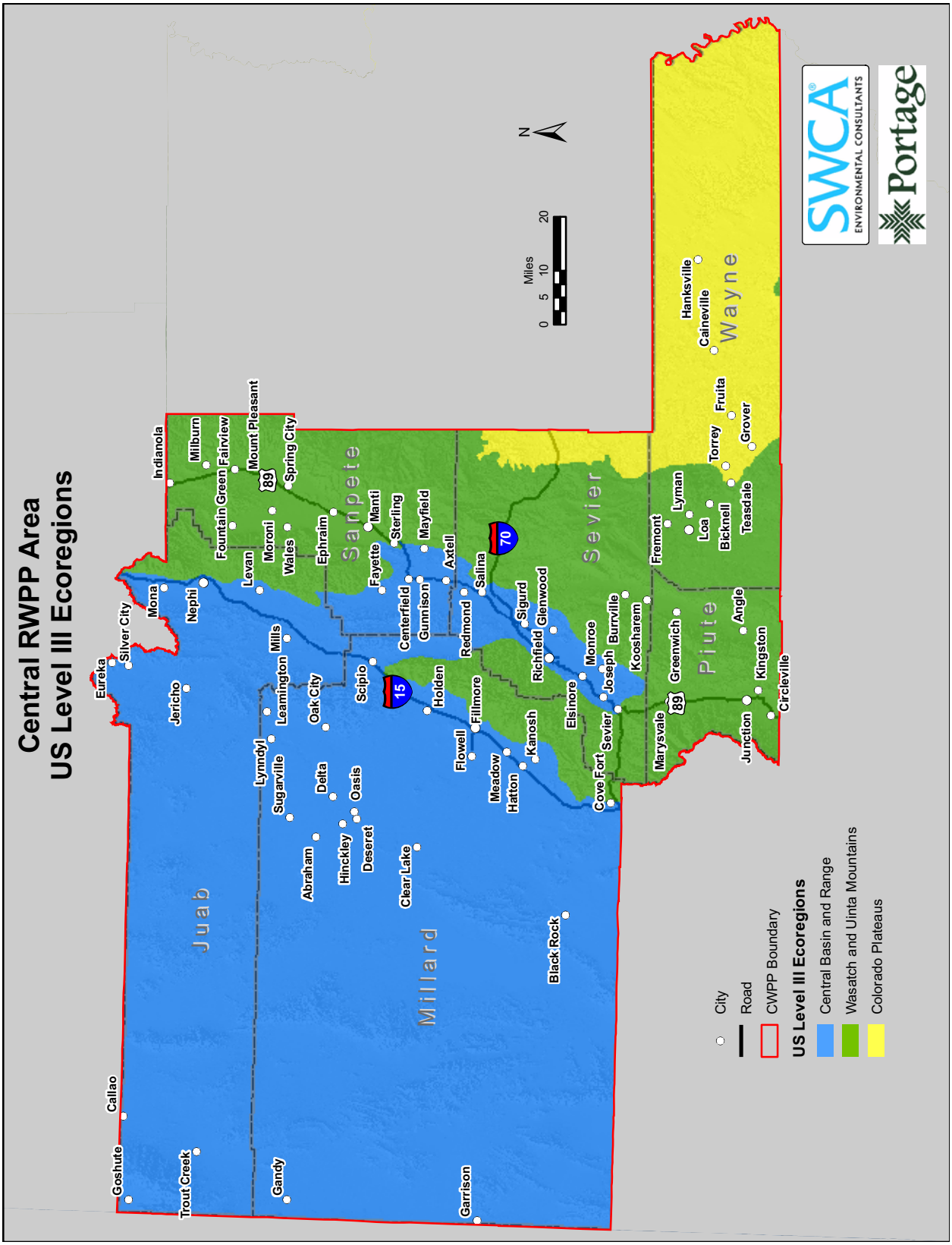

Figure 10. Central Utah ecoregions.

Precipitation in this ecoregion averages 4 to 10 inches annually, though mountains may receive as much as 18 inches. Precipitation is very low from summer to mid-autumn. Summers are hot and dry with low humidity, and winters are cold and dry. Temperature throughout the year averages from 45 to 55 ºF (7 to 13 ºC) and the growing season ranges from 60 to 150 days (USFS 1994a). Precipitation that falls within the Central Basin and Range ecosystem does not ultimately drain to either to the Atlantic Ocean or to the Pacific Ocean, but rather, drains to ephemeral or saline lakes via streams, or disappears via evaporation and/or absorption into the soil (Grayson, 1993, as cited in Soulard 2006).

The Sevier River is the major drainage for the portion of the Central Basin and Range ecoregion located in the project area; however, its waters are used for irrigation and seldom reach Sevier Lake, its terminus. Sevier Lake usually contains water during exceptionally wet cycles; otherwise it is a wind-swept playa. Small streams drain the mountain ranges, and all areas have internal drainage (USFS 1994a). Springs are relatively numerous, but usually small. Ground water is scarce and has poor quality because of salts. Clear Lake Wildlife Management Area and Fish Spring National Wildlife Refuge are important waterfowl management areas.

2.4.1.2 VEGETATION AND WILDLIFE

The dominant natural vegetation of the Basin and Range ecoregion includes those species in the Mid-elevation sagebrush and grasses, desert shrub, pinyon-juniper and barren vegetation types. The sagebrush zone constitutes the largest amount of land in the Central Basin and Range Ecoregion. This ecoregion supports a number of populations including bison, antelope, desert bighorn sheep, deer, cougar, coyotes, bobcats and extensive populations of rabbits, hares, and pikas (USFS 1994a).

2.4.1.3 DISTURBANCE REGIMES

Common low intensity short duration burns of sagebrush and desert shrubs occur during summer thunderstorms. Often there is insufficient understory to carry fires, or they are suppressed. Cheatgrass and other introduced annuals not only out compete native bunchgrasses, but have also altered the ecoregion's fire regime; in areas that previously burned about every 30 to 70 years, the introduction of cheatgrass has increased fire-return intervals to less than 10 years. In turn, this has led to a significant decline in native sagebrush. Historical fire suppression and widespread livestock grazing have also contributed to contraction of the sagebrush zone (Soulard 2006).

2.4.2 WASATCH AND UINTA MOUNTAINS ECOREGION

2.4.2.1 TOPOGRAPHY AND CLIMATE

The Wasatch and Uinta Mountains ecoregion is a block of high montane habitat stretching from southeastern Idaho and southwestern Wyoming to the isolated ranges of the Colorado Plateau in southern Utah (see Figure 10). It is composed of high, glaciated

mountains, dissected plateaus, foothills, and intervening valleys. Above an elevation of about 11,000 feet, alpine meadows, rockland, and talus slopes occur. The ecoregion encompasses two different mountain ranges; the Wasatch, a major north-south range; and the Uinta, one of few major east-west ranges (WWF 2001). Summers are generally warm and dry with low humidity and winters are generally cold with considerable snow fall. Precipitation ranges from 16 to 40 in annually; most occurs during fall, winter and spring. It occurs mostly as snow above 6,000 feet. Temperature averages 35 to 45 °F, but may be as high as 50° in the valleys and the growing season lasts 80 to 120 days (USFS 1994b).

Most rivers in the Wasatch area flow into the Great Basin drainage (a closed drainage system that, unlike most drainages, does not ultimately lead to the ocean, but rather ends in terminal basins such as Sevier Lake). A small area of the ecoregion is drained by the Colorado River. Lakes and wet meadows are associated with areas higher than 5,000 ft (1,500 m) but they are generally few (USFS 1994b).

2.4.2.2 VEGETATION AND WILDLIFE

The dominant natural vegetation of the Wasatch and Uinta Mountains ecoregion includes those species in the mountain shrub, mixed conifer, and pinyon-juniper vegetation types. The Aquarius Plateau, a portion of the Uinta and Wasatch Ecoregion, is an important remnant block of aspen, ponderosa pine, and spruce/fir forests at higher elevation (WWF 2001). Part of the Aquarius Plateau is located in Wayne County, which is within the Central Utah RWPP project area.

The ecoregion is home to a variety of wildlife, including bighorn sheep, mule deer, elk, black bears, cougars, moose, and Rocky Mountain goat, as well as a variety of reptiles, neotropical migratory land birds, waterfowl and game birds, and fish species (USFS 1994b).

2.4.2.3 DISTURBANCE REGIMES

Continued grazing and 50 years of attempted fire exclusion have allowed juniper expansion to go unchecked (Ferry et al. 1995). Decreases in fire frequency are also seriously affecting ponderosa pine forests. Historically, the ponderosa pine ecosystem had frequent, low-intensity, surface fires that perpetuated park-like stands with grassy undergrowth (Barrett 1980, as cited in Ferry at al. 1995). In recent years, however, humans have attempted to exclude fire on these sites, resulting in ponderosa pine forests that are overstocked, and subject to severe stand-destroying fires (Mutch et al. 1993, as cited in Ferry et al. 1995). Long-term fire suppression has also resulted in a loss of aspen. Aspen replace higher seral species after fire; root systems of top-killed stems send up a profusion of sprouts for several years after fire and may outcompete other woody vegetation. Fire suppression has resulted in increased dominance of conifer species.

2.4.3 COLORADO PLATEAU ECOREGION

2.4.3.1 TOPOGRAPHY AND CLIMATE

The Colorado Plateau lies between the Great Basin to the west, and the Rocky Mountains to the east (see Figure 10). The flora and fauna of the region include elements of each of these provinces in addition to endemic species that have evolved in areas of relative isolation atop the Plateau. The Colorado Plateau is generally very dry with annual precipitation amounts in most areas of less than 10 inches. More than half of the annual precipitation falls during the winter (CPEPT et al. 2002). Summers are dry with low humidity. The high plateaus and small mountain ranges receive considerably more precipitation than surrounding lower elevation areas due to orographic lifting and cooler temperatures. Most areas above 8,000 feet receive 20-25 inches annually, while mountains above 11,000 feet often receive about 35 inches per year. Most of this occurs in the winter as snow. Annual average temperatures are 40 to 55F (4 to 13 °C), decreasing with rising elevation (USFS 1995).

The Colorado River and its tributaries drain the Colorado Plateau ecoregion. In general, water is scarce and ground water supplies are deep and limited. Summer rainstorms cause flash flooding in much of the ecoregion. Some of the high plateaus of Utah are known to have an abundance of surface water. Natural high-elevation wetlands on the plateau include the many subalpine lakes of the Boulder Top area of the Aquarius Plateau in southern Utah (Grahame and Sisk 2002).

2.4.3.2 VEGETATION AND WILDLIFE

The dominant natural vegetation of the Colorado Plateau ecoregion includes those species in the desert shrub, pinyon-juniper, and barren vegetation types. Summer moisture from thunderstorms supports warm season grasses not found in the Central Basin and Range region, and the species diversity is greater (Woods et al. 2001). Wildlife species include mule deer, coyotes, desert bighorn sheep, mountain lions, golden eagles, various hawks, and occasionally black bear. Native fish species include the Colorado pikeminnow and the humpback chub.

2.4.3.3 DISTURBANCE REGIMES

Wildfires were once common occurrences throughout the grasslands and forests of the Colorado Plateau. These regular wildfires helped maintain an open forest structure in the region's middle-elevation forests by preventing tree encroachment into mountain meadows and grasslands. In some areas, regular wildfires led to replacement of forested land with grassland or savannah. Fire suppression has disturbed this natural occurrence, and like other ecoregions, pinyon-juniper woodlands, ponderosa pine forests, and drier mixed conifer forests of the Colorado Plateau have shifted from a fire regime of frequent, surface fires to one of stand-replacing, high-intensity fires (Grahame and Sisk 2002).

2.5 COUNTY DEMOGRAPHICS

2.5.1 JUAB COUNTY

2.5.1.1 GEOGRAPHY AND CLIMATE

The central and western portions of Juab County are part of the Central Basin and Range ecoregion and consist of broad, semi-arid valleys and low desert mountains. The eastern portion, home to most of the agriculture and livestock grazing, is part of the Wasatch and Uinta Mountains ecoregion. The average elevation of Juab County is 5000 feet above mean sea level (UHE 1994). The average precipitation ranges from 5.75 inches per year in the western areas to 14.55 inches per year in the eastern portions of the county (USU 2005).

Juab County contains a portion of nine subbasin (4th level or 8 digit HUC code) watersheds[3]: Hamlin-Snake Valleys, Lower Sevier, Middle Sevier, Rush-Tooele Valleys, Southern Great Salt Lake Desert, Spanish Fork, San Pitch, Tule Valley, and Utah Lake.

2.5.1.2 HISTORY AND LAND USE

Juab County's name comes from the Ute Indian word "yoab" meaning "level plain." Nephi, the count seat and largest city in the county, was settled by Mormon pioneers in 1851 (Juab County 2004). While settlers were originally attracted to Nephi and Juab County for its rich soil, in 1869, silver, gold, copper and other precious metals were discovered in the Tintic region. Today, the dominant industries of Juab County still include agriculture and mining, but also manufacturing and recreation (UHE 1994).

Approximately 65% of Juab County's 3,412 square miles is federally owned (6 County AOG 2004). Private land accounts for about 30% of land ownership; however much of that land is not developable due to lack of water and county zoning requirements for water access and a minimum of 160 acres per house. Most of the current land development is along the I-15 corridor (6 County AOG 2004).

Mid-elevation sagebrush/grasses (38%), desert shrub (25%), and pinyon-juniper (17%) vegetation types make up the majority of land cover types in Juab County. Less than 1% of the county's land area is developed, and 4% is agricultural (Figure 11).

[3] The HUC coding has been standardized to the 8-digit level across the United States. This scale is commonly used for state-level classification or assessment and for reporting to national databases.

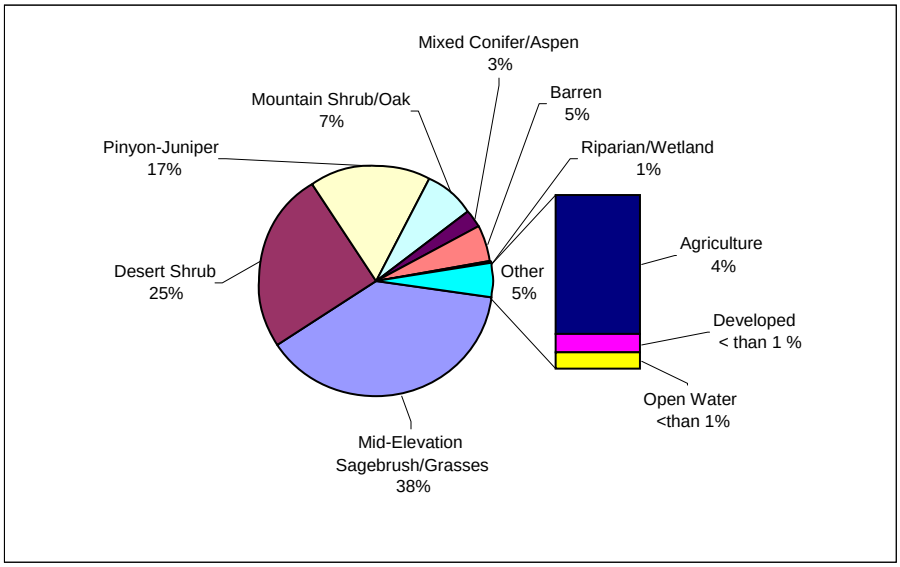

Figure 11. Juab County land cover and land use.

2.5.1.3 Population and Communities at Risk

In 2005 Juab County's population was estimated at 9,113. This is a 10.6% increase over the 2000 population of 8,238 (USCB 2007). The major population centers of Nephi, Levan and Mona are located in the far eastern portion of the county, in the agricultural area of Juab Valley. Eureka, located in the Tintic District, is also a major population center of Juab County. Western Juab County has only a few towns or communities; the largest population center is located on the Goshute Reservation. The central portion of the county is largely uninhabited.

The seven state-identified CARS in Juab County are Eureka, Levan-East Bench, Mona-Willow/Mendenhall, Nephi-East Bench, Rocky Ridge, Sevier River Estate and Tintic Junction. Of these CARs, only Eureka and Rocky Ridge have completed a local CWPP. Appendix A includes a list of all communities at risk and a list of the CWPPs that have been completed.

2.5.1.4 Community Values at Risk

Watersheds and other natural resources at risk. Watershed areas are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Other natural resources at risk from wildfire could include range grazing lands and pinyon-juniper forest land.

Infrastructure. The 2003 Six County Predisaster Mitigation Plan identified over 50 miles of railroad, 1785 miles of local streets and road, over 250 miles of State Highway, almost 150 miles of Interstate/U.S. Highway, and 6 electrical substations and 114 miles of powerlines in Juab County that are at risk from wildfire.

Recreation areas and historical sites. Juab County contains a number of popular outdoor recreation areas, including the Little Sahara Recreation Area, Yuba Reservoir, portions of the Mount Nebo Wilderness Area and the Nebo Loop Scenic Byway, and Fish Springs National Wildlife Refuge. Archaic and Fremont-Sevier cultural sites have also been found in Juab County.

2.5.1.5 FIRE HISTORY AND WILDFIRE CONCERNS

Most wildfires in Juab County occur in mid-late summer. Concerns regarding fire response capability as mentioned in the Juab County Mobilization Guide include:

- WUI areas around Eureka, Rocky Ridge, Levan, and other various locations throughout the county.
- Railroad rights-of-way along I-15 through Juab Valley, and rights-of-way extending along Highway 6/Highway 36. I-15, Highway 6, Highway 132, the West Desert area of Little Sahara, and Yuba Reservoir areas are highly influenced by people and are at higher risk for human-caused fires.
- Areas highly susceptible to lighting strikes include the mountains east and west of the Juab Valley, the Gilson Mountains, Tintic Valley and the area south of Levan.
- Cheat grass fuels in the mountains east and west of the Juab Valley, the Gilson Mountains, Tintic Valley and the area south of Levan and the West Desert allow fires to grow and spread rapidly.

There were 1790 reported fire starts in Juab County from 1973-2005, mostly in more populated county areas, including the I-15 and Highway 6 and 132 corridors, the Tintic and Gilson Mountains, and the Little Sahara and Yuba reservoir recreation areas (Figure 12). To help address wildfire concerns, Juab County enacted a WUI ordinance in 1998 specifying fuel break distances for new construction not located within incorporated cities (Juab County 1998). This ordinance has been updated to be compliant with the new stipulations of House Bill 146[4].

2.5.1.6 FIRE RESPONSE CAPABILITIES

Juab County has one full time Fire Warden and eight volunteer fire departments (VFDs) (see Figure 12). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the County. Support is furnished by local and area resources, including VFDs, State, BLM and USFS resources. When the fire exceeds the capability of local and area resources, additional resources are obtained through Richfield Interagency Fire Center.

[4] In 2002, Utah wildland fire suppression costs well exceeded the funds available in the State's Wildland Fire Suppression Fund and a supplemental appropriation of $12.4 million had to be requested from the legislature. As a result, a joint task force consisting of State legislators and County commissioners was formed to review the State's program and subsequently recommended changes to the existing statute. House Bill 146 took effect March 7, 2006. In order to be eligible to enter into a cooperative agreement with the State of Utah Divisions of Forestry, Fires and State Lands, Counties must: a) adopt a wildland fire ordinance based on minimum standards established by the division; b) require county fire departments (or private provider under contract with the County) to meet minimum standards for wildland training, certification, and wildland fire suppression equipment based on nationally accepted standards as specified by the division; and c) file a budget for fire suppression costs with the State.

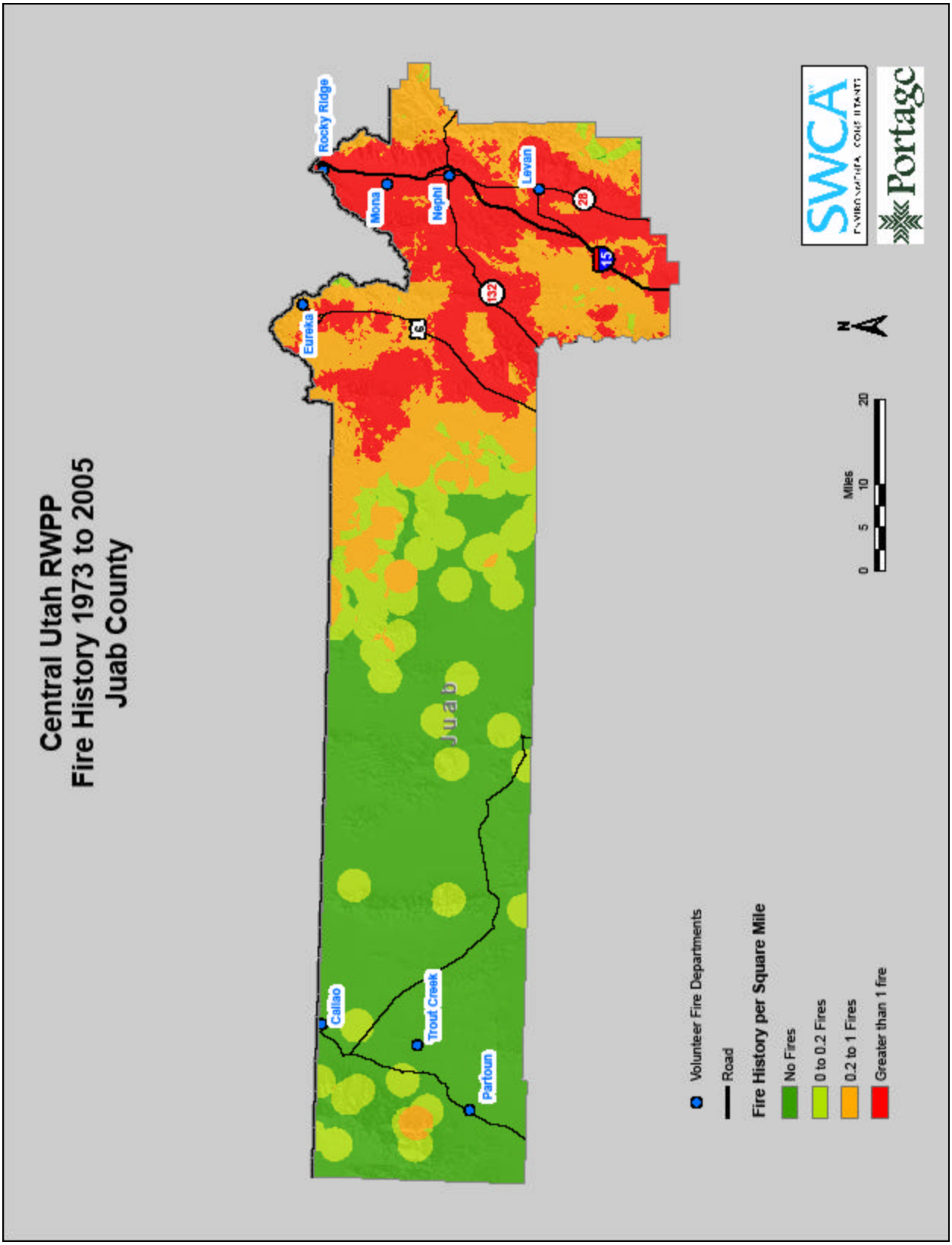

Figure 12. Juab County fire history and fire department locations.

2.5.2 MILLARD COUNTY

2.5.2.1 GEOGRAPHY AND CLIMATE

Almost all 6,818 square miles of Millard County is part of the Central Basin and Range ecoregion. Only the Pahvant Range and Canyon Mountains, located in the most eastern portion of the County, are part of the Wasatch and Uinta Mountains ecoregion. Precipitation ranges considerably, from 7.6 inches to almost 15 inches per year (USU 2005).

Millard County contains 9 watersheds including Beaver, Bottoms-Upper Beaver, Hamlin-Snake Valleys, Lower Beaver, Lower Sevier, Middle Sevier, Pine Valley, Sevier Lake, Southern Great Salt Lake Desert, and Tule Valley (EPA 2006). Near the center of the county lies Sevier Lake, a mostly dry remnant of Lake Bonneville. The Sevier River, which begins in the mountains east of Cedar City, drains into Sevier Lake during wet cycles (UHE 1994).

2.5.2.2 HISTORY AND LAND USE

Millard County was settled by Mormon pioneers in 1851. Territorial officials originally selected Fillmore to be the capital, since is was near the geographical center of Utah Territory, but it was moved to Salt Lake City because Fillmore was too far from major cities. The establishment of the Union Pacific railroad line through west Millard County, and the creation of nearby Yuba Dam in 1907 led to development of large-scale alfalfa seed production, which now amounts to three-fourths of the state's total crop and has received top honors nationally for quality (Online Utah 2007).

Millard County ranks third in the state in agricultural production. Other important sources of income are cattle and electric power generation by Intermountain Power Project's coal-burning power plant near Delta. Mining and smelting have also contributed to the county's economic growth, producing significant amounts of fluorspar, copper, manganese, sulphur, gypsum, beryllium, and salt (UHE 1994).

Over 75% of Millard County is under federal ownership and aside from extractive industry, is not developable (USU 2005). Approximately 13% is privately owned, most of which is not developable due to lack of water. Millard County zoning ordinances currently specify water access and a minimum of 0.5 acres per house. Most of the current land development is along the I-15 corridor and in the Delta area (6 County AOG 2004).

Mid-elevation sagebrush/grasses (36%), desert shrub (33%), and pinyon-juniper (13%) vegetation types make up the majority of land cover in Millard County (Figure 13). About 1% of the county's land area is developed, and 4% is agricultural.

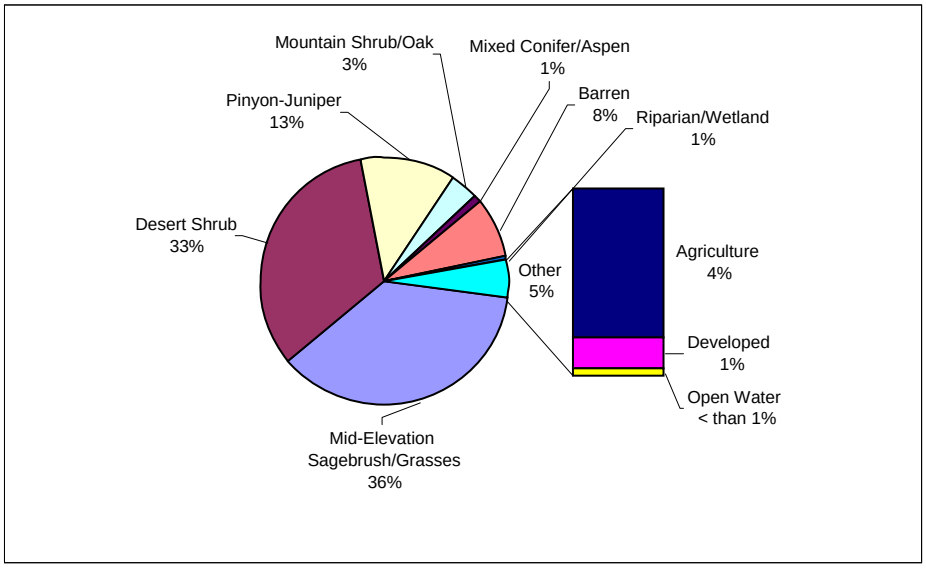

Figure 13. Millard County land cover/land use.

2.5.2.3 Population and Communities at Risk

Utah's growth spurt in the last quarter century bypassed Millard County. The county had 12,400 residents in 2000 and approximately 12,284 in 2005 (USCB 2007). The majority of development is in the eastern portion of the county.

As of 2005, the State of Utah had identified the following communities at risk in Millard County: Cove Fort, Fillmore, Holden-East Bench, Kanosh, Meadow, Oak City, and Scipio, all located near the base of the Pahvant and Canyon Mountains. There are currently no completed CWPPs in Millard County.

2.5.2.4 Community Values at Risk

Watersheds. Watershed areas are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Flooding is a concern along the Sevier River and its tributaries, Oak and Dry creeks, Corn Creek, Pine Creek, Chalk Creek and Meadow Creek. Spring runoff or precipitation from summer thunderstorms ("monsoons") can cause post wildfire/damaged watershed flooding (6 County AOG 2004). Oak City, Scipio, Fillmore, Meadow, Holden–all communities at risk from wildfire–have experienced repeated flooding events and would be at risk from post-fire flooding.

Infrastructure. The 2003 Six County Predisaster Mitigation Plan identified 3.6 miles of railroad; approximately 1225 miles of local streets and road, 25 miles of State Highway, and 85 miles of Interstate/US Highway; and 2 power stations and 58 miles of powerlines in Millard County that are at risk from wildfire.

Recreation and points of interest. Tourism is now viable in Millard County, and annual events such as the ATV Jamboree and the Snow Goose Festival draw thousands of visitors. Points of interest for the area include the territorial statehouse in Fillmore, Cove Fort, Old Fort Deseret, Topaz Relocation Camp, Gunnison massacre site, and the Clear Lake Waterfowl Management Area (Millard County 1998).

2.5.2.5 Fire History and Wildfire Concerns

According to the 2006 Millard County Mobilization Guide, the fire occurrence in the Millard County area in a normal year would likely include:

- 30 Class A fires,
- 10 Class B fires,
- 5 Class C fires, and
- 1 Class D fire.

Documented fire history for Millard County show a total of 1162 fire starts between 1973 and 2005; most of these have occurred in the Pahvant Mountains and in the Oak City/Canyon Mountain area (Figure 14).

Other concerns regarding fire response capability as mentioned in the Millard County Mobilization Guide include:

- special hazard and risk areas: area along I-15 through the whole county, Utah 26 from Holden to Delta and the cultivated dry land areas of Dog Valley, Kanosh and Fillmore;
- railroad right-of-ways extending through Millard County.

A WUI ordinance was passed to address these issues. The ordinance requires new subdivisions or homes built in Millard County's WUI to adhere to more stringent water supply, building material, and defensible space stipulations (see footnote 4 on page 2-20). Existing homes are exempt from these requirements.

2.5.2.6 Fire Response Capabilities

Millard County has a one full time fire warden, and 12 VFDs (see Figure 14). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the county. Support is furnished by local and area resources, including VFDs, State, BLM and Forest resources. When the fire exceeds the capability of local and area resources, additional resources are obtained through Richfield Interagency Fire Center (Sevier County 2006).

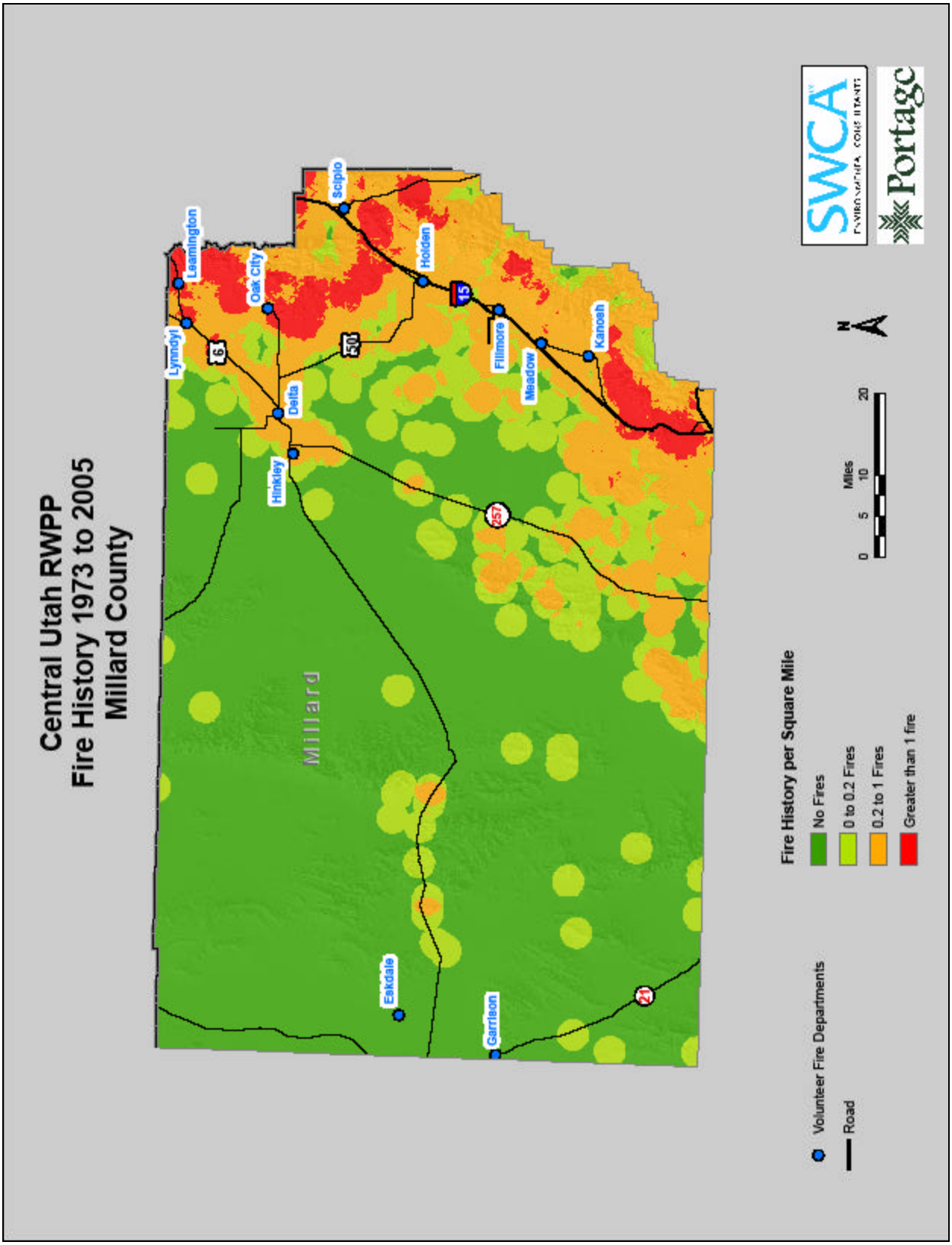

Figure 14. Millard County fire history and fire department locations.

2.5.3 PIUTE COUNTY

2.5.3.1 GEOGRAPHY AND CLIMATE

At 754 square miles, Piute County is one of the smallest of Utah's twenty-nine counties. Piute County is located in the central southern portion of the State and its area is largely covered with mountains. It is entirely within the Wasatch and Uinta Mountains ecoregion. Its western boundary approximates the crest of the Tushar Mountains, which includes Delano Peak (12,173 feet) (UHE 1994). The annual average precipitation for Piute County is approximately 9 inches (Utahreach 2007)

There are two narrow valleys in the county that furnish tillable land for agriculture. The Sevier River Valley, located to the east of the Tushar Mountains, is about 27 miles long and 6 miles wide at its widest point, and includes the towns of Marysvale, Junction, Kingston, and Circleville. Further to the east, the Grass (or Otter Creek) Valley lies between the Sevier Plateau and the Parker Range, the county's eastern border. Most of the county's population is concentrated in the Sevier River Valley (UHE 1994).

Piute County contains a portion of 5 watersheds including Beaver Bottoms-Upper Beaver, East Fork Sevier, Fremont, Middle Sevier, Upper Sevier (EPA 2006).

2.5.3.2 HISTORY AND LAND USE

Circleville and Junction were settled in 1864 by a group of Mormon pioneers from Ephraim drawn by the good grazing and agricultural land in the Sevier River Valley. Piute County was formed from Beaver County in 1865. A gold and silver boom in the Tushar Mountains spawned the towns of Bullion, Kimberly, and Marysvale around the turn of the century; later, lead, zinc, alunite, and uranium were significant products UHE 1994). Piute County has the world's largest alunite deposits and is the largest producer of primary type uranium ore in the US (Nationmaster.com 2003).

Piute County's major income sources are beef cattle, dairy cattle and sheep (UHE 1994). Wild hay, alfalfa, grain, and pastureland provide feed for the county's beef and dairy production and there is considerable summer range in the high mountains and spring and winter range in the low hills. Other sources of income include tourism, education, and trucking (Piute County 2006).

Over 74% of Piute County is federal or state owned (USU 2005). Approximately 13% of the land area is privately owned. However, much of that land in is not developable due to a lack of water and county zoning requirements for water access and 5 acres per house. Most development is occurring along the Highway 89 corridor (6 County AOG 2004).

Pinyon-juniper species are the dominant vegetation type in Piute County, comprising 26% of the county's land cover (Figure 15). Mid-elevation sagebrush/grasses follow closely with 24%, and mountain shrub/oak with 21%. Agriculture comprises 7% of the land use for the county.

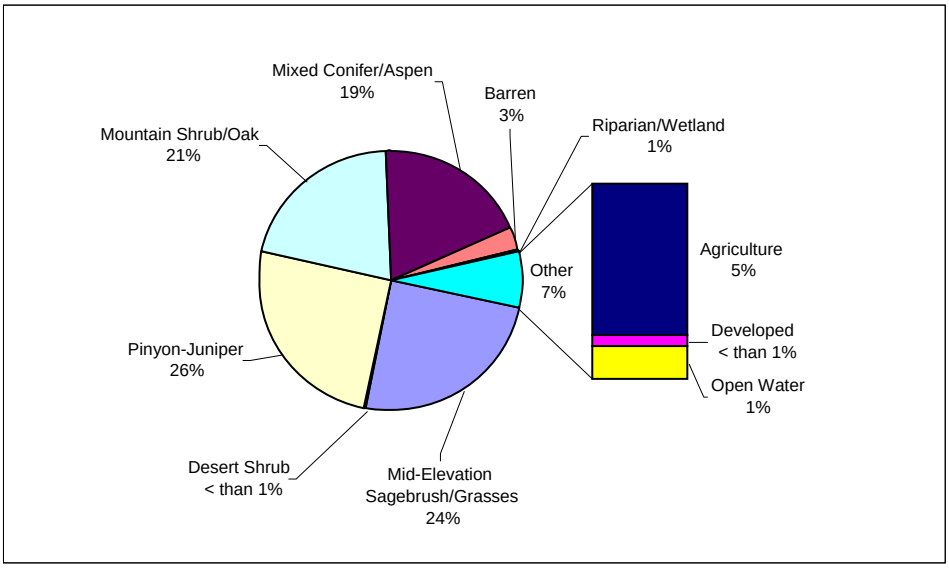

Figure 15. Piute County land cover/land use.

2.5.3.3 POPULATION AND COMMUNITIES AT RISK

Piute County is also one of the smallest counties in terms of population. The 2005 estimated population was 1,365, a 4.9% decrease from the 2000 population of 1,435 (USCB 2007). Most of the population resides in Circleville, Marysvale, Junction, and Kingston, all of which are located along or near Highway 89.

Kingston, Marysvale, and Little Meadow (a recreational community found near Otter Creek), have been identified by the State of Utah as communities at risk from wildfire. Marysvale/Bullion Canyon has a completed CWPP. Monroe Mountain, a combination of Manning Meadow, Monroe Meadow and Long Flat all identified as communities at risk comprised of approximately 75 homes located in both Piute and Sevier counties has also completed a CWPP.

2.5.3.4 COMMUNITY VALUES AT RISK

Watersheds. Watershed areas are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Flooding is a concern along the Sevier River, Otter Creek, and their tributaries, Pine Creek, City Creek and Rocky Ford Creek. Spring runoff or precipitation summer thunderstorms can cause post-wildfire flooding (6 County AOG 2004). Marysvale, Kingston, and Circleville are located in the floodplain and thus could be at risk from post-fire flooding.

Infrastructure. The 2003 Six County Predisaster Mitigation Plan identified 3.5 miles of railroad; approximately 74 miles of local streets and road, 6 miles of State Highway, and 5 miles of US Highway; 8 electrical substations and 26 miles of powerlines in Piute County that are at risk from wildfire.

Recreation. The Piute ATV trail is an extremely popular OHV route and rated one of the best 15 trails in the US by Dirt Wheels magazine. Piute and Otter Creek reservoirs provide good boating, water skiing, and fishing for county recreationists and visitors. Other points of interest include Bullion Miners Park, Big Rock Candy Mountain, Historic Piute County Court House, the Tushar Mountains, Otter Creek and Piute reservoirs, and the Parker Ranch/Butch Cassidy home (Piute County 2006). Evidence of prehistoric inhabitants has been found in the caves of Kingston Canyon, a local recreation area.

2.5.3.5 Fire History and Wildfire Concerns

There were 93 wildfire starts reported in Piute County between 1973 and 2005. Most of those occurred in the Tushar Mountains located western portion of the county near Marysvale, Junction; and Circleville, or in the Sevier Plateau/Grass Valley/Otter Creek area, located in the northwestern portion of the county (Figure 16).

Piute County passed an ordinance requiring all new subdivisions or homes built in the county's WUI to adhere to more stringent water supply, building material, and defensible space stipulations. Existing homes are exempt from these requirements.

2.5.3.6 Fire Response Capabilities

Piute County shares one fulltime Fire Warden with Sevier and Wayne counties and has 3 VFDs, located in Circleville, Junction and Marysvale (see Figure 16). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the county. Support is furnished by local and area resources, including VFDs, State, BLM and Forest resources. When the fire exceeds the capability of local and area resources, additional resources are obtained through Richfield Interagency Fire Center.

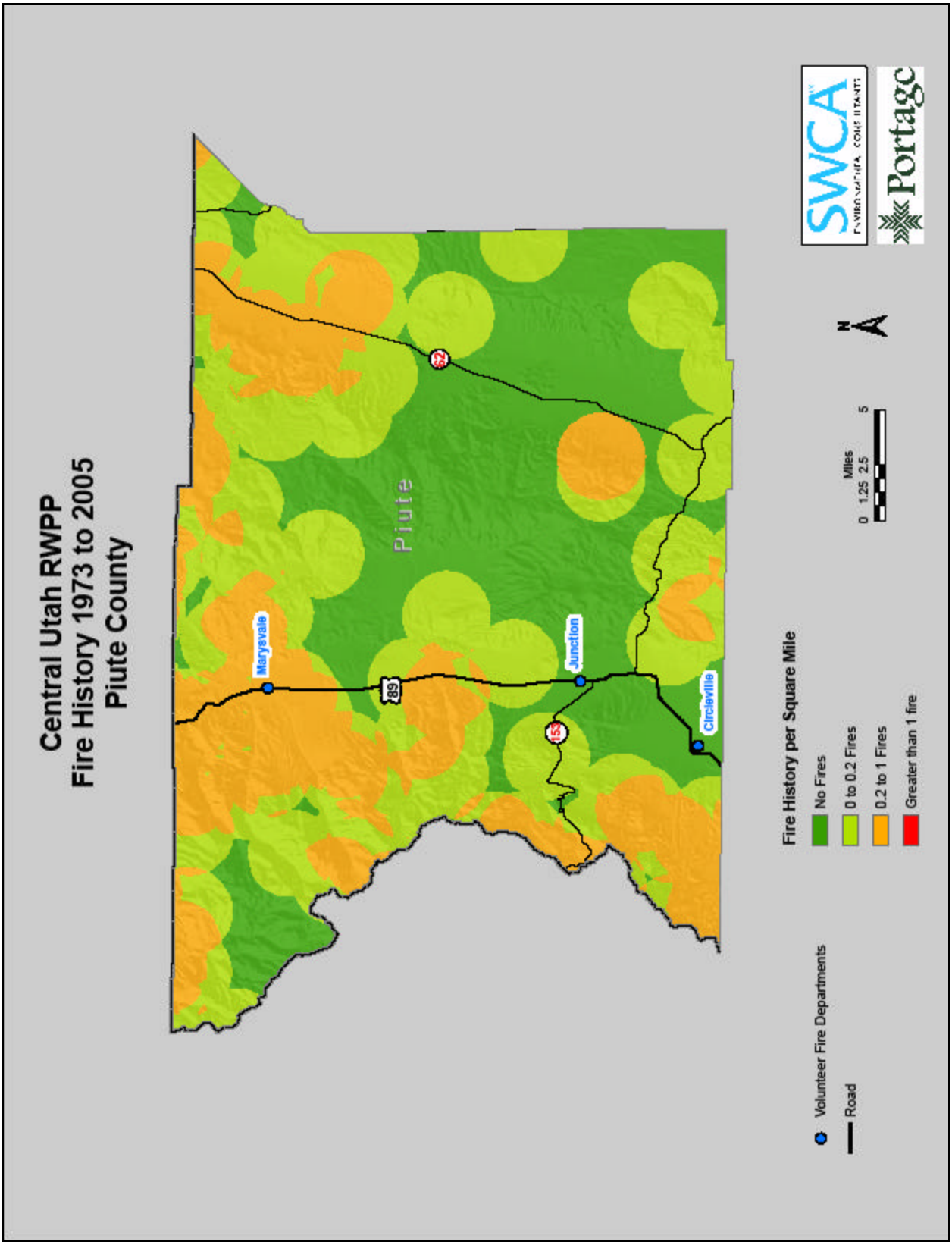

Figure 16. Piute County fire history and fire department locations.

2.5.4 SANPETE COUNTY

2.5.4.1 GEOGRAPHY AND CLIMATE

The majority of Sanpete County's 1,597 square miles are located within the Wasatch and Uinta Mountains ecoregion. Sanpete is bounded along its eastern side by the Wasatch Plateau (sometimes known as the Manti Mountains). The Sanpete Valley, the primary area of development and where the majority of the county's population resides, is tucked between the Wasatch Plateau to the east and the San Pitch or Gunnison Plateau to the west.

Sanpete County contains a portion of 8 watersheds: Lower Sevier, Middle Sevier, Muddy, Price, San Pitch, San Rafael, Spanish Fork, and Utah Lake (EPA 2006). Runoff from the western slopes of Wasatch Plateau provides water to the county's cities and agricultural areas. The Sanpete valley drains south to the Gunnison Valley section of the Sevier River, which then drains northwest to the Great Basin. Annual precipitation in Sanpete County ranges from 9 to 13 inches (USU 2005).

2.5.4.2 HISTORY AND LAND USE

Sanpete County was initially settled for its nearby farming and grazing lands. Since settlement, Sanpete County's main economic base has been agriculture (particularly turkeys; sheep, and beef and dairy cattle are also important to the area), and local government. Snow College, located in Ephraim, also plays an important role in the local economy (UHE 1994).

Sanpete County has the greatest percentage of private land of all the counties in the project area, almost 42% (USU 2005). Much of that private land is not developable due to steep terrain, and county zoning requirements for water access and a minimum of 5 acres per house. Most development is occurring along the Highway 89 corridor (6 County AOG 2004). Mountain areas are also being developed for summer cabin communities.

Sanpete County's dominant land cover is mixed conifer/aspen (26%; Figure 17). Mountain shrub/oak follows closely with 22%, and pinyon-juniper with 19%. Sanpete County's agricultural land cover is 12%. This is the largest percentage of all of the counties in the Central Utah region.

2.5.4.3 POPULATION AND COMMUNITIES AT RISK

The 2005 estimated population of Sanpete County was 24,044, a 5.6% increase over the 2000 population of 22,763 (USCB 2007). The primary cities in Sanpete County are Ephraim, Manti, Mount Pleasant, Gunnison, Moroni, Fairview, and Centerfield.

Sanpete County has 32 communities identified by the state as being at risk from wildfire, the greatest of all the counties in the Central Utah region. These communities are as

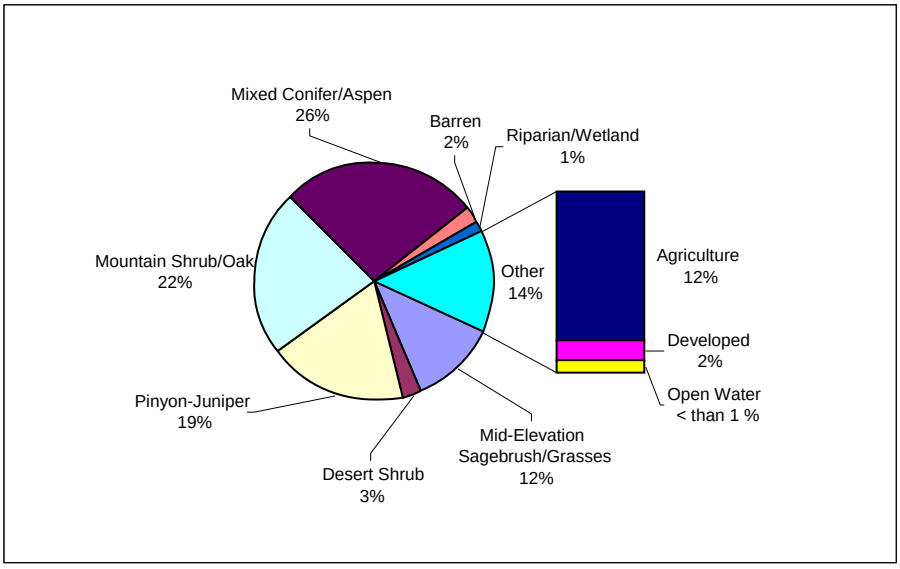

Figure 17. Sanpete County land cover/land use.

follows: Aspen Hills, Beaver Dams, Canal Canyon, Elk Ridge, Ephraim, Fairview, Fairview Lakes, Ferron Reservoir, the Great Basin Environmental Education Center (GBEEC), Gooseberry Mountain Estates, Hideaway Valley, Indian Ridge, Indianola, Manti, Manti Summer Homes, Mayfield, Mia Shalom, Milburn, Mount Pleasant, Oaker Hills, Palisade/Six Mile, Panorama Woods, Pine Creek, Pine Mountain, Sky Haven, Skyline Mountain Resort, Spring City, Sterling, Tucker, Utibica, Whispering Pines, and Willow Glen.

Additionally, Holiday Oaks and Blackhawk have been identified as Communities of Interest by the Core Team. This means that although they were not identified as Communities of Risk on the 2005 state list, they are areas in the county considered "at risk" from wildfire. It is anticipated that these areas will be included when the state list is updated. CWPPs have been prepared for Aspen Hills, Elk Ridge/Oaker Hills, Fairview Lakes, Skyline Mountain Resort, Pine Creek Ranch and North Sanpete County, which includes the communities of Hideaway Valley, Blackhawk Estates, Indian Ridge, Panorama Woods, Fairview Ranchos, and Indianola. Pine Mountain is currently preparing a CWPP (personal communication, Heath 2006).

2.5.4.4 COMMUNITY VALUES AT RISK

Watersheds. Watershed areas are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Numerous flooding events in 1983 and 1984 and in 1998 caused significant economic damage to Sanpete County, and the Six County AOG Predisaster Mitigation Plan identifies varying degrees of flooding risk along Manti Creek, Ephraim Creek, Pine Creek, Twin Creek, Pleasant Creek, Cottonwood Creek, San Pitch River, Log Canyon Creek, Uinta Creek, Gemmet Creek, Oak Creek, Canal Creek, Six Mile Creek, Wales Canyon Creek, and 12 Mile Creek.

Infrastructure. The 2003 Six County AOG Predisaster Mitigation Plan identified .2 miles of railroad; approximately 1310 miles of local streets and road, 23 miles of State Highway, and 17 miles of US Highway; 3 electrical substations and over 50 miles of powerline in Sanpete County that are at risk from wildfire.

Recreation and points of interest. Manti LDS Temple, Spring City Historic District, Fairview Museum, Wasatch Plateau, Maple and Box Canyons.

2.5.4.5 Fire History and Wildfire Concerns

Sanpete County had 790 fire starts between 1973 and 2005, as reported by the BLM, USFS and UDFFSL. The majority of these fires were located in the WUI area along Highway 89, and along Highway 28 just southeast of Yuba Reservoir (Figure 18).

Concerns regarding wildfire response capability as mentioned in the Sanpete County Mobilization Guide are as follows:

> Numerous land developers are subdividing mountain areas into building lots for cabins. These areas extend from Spring City to Indianola. The wildland subdivisions face many fire suppression complications. In many cases, roads are too narrow or otherwise inadequate to allow heavy equipment to pass. Water is a problem. In most subdivisions, there are very few or no fire hydrants. The county fire district should make it a priority to help out lying departments in the county get water tenders to help the situation. Locked gates are common on main roadways and individual properties. Some areas allow only one road in and out, thus making entrapment a concern. There are numerous other hazards typical to the urban interface environment. Continuous efforts are underway to build relationships with homeowners and to resolve other concerns (Sanpete County 2006).

A WUI ordinance was passed in September 2006 to address these issues. The ordinance requires any new subdivisions or homes built in the WUI to adhere to more stringent water supply, building material, and defensible space stipulations. However, existing homes are exempt from these requirements and enforcement of the ordinance is likely to be a challenge because of limited resources.

2.5.4.6 Fire Response Capabilities

Sanpete County has one fulltime Fire Warden and 11 VFDs (see Figure 18). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the county. Support is furnished by local and area resources, including VFDs State, BLM and USFS. When the fire exceeds the capability of local and area resources, additional regional and federal resources are ordered through the Richfield Interagency Fire Center, or though the Moab Interagency Fire Center if the fire is on the Manti-La Sal National Forest. Additionally, Sanpete County has developed an Evacuation Plan as part of their Emergency Operations Plan.

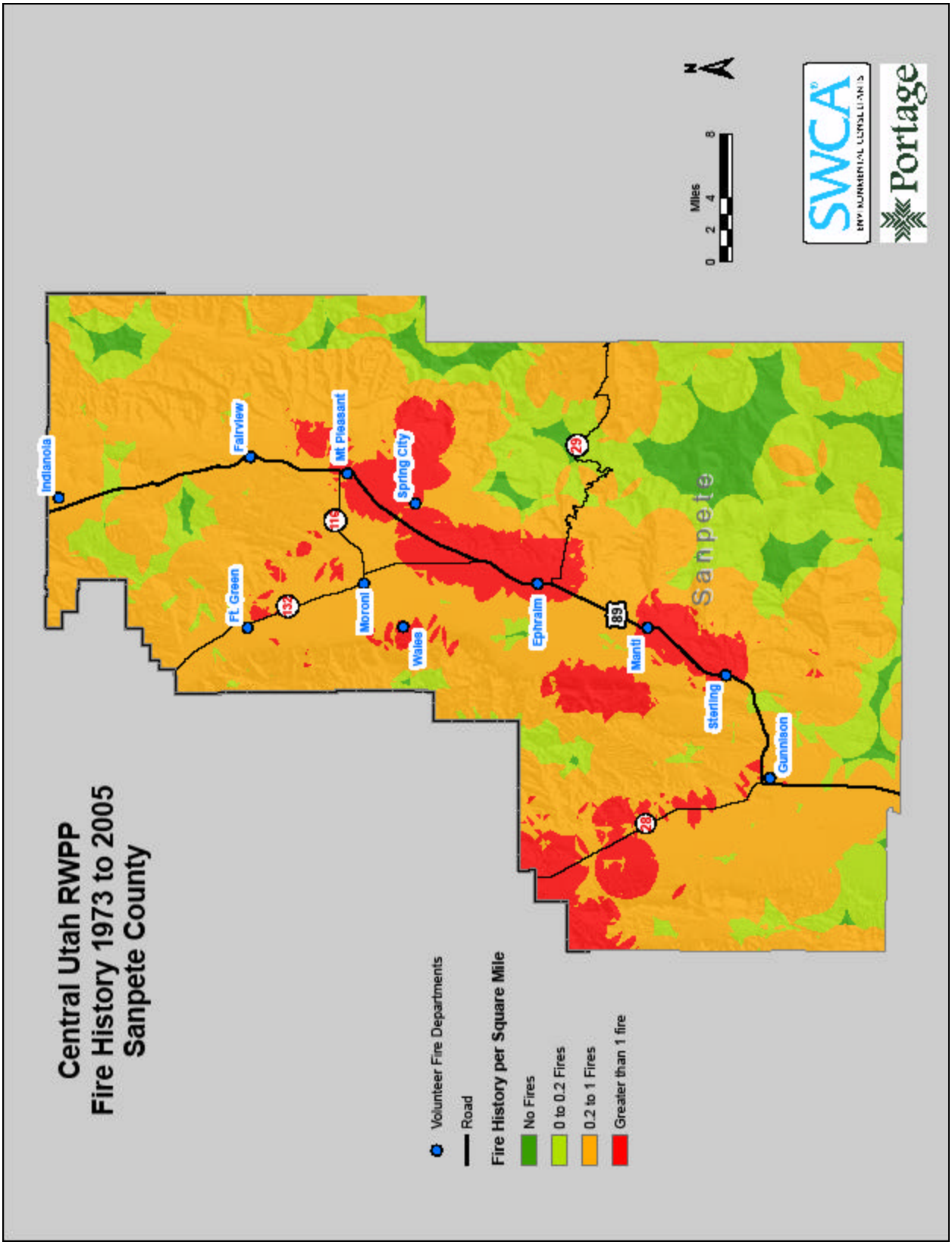

Figure 18. Sanpete County fire history and fire department locations.

2.5.5 SEVIER COUNTY

2.5.5.1 GEOGRAPHY AND CLIMATE

Sevier County is located in the high plateau country of central Utah. Most of the towns lie in the Sevier River valley, part of the Central Basin and Range ecoregion. The valley is bordered on the west by the Pahvant Range and on the east by the Wasatch and Fish Lake plateaus, both part of the Wasatch and Uinta Mountains ecoregion. The far eastern portion of Sevier County is part of the Colorado Plateau ecoregion. Sevier County contains a portion of 8 watersheds including Beaver Bottoms-Upper Beaver, East Fork Sevier, Fremont, Lower Beaver, Lower Sevier, Middle Sevier, Muddy, and San Pitch (EPA 2006). The area is seismically active, and a number of earthquakes have centered in the southern part of the county on the Sevier Fault.

2.5.5.2 HISTORY AND LAND USE

In 1849, Brigham Young sent an exploring party from Salt Lake City to determine if the Sevier Basin could support a group of settlers. Mormon pioneers established communities in the early 1860s and Sevier County was created in 1865 from the southern part of Sanpete County Violent confrontations with the Ute Indians forced the abandonment of all the Sevier settlements in 1867, however and the area was not resettled until 1870 (UHE 1994).

The Deseret Telegraph line extension from Gunnison to Monroe in 1872 provided a vital communications link for the area's cities, and by 1874 the Richfield area was on its way to becoming a major regional commercial center. The Denver and Rio Grande Railroad reached Salina in 1891 and Richfield in 1896, improving the marketing of Sevier County agricultural products. The completion of Interstate 70 in the 1980s was a significant impact to the county, linking the county to the national freeway system (UHE 1994).

Sheep and cattle dairy products, field crops, turkey-raising, and trade and manufacturing, including food processing and building product manufacturing are important to the local economy, and Sevier County is the state's leading producer of gypsum. The county also has coalmines and natural gas reserves in the northeast and major geothermal resources that could be tapped for energy production (UHE 1994).

Federal lands account for 76% of Sevier County's 1,976 square miles. National forests cover almost half of the county. About 19% of the land area in the county is privately owned, much of which is not developable due to county zoning requirements for water access and 40 acres per house in much of the county (USU 2005). Most development is occurring along the I-70 corridor from Joseph to Salina (6 County AOG 2004).

As shown in Figure 19, pinyon-juniper species are the dominant vegetation type with 29%. Mountain shrub/oak follows closely with 25%. Agriculture comprises 5% of the land use for the county.

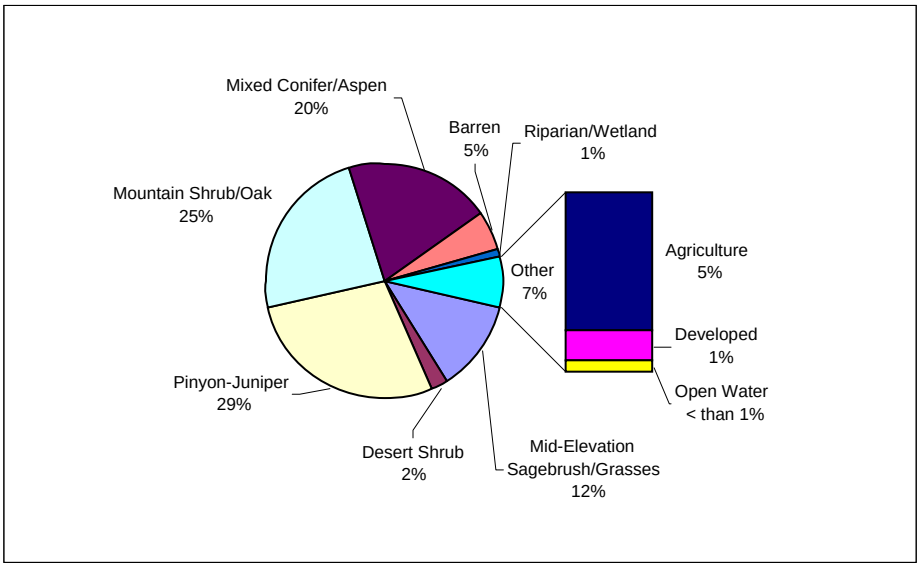

Figure 19. Sevier County land cover/land use.

2.5.5.3 POPULATION AND COMMUNITIES AT RISK

The population of Sevier County in 2000 was about 18,842 (USCB 2007). In 2005 the estimated population was 19,386, a 2.9% increase from 2000. The primary cities in Sevier County are Richfield, Salina, Monroe, Aurora, Redmond, Elsinore, and Annabella.

In 2005, the State of Utah identified the following communities as begin at risk from wildfire: Acord Lakes, Annabella, Burrville, Dog Flat, Fishlake Summer Homes, Gooseberry, Koosheram Reservoir, Long Flat, Manning Meadows, Monroe, Monroe Meadows, Quakee Haven, Rockwood, Salina Creek, and Sleepy Hollow. Monroe Mountain, consisting of Manning Meadow, Monroe Meadow and Long Flat communities located in both Sevier and Piute Counties is the only community in Sevier County with a completed CWPP.

2.5.5.4 COMMUNITY VALUES AT RISK

Watersheds. Watershed areas are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

Infrastructure. The 2003 Six County Predisaster Mitigation Plan identified .6 miles of railroad; approximately 1364 miles of local streets and road, 77 miles of State Highway, and 82 miles of Interstate/US Highway; 5 electrical substations and approximately 160 miles of powerline in Sevier County that are at risk from wildfire.

Cultural. Many prehistoric Indian sites have been found in Sevier County. Sudden Shelter, an Archaic site on Ivie Creek, contains the oldest time record (B.C. 5080 to A.D. 1900) in Utah east of the Wasatch (Sevier County Tourism 2007). Fremont State Park

preserves a recently uncovered Fremont Culture prehistoric village and Fremont and Sevier Culture sites continue to be found, especially during construction projects.

2.5.5.5 Fire History and Wildfire Concerns

Sevier County has had 704 fire starts reported by the State of Utah, BLM and USFS between 1973 and 2005. The areas of highest fire start density are along Highway 89 and Highway 24 and atop the Sevier Plateau (Figure 20). According to the 2006 Sevier County MOB Guide, "Anticipated fire occurrence and fire size class in Sevier County area in a normal year could be 5 Class A, 2 Class B, 2 Class C, and 1 Class D fires."

A WUI ordinance was passed in March 2007 to address these issues. The ordinance requires any new subdivisions or homes built in the WUI to adhere to more stringent water supply, building material, and defensible space stipulations. However, existing homes are exempt from these requirements and enforcement of the ordinance is likely to be a challenge because of limited resources.

2.5.5.6 Fire Response Capabilities

Sevier County shares one fulltime Fire Warden with Wayne and Piute Counties and has 7 VFDs (see Figure 20). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the County. If another agency or fire department takes initial attack, the fire wardens will be notified as to the size and reinforcements necessary. Support is furnished by local and area resources, including Volunteer Fire Departments, State, BLM and Forest resources. When the fire exceeds the capability of local and area resources, additional regional and federal resources will be ordered through the Richfield Interagency Fire Center (Sevier County 2006).

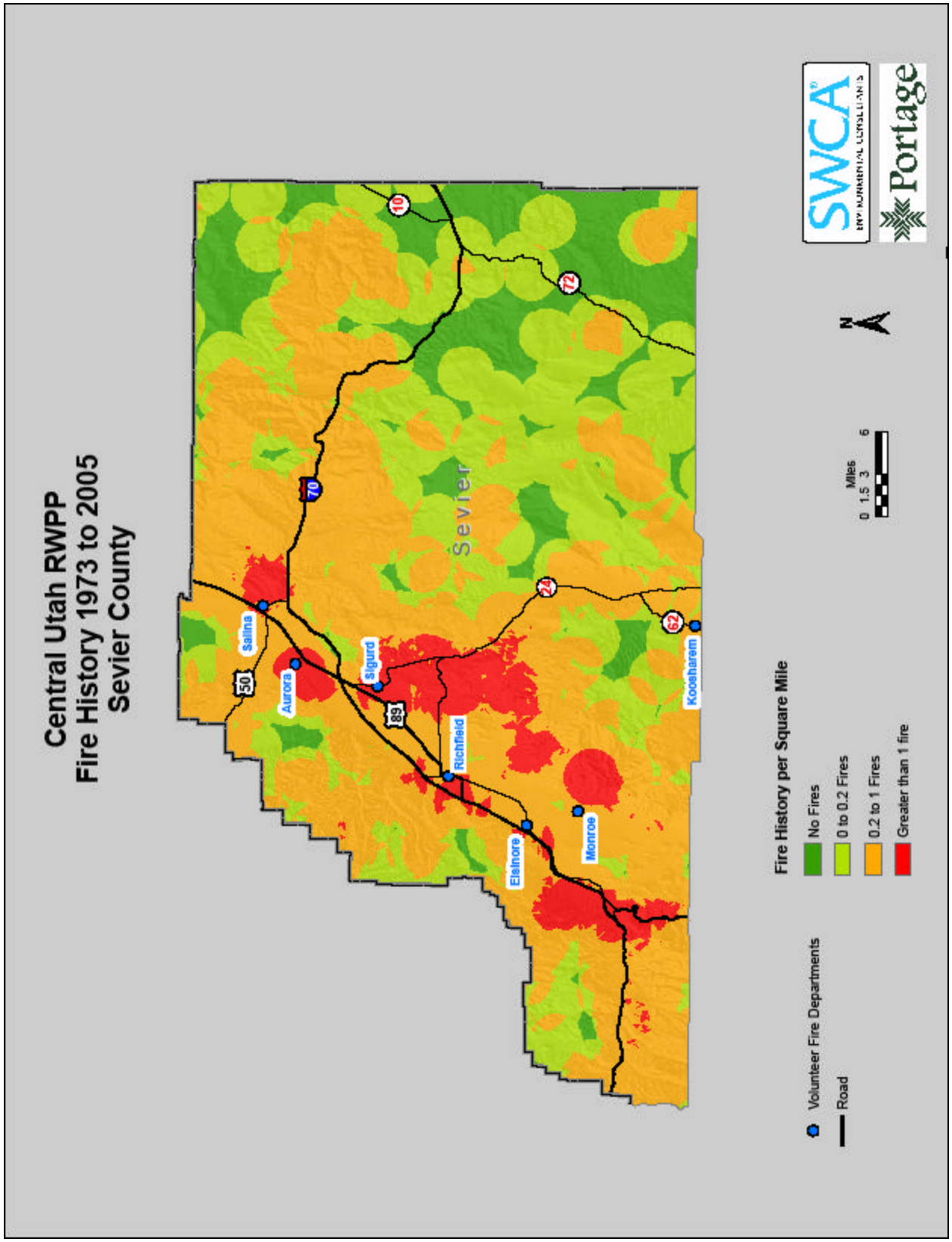

Figure 20. Sevier County fire history and fire department locations.

2.5.6 WAYNE COUNTY

2.5.6.1 GEOGRAPHY

Wayne County is approximately 2,486 square miles and lies almost entirely within the Colorado Plateau ecoregion. The county's western and eastern borders are the base of the Parker Mountains and the Green River, respectively. The far west part of the county, the Awapa Plateau, is unpopulated. The central western portion of the county, known as Rabbit Valley, contains the Fremont River and the majority of the county's development. The mountains just south of this area are part of the Wasatch and Uinta Mountains ecoregion. Known as the Aquarius Plateau, one of the largest and highest plateaus in the U.S., this area contains the highest point in the county, Bluebell Knoll, at 11,328 feet. The San Rafael Desert is located at the center of the county. Here the Fremont River joins Muddy Creek to form the Dirty Devil River, a tributary of the Colorado River. Beyond the Dirty Devil River lie uninhabited desert and remote portions of the Glen Canyon National Recreation Area and Canyonlands National Park. The area is served only by small jeep trails and unimproved roads.

2.5.6.2 POPULATION AND COMMUNITIES AT RISK

Population is decreasing in Wayne County. In 2000 Wayne County's population was about 2,509, falling to about 2,450 in 2005, a 2.4% decrease (USCB 2007). The majority of the county's population resides in Rabbit Valley, which includes the towns of Fremont, Loa, Bicknell, and Lyman. The area between Boulder Mountain (part of the Aquarius Plateau) and the San Rafael Desert is home to Torrey, Teasdale and Grover, as well as Capitol Reef National Park. The town of Hanksville, located just south of the confluence of the Fremont River and Muddy Creek, is the only community in that area. There are no communities in the western portion of the county.

CARs in Wayne County as identified by the State of Utah include Bicknell, the Blackridge interface, Fremont, Grover, Happy Valley, Loa, Lyman, Lyman-Horse Valley, Teasdale, and Torrey. A CWPP for Central Wayne County, encompassing the communities of Grover, Torrey and Teasdale has recently been completed.

2.5.6.3 HISTORY AND LAND USE

Wayne County was formed from Piute County in May 1892. Most of its towns were settled after 1880 because of their remote location and limited resources. The main economic base for the county has been beef cattle, dairy cows, sheep, poultry, and lumber. Recently, tourism has become a more prominent part of the area economy. Uranium has been mined in Wayne County, and tar sands resources await development. The state operates two fish hatcheries in Wayne (Onlineutah.com 2007).

The state and federal governments own almost 96% of the land (USU 2005) in Wayne County. Private land accounts for only 4% of Wayne County and is primarily farmground and grazing areas. Much of this land is not developable due to lack of water and county

zoning ordinances for water access and 5 acres per home. Most development is occurring along Highway 24, from Loa to Torrey (6 County AOG 2004).

The majority of Wayne County is considered barren (35%) or consisting of desert shrub (24%; Figure 21).

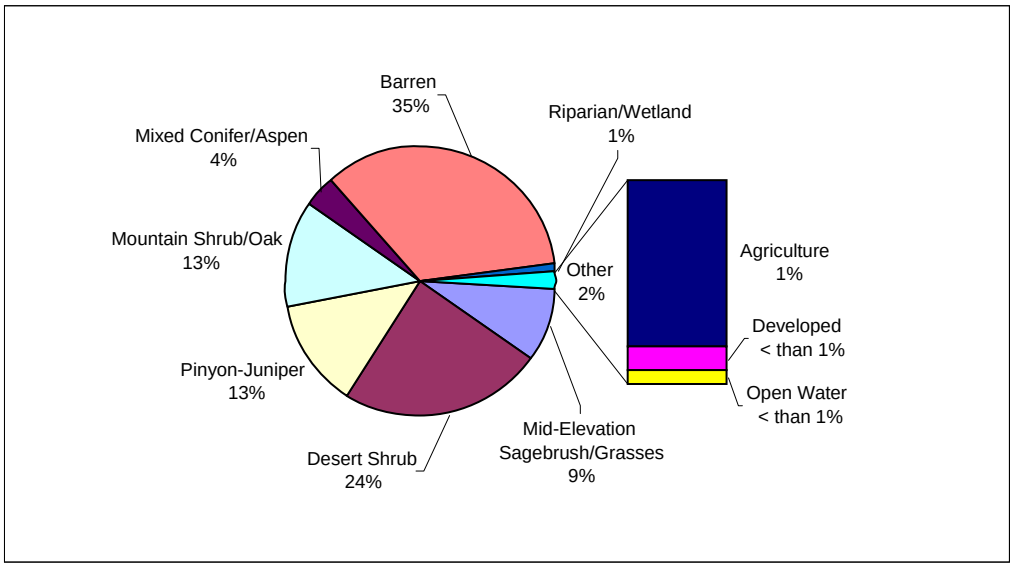

Figure 21. Wayne County land cover/land use.

2.5.6.4 COMMUNITY VALUES AT RISK

Watersheds. Wayne County contains a portion of 9 watersheds including Dirty Devil, East Fork Sevier, Escalante, Fremont, Lower Green, Muddy, San Rafael, Upper Colorado-Kane Springs, and Upper Lake Powell (EPA 2006).

Infrastructure. The 2003 Six County AOG Predisaster Mitigation Plan identified approximately 340 miles of local streets and road, 27 miles of State Highway, and one power generating stations at risk from wildfire in Wayne County.

Recreation. Capital Reef National Park and a small portion of Canyonlands National Park lie within Wayne County. Other points of interest include the Fruita Schoolhouse, Teasdale Tithing Office and Granary, and Thousand Lake Mountain (11,305 feet). Archaic and Fremont Indian sites dating to between 6300 B.C. and 450 A.D. have been excavated in Wayne County, and Horseshoe (Barrier) Canyon and the Maze section of Canyonlands National Park in eastern Wayne contain spectacular pictographs (UHE 1994). The Henry Mountains contain the only herd of free-roaming buffalo in the US (Wayne County 2006).

2.5.6.5 Fire History and Wildfire Concerns

Seventy-three fire starts were reported in Wayne County between 1973 and 2005. The majority were located along the rim of the Aquarius Plateau, near the communities of Torrey, Teasdale, and Grover (Figure 22).

A ordinance was passed to help address the growing issue of wildland fire in the WUI. The ordinance requires new subdivisions or homes built in the WUI to adhere to more stringent water supply, building material, and defensible space stipulations. Existing homes are exempt from these requirements.

2.5.6.6 Fire Response Capabilities

Wayne County shares one fulltime Fire Warden with Sevier and Piute Counties and has 8 VFDs (see Figure 22). The District Fire Warden is responsible for prevention, detection and suppression of wildland fires on all non-federal wildland within the county. If another agency or fire department takes initial attack, the fire wardens are notified as to the size and reinforcements necessary. Support is furnished by local and area resources, including VFDs, State, BLM and USFS resources. When the fire exceeds the capability of local and area resources, additional regional and federal resources will be ordered through the Richfield Interagency Fire Center, except for the far eastern portion of the county, which is served by the Moab Fire Center.

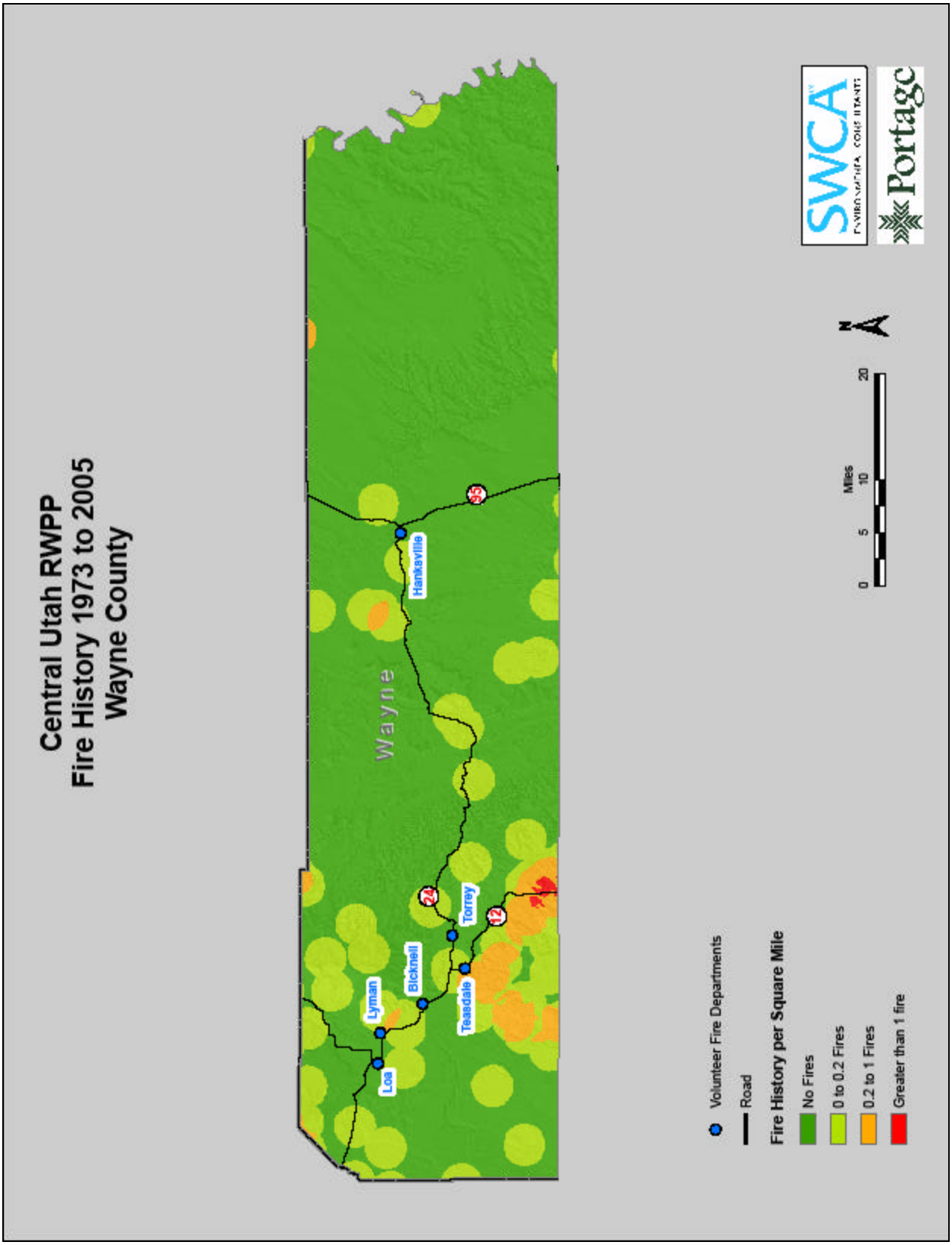

Figure 22. Wayne County fire history and fire department locations.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 3: Community Risk Assessment

The purpose of the risk assessment is to provide regional, landscape-level data about the level of risk associated with wildfire and the consequences that fire would have on communities, property, and infrastructure located in the WUI. These data are needed to provide an assessment of wildland fire risks throughout the project area and what impact the risks could have on the communities in the region. From this risk assessment, land-use managers, fire officials, planners, and others can identify priority areas for treatment in the region, put available federal funds to their best possible use, and prepare strategies, methods, and community education for reducing the threat of wildfire. The identified goals of the risk assessment include the following:

- Depict the risk of wildfire to communities
- Identify potential for high-intensity wildfire within the region
- Communicate wildland fire management concerns to Utah public officials.
- Provide a visual display of fire concerns within the state of Utah to support fire management funding.
- Identify and prioritize areas where fuels reduction treatment may be necessary.
- Identify general areas within the region where more detailed interagency planning may be needed.

3.1 Risk Assessment Methodology

The risk assessment was performed by developing a spatially weighted, overlay model using geographic information systems (GIS) technology to integrate individual GIS datasets into a comprehensive map. A spatially weighted overlay model takes datasets of the same scale and assigns a user-defined weight to each dataset, according to its importance. A weighted overlay must use datasets that rank the data units, or cells, according to a specific number of classes.

This risk assessment used four classes (1–4, with 1 being the lowest risk). In each dataset, depending on the original data cell values and value ranges, each cell's value was reclassified according to the four classes, between 1 and 4, based on the significance of the value to overall risk. Ultimately, each layer of the model represented a dataset with cell values from 1 to 4. As each layer was overlaid on the next, its weighting in the overall model (i.e., its percentage of the entire model, based on its importance as a risk factor) was fine-tuned to accurately reflect on-the-ground conditions.

Table 4 provides a summary of the individual datasets, data sources, the relative weights assigned within the model, and the risk categories assigned to the data. Each dataset is discussed in further detail in the paragraphs following this table.

Table 4. Risk Assessment Layer Summary

Layer	Data Source and year	Weight	Risk Category
Fuel Hazards[1]	SW ReGAP 2004	40%	See Fuels reclassification spreadsheet in Appendix C.
Distance from CARs/Population[2]	2005 State of Utah CARs list	40%	0-2 miles = 4 2-4 miles = 3 4-8 miles = 2 Greater than 8 miles = 1
Fire History[1]	BLM State and National Forest Fire History Data 1980-1996	20%	0 Fires/mile^2 = 1 0-0.2 Fires/ mile^2 = 2 0.2-1 Fires/ mile^2 = 3 Greater than 1 Fires/ mile^2 = 4

[1] raster (grid) data.

[2] vector (polygon) data.

3.1.1 FUEL HAZARDS MODEL

To identify the potential for high intensity wildfire within the region, the fuels hazard layer delineated the four risk classes according to vegetation communities based on expected fire behavior.

The vegetation of an area determines critical fire characteristics such as flame length and rate/type of spread. Fire spreads in three basic ways:

1) surface fire spread, where the flaming front remains on the ground surface (i.e., in grasses, shrubs, small trees, etc);
2) crown fire, where the surface fire "ladders" up into and spreads through the tops (or crowns) independent of or along with the surface fire, and
3) spotting, where embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels.

Surface fires burn hot and fast, but are usually relatively easy to control, whereas crown fires are much more catastrophic and possibly beyond the capability of suppression resources. The risk of catastrophic fires resulting from spotting would depend upon the properties of the vegetation present. Low moisture content or presence of volatile oils, make certain vegetation types more combustible and at higher risk for ignition.

This fuels data layer was derived from Regional Southwest GAP vegetation data, which are generated utilizing multi-season satellite imagery (Landsat ETM+) from 1999 through 2001, in conjunction with digital elevation model (DEM)-derived datasets, to form natural and semi-natural vegetation classes. Each ReGAP vegetation class present in the project area was given a rank from 1 (lowest risk of high-intensity wildfire) to 4 (greatest risk). Initial classifications were reviewed by the Core Team for accuracy against on-the-ground conditions and were revised accordingly.

Mixed conifer communities were assigned the highest, or most extreme, hazard rating based on the loading or volume of both live and dead fuels. Cover types with significant cheatgrass invasion were also classified as high or extreme due to the potential for wind to quickly spread wildfire and endanger or engulf suppression crews. Low- and mid-elevation shrub and grass cover types not dominated by cheatgrass were rated as a moderate hazard, because flame lengths in these cover types generally allow for direct attack by suppression crews. Cover types such as rock and water, as well as urban cells, were assigned a low hazard level because of the lack of fuel in these types. Although the urban areas, or CARs, generally have little or no vegetative fuel, being composed of large, open areas of bare soil, concrete, and other inflammable materials, they do invariably contain homes, wood decks and firewood, aboveground propane tanks, and other highly flammable elements. These concerns are noted in the recommended project treatment areas.

Because wildfire is impossible without fuel, this layer was weighted at 40% in the final model.

3.1.2 Distance from CARs/Population Model

To depict the risk of wildfire to communities, the CARs data layer assigned a risk value based on distance to a state-identified CAR.

The fire management officer on the Central Utah Core Team identified the boundaries of each CAR, and a 1/2-mile boundary was added to that boundary, in accordance with the chosen WUI definition. Risk categories were assigned as follows:

- 0-2 miles from CAR = 4
- 2-4 miles from CAR = 3
- 4-8 miles from CAR = 2
- More than 8 miles from CAR = 1

This layer was weighted at 40% of the final model, equal in importance to the fuels layer. This weighting was chosen because the primary goal of the risk assessment is to depict the risk to the region's communities.

3.1.3 Fire History Model

Because the locations of past fires can be indicators of where fires may occur in the future, fire history was chosen as the final layer in the risk assessment

The fire history layer of the model was derived from a database of all fires reported by the State, BLM, and USFS, regardless of size. This database consisted of point data (i.e., one point on the map per fire, regardless of the number of acres burned). To convert these data to risk classes, all fires were plotted on the map, and a 5-mile radius was put around each point to calculate the density. These densities were then reclassified based on fires per square mile, as follows:

- More than 1.0 fires per square mile = 4
- 0.2-1.0 fires per square mile = 3
- 0.0-0.2 fires per square mile = 2
- 0.0 fires per square mile = 1

Fire history was weighted at 20% in the final model.

3.2 Risk Assessment Results

The risk assessment resulted in a depiction of extreme, high, medium and low risk areas across the Central Utah region (Figure 23). The percentages calculated from the model are

- Low = 40.02%
- Medium = 40.51%
- High = 18.91%
- Extreme = 0.56%

The vast majority of the Central Utah region—80%—is at moderate risk of wildfire or lower. Less than 1% of the region is at extreme risk; however these high risk areas do include WUI areas.

3.3 Risk Assessment Limitations

The risk assessment was based on the best available data combined with the Core Team's professional knowledge of field conditions in the project area. However, there are several limitations to the risk assessment selected for the Central Utah RWPP:

1) **The choice of the parameters selected**. The choice of the layers and the weights they were given influence the degree to which the risk assessment measures wildfire risk or risk to communities from wildfire. The risk assessment did not factor in parameters such as slope, or aspect (direction the slope faces), which are important factors in determining fire behavior. Fire tends to run upslope faster than downslope, for example, and can also be "channeled" by wind through valleys, canyons, and narrow drainages. As a result, there may be areas where there is a high potential for wildfires, but because they are not near communities, they do not show up as extreme or high risk areas on the map. Alternatively, because 60% of the total weighting does come from fuels and fire history layers, the assessment may also not depict the risk to communities to the degree desired.
2) **Additional factors such as weather conditions, wind speed, and directions that were not considered in this risk assessment.** These factors affect ignition rate and rate of spread. Spring and summer winds and increasing temperatures can dry out fuels, particularly on south-facing slopes, and burning conditions can worsen rapidly. Cured grasses, for example, can become highly flammable in as

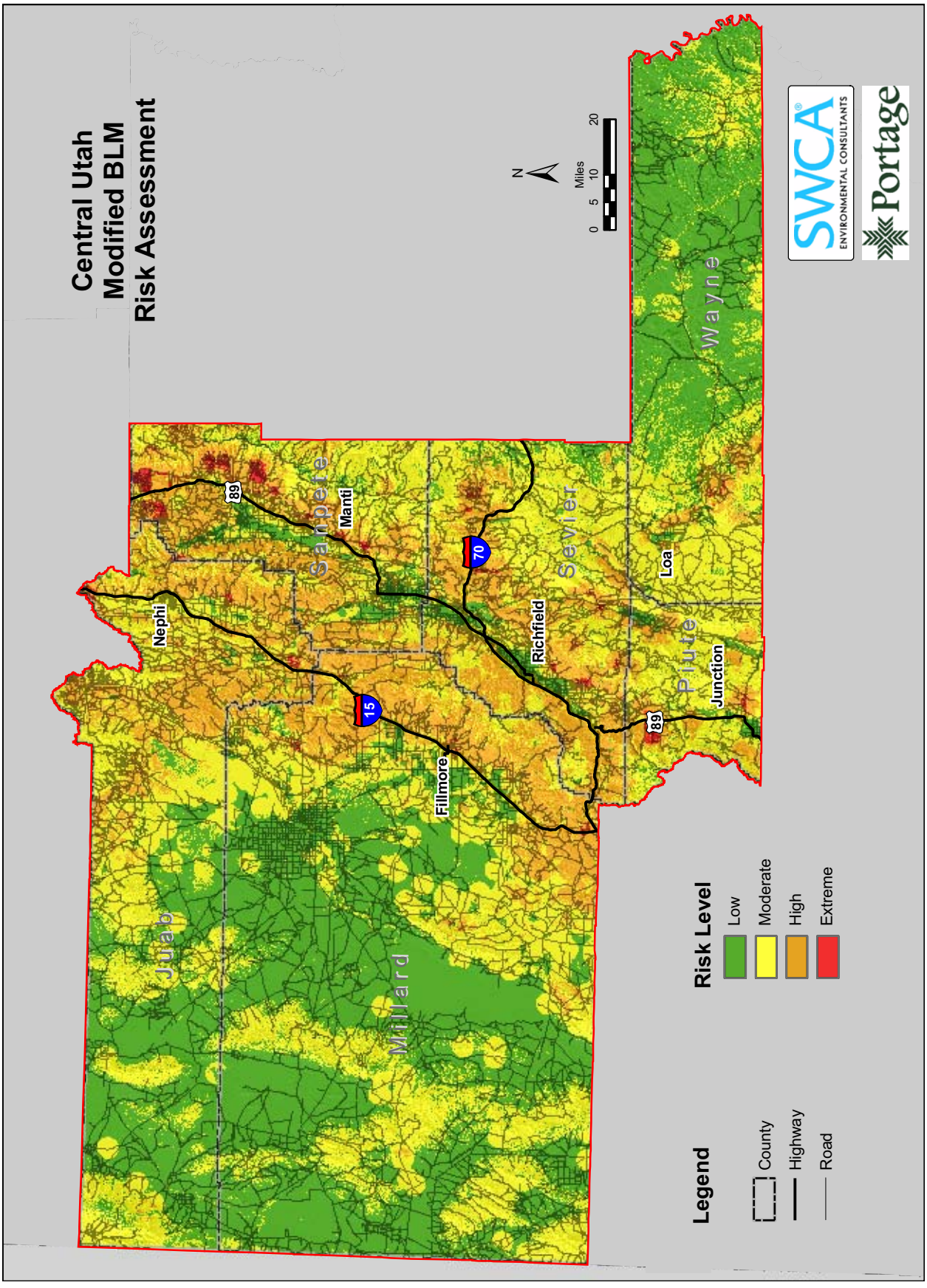

Figure 23. Central Utah RWPP risk assessment.

little as one hour following precipitation. With a high wind, grass fires can spread faster than a moving vehicle and can reach a community quickly. Prevailing wind data are not available on a region- or county-wide basis.

3) **Difficulty in identifying and analyzing specific ignition sources**. An evaluation of fire history provided some indication of where and how frequently fires occur. Information regarding specific sources of potential ignitions might have yielded still more useful results; however, data were not available on a region- or county-wide basis.

4) **Vegetation layer limitations**. Southwest ReGap vegetation data were intended to be used for depicting the distribution of various vegetation types at scales of 1:100,000 or smaller. While adequate for characterizing vegetation over large areas, these data are less accurate when viewed for smaller project areas. Additionally, the type and volume of dead and downed fuels are not factored into available ReGAP data.

5) **Map resolution**: Data used in the risk assessment are coarse and intended for use at a regional level. These maps are at 30-m resolution (the smallest possible level of detail of a given sensor, or the minimum mapping unit). A 30-m resolution is about 10,000 square feet, or 0.25 acre. While this resolution is sufficient at a region-wide level, the accuracy of the information decreases when viewed at a county level. Each square, or pixel, represents our best estimate of the predominant land cover represented by that pixel, but small features can be missed.

6) **CVARs are not included in the model.** The risk assessment does not measure risk to watersheds, recreation areas, or other CVARs. These values would need to be taken into account when developing fuels reductions projects.

Chapter 4: Regional Recommendations and Priorities

Two primary goals of the RWPP are to

1) provide general recommendations for the Central Utah region, and
2) provide guidelines and direction for the preparation of county and local CWPPs.

Although county guidelines are included, specific recommendations for each community were not designed to be part of this process since the needs for each community will vary depending on local fuels, topography, organization, public knowledge of the issues, and the desire to address those issues.

4.1 Priority Project Areas

Core Team meeting attendees mapped 16 high priority project areas within the Central Utah region (Figure 24). The selection of these areas was based on the need for fuels reductions as understood by fuels specialists and fire wardens, risk levels in the RWPP risk assessment, community values at risk in the area, firefighting and access concerns, the presence of CARs, and local community interest (i.e., does the area have a CWPP? Have they expressed interest and concern in fuels reduction? Did the RWPP public comments include these areas? Does the Core Team have a working relationship with anyone in that area/municipality that will help move projects forward?)

The 16 projects selected, in order of priority, are described below. Each section contains information about the project boundary and a general description of the area, including its vegetation, community values at risk, and firefighting/access concerns. Each project also contains a list of general goals for the area. Goals common to all treatment areas include fuels reduction, public education, and increases in equipment and training available to firefighting personnel. Specific recommendations to help accomplish these goals are included in Section 4.2, Additional Regional Recommendations.

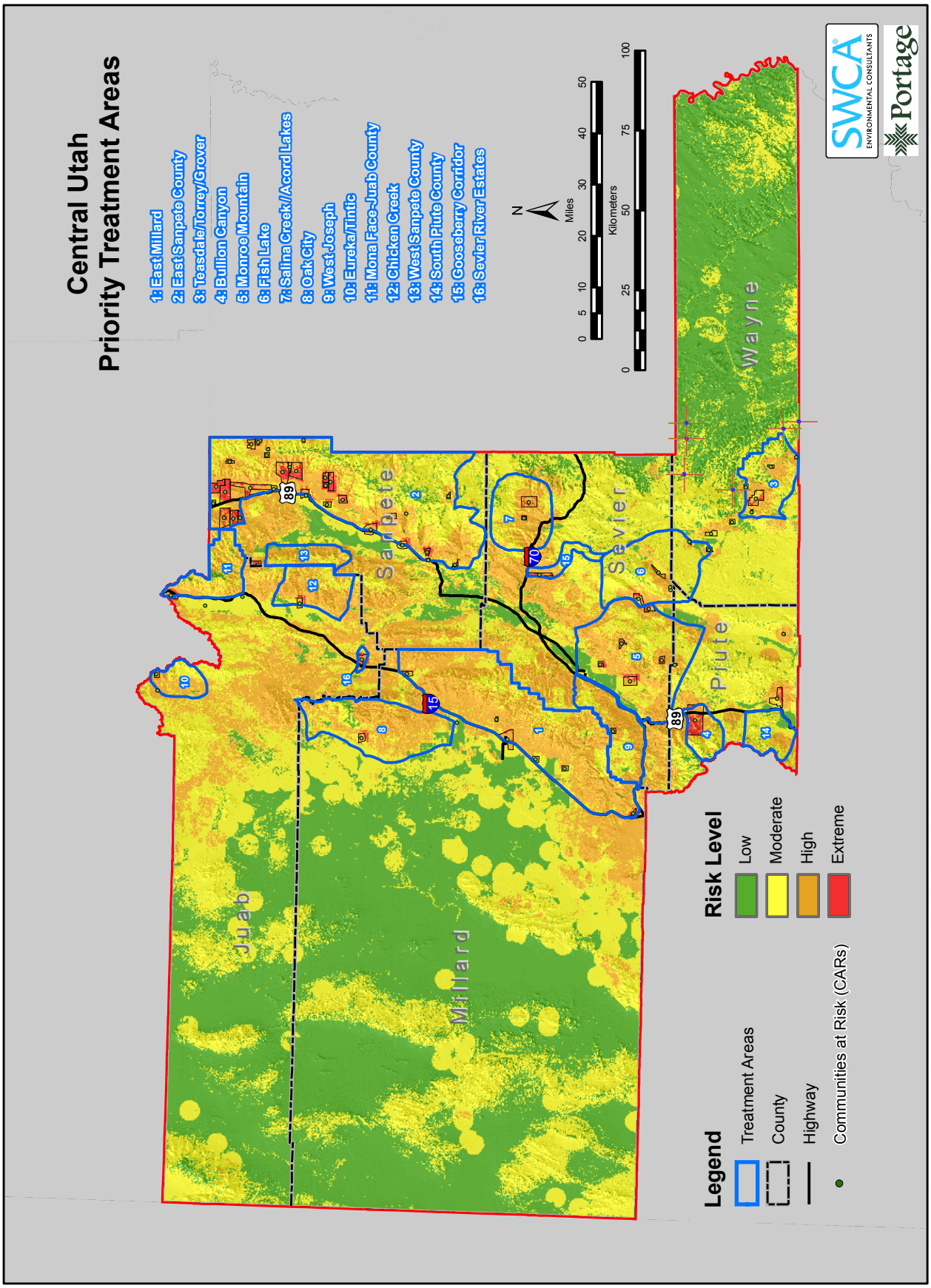

Figure 3. Central Utah RWPP priority treatment areas.

PROJECT #1. EAST MILLARD COUNTY (MILLARD COUNTY)

Project Area: All federal, state, tribal and private lands located from Scipio to Cove Fort and between the Millard-Sevier county line and I-15.

Project Boundaries are generally defined as follows: **North**: Scipio; **South**: Cove Fort; **East**: Millard-Sevier county line. **West**: 1-15.

Communities at Risk in the Project Area:

Cove Fort, Fillmore, Holden, Kanosh, Meadow, Oak City and Scipio are all state-identified CARs (see Appendix A). Reducing risk in this area is a priority under the HFRA. The area does not currently have any local CWPPs in place and needs RWPP coverage to be eligible for funding under the HFRA.

Project Area Description and Vegetation:

Vegetation communities include sagebrush and pinyon-juniper at lower elevations and mountain shrub, aspen, and mixed conifer, at higher elevations. The Pahvant Mountains, which constitute the majority of the project area, contain heavy fuels and overstocked forest.

Most of the fires occurring in this area have been on the Fishlake National Forest. Most are lightning caused and small. Fires in this area are mainly wind driven and have a high potential for large fire growth in a short time frame. In 1996, the Adelaide fire burned nearly 15,000 acres. In the mid and upper elevations fires have the potential to be large long-term events that will require an immediate appropriate management decision and a long-term commitment of resources (BLM 2004, USFS 2006a).

Watershed areas above the communities are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Flooding is of special concern along the Corn Creek, Pine Creek, Chalk Creek and Meadow Creek. Spring runoff or precipitation from summer thunderstorms can cause post wildfire watershed flooding (6 County AOG 2004).

Firefighting and Access Concerns:

- The 2006 Millard County Mobilization Guide notes that the area along I-15 receives high use and is at high risk for human-caused wildfires.
- Most of the area is restricted to high clearance vehicles using narrow unimproved roads (limiting heavy engine access), and there are confusing and limited road networks for ingress and egress (BLM 2004, USFS 2006a).

Community values at risk include, but are not limited to, the following:

- **Watershed.** There is high potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Meadow and Holden, defined as communities at risk from wildfire, could be at risk from post-fire flooding and debris flow. Both communities have experienced flooding and debris flow events in the past.
- **Wildlife.** The lower elevations of Pahvant Mountains are critical winter range for both deer and elk. Many deer populations also utilize these lower elevations for summer range (BLM 2004, USFS 2006a). .
- **Cultural Resources.** Archaeological resource concerns include rock art sites, historic mining, logging sites, and guard stations, and Indian burial sites (BLM 2004, USFS 2006a). .
- **Recreation.** The area receives a high amount of recreational use year round. Public and permitted uses include developed and dispersed recreation on both private and public sites.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #2. EAST SIDE SANPETE COUNTY (SANPETE COUNTY)

Project Area: All federal, State, tribal and private lands located from the Sanpete-Utah County border to the edge of the San Pitch watershed near the Sanpete-Sevier county border and between Highway 89 and the Sanpete-Emery county line.

Project Boundaries are generally defined as follows: **North:** Sanpete-Utah county line; **East:** Sanpete-Emery county line; **South:** Edge of San Pitch watershed. **West:** Highway 89.

Communities at Risk in the Project Area:

This area contains over 30 state-identified communities at risk (see Appendix A.). Reducing risk in this area is a priority under the HFRA. There has been community interest in fuels reduction projects and creating defensible space. A number of communities in the area have completed CWPPs.

Project Area Description and Vegetation:

This area is used primarily for developed and dispersed recreation, livestock grazing, special uses (summer homes, outfitter and guides), and timber management. The area contains a growing WUI population with a mix of year-round and summer residents including privately owned and permitted lands with substantial developments (camps, summer homes), and mountain cabin communities located in remote areas (USFS 2006b).

Vegetation is naturally patchy in much of the management area, with islands of coniferous forest surrounded by sagebrush/grass communities. Lower and mid-elevations feature sagebrush/grass and pinyon-juniper communities. North aspects support subalpine fir, Englemann spruce (*Picea engelmannii)* and aspen communities. There is moderate to heavy fuel loading in much of the forested areas. Many of the Englemann spruce-dominated stands have been killed during bark beetle infestations. Invasive species are also present in this area (USFS 2006b; Fairview Lakes 2001).

There is high potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

Average annual precipitation is 14 to 26 inches with 8 to 12 inches of rainfall from May through September. A neutral to unstable atmosphere predominates with winds usually from the southwest during the day and local down-canyon winds at night. Storm systems generally come from the southwest or west, preceded by winds from the southwest to southeast. High intensity thunderstorms are common from mid-July through September (USFS 2006b).

Firefighting and Access Concerns:

- Fire response times may be long, especially if aviation resources are not available.
- Winds can cause fire to spread rapidly.
- Higher elevations are dominated by steep rocky terrain with unstable soils, and some slopes in this area are dangerous for suppression forces (USFS 2006b).
- There is limited road access, and poor ingress/egress.
- Concerns regarding wildfire response capability for this area as mentioned in the Sanpete County Mobilization Guide, as well as in the Elk Ridge/Oaker Hills, Aspen Hills, and North Sanpete County CWPPs include the following:

- Many roads are too narrow or otherwise inadequate to allow heavy equipment to pass.
- Many subdivisions have few or no fire hydrants.
- Many homes are tightly surrounded by natural vegetation.
- Locked gates are common on main roadways and individual properties.
- Some areas allow only one road in and out, making entrapment a concern.

Community values at risk include, but are not limited to, the following:

- **Watersheds.** Many of water supplies for local communities come directly from this area. The Mount Pleasant, Fairview, and Spring City Municipal Watersheds (5282, 4492, and 6342 acres) have been determined by the analysis for Utah Fire Plan Amendment to be critical watersheds (USFS 2006b). Other watersheds of concern are the Ephraim, Manti, Sterling and Mayfield watersheds. Concerns for all watersheds include both municipal culinary systems and irrigations systems.
- **Wildlife.** The lower elevations of Pahvant Mountains are critical winter range for both deer and elk. Many deer populations also utilize these lower elevations for summer range. There is a fishery in Oak Creek.
- **Recreation.** The area receives a high amount of recreational use year round. Public and permitted uses include developed and dispersed recreation on both private and public sites.
- **Other:** There are power plants located in Manti, Spring City and Mt. Pleasant Canyons; the area also has some mining concerns, as well as electronic and communication sites.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #3. TEASDALE, TORREY, GROVER, HAPPY VALLEY AREA (WAYNE COUNTY)

Project Area: All federal, state, tribal and private lands located from Highway 24 to the rim of the Aquarius Plateau and between Government Creek drainage and Capitol Reef National Park. The project area includes the communities of Torrey, Teasdale, Grover and Happy Valley.

Project Boundaries are generally defined as follows: **North:** Highway 24; **West:** Government Creek drainage area from Highway 24 to Lookout Peak; **South**: Along the rim of the Aquarius Plateau from Lookout Peak to Chokecherry Point, then along Chokecherry Creek to Capitol Reef National Park boundary; **East:** Capitol Reef National Park boundary.

Communities at Risk in the Project Area: Torrey, Teasdale, Grover, the Blackridge Interface, and Happy Valley are all state-identified communities at risk; reducing risk in these areas is a priority under the HFRA (see Appendix A). There has been community interest in fuels reduction and creating defensible space. The area has completed a CWPP.

Project Area Description and Vegetation:

Neighboring BLM and NF lands contain heavy fuels and overstocked forest (BLM 2004, USFS 2006a). Pinyon has seen mortality from drought and insects in the lower elevations. An estimated 5-10% of the pinyon on NF lands has died in the last 18 months (USFS 2006a).

Historical fire records dating from 1970 through 2001 indicate the National Forest land (Teasdale Fire Management Unit) has consistent fire activity with an average of 4.1 fires per year. Most of them are lightning caused and have the potential to grow very large (USFS 2006a).

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of culinary and irrigation watershed water quality following wildland fire.

Firefighting and Access Concerns:

Homes in the WUI are largely wooden structures with little signage and poor access. Few access routes exist or they are confusing. Many bridges are inadequate for emergency equipment making firefighting especially dangerous (Torrey et al. 2006).

Community values at risk include, but are not limited to, the following:

- **Wildlife**. The lower elevations of neighboring National Forest land contain critical winter range for deer, elk, and turkeys. The higher elevations are critical summer range for the same wildlife (USFS 2006a).

- **Watersheds**. Watershed areas above the community provide culinary and irrigation water.
- **Cultural Resources**. This area contains one of the most concentrated areas of identifiable Fremont Indian remains anywhere as well as a few prehistoric lithic scatters and historic cowboy camps (BLM 2004).
- **Outdoor Recreation Opportunities**. The area provides a wide opportunity for outdoor recreation and supports a growing tourist industry.
- **Other**. Viewsheds are important because of the increasing importance of tourism to the local economy.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #4. BULLION CANYON (PIUTE COUNTY)

Project Area: All federal, state, tribal and private lands located around the Town of Marysville and up Bullion Canyon area from Beaver Creek to Cottonwood Creek and between the Sevier River and the Piute-Beaver county line.

Project Boundaries are generally defined as follows: **North**: Beaver Creek drainage; **East**: Sevier River; **South:** Cottonwood Creek drainage; **West**: Piute-Beaver county line.

Communities at Risk in the Project Area:

Marysvale is a state-identified community at risk. Reducing risk in this area is a priority under the HFRA. There has been strong community interest in fuels reduction and creating defensible space. The area has completed a CWPP.

Project Area Description and Vegetation:

Neighboring National Forest and BLM lands contain heavy fuels. Fires on neighboring National Forest lands include the Pole Canyon Fire in 1996 (7500 acres) and the Cottonwood Fire in 2002 (1800 acres) (BLM 2004; USFS 2006a).

Bullion Canyon contains large amounts of decadent cottonwood trees that are dead and down creating a severe fire hazard. Recent data indicate several fires of small size caused by lightning. The largest recent fire was in 2000 and was 523 acres (Bullion Canyon 2005). The steep slope of the area allows wildfire to travel quickly.

The entire area receives a very substantial amount of ATV use throughout summer months with an influx of users during the hunting seasons. A portion of the Paiute ATV trail, a popular tourist attraction, is located in the area.

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

Firefighting and Access Concerns:

- Many of the homes in this area are wood and have aboveground propane tanks.
- Fire response times may be long, especially if aviation resources are not available.
- The steep slope of the area allows wildfire to travel quickly and may be dangerous to suppression personnel.

Community values at risk include, but are not limited to, the following:

- **Wildlife**. The lower elevations of the Tushar Mountains, including Bullion Canyon, contain critical winter and summer range for both deer and elk and there are Bonneville cutthroat trout in the streams on the Tushar Mountain National Forest lands, including Pine Creek (located within Bullion Canyon).
- **Watersheds.** There is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Cultural Resources**. There are a number of historic and prehistoric sites in the area, including the Bullion Canyon Interpretive Site, the gold mine at Deer Trail Mountain and the Kimberly Historic Mining Area.
- **Outdoor Recreation Opportunities**. The area is very popular with summer visitors and hunters. ATV use is growing. The Piute ATV trail, located in the area, is an extremely popular OHV route and rated one of the best 15 trails in the US by Dirt Wheels magazine.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #5. MONROE MOUNTAIN AREA (INCLUDES AREA FROM MONROE TO GLENWOOD) (SEVIER COUNTY)

Project Area: All federal, state, tribal and private lands in the Sevier Plateau area, and generally located from Richfield/Glenwood to Barney Lake/Manning Meadow/Greenwich and between Interstate 70/Highway 89 and Highway 24/Highway 60.

Project Boundaries are generally defined as follows: **North:** Along Highway 119, from Richfield to and including the town of Glenwood; **East:** Highway 24/East Kings Meadow area from Glenwood through and including the town of Burrville, then along Highway 62 to one mile south of the town of Greenwich; **South:** boundary line runs in a northwesterly direction from one mile south of Greenwich to Hoover Peak (38.3042N 112.1504W), so that Barney Lake and Maryville Peak are included in the project area; **West:** Highway 70 from Richfield to Sevier Junction, then continuing along Highway 89 through Marysvale Canyon to and including Hoover Peak.

Communities at Risk in the Project Area:

Monroe, Annabella, Monroe Meadows, Manning Meadows, the Koosharem Reservoir area, Long Flat, and Burrville are all state-identified Communities at risk; reducing risk in these communities is a priority under the HFRA. There has been strong community interest in fuels reduction and creating defensible space. The area has completed a CWPP.

Project Area Description and Vegetation:

Area vegetation includes sagebrush and pinyon-juniper at lower elevations, and aspen and mixed conifer at the upper elevations (BLM 2004; USFS 2006a).

The National Forest lands contain heavy fuels and overstocked forest. There are several small subdivisions on Monroe Mountain National Forest lands with dense forest covering three-fourths of the surrounding land. The understory is also dense and could provide ladder fuels to create a catastrophic crown fire BLM 2004; USFS 2006a).

Watershed areas above the communities are of concern because of the potential for flooding, debris flow and degradation of local municipal watershed water quality following wildland fire.

Firefighting and Access Concerns:

- Fire response times may be very long, especially if aviation resources are not available.
- Most of the area is restricted to high clearance vehicles using narrow unimproved roads (limited heavy engine access) and there is a confusing and limited road network for ingress and egress (BLM 2004; USFS 2006a).

Community values at risk include, but are not limited to, the following:

- **Timber**. There are thousands of acres of timber in the area (Monroe Mountain 2005).
- **Watersheds**. Watershed areas above the community provide municipal water.
- **Wildlife**. The lower elevations of the area are critical winter range for both deer and elk. Many deer populations also utilize these lower elevations for summer range. There is a Utah Division of Wildlife Resources (UDWR) fish hatchery located in Glenwood and the UDWR also uses the Manning Meadows Reservoir as habitat for brood stock of Bonneville cutthroat trout.
- **Cultural Resources**. Archaeological sites are present throughout the unit, but the area on the east contains an abundance of Fremont and Numic sites. These represent resource exploitation sites for the most part and some are quite important to the Paiute Indian Tribe of Utah (BLM 2004; USFS 2006a).

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.

- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #6. FISHLAKE SUMMER HOME AREA (SEVIER COUNTY)

Project Area: All federal, state, tribal and private lands located on the Fishlake Hightop Plateau and in the Crater Lake/Mytoge Mountain recreation and summer home areas, between Highway 24, the Gooseberry-Fremont Road, and the Lost Creek Reservoir area.

Project Boundaries are generally defined as follows: **North**: From Highway 24 east to and including the Mt Terrill Ranger Station (and the Lost Creek Reservoir area) and ending one mile east of Gooseberry-Fremont Rd.; **East**: a line 1 mile east of the Gooseberry-Fremont Rd. from the Mt. Terrill Ranger Station to the town of Loa (including Johnson Valley Reservoir, Mill Meadow Reservoir, and the town of Fremont); **South**: along Highway 24 from Loa to the point where Highway 24 runs north; **West**: Highway 24.

Communities at Risk in the Project Area:

The Fishlake Summer Home area, Quakee Haven, Koosharem Reservoir, Sleepy Hollow, Dog Flat, and Loa are state-identified CARs located in this area; reducing risk in this area is a priority under the HFRA. This area does not currently have any CWPPs in place and needs RWPP coverage to be eligible for funding under the HFRA.

Project Area Description and Vegetation:

Area vegetation includes sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush. Higher elevations contain aspen/mixed conifer, and large continuous stands of aspen (BLM 2004; USFS 2006a).

There are numerous summer homes and private recreation sites in the area. This area is popular for recreation in the Central Utah region and may receive 4-5,000 visitors per weekend throughout the summer (personal communication, Ivie 2007).

There are heavy fuel accumulations in forested areas. The national forest lands have dense forest with dense understory that could provide ladder fuels to create a catastrophic crown fire. The area also has significant numbers of dead trees resulting from beetle bark infestation (personal communication, Chappell 2007).

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire, especially above the Fishlake basin area.

Firefighting and Access Concerns:

- Fire response times may be very long, especially if aviation resources are not available.
- There is limited road access, and/or confusing egress routes (BLM 2004; USFS 2006a).
- There would be tremendous evacuation difficulties in the event of a wildfire (BLM 2004; USFS 2006a).

Community values at risk include, but are not limited to, the following:

- **Watersheds.** There is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Wildlife**. The area contains habitat for deer, sage grouse and elk.
- **Recreation**. The area is very popular for camping, fishing, boating, biking, and other forms of outdoor recreation.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #7. SALINA CREEK/ACORD LAKES (SEVIER COUNTY)

Project Area: All federal, state, tribal and private lands located in the Salina Creek and Acord lake recreation and summer home areas.

Project Boundaries are generally defined as follows: **North**: from the Water Hollow/Willow Creek Rd intersection east to the north fork of Quitchupah Creek, and generally along Willow Creek Rd and/or Manti-La Sal/Fishlake National Forest boundary such that Salina Flats and Salina Creek are included in the project area; **West**: from the Willow Water Hollow/Willow Creek Rd south to and including a private ranch located south of I-70; **South**: from the private ranch area located to the south of I-70 and generally straight east to Old Woman Plateau; **East**: along the edge of Old Woman Plateau, roughly from North/South Water Hollow to the north fork of Quitchupah Creek.

Communities at Risk in the Project Area:

The Salina Creek/Accord Lakes area is a state-identified Community-at-risk; reducing risk in this area is a priority under the HFRA. There are numerous summer homes and this area is popular for camping and ATV use. This area does not currently have a CWPP in place and needs RWPP coverage to be eligible for funding under the HFRA.

Project Area Description and Vegetation:

Vegetation includes pinyon-juniper and mountain brush at lower elevations and aspen and mixed conifer at upper elevations. The national forest lands surrounding the Acord Lake/Salina creek interface areas have forest stands with dense understory that could provide ladder fuels to create a catastrophic crown fire (BLM 2004; USFS 2006a).

Watershed areas around these communities are of concern because of the potential for flooding, debris flow and degradation of culinary watershed water quality following wildland fire. The steep, deep canyons of the area may be vulnerable to post-fire flooding and erosion.

Firefighting and Access Concerns:

- There is limited road access, and/or confusing egress routes (BLM 2004; USFS 2006a).
- Fire response times may be long, especially if aviation resources are not available.
- The area is popular for camping and ATV use, resulting in high traffic volumes (BLM 2004; USFS 2006a).

Community values at risk include, but are not limited to, the following:

- **Recreation**. The area is popular for camping and ATV use.
- **Wildlife**. Bonneville cutthroat trout, a native fish species, are found in Salina Creek, and there are fisheries located at Skootumpah Reservoir and Salina Creek.

- **Watersheds.** There is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Other:** The SUFCO coal mine.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #8. OAK CITY (MILLARD COUNTY)

Project Area: All federal, state, tribal and private lands located in the Canyon Mountain range and Oak City area from Leamington Canyon to Holden, and between the Central Utah Canal and the Canyon Mountain Ridgeline.

Project Boundaries are generally defined as follows: **North:** Leamington Canyon (Highway 132) from the Central Utah Canal to the ridgeline of the Canyon Mountains; **East**: along Canyon Mountain Ridgeline from Leamington Canyon to and including the town of Holden; **South**: from the Town of Holden west to the Central Utah Canal; **West**: the area of the Central Utah Canal located between Green wood and Leamington Canyon.

Communities at Risk in the Project Area: Oak City is a state-identified Community-at-risk; reducing risk in this area is a priority under the HFRA. This area does not currently have a CWPP in place and needs RWPP coverage to be eligible for funding under the HFRA.

Project Area Description and Vegetation:

Oak Canyon is a popular outdoor recreation area with numerous campgrounds and private cabins. Area vegetation includes sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to scattered aspen and mixed conifer stands at the upper elevations (BLM 2004; USFS 2006a).

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire. Precipitation from spring runoff or summer thunderstorms can cause post wildfire watershed flooding. The 6-County Predisaster Plan notes that flooding is a concern along Oak and Dry Creeks, and Oak City itself has experienced repeated post-fire flooding events.

All of the fires occurring in this area, mostly lightning caused, have been on the Fishlake National Forest. There were several large fires on the north end of Oak Canyon range in 1980, 1996, 2000 and 2006 (BLM 2004; USFS 2006a).

Firefighting and Access Concerns:

- Oak Canyon is a popular recreation area and there is only one ingress/egress road into the canyon; recreationists are at risk for entrapment. Fuels reduction along the canyon road could help reduce risk to those camping in the area.
- Fires in this area are mainly wind driven and have a high potential for large fire growth in a short time frame BLM 2004; USFS 2006a).
- Fires in this area burn actively downhill at night BLM 2004; USFS 2006a).
- The Union Pacific railroad and Highway 132 runs through Leamington Canyon. These areas are at higher risk for human caused fires (Millard County 2006).

Community values at risk include, but are not limited to, the following:

- **Watersheds.** Watershed areas above the community provide municipal water and there is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Recreation.** Oak Canyon is a popular recreation area for campers, ATV users.
- **Wildlife**. The Canyon Mountains contain critical winter range for both elk and deer. Many deer populations also utilize the lower elevations for summer range.
- **Cultural Resources**. There are numerous Fremont period rock art sites though most would not sustain substantial damage from wildfire.
- **Other**. There are communications sites and high voltage powerlines in the area, including the IPP powerline, which runs through Leamington Canyon

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.

- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #9. AREAS WEST OF JOSEPH (SEVIER COUNTY)

Project Area: All federal, state, tribal and private lands located on the east side of the Pahvant Range between I-70, the Sevier-Millard county line, and the town of Richfield.

Project Boundaries are generally defined as follows: **North:** The Deer Creek Canyon USFS roads (FR 171 and 096) from the Sevier-Millard county line to the town of Richfield; **East**: I-70 from Richfield to Sevier Junction; **South**: I-70 from Sevier Junction to the Sevier-Millard county line; **West**: Sevier-Millard county line, from I-70 to the Deer Creek Canyon NF roads.

Communities at Risk in the Project Area:

The project area includes Rockwood, a state-identified community at risk; reducing wildfire risk is a priority under the HFRA. This CAR does not currently have a CWPP in place and would need RWPP coverage to be eligible for funding under the HFRA.

The Town of Joseph, although not a CAR, has exhibited significant community interest in creating a fuel break between the town and tribal lands above the town and has met with the state WUI coordinator to create a CWPP.

Project Area Description and Vegetation:

Vegetation includes sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to mixed conifer at the upper elevations (BLM 2004; USFS 2006a). The tribal areas above the town have not been treated. Westerly winds can cause wildfires to spread down the mountain from untreated tribal lands into the town of Joseph, threatening structures located there.

Firefighting and Access Concerns:

- Fires in this area are mainly wind driven and have a high potential for large fire growth in a short time frame (BLM 2004; USFS 2006a).
- USFS roads are restricted to high clearance vehicles (limiting heavy engine access), and there are confusing and limited road networks for ingress and egress (BLM 2004; USFS 2006a).

- I-70 may not be an adequate fuels break because fire can jump the interstate, and has done so in the past.

Community values at risk include, but are not limited to, the following:

- **Wildlife.** The lower elevations of this FMU are critical winter range for both deer and elk. Many deer populations also utilize these lower elevations for summer range.
- **Cultural Resources:** Fremont Indian State Park is located in this project area. Rock art sites are found in the area as well.
- **Other.** Communication and high voltage power lines.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #10. EUREKA/TINTIC AREA

Project Area: The city of Eureka, the town of Mammoth, the historic town site of Silver City, Tintic Junction, and Tintic Valley/Tintic Pasture/USU experimental station located several miles south of those communities.

Communities at Risk in the Project Area:

Eureka and Tintic Junction are state-identified communities-at-risk; reducing risk in these areas is a priority under the HFRA. Eureka, Mammoth and Silver City have a CWPP.

Project Area Description and Vegetation:

Area vegetation includes sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to scattered aspen and mixed conifer

stands at the upper elevations. Most wildfire threats approach the area from the southwest due to the prevailing wind and large areas of cheatgrass and thick stands of pinyon-juniper at the southern and western portions of the valley. The prevailing winds channel directly into the upslope-positioned populated valley (Eureka 2003). East of the city the terrain slopes quickly. These easterly slopes are mountainous with many canyons covered with pinion pine and juniper trees, sage and grasses (Eureka 2003).

The Tintic Valley is highly susceptible to lightning strikes (Juab County 2006). This area is located in high fire return interval area for natural ignition by lightning. Eureka and the surrounding area have been threatened several times in resent history by wildfire: the Little Sahara and Leamington Complexes in 1996, the Railroad Fire in 1999 and the West Mona Fire in 2000 (Eureka 2003). Most of the fires are lightning caused. There have been numerous large fires including notable fires in 1996, 1999, and 2000.

A fuel break has been completed on the west side of the area. The Town of Eureka has requested a water tank because it is not possible to continue the fuel break on the east side.

Firefighting and Access Concerns:

- Urban interface problems around Eureka are of special concern: homes in the area are historic wooden structures and many have aboveground propane tanks. Roads are often narrow two lane roads that can be limiting to larger fire engines and other large vehicles (Juab County 2006; Eureka 2003).
- Fire response times may be very long, especially if aviation resources are not available.
- Right-of-ways that extend along Highway 6/Highway 36 are highly influenced by people. Human-associated fires also occur due to railroad, highway and recreational use (Juab County 2006; Eureka 2003).
- Cheatgrass fuels allow fires to grow and spread rapidly (Juab County MOB Guide).
- Fires in this area are mainly wind driven and have a high potential for large fire growth in a short time frame (BLM 2004; USFS 2006a).
- There is considerable danger to suppression personnel due to fast moving fires in brushy fuels with cheatgrass understory, very poor access to remote sites, and a confusing and limited road network for ingress and egress. Old mines are very common.

Community values at risk include, but are not limited to, the following:

- **Cultural Resources**. Archaeological resources such as the East and West Tintic Historic Mining Districts; the Fitch Cemetery (part of the Eureka Multiple Resource National Register District); several abandoned mining towns with associated features, and rock art and prehistoric sites with flammable features.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #11. MONA FACE-JUAB COUNTY

Project Area: All federal, state, tribal and private lands located from the Juab-Utah County border to the Town of Nephi, and generally between I-15 and the Juab/Sanpete county boundaries. The project area also includes the community of Rocky Ridge, located on the west side of I-15.

Project Boundaries are generally defined as follows: **North**: Juab-Utah county border/ Pole Canyon area; **East**: follows the Juab-Utah county line and Juab/Sanpete county line down to Hop Creek/Salt Creek area; **South**: from the Juab/Sanpete county line/Hop Creek area along and including Salt Creek west to the Town of Nephi; **West**: I-15 from the town of Nephi up to the Juab-Utah county line. Near the northwestern boundary, the project area extends across I-15 to include the Rocky Ridge community.

Communities at Risk in the Project Area:

Mona-Willow/Mendenhall, Nephi-East Bench and Rocky Ridge are state-identified CARs reducing risk in this area is a priority under the HFRA. The community of Rocky Ridge has a CWPP in place.

Project Area Description and Vegetation:

The area contains sagebrush and grasses at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to scattered aspen and mixed conifer stands at the upper elevations. There is significant cheatgrass infestation.

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

The mountains east and west of Juab Valley are highly susceptible to lightning strikes, and the railroad and I-15 rights-of-way through the Juab Valley are highly influenced by people and susceptible to human-caused fires (Juab County 2006).

Community values at risk include, but are not limited to, the following:

- **Wildlife**. The area is critical wildlife habitat for big game winter range (Rocky Ridge 2004).
- **Watersheds.** There is potential for flooding, debris flow as well degradation to the Nephi municipal watershed water quality following wildland fire.
- **Other**. There is an electrical substation located to the west of Mona.

Firefighting and Access Concerns:

- The cheatgrass fuels in the area allow fires to grow and spread rapidly (Juab County 2006).
- Fires in this area are mainly wind driven and have the potential for large fire growth in a very short period of time (Juab County 2006).

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #12. CHICKEN CREEK (JUAB COUNTY)

Project Area: All federal, state, tribal and private lands in the Chicken Creek drainage generally located between the Town of Levan and the Juab/Sanpete county line, and between 4-Mile Creek and Chriss Creek.

Project Boundaries are generally defined as follows: **North**: 4-Mile Creek from Highway 28 to the Juab/Sanpete county line, **East**: Juab/Sanpete county line from 4-Mile Creek to Chriss Creek; **South**: Chriss Creek from the Juab/Sanpete county line to Highway 28; **West**: Highway 28 from Chriss Creek to 4 Mile Creek and including the Town of Levan.

Communities at Risk in the Project Area:

This area is includes the town of Levan (a state-identified CAR); reducing risk in this area is a priority under the HFRA. There are currently no CWPPs in place in the project area.

Project Area Description and Vegetation:

Area vegetation includes sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to scattered aspen and mixed conifer stands at the upper elevations. There is moderate to heavy fuel loading in much of the forested areas, and fairly continuous stands of oak and mountain brush and pinyon-juniper in the lower elevations near the forest boundary (BLM 2004; USFS 2006a).

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

There are several areas that are highly susceptible to lightning strikes, including the mountains east of Juab Valley (Juab County 2006).

Firefighting and Access Concerns:

- Suppression concerns include: moderate to long travel times, especially if aviation resources are not available; potential need for traffic control and possible evacuation coordination; and ingress/egress issues, including numerous dead-end 2-track roads (BLM 2004; USFS 2006a).
- On the western edge of this area, the railroad and highway rights-of-way that extend along I-15 are highly influenced by people (Juab County 2006).
- There is significant cheatgrass infestation at lower elevations and along the railroad and highway rights-of-way, allowing wildfires to spread quickly.

Community values at risk include, but are not limited to, the following:

- **Recreation**. There are numerous dispersed recreation sites in the area.
- **Wildlife**. Chicken Creek is critical wildlife winter range (BLM 2004; USFS 2006a).
- **Watersheds.** There is potential for flooding, debris flow and degradation of municipal watershed water quality following wildfire.
- **Other**. There are mining concerns, livestock grazing, and communications sites in the area. Chriss Creek area has a commercial dairy that could be impacted by wildfire, or post-wildfire flooding or debris flow.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #13. WEST SANPETE COUNTY (SANPETE COUNTY)

Project Area: All federal, state, tribal and private lands on the east side of the San Pitch Mountains between Axhandle Canyon, the town of Wales, and the town of Fountain Green.

Project Boundaries are generally defined as follows: **West**: the Sanpete/Juab county line from just north of Fountain Green south to Axhandle Canyon; **South**: along Axhandle Canyon from the Sanpete/Juab county line to the junction with the N-S county road; **East**: along the unnumbered county road from the Axhandle canyon area north past the town of Wales to and including the town of Fountain Green; **North**: from the town of Fountain Green west to the Sanpete/Juab county line.

Communities at Risk in the Project Area:

Although there are no Communities at Risk in the area listed on the 2005 list, the Holiday Oaks community has been identified by the Core Team as a Community of Interest and will be included when the state list is updated. The area is located west of and would affect the towns of Wales and Fountain Green where there is a scattering of homes throughout this area. There are currently no CWPPs in place in the project area.

Project Area Description and Vegetation:

Predominant vegetation types are pinyon-juniper, sagebrush, mountain brush and mixed conifer. There is moderate to heavy fuel loading in much of the forested areas, and fairly continuous stands of oak and mountain brush and pinyon-juniper in the lower elevations near the forest boundary (BLM 2004).

The area receives high recreational use and there are numerous dispersed recreation sites and cabins in the area. Maple Canyon is an internationally renowned climbing site.

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

Firefighting and Access Concerns:

- Moderate to long travel times, especially if aviation resources are not available.
- Potential need for traffic control and possible evacuation coordination and ingress/egress issues, including numerous two-track roads (BLM 2004).
- Fast moving fires due to brushy fuels with significant cheatgrass understory.

Community values at risk include, but are not limited to, the following:

- **Recreation**. Numerous recreation sites and outdoor recreation opportunities are located in the area.
- **Watersheds.** Watershed areas above the community provide municipal water and there is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Other**. A number of communication sites are in the area, and parts of the project area are used for livestock grazing.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.

- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #14. SOUTH PIUTE COUNTY

Project Area: All federal, state, tribal and private land located on the east face of the Tushar Mountains between Junction and Circleville and including the Birch Creek, Cottonwood Creek, and City Creek drainages.

Project Boundaries are generally defined as follows: **West**: the Piute/Beaver county line from Circleville Mountain to City Creek Peak; **North**: from City Creek Peak east to Highway 89; **East**: along Highway 89 from a point due east of City Creak Peak south to Birch Creek; **South**: Birch Creek from Highway 89 to Circleville Mountain.

Communities at Risk in the Project Area:

There are no state-identified CARs in the project area and there are currently no CWPPs in place. The portion of Circleville and Junction located to the west of Highway 89 are included in the project area.

Project Area Description and Vegetation:

Area vegetation includes significant amounts of pinyon-juniper and mountain brush at lower elevations. Upper elevations consist of aspen and mixed conifer stands. The national forest lands to the east of town have heavy fuels, overstocked forest with dense understory that could provide ladder fuels to create a catastrophic crown fire (BLM 2004; USFS 2006a).

This area is popular for recreation with a substantial amount of ATV use throughout the summer months and an influx of users during the hunting seasons. Portions of the Paiute ATV trail, a popular tourist attraction, are located in the area.

Most fires in this area are lightning caused and are small but occasionally a fire will become large, such as The Pole Canyon Fire in 1996 (10,000 acres) and the Cottonwood Fire in 2002 (1800 acres). In the mid and upper elevations fires have the potential to be large long-term events that will require an immediate appropriate management decision and a long-term commitment of resources (BLM 2004; USFS 2006a).

Watershed areas above the community are of concern because of the potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.

Firefighting and Access Concerns:

There are numerous wildfire suppression concerns, including a confusing and limited road network for ingress and egress, narrow unimproved roads (limited heavy engine access), and steep slopes with unsure footing. Fire response times may be very long, especially if aviation resources are not available (BLM 2004; USFS 2006a).

Community values at risk include, but are not limited to, the following:

- **Watersheds.** Watershed areas above the community provide municipal water and there is potential for flooding, debris flow and degradation of municipal watershed water quality following wildland fire.
- **Recreation**. Numerous recreation sites and outdoor recreation opportunities are located in the area.
- **Wildlife:** The lower elevations of the Tushar Mountains contain critical winter and summer range for both deer and elk.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #15. GOOSEBERRY CORRIDOR

Project Area: All federal, state, tribal and private land located in a 2-mile-wide corridor extending along Gooseberry-Fremont Road from I-70 to and including the Mount Terrill Ranger Station.

Project Boundaries are generally defined as follows: **North**: I-70; **West**: one mile west of the Gooseberry-Fremont road; **East**: one mile east of Gooseberry-Fremont road; **South**: Mount Terrill Ranger Station.

Communities at Risk in the Project Area:

The Gooseberry Estates community is a state-identified community at risk; reducing wildfire risk in the area is a priority under the HFRA. There are currently no CWPPs in place in the project area.

Project Area Description and Vegetation:

Area vegetation consists of sagebrush/grass at lower elevations, climbing though pinyon-juniper woodlands and mountain brush, and then up to scattered aspen and mixed conifer stands at the upper elevations. There are heavy fuel accumulations in forested areas. The national forest lands have dense forest with dense understory that could provide ladder fuels to create a catastrophic crown fire (BLM 2004; USFS 2006a). The area has significant numbers of dead trees resulting from beetle bark infestation (personal communication, Chappell 2007).

The area is popular for recreation including cabins and summer homes. The Gooseberry-Fremont Road is also a travel route from I-70 to other popular recreation areas, including the Fishlake Basin area, which is a very heavily used recreation area.

Firefighting and Access Concerns:

- The Gooseberry-Fremont Road would be the major evacuation route in case of wildfire in this project area and in the Fishlake Basin area.
- Fire response times may be very long, especially if aviation resources are not available.

Community values at risk include, but are not limited to, the following:

- **Recreation.** The Gooseberry Ranger Station, Mount Terrill Ranger Station, and Gooseberry recreation sites are located in this area.
- **Cultural Resources.** The Gooseberry Ranger cabin is on the National Register of Historic Places (BLM 2004; USFS 2006a).

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.

- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

PROJECT #16. SEVIER RIVER ESTATES

Project Area: The project area includes a portion of I-15, the community of Mills and nearby residential areas located along the Sevier River.

Communities at Risk in the Project Area:

The entire project area is a state-identified community at risk; reducing wildfire risk in this area is a priority under the HFRA. There are currently no CWPPs in place in the project area.

Project Area Description and Vegetation:

The area contains sagebrush and grasses, and includes a significant cheatgrass infestation. The railroad right-of-way runs through Sevier Canyon to I-15.

Firefighting and Access Concerns:

- Residential structures in the area may be wooden, not built to code, or have aboveground propane tanks.
- There is concern that residential fires could easily ignite neighboring cheatgrass and overgrown vegetation and spread rapidly (personal communication Wilding 2007).
- The railroad and I-15 rights-of-way are highly influenced by people and susceptible to human-caused fires (Juab County 2006).
- Fires in this area are mainly wind driven and have the potential for large fire growth in a very short period of time (Juab County 2006).

Community values at risk include, but are not limited to, the following:

- Sevier River water quality; personal property located in the project area.

Project area goals include, but are not limited to, the following:

- Protection of human life, firefighter and public safety as the highest priority.
- Public education and partnerships with citizens or community-centered approaches to manage fire risks and hazards in WUI areas located in the project area, including effort aimed towards the implementation and maintenance of defensible space projects to reduce risk to homes and personal property.
- Protection of high value resources and watersheds through fuels reduction treatments as determined locally.
- Restoration and maintenance of ecosystems consistent with land uses and historic fire regimes. Restoration of vegetation to the appropriate Condition Classes and Fire Regimes.
- Maintenance and/or improvement of fire prevention and road/structure identification signage. Dissemination of fire restriction information through appropriate signage and/or visitor contacts when necessary.
- Improvement of wildland firefighting equipment, training and information for volunteer fire departments located in the project area, including the improvement of GIS and road data.

4.2 ADDITIONAL REGIONAL RECOMMENDATIONS

In addition to the 16 priority treatment areas, additional recommendations were developed as guidelines for communities developing local plans. These guidelines are intended to assist communities in obtaining funding towards fire prevention in the WUI, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. Additionally, the recommendations are designed to assist communities in meeting the eligibility requirements of the hazard mitigation criteria in the categories of education, fuels reduction, and planning. Also recommendations are included based on specific comments received from local citizens and community members.

Recommendation: Central Utah Communities May Complete More Detailed Community Wildfire Protection Plans As Needed.

Local plans may include but are not limited to:

- Location of community in relation to the WUI
- Definition of the WUI based on specific site conditions
- Land ownership within the community
- Jurisdiction and land ownership
- Population
- Schools

- Hospitals
- Fire stations
- Risk factors to that community or county
- Municipal water supply
- Past fire occurrence
- Community values at risk
- Preparedness and protection capabilities
- Detailed Fuels Reduction Plans, especially for high-risk areas
- Various education programs to reduce structural ignitability for homeowners and the community

Recommendation: **Sanpete County should cooperate with Emery County in conducting the following watershed treatments on the east side of Sanpete County.**

Little Swens Canyon	T13S R6E Harvest/Slash burn
Swens Canyon	T13S R6E Harvest/Slash burn
Boulger Canyon	T14S R6E Harvest/Slash burn
Little Eccles Canyon	T14S R6E Harvest/Slash burn
Flat Canyon	T13S R6E Harvest/Slash burn
Boulger Canyon	T14S R6E Harvest/Slash burn
Little Eccles Canyon	T14S R6E Harvest/Slash burn
Spring Creek	T14S R6E Harvest/Slash burn
North Fork Lake Canyon	T14S R6E Harvest/Slash burn
South Fork Lake Canyon	T14S R6E Harvest/Slash burn
Rolfson Creek	T14S R6E Harvest/Slash burn
Staker Creek	T15S R6E Harvest/Slash burn
Miller Flat Creek	T15S R6E Harvest/Slash burn
Paradise Creek	T16S R6E Harvest/Slash burn
Potters Pond and tributaries	T16S R6E Harvest/Slash burn
Bulger Canyon	T16S R5&6E Harvest/Slash burn
Mill Canyon	T16S R5&6E Harvest/Slash burn
Black Canyon	T16S R5&6E Harvest/Slash burn
Reeder Canyon	T17S R5&6E Harvest/Slash burn
Littles Creek	T17S R5&6E Harvest/Slash burn
Olsen Canyon	T17S R4,5&6E Harvest/Slash burn
Swasey Creek	T17S R5&6E Harvest/Slash burn
Seeley Creek and Tributaries	T17S R4,5&6E Harvest/Slash burn
Big Bear Creek and Tributaries	T18S R4&5E Harvest/Slash burn
Little Bear Creek	T18S R4&5E Harvest/Slash burn
Cove Creek and Tributaries	T18S R4&5E Harvest/Slash burn
Feron Creek and Tributaries	T19S R4&5E Harvest/Slash burn
Georges Fork	T19S R4&5E Harvest/Slash burn
Duck Creek	T19S R4&5E Harvest/Slash burn
Indian Creek	T19S R4&5E Harvest/Slash burn

Little Horse Creek	T19S R4&5E Harvest/Slash burn
Horse Creek	T20S R4&5E Harvest/Slash burn
Muddy Creek and Tributaries	T20S R4&5E Harvest/Slash burn

Recommendation: Central Utah Communities Should Promote Education and Community Outreach.

One important element of fire prevention is education for homeowners and community members on how to reduce the risk of wildfire damage to their homes and communities. Many residents attending the RWPP public meetings expressed a need for better information on reducing wildfire risk and what to do in the event of a wildfire. A Homeowners Guide is provided as Appendix D of this document. This guide was developed to meet the expressed needs of the community, and can be distributed to the public to provide information on reducing wildfire risk, what to do in the event of a wildfire, as well as specific measures that can be taken by homeowners to reduce structure ignitability.

The following list includes additional suggestions for education about fire prevention and mitigation of loss.

- Allowing for full-time dedicated personnel to promote public education. This may include materials development (pamphlets, brochures, and handouts), school presentations, newspaper inserts, and community workshops/demonstrations (fire expert).
- Implementing education programs that discuss the different fuels reduction types and the pros and cons of each. Concern arises from the visual impacts of prescribed fire and/or mechanical thinning when it looks like a "clearcut." Perhaps an understanding of how and why these methods would be used may be helpful.
- Promoting education regarding defensible space and other programs to help homeowners be more knowledgeable about how to reduce wildfire risk.
- Educating communities on historic fire regimes and how moving towards a historical fire regime can be beneficial to communities. Appropriate fuels treatments (see below) can help reduce the risk of future large catastrophic wildfires that threaten communities. Elements of historic fire regimes that can be helpful for communities include reduction in salvage logging practices, promoting the establishment of native plants through post-burn seeding practices, and implementing programs for vegetation treatment programs such as SageSTEP (SageSTEP 2007).
- Providing education on the availability and type of community and volunteer fire fighter resources available.
- Providing education regarding defensible space, particularly around culinary water sources.
- Educating landowners of the risk of wildfire to increase interest and cooperation.
- Providing education on where building is occurring.
- Providing education regarding clearing combustible vegetation.

- Providing education on land practices that would lead to historic fire regimes such as education on cheat grass proliferation and mitigation and how to deal with dead and diseased trees on forest lands.
- Providing education on the available resources to residents and local volunteer fire fighters.
- Incorporating Firewise education requirements as part of the Boy Scouts program.
- Incorporating Firewise education in local high schools through workshops.
- Implementing Firewise concepts in future community development.
- Conducting surveys to gauge the impact of Firewise and other fire education materials.
- Developing and maintaining relationships with partners relevant to meeting the National WUI Fire Program's goals, in coordination with local fire plans.
- Seeking community training through local workshops and site demonstrations.
- Providing training for local volunteer fire fighters so they can work with agencies.
- Providing more code enforcement education for fire officials.
- Providing additional information on closed fire season.

Recommendation: Central Utah Communities Should Develop Additional Fuels Reduction Activities to Reduce the Risk of Wildfire.

Another way for communities to reduce the risk of wildfire is through hazardous fuels reduction projects using a variety of treatment methods. The first priority should be given to treating areas of dangerous fuels adjacent to communities, and then working outward in the WUI.

Appendix E includes a description of the different types of fuels reduction that may be effective in reducing wildfire risk. The "best" treatment will vary for each community depending on the area's local geography, topography, vegetation types and communities at risk. A list of pros and cons as well as optimal treatment for various soil types is also included in Appendix E.

Recommendation: Central Utah Communities Should Develop Plans to Reduce Structural Ignitability to Homes and Community Values at Risk.

An important action for communities to consider is reducing the risk of structural ignitability to homes and communities. Actions that may help in achieving this goal could include the following:

- Firewise landscaping.
- Firewise construction.
- Encouraging defensible space.
- Removing flammable materials.
- Developing fuel breaks.

- Highway Mowing to reduce flammable vegetation.
- Developing a Community Weed Management Area (CWMA) for cheatgrass control and eradication.
- Increasing communications between firefighters and homeowners.

Recommendation: Central Utah Communities Should Improve Fire Response Capabilities.

Another important element in reducing risk to homeowners and communities is ensuring that wildfire response capabilities are adequate in the event of a wildfire. Community members can be educated and make efforts to reduce hazardous fuels and structural ignitability but without adequate fire-fighting capabilities there still exists a great risk to communities. The following is a list of suggestions that could help communities enhance their wildfire response capabilities.

- Improving roads to provide adequate access.
- Improving GIS and road data.
- Obtaining accurate e-911 data.
- Obtaining adequate equipment including possible purchase from federal agencies.
- Seeking training reimbursements for volunteer firefighters.
- Enhancing communications between local and federal governments regarding wildfire response.
- Improving egress routes to recreation areas.
- Improving communications between local and agency fire officials.
- Developing air support and a satellite operations center based out of Fillmore.
- Increasing the turnover rate of federal and state equipment to allow local fire departments to have newer equipment.

Recommendation: Central Utah Fire Officials Should Consider Local Information When Developing Local Plans.

Recommendation: Central Utah Should Reconsider the Definition of WUI to include Watersheds that are Municipal Infrastructure (Providing Culinary or Irrigation Water).

Recommendation: Existing CWPPs in the Central Utah Region should be Updated to include Watersheds that are Municipal Infrastructure (Providing Culinary or Irrigation Water) into their Definition and Boundary of their Designated WUI.

Recommendation: Agencies Should Seek Ways to Promote Dead Timber Harvest.

Recommendation: Central Utah Should Consider Working with the Utah State Insurance Commission to Motivate Homeowners to Pursue Firewise Principles.

Recommendation: Agencies Should Provide Protection for Homes, Scenery, Wildlife Habitat, Watersheds, and Community Water Supplies (Irrigation and Culinary) to Protect Historic Values and Scenic Resources for the Tourist Industry.

4.3 LOCAL RECOMMENDATIONS

Recommendation: Agencies should provide protection for mountain homes and cabins.

Recommendation: Agencies should consider fuels reduction treatments in the national forest lands East of Nephi.

Recommendation: Priority should be given to the following resources located in Juab County:

- The Watershed for Nephi City
- Viewscapes east of Nephi

Recommendation: Agencies should consider the following fuels reduction treatment recommendations in Millard County:

- Prescribed burn needed outside Scipio
- Oak City area
- South end of Millard County
- BLM/USFS lands east of Meadow
- Fillmore foothills and other heavy growth areas
- South end of Kanosh
- Area between Cove Fort and Richfield
- Promote and simplify the harvest of wood products
- Fire break on the north and east of town (Meadow, UT).
- Reduce all light flashy fuels
- Construct fire breaks on the south end of Millard County

Recommendation: Priority should be given to the following resources located in Millard County:

- Kanosh town
- Watersheds for towns and homes in the Oak City area
- Cove Fort historic site
- Campgrounds and picnic areas
- Public and private property
- Including encouragement for property owners to comply with fire-safe standards and reduce the risk of structural ignitability and wildfire

Recommendation: Agencies should encourage tribal participation to reduce fire spreading from untreated tribal lands.

Recommendation: Agencies should consider the following fuels treatments in Sanpete County:

- In the 33 areas identified (township/range; see Sanpete County comments in Appendix B)
- Harvest beetle kill trees

Recommendation: Agencies should consider the following fuels reduction treatments in Wayne County:

- On private and Federal lands
- By removing beetle kill through burning, logging, or thinning

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 5. Implementation & Monitoring Strategies

5.1 Steps to Implement Plan

Implementation and monitoring of this RWPP will be the responsibility of the Local Interagency Fuels Committee (Committee). Updates to the plan will occur annually or on and "as needed" basis determined by the Committee. Additionally, a specific project implementation plan will be developed for each of the 16 treatment areas described in Chapter 4.

Project specific plans will be developed for each of the 16 priority areas with specific timeframes, goals, and measurable criteria. .

5.2 Funding

Appendix F includes a list of grant opportunities and the associated websites with information on funding opportunities that may be available to communities for fire prevention, education, hazardous fuels reduction, and wildfire response.

THIS PAGE INTENTIONALLY LEFT BLANK

Chapter 6. Summary of Plan

The Central Utah Regional Wildfire Protection Plan (RWPP) has been developed to meet the requirements of a CWPP as specified in HFRA The Central Utah RWPP is one of five regional plans and the primary goal of the plan is to assist Utah regions, counties, and communities, and government agencies in reducing the risk of catastrophic wildfire within the region.

The Central Utah RWPP used a collaborative process involving federal agency and local government representatives to identify high-risk areas across the Central Utah region, and to set broad priorities for recommendation and actions to reduce the risk to human life property due to catastrophic wildland fire in the Wildland Urban Interface (WUI) of the state-identified "communities at risk" (CARs).

Federal agency and local government representatives formed a core planning team to set the direction for the plan and process. Organizations and stakeholders were contacted through press releases and radio and newspaper advertisements and encouraged to participate in plan development by submitting comments by mail or at one of the six public meetings held in the region. Public comments received are included as Appendix B.

The Core Team established a baseline map of the WUI areas located in the Central Utah region, using the WUI definition contained in the Healthy Forest Restoration Act (HRFA), and developed a community risk assessment that considered fuel hazards; risk of wildfire occurrence; and distance from CARs (as defined by the State of Utah).

Using the base map, risk assessment, and the public comments received during public meetings, the core team identified and made the following types recommendations for16 priority areas:

- reduce hazardous forest fuels,
- restore forest/watershed health,
- promote community involvement,
- increase communities' ability to prepare for and respond to wildland fires,
- reduce structural ignitability, and
- increase wildfire awareness and education.

As such, the Central Utah RWPP meets and exceeds the minimum requirements for CWPPs under HFRA.

A collaborative process has been in place for the duration of this plan and will continue as projects are implemented. RWPP implementation and monitoring will be the responsibility of the Local Interagency Fuels Committee. The plan will be updated a

minimum of annually. Individual project implementation plan will be developed for each of the 16 treatment areas described in Chapter 4, and will include specific timeframes, goals, and measurable criteria.

Acronyms and Glossary

LIST OF ACRONYMS

AOG	Association of Government
ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
CARs	Communities at Risk
CVAR	Community Values at Risk
CWMA	Community Weed Management Area
CWPP	Community Wildfire Protection Plan
DEM	Digital Elevation Model
EA	Environmental Assessment
EPA	Environmental Protection Agency
FD	Fire Department
FEIS	Final Environmental Impact Statement
FMO	Fire Management Officer
FMP	Fire Management Plan
FRCC	Fire Regime Condition Class
GBEEC	Great Basin Environmental Education Center
GIS	Geographic Information System
HFI	Healthy Forest Initiative
HFRA	Healthy Forest Restoration Act
MFI	Mean Fire Return Interval
MOB	Mobilization Guide
NF	National Forest
NFP	National Fire Plan
NRCS	National Resource Conservation Service
RC&D	Resource Conservation and Development
ReGAP	Regional Gap Analysis Program
RWPP	Regional Wildfire Protection Plan
SAF	Society of American Foresters
SWCA	SWCA Environmental Consultants, Inc.
UDFFSL	Utah Division of Forestry, Fires and State Lands

UDNR	Utah Department of Natural Resources
UDWR	Utah Division of Wildlife Resources
UHE	Utah History Encyclopedia
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
USU	Utah State University
VFD	Volunteer Fire Department
WWF	World Wildlife Fund
WUI	Wildland-Urban Interface

GLOSSARY

Aerial Fuels: Standing and supported live and dead combustibles not in direct contact with the ground and consisting mainly of foliage, twigs, branches, stems, cones, bark, and vines.

Agency: An agency is a division of government with a specific function, or a non-governmental organization (e.g., private contractor, business, etc.) that offers a particular kind of assistance. In ICS, agencies are defined as jurisdictional (having statutory responsibility for incident mitigation), or assisting and/or cooperating (providing resources and/or assistance).

Aspect: Direction toward which a slope faces.

Bark Beetle: An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs.

Canopy: The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees.

Conifer: A tree that produces cones, such as a pine, spruce, or fir tree.

Crown: The part of a tree or other woody plant bearing live branches and foliage.

Crown Fire: A fire that advances through the crown fuel layer, normally in direct conjunction with a surface fire.

Decadent: A stand of trees is considered decadent when there are a large number of over-mature trees, dead and downed trees, and a dense understory of young trees and shrubs.

Density: The number of trees growing in a given area, usually expressed in terms of trees per acre.

Diameter at Breast Height (DBH): Tree diameter, measured 4.5 feet above ground.

Direct Attack: A fire-fighting technique in which a line is constructed adjacent to the fire perimeter. Usually the preferred method, because of immediate access to escape routes and safety zones. Used when fire behavior, weather and fuel permit. Directly related to individual experience, escape routes and safety zones.

Ecosystem: A functional unit consisting of all the living organisms in a given area, and all of the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size, but it always functions as a whole unit.

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

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

Fire Behavior: How fire reacts to the influences of fuel, weather, and topography.

Fire Management Plan (FMP): A plan which identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire, prescribed fire, and wildland fire use). The plan is supplemented by operational plans, including but limited to preparedness plans, preplanned dispatch plans, and prevention plans. Fire Management Plan's assure that wildland fire management goals and components are coordinated.

Fire Prevention: Activities such as public education, community outreach, law enforcement, and reduction of fuel hazards that are intended to reduce wildland fire and the risks it poses to life and property.

Fire Regime: Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval.

Fire Regime Condition Class (FRCC): Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).

Fire Risk: The probability or chance of a fire starting, determined by the presence and activities of causative agents.

Fire Suppression (Fire Control): All of the work and activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Fire: Rapid oxidation, usually with the evolution of heat and light; heat fuel, oxygen and interaction of the three.

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

Forest Health: The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity while providing for human needs and values.

Fuel: Combustible material that includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees. Includes living plants, dead, woody vegetative materials, and other vegetative materials that are capable of burning.

Fuel Break: A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: natural barriers, constructed fuel breaks, man-made barriers.

Fuel Condition: Relative flammability of fuel as determined by fuel type and environmental conditions.

Fuel Loadings: The oven dry weight of fuels in a given area, usually expressed in tons per acre. Fuel loadings may be referenced to fuel size or time lag categories; and may include surface fuels or total fuels. The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Management: Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.

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

Fuel Reduction: Manipulation, including combustion or removal of fuels, to reduce the likelihood of ignition and/or lessen potential damage and resistance to control.

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

Geographic Information System (GIS): Computer software that provides database and spatial analytic capabilities.

Hazard: In fire-fighting, a fuel complex, defined by kind, arrangement, volume, condition, and location, forming a special threat of ignition and resistance to control.

Hazard Reduction: Any treatment of living and dead fuels that reduces the potential spread or consequences of fire.

House Bill 146 (HB 146): In 2002, Utah wildland fire suppression costs well exceeded the funds available in the State's Wildland Fire Suppression Fund and a supplemental appropriation of $12.4 million had to be requested from the legislature. As a result, a joint task force consisting of State legislators and county commissioners was formed to review the State's program and subsequently recommended changes to existing statute. The bill took effect March 7, 2006 and resulted in Utah Code Section 65A-8-6. To be eligible to enter into a cooperative agreement with the division a county must: a) adopt a wildland fire ordinance based on minimum standards established by the division; b) require county fire departments (or private provider under contract with the county) to meet minimum standards for wildland training, certification, and wildland fire suppression equipment based on nationally accepted standards as specified by the division; and c) file a budget for fire suppression costs with the State. The State cannot enter into an agreement until the County meets these requirements.

Implementation Plan: The design and definition of all the activities, resources, limitations, and contingencies required for successful wildland fire management.

Initial Attack: An aggressive suppression action consistent with fire-fighter and public safety and values to be protected.

Ladder Fuels: Fuels that provide vertical continuity between strata, so that fire is able to move upward from the surface fuels into the crowns of trees or shrubs with relative ease.

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

Mitigation: Those activities implemented prior to, during, or after an incident which are designed to reduce or eliminate risks to persons or property that lessen the actual or potential effects or consequences of an incident. Mitigation measures can include efforts to educate governments, businesses, and the general public on measures they can take to reduce loss and injury and are often informed by lessons learned from prior incidents.

Mobilization Guide (MOB): A written description of procedures used by federal, state, and local organizations for activating, assembling, and transporting resources that have been requested to respond to or support an incident.

Monitoring: The orderly collection, analysis, and interpretation of environmental data to evaluate management's progress toward meeting objectives, and to identify changes in natural systems. Monitoring is also conducted on wildland fires to observe fire effects,

fire behavior, or both. For example, the work done by Fire Effects Monitor (FEMO) or Field Observer (FOBS) positions.

Montane: refers to highland areas located below the timberline. Montane regions generally have cooler temperatures and often have higher rainfall than the adjacent lowland regions, and are frequently home to distinct communities of plants and animals. Areas above the timberline are known as Alpine regions.

National Forest Lands: Public lands, generally forest, range, or other wildland, administered by the Forest Service, USDA.

National Forest System: Consists of all national forest lands, the national grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act, and other interests as defined in Section 9 of the National Forest Management Act of 1976.

National Interagency Fire Center (NIFC): A facility located at Boise, Idaho, jointly operated by several federal agencies, dedicated to coordination, logistical support, and improved weather services in support of fire management operations throughout the United States.

National Park: A federal reservation administered by the National Park Service of the U.S. Department of the Interior in order to conserve unique scenery, flora and fauna, and any natural and historic objects within its boundaries for public enjoyment in perpetuity.

Native Species: Species that are indigenous to a region, not introduced or exotic.

Preparedness Plan: A written plan providing for timely recognition of approaching critical fire situations, priority setting, the deployment of forces, and other actions to respond to those situations.

Prescribed Burning: Application of prescribed fire.

Prescribed Fire: The intentional application of fire to wildland fuels in either their natural or modified state under conditions that will allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, etc.). Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Project: An organized effort to achieve an objective, identified by location, activities, outputs, effects, time period, and responsibilities for execution.

Riparian: A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affect the ecosystem. Includes floodplains, woodlands, and all areas within a specified distance from the normal line of high water of a stream channel, or from the shoreline of a standing body of water.

Risk: The chance of a fire starting, as determined by the presence and activity of causative agents.

Safety Zone (SZ): Areas that are fuel-free zones, thus incapable of burning. They afford a very high degree of fire-fighter safety from advancing wildfire. They can be natural or human-made fire-resistant areas such as lakes, dirt, gravel or asphalt parking lots, roads, and areas burned to secure line.

Significant Fire Potential: The likelihood a wildland fire event will require mobilization of additional resources from outside the area in which the fire situation originates.

Slope: The ratio between the amount of vertical rise of a slope and horizontal distance.

Suppression: The act of extinguishing or confining a fire.

Surface Fire: Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

Watershed: The drainage basin to a stream, lake, or river, contributing water, organic matter, dissolved nutrients, and sediments.

The following key terms were used as part of the risk assessment. Section 3.1 includes a description of the methodology used for the risk assessment. SOURCE: NIFC Glossary of Wildland Fire Terms.

Understory: The portion of vegetation that is underneath the dominant tree canopy.

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

Volunteer Fire-fighter: Legally enrolled fire-fighter under the fire department organization laws who devotes time and energy to community fire service without compensation other than Worker's Compensation or other similar death and injury benefits.

Wildfire: An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Wildfire Suppression: An appropriate management response to wildfire, escaped wildland fire use or prescribed fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

Wildland Fire Use: The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives in pre-defined designated areas outlined in Fire Management Plans.

Wildland Fire: A non-structure fire, other than prescribed fire, that occurs in the wildland. Any fire originating from unplanned ignition.

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

Wildland: An area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

THIS PAGE INTENTIONALLY LEFT BLANK

References

Aspen Hills. 2003. Aspen Hills Subdivision Community Fire Plan A Wildland/Urban Interface Designed to Protecting Life, Property, and Community Values Through Community-Based Planning Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City. October 2003.

Bullion Canyon and Marysvale (Bullion Canyon). 2005. Community Wildfire Protection Plan for Bullion Canyon and Marysvale, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Bureau of Land Management (BLM) 2004. Fire Management Plan, Fillmore and Richfield Field Offices.

BLM. 2005a. FONSI/DR and Environmental Assessment for the Utah Land Use Plan Amendment of Fire and Fuels Management UT-USO-04-01. .September.

BLM 2005b. Richfield Fire Management Plan Environmental Assessment. UT-050-04-045. November.

Chronquist, Arthur, Holmgren, Arthur H., Holmgren, Noel H. and James L. Reveal. 1982. Intermountain Flora. Vascular Plants of the Intermountain West, USA. Volume One. Published by the New York Botanical Garden. Hafner Publishing Company, New York.

Climate Assessment for the southwest (Climas). 2002. Fire History Analysis Using Tree Rings. Can be accessed at http://www.ispe.arizona.edu/climas/learn/fire/history.html. Updated June19.

David Evans and Associates, Inc (DEA). 2002. Wasatch Front Fuels Assessment Report. Prepared for USFS, Wasatch-Cache and Uinta National Forests.

Eureka, Mammoth and Silver City (Eureka). 2003. Community Fire Plan for Eureka, Mammoth and Silver City, Juab County, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Elk Ridge/Oaker Hills undated. National Fire Plan Community Project Fire Plan. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Fairview Lakes. 2001. 2001 Western Wildland Urban Interface Grant Program: Project Plan for the Fairview Lakes Community. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Ferry, Gardner W. Ferry Clark, Robert G., Mutch, Robert W., Leenhouts, Willard P. and G. Thomas Zimmerman(Ferry et al.). 1995. Altered Fire Regimes Within Fire-adapted Ecosystems. Available at: http://biology.usgs.gov/s+t/noframe/m1197.htm. Accessed on January 29, 2007.

Grahame, John D. and Thomas D. Sisk, ed. 2002. Canyons, cultures and environmental change: An introduction to the land use history of the Colorado Plateau. [12/15/2006)] <http://www.cpluhna.nau.edu/>.

Juab County. 1998. Urban Interface Fire Ordinance: Designation of high risk areas Fuelbreaks.

Juab County. 2004. Brief History of Juab County. Available at http://www.co.juab.ut.us/). Accessed on 11/30/2006.

Juab County. 2006. Juab County 2006 Mobilization Guide. Prepared by Juab County, County Seat, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Millard County, 1998. Millard County website. Millard county attractions. Available at: http://www.millardcounty.com/tourism.html.

Millard County. 2006. Millard County 2006 Mobilization Guide. Prepared by Millard County, County Seat, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Monroe Mountain. 2005. Monroe Mountain Community Fire Plan for the Wildland-Urban Interface. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City. May 25, 2006.

National Fire Plan (NFP). 2001. Overview of the National Fire Plan. Available at: http://www.fireplan.gov/overview/whatis.html. Last accessed on April 4, 2007.

Nationmaster.com. 2003. Encyclopedia entry for "Piute." Available at: http://www.nationmaster.com/encyclopedia/Piute. Last accessed on January 29, 2007.

North Sanpete County. 2003. North Sanpete County Regional Fire Plan for the Wildland/Urban Interface: Protecting Life, Property, and Community Values through Community-Based Planning. Prepared by North Sanpete Fire Council. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City. September 16.

Online Utah. 2007. Utah County Histories. Available at: http://www.onlineutah.com/counties.shtml

Piute County. 2006. Piute County government website. Available at www.piute.org. Last accessed November 2006.

Rocky Ridge. 2004. Rocky Ridge Town Community Fire Plan for the Wildland/Urban Interface: Protecting Life, Property, and Community Values through Community-Based Planning. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Sagebrush Steppe Treatment Evaluation Project. (SageSTEP) 2007. Available at www.sagestep.org. Accessed on April 4, 2007.

Sanpete County. 2006. Sanpete County 2006 Mobilization Guide. Prepared by Sanpete County, County Seat, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Sevier County. 2006. Sevier County 2006 Mobilization Guide. Prepared by Sevier County, County Seat, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Sevier County Tourism & Events Office, in conjunction with the Sevier County Travel Council and the Sevier Board of County Commissioners (Sevier County Tourism) 2007. Sevier County Online Visitor's Guide. Available at: http://www.visitsevier.com/area/. Accessed on 1/5/207.

Six County Association of Government (6 County AOG). 2004. Six County Association of Governments (comprising Juab, Millard, Piute, Sanpete, Sevier, and Wayne Counties) Pre-Disaster Mitigation Plan, prepared by the Six County Planning and Community Development.

Society of American Foresters, National Association of Counties, National Association of State Foresters, Western Governors' Association, and the Communities Committee (SAF et al.). 2004. Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities." http://www.safnet.org/policyandpress/cwpphandbook.pdf.

Soulard, Christopher E. 2006. Land-Cover Trends of the Central Basin and Range Ecoregion. U.S. Geological Survey Scientific Investigations Report 2006-5288.

10-Year Comprehensive Strategy Implementation Plan. 2002. A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment.

The Colorado Plateau Ecoregional Planning Team. (CPEPT), 2002. A Conservation Assessment of the Colorado Plateau Ecoregion. The Nature Conservancy, Moab Project Office, Moab, Utah.

U. S. Environmental Protection Agency (EPA). 2006. Surf your Watershed. Available at http://www.epa.gov/surf/). Accessed on 12/18/2006.

U. S. Forest Service (USFS). 1994a. Ecological Subregions of the United States. Chapter 47. Intermountain Semi-Desert and Desert. Available at: http://www.fs.fed.us/land/pubs/ecoregions/ch47.html. Accessed on January 29, 2007.

USFS. 1994b. Ecological Subregions of the United States. Chapter 43. Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow. Available at: http://www.fs.fed.us/land/pubs/ecoregions/ch43.html. Accessed on January 29, 2007.

USFS. 1995. Colorado Plateau Semidesert Province. Available at http://www.fs.fed.us/colorimagemap/images/313.html. Accessed on January 29, 2007.

USFS 2005. Project and Policies: *Healthy Forest Initiative*. Information available at http://www.fs.fed.us/projects/hfi/.

USFS. 2006a. Fishlake National Forest Fire Management Plan. 2006.

USFS. 2006b. Manti-La Sal National Forest Fire Management Plan. 2006.

U.S. Forest Service and Bureau of Land Management (USFS and BLM) 2004.The Healthy Forests Initiative and Healthy Forests Restoration Act Interim Field Guide. February 2004.

U. S. Geological Survey (USGS). 2004. Southwest Regional GAP Analysis Project, Land Cover Descriptions. Available at: http://earth.gis.usu.edu/swgap .

Utah Department of Natural Resources, Division of Forestry, Fire and State Lands. (UDNR et al.) 2003. Forest Health in Utah. June.

Utahreach. 2007. A History of Piute County. Available at: http://utahreach.org/piute/visitor/HISTORY.HTM. Accessed on January 29, 2007.

Utah State University Extension (USU). 2005. Agricultural County Profiles. Available at: http://extension.usu.edu/htm/publications/by=category/category=94 /.

Utah History Encyclopedia (UHE). 1994. Edited by Allan Kent Powell. Originally published by the University of Utah Press in 1994. Available at: http://www.media.utah.edu/UHE/.

Wayne County 2006. Wayne County Government website. Available at http://www.waynecnty.com/. Accessed on 1/29/2007.

Woods, A.J., Lammers, D.A., Bryce, S.A., Omernik, J.M., Denton, R.L., Domeier, M., and Comstock, J.A. (Woods et al). 2001. Ecoregions of Utah (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,175,000).

The White House. 2007. Healthy Forests: An initiative for wildfire prevention and stronger communities.

World Wildlife Fund (WWF). 2001. Terrestrial ecoregions of North America: A Conservation Assessment. Wasatch and Uinta montane forests. Island Press. Available at: http://www.worldwildlife.org/wildworld/profiles/terrestrial/na/na0530_full.html

THIS PAGE INTENTIONALLY LEFT BLANK