Southeastern Utah
Regional Wildfire Protection Plan

May 11, 2007

PUBLIC DRAFT
SOUTHEASTERN UTAH
REGIONAL WILDFIRE PROTECTION PLAN

Prepared by

PORTAGE
1075 South Utah Avenue, Suite 200
Idaho Falls, Idaho 83402
(208) 227-1370

SWCA ® ENVIRONMENTAL CONSULTANTS
257 East 200 South, Suite 200
Salt Lake City, Utah 84111
Telephone (801) 322-4307; Facsimile (801) 3224308

5647 Jefferson Street, NE
Albuquerque, New Mexico 87109
Telephone (505) 254-1115; Facsimile (505) 254-1116
www.swca.com

WILDLAND FIRE ASSOCIATES
118 W. Main St.
Rangely, Colorado 81648
(970) 675-2225

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EXECUTIVE SUMMARY

Wildland fire is a natural part of the environment in the western United States. It has assisted in developing the landscape of forests, woodlands, and grasslands that is valued by residents and visitors alike. These vegetative communities have been significantly altered by drought, infestation, fire-suppression protocols, and encroachment, resulting in increased fuels and greater risk to humans and infrastructure. In addition, contemporary population growth has led to increased development close to the wildland urban interface and 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 has completed the arduous but rewarding process of developing the Southeastern Utah Regional Wildfire Protection Plan.

The purpose of the plan is to assist in protecting human life and reducing property loss due to wildfire in the communities and counties of southeastern Utah and the surrounding areas. Although reducing the risk of wildfire is the principal motivation behind the development of this plan, managing the lands for hazardous fuels, managing wildfires when they occur, and protecting communities are also important components of the plan. Residents and visitors are interested in preserving the diversity and uniqueness of the forests and wildlands within southeastern Utah to promote sustainability and maintain a valued way of life.

The regional plan serves as an umbrella plan for all counties and communities within the project area and addresses issues on a landscape level. The planning process emphasized public participation among all collaborating entities, as well as tribal nations. This document makes recommendations for fuel reduction treatments and educational outreach activities for 27 communities in the project area. This suggested list is not all-inclusive, and other communities could benefit from similar types of recommendations. The recommendations are based on a wildfire risk assessment and are general in nature to provide high levels of flexibility in the implementation phase. The risk assessment considered three factors: fuel hazards, wildland urban interface areas, and fire history. This is a living document and should be revised as environmental conditions change or social issues arise.

The wildfire threat to the residents and communities of southeastern 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 Southeastern Utah Regional Wildfire Protection Plan and will be important in maintaining the goals and priorities of the plan in the future.

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CHAPTER 1
INTRODUCTION

1.0 NEED FOR THE REGIONAL WILDFIRE PROTECTION PLAN

Fire has been suppressed in southeastern Utah since the earliest settlers arrived. As this region has become a popular recreational and residential destination, fire suppression has increased. The benefits of wildfire for ecosystems have largely been ignored during the past century, as fire was treated solely as a destructive force. As a result of this approach, many of today's forests have unprecedented levels of flammable materials, including but not limited to underbrush, needles, and leaves (Joint Science Fire Program 2002). Consequently, fires today are different from past fires because they often burn hotter, are more destructive, and are more dangerous to control.

Historically, before the introduction of fire suppression, fires were generally at ground level and confined to the understory, burning grass, small shrubs, and saplings. Frequent, low-intensity fires resulted in open stands with limited understory. A dramatically reduced fire interval has resulted in increased understory. Stands are much denser today than they were a century ago, often with several times as many trees per acre than occurred under historical conditions. These tightly packed trees are smaller, weaker, more disease prone, and more susceptible to insect and disease attack than their predecessors (Joint Science Fire Program 2002). These increased fuel loads (awaiting ignition) pose a significant threat, particularly in times of drought (Joint Science Fire Program 2002). An estimated 180 million acres of federal land are currently at risk of unusually severe wildfires (National Fire Plan 2002).

In addition, as a result of the high level of growth in the wildland urban interface (WUI), more citizens and property are at risk from wildland fire now than in the past. These two factors in particular indicate the need for a regional wildfire protection plan (RWPP). An RWPP provides a clearly identified list of areas at risk on a regional scale, along with priority fuel reduction treatments and guidelines for homeowners and community members to follow in protecting structures. Actions taken by communities and homeowners to prepare for wildland fires often make the difference between structures and lives being saved or lost, as fire responders have limited resources and often are not equipped to protect every structure and every person.

Within the project area, hundreds of acres have burned across all types of environments and landownership. Table 1.1 shows the number of acres burned, the total number of fires, and the number of fires started by lightning and by humans throughout the project area. Major ignition sources for human-caused wildfire events are arson, recreational activities, burning of debris, and carelessness with fireworks (Utah Department of Public Safety, Emergency Services and Homeland Security 2006). The high percentage of human-caused fires indicates that education and fire planning could substantially reduce the number of wildfire starts.

Table 1.1. Fire Activity in Southeastern Utah

County	Acres Burned	Number of Fires	Fires Caused by Lightning	Fires Caused by Humans	Years of Data
Carbon	444.70	193	152	41	2000–2006
Emery	6,536.50	117	93	24	2000–2006
Grand	97,356.45	301	216	84	2000–2006
San Juan	4,133.27	492	437	55	2003–2005
Total	**108,470.92**	**1103**	**898**	**204**	

From Utah Division of Forestry, Fire and State Lands (FFSL) 2006.

1.1 OVERVIEW OF REGIONAL AND COMMUNITY WILDFIRE PROTECTION PLANS

The summer of 2000 demonstrated how the effects of severe wildland fires impact communities and community members on both large and small scales. In response to that landmark season, the National Fire Plan (NFP) was established in 2002 to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient fire-fighting capacity for the future. The NFP was followed in 2002 by the Western Governors' 10-Year Comprehensive Strategy Implementation Plan, which focuses on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, reducing risks to communities, providing economic benefits, and improving fire prevention and suppression strategies (Western Governors' Association 2006).

In recognition of widespread declining forest health, in 2003 the U.S. Congress passed and President George W. Bush signed into law the Healthy Forest Restoration Act (HFRA) (White House 2007). The HFRA expedites the development and implementation of hazardous-fuels-reduction projects on federal land. A key component of the HFRA is the development of community wildfire protection plans (CWPPs). A CWPP is a planning document that promotes collaboration between federal agencies and communities to develop hazardous-fuels-reduction projects and place priority on treatment areas identified by a core team (see below) and community members. In addition, communities with an established CWPP are given priority for funding of hazardous-fuels-reduction projects carried out under the auspices of the HFRA. Although the HFRA and its specific guidelines are new, the principles behind the CWPP program are not. The National and State Fire Plans, the 10-Year Comprehensive Strategy, and the Federal Emergency Management Agency Disaster Mitigation Act of 2000 all mandate community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multi-agency cooperation.

While CWPPs are usually site specific, an RWPP is much broader in scope and addresses issues on a landscape level, following the same requirements as a CWPP. The scale and scope of an RWPP do not permit inclusion of detailed information about the specific needs and recommendations for each community or county in the project area. An RWPP provides background information that communities and counties can then use to develop local CWPPs to meet their particular needs.

Utah is one of the first states to address the risk of and response to wildland fire on a regional scale. Throughout the State of Utah, five RWPPs covering every county in the state are being

produced by federal, state, and local governmental agencies in collaboration with community members. In southeastern Utah, a core team of various specialists with experience related to fire management, education, and protection is working to create an RWPP for this region that will identify areas most at risk for wildland fire, create a partial list of prioritized fuel reduction projects, and address wildfire response issues and community preparedness at the regional level. Each RWPP will provide background information about the project area, community base maps, a fuels risk assessment, recommendations for fuels reduction treatment areas, and monitoring and assessment strategies, and will promote education and awareness about wildland fires.

Developing a community base map is one of the first steps in preparing a wildfire protection plan. These maps provide baseline information, such as the project boundary, areas at potential risk for wildland fire, land ownership, and topography.

An assessment of community values at risk (CVAR) is used to define the areas or resources of particular importance to a community. CVARs provide a measure of people, property, natural resources, and other resources that could suffer catastrophic losses in a wildfire event. Examples of CVARs might include (but are not limited to) housing, business and infrastructure (including utilities, trails, and roads), natural resources (including wildlife and biological resources), cultural resources, tribal concerns, recreation areas and open space, scenic resources (including significant landscapes), and water resources.

Gathering information from community members about CVARs is a component of the fuels risk assessment that is a primary component of a CWPP or RWPP (Society of American Foresters [SAF] 2004). The fuels risk assessment uses GIS modeling to identify areas that are at the greatest risk in the event of a wildland fire, as discussed in detail in Chapter Three. The CVAR information is included in the written document but is not included in the modeling process. Integrating qualitative information into a modeling process based on quantitative data is difficult, as the weighting system used to determine level of risk for a given area can be skewed by these social values.

The recommendations in the wildfire protection plan are for fuels treatment areas and public education and awareness. These recommendations are not required to be implemented. However, if funding becomes available, the recommendations may be used as guidelines for the implementation process. Monitoring and assessment strategies are addressed in Chapter Five.

The RWPP will meet all of the requirements for completion of a CWPP as outlined in the HFRA, including collaboration, prioritized fuel reduction projects, and treatment of structural ignitability. On the regional scale, the RWPP will serve as an umbrella plan, providing an assessment of the areas most at risk in southeastern Utah. The RWPP will also provide all communities in the project area with a background assessment that will allow them to seek funding to write a local CWPP. Local communities, particularly those at greatest risk, will then be able to tier from the regional plan to create their CWPPs. The CWPPs of communities that have already completed a local plan will be included as an appendix to the regional plan to serve as models for other communities.

The increasing frequency, severity, and cost of wildfires have created an urgent need to reduce the vulnerability of communities and private landowners to wildfire. While federal, state, and

local agencies are exhausting all efforts to reduce communities' vulnerability to wildfire, the magnitude of the problem exceeds the ability of government agencies' efforts and resources, further demonstrating the need for communities to actively become involved in preparing for wildland fire.

The process of developing a wildfire protection plan can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the WUI. The process can also lead community members through valuable discussions regarding natural resource and land management options and implications for surrounding watersheds. The language in the HFRA provides maximum flexibility for communities to determine the substance and detail of their plans and the procedures they use to develop them (SAF 2004).

Both for communities that have completed a CWPP and for those that are just beginning to write a plan, grants are available to assist in plan development and implementation. The State of Utah has at its disposal obligated federal funding for the development of CWPPs, and funds are available through the National Fire Plan and the state to implement mitigation projects on both public and private lands. The mitigation funding may also be used for training and preparedness for wildland fires. For a community to take advantage of the funding opportunities to implement mitigation, a wildfire protection plan must already be established.

Regional and community wildfire protection plans allow communities to become active partners in protecting themselves from wildfires, and community collaboration and coordination are essential to achieving wildfire protection goals. The HFRA provides communities with a tremendous opportunity to influence where and how agencies implement fuel reduction projects and how funds may be distributed for projects on nonfederal lands.

1.2 DEFINITION OF WILDLAND URBAN INTERFACE

The core team for the Southeastern Utah RWPP used the section 101(16)2004 HFRA definition of wildland urban interface: "an area extending 1.5 miles from the boundary of an at risk community." The WUI is more commonly defined as an area where humans and their development meet or intermix with wildland fuels (Bureau of Land Management [BLM] 2005a). At least 50 percent of all funds appropriated for projects under the HFRA must be used within a WUI buffer. The HFRA's definition of WUI was used for this project so that the RWPP would be applicable in as many areas as possible. Communities that write local CWPPs are encouraged to develop a more detailed, site-specific definition of WUI for their locales.

Various issues facing many communities spread beyond the boundary of the WUI, as defined by this project. In particular, watersheds need to be considered when planning for WUI issues, and municipal water supply systems need special consideration. Using a watershed approach, which is hydrologically defined and involves all stakeholders, for land use planning provides a holistic framework for addressing natural resource challenges. Watersheds supply drinking water, provide recreation opportunities, support wildlife and plant habitat, and sustain life (EPA 2006).

1.3 WILDLAND URBAN INTERFACE AREAS

The WUI areas are displayed as polygons in various maps throughout this plan. In many cases, the defined WUI area encompasses multiple communities that are located near each other. The delineated WUI areas in the project area have a buffer of 1.5 miles demarcated around them, which is referred to as WUI. The BLM used HRFA guidelines to create WUI areas. The boundaries of each area are site specific and were defined using several factors.

The process for creating the spatial boundaries is described in the following text. First, the municipal layer was obtained from the State of Utah's Automated Geographic Reference Center (AGRC) website (http://agrc.its.state.ut.us/). The county layers were selected and merged together to create datasets for the Moab Interagency Fire Center, as well as for the polygons for the incorporated portions of the communities. The communities deemed "not at risk" were removed from these polygons. For unincorporated communities, the local knowledge of the state agency responsible for hazard assessments and fire suppression was used for WUI delineation (H. O'Hanlon, Fire Mitigation/Education Specialist, personal communication 2006). Please see Figure 1.1 to view an example WUI area and WUI.

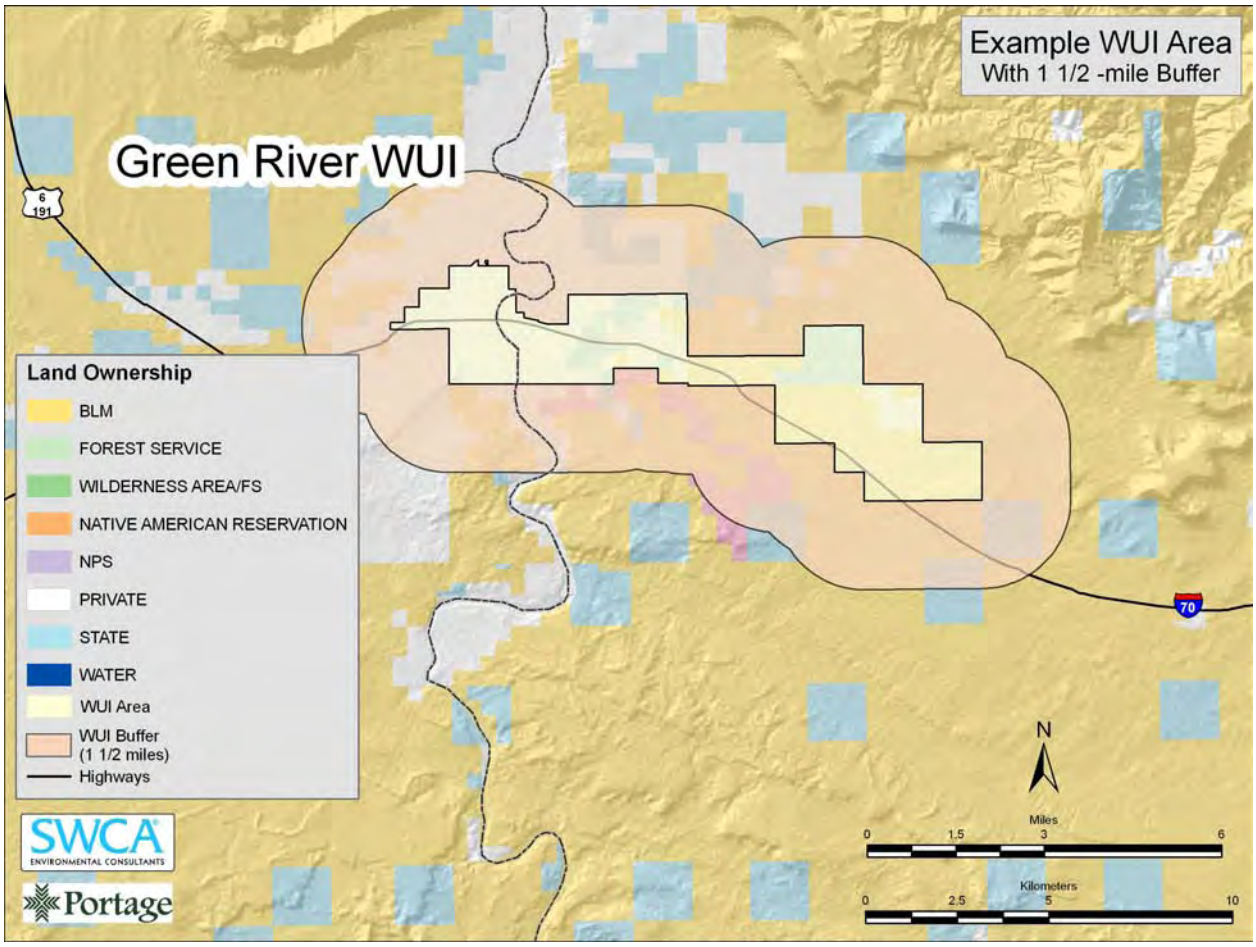

Figure 1.1. Example WUI area and buffer.

1.4 GOALS OF THE REGIONAL WILDFIRE PROTECTION PLAN

The goal of the Southeastern Utah RWPP is to enable community members and government agencies to collaboratively work together and coordinate efforts in identifying high fire-risk areas and prioritizing areas for mitigation, suppression, and emergency preparedness management throughout the project area. The HFRA's minimum requirements (SAF 2004), listed below, are the same for an RWPP as for a CWPP.

Collaboration: Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP.

Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.

Treatments of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

1.5 PLANNING PROCESS

The Utah State Office of the BLM contracted with Portage Environmental (Portage), SWCA Environmental Consultants (SWCA), and Wildland Fire Associates (WFA) to facilitate planning meetings, conduct the risk assessment, hold public meetings and compile public comments, and write the Southeastern Utah RWPP. The RWPP planning process and final document are expected to be completed in May 2007. The length of the planning process varies by project and is usually dependent on the number of community and government participants. The process used to facilitate the tasks necessary to produce the elements of the Southeastern Utah RWPP is summarized in this document.

The Society of American Foresters, in collaboration with the National Association of Counties, the National Association of State Foresters, the Western Governors' Association, and the Communities Committee, developed a guide entitled "Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities" (available online at http://www.safnet.org/policyandpress/cwpphandbook.pdf) to provide communities with a concise process to use in developing a CWPP. This document, which served as the guide for preparing the Southeastern Utah RWPP, lists eight steps for developing a CWPP:

Step One: Convene Decision Makers. Form a core team made up of representatives from the appropriate local governments, the local fire authority, and the state agency responsible for forest management.

Step Two: Involve Federal Agencies. Identify and engage local representatives of the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). Contact and involve other land management agencies as appropriate.

Step Three: Engage Interested Parties. Contact and encourage active involvement in plan development by a broad range of interested organizations and stakeholders.

Step Four: Establish a Community Base Map. Work with partners to establish a baseline map that defines the community's WUI and displays inhabited areas at risk; forest, rangeland, and riparian areas that contain critical human infrastructure; and other areas at risk for 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; and local preparedness capability. Rate the level of risk for each factor and incorporate into the CWPP base map as appropriate.

Step Six: Establish Community Priorities and Recommendations. Use the base map and community risk assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for fuel treatment, reducing structural ignitability, and other issues of interest, such as improving fire-response capability. Clearly indicate whether priority projects are directly related to protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

Step Seven: Develop an Action Plan and Assessment Strategy. Consider developing a detailed implementation strategy to accompany the CWPP, as well as a monitoring plan that will ensure its long-term success.

Step Eight: Finalize the Community Wildfire Protection Plan. Finalize the CWPP and communicate the results to community and key partners. In this step the core team reconvenes to agree on the fuels treatment priorities, preferred methods for fuels treatment projects, the location of the WUI, structural ignitability recommendations, and other information pertaining to the final document.

A ninth step, which is not part of the handbook, encourages involved entities to continue working and revising the document after initial completion.

1.6 CORE TEAM

The core team consists of approximately 15 members representing various agencies and levels of government, including the BLM, the USFS, the Utah Division of Forestry, Fire and State Lands (FFSL), representatives from the counties within the project area, and local fire districts. All members have experience in natural resources management related to wildland fires and/or a background in planning, response, mitigation, or education. The core team met seven times during a nine-month period to discuss issues related to completing the project.

1.7 PROJECT AREA

The Southeastern Utah project area located in the southeast corner of Utah (Figure 1.2) includes Carbon, Emery, Grand, and San Juan Counties (Figure 1.3) and encompasses 11,039,399.07 acres of 17,249.06 square miles. The core team decided to use political rather than geographic or watershed boundaries to determine the project area because the existing data relating to wildland fire are organized using these political boundaries. Some of the important issues addressed in this document expand beyond the project area and require coordination and planning efforts with neighboring regions, such as Central Utah. While the RWPP is broad-based and addresses issues at the landscape level, some specific background information on each of the four counties is included to allow each county to use the document for its particular circumstances in applying for funding to write a CWPP or to implement RWPP recommendations.

Table 1.2 shows land ownership throughout the project area by acreage, square miles, and percentage of the total area. Public lands in the project area are administered primarily by federal agencies, including the National Park Service (NPS), BLM, USFS, and Bureau of Indian Affairs (BIA).

1.8 PUBLIC INVOLVEMENT

A key element in the community fire planning process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (SAF 2004). Public involvement is an important component of this process, and the HFRA emphasizes using public comments to prioritize recommendations for fuels reduction projects and public outreach and education. The Southeastern Utah RWPP project included a series of public meetings to receive feedback from community members.

To solicit public input, the BLM developed a press release to announce the project and on October 18, 2006, made it available online on the Utah Interagency Fire Information (UIFI) website at www.utah.fireinfo.gov/CWPP/cwpp.htm. The BLM also posted the planning process and the goals of the project on the website. The website further served to provide a medium through which the public could provide feedback. In the southeastern region, the core team organized four public meetings in each of the four county seats within the project boundaries and announced these events via radio, newspaper advertisements, and postcard mailings in an effort to advertise the process as widely as possible and solicit comments from as many individuals and groups as possible. The core team designed the events as informal open houses. After a brief presentation on the regional wildfire protection planning process and goals, residents were encouraged to engage in a discussion addressing community values at risk, recreation sites frequented, and areas that needed protection, and to present their ideas and comments.

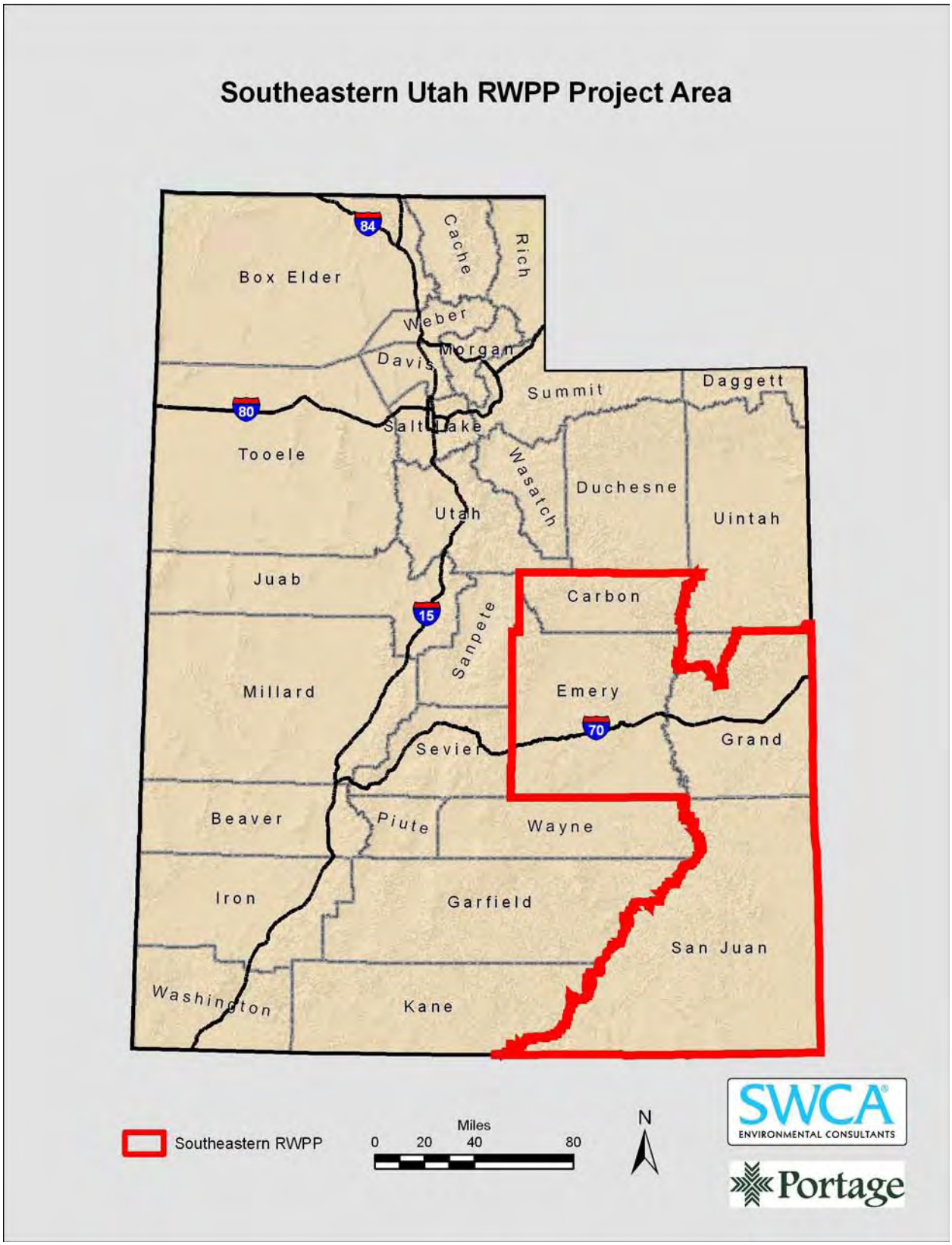

Figure 1.2. Southeastern regional project area in Utah.

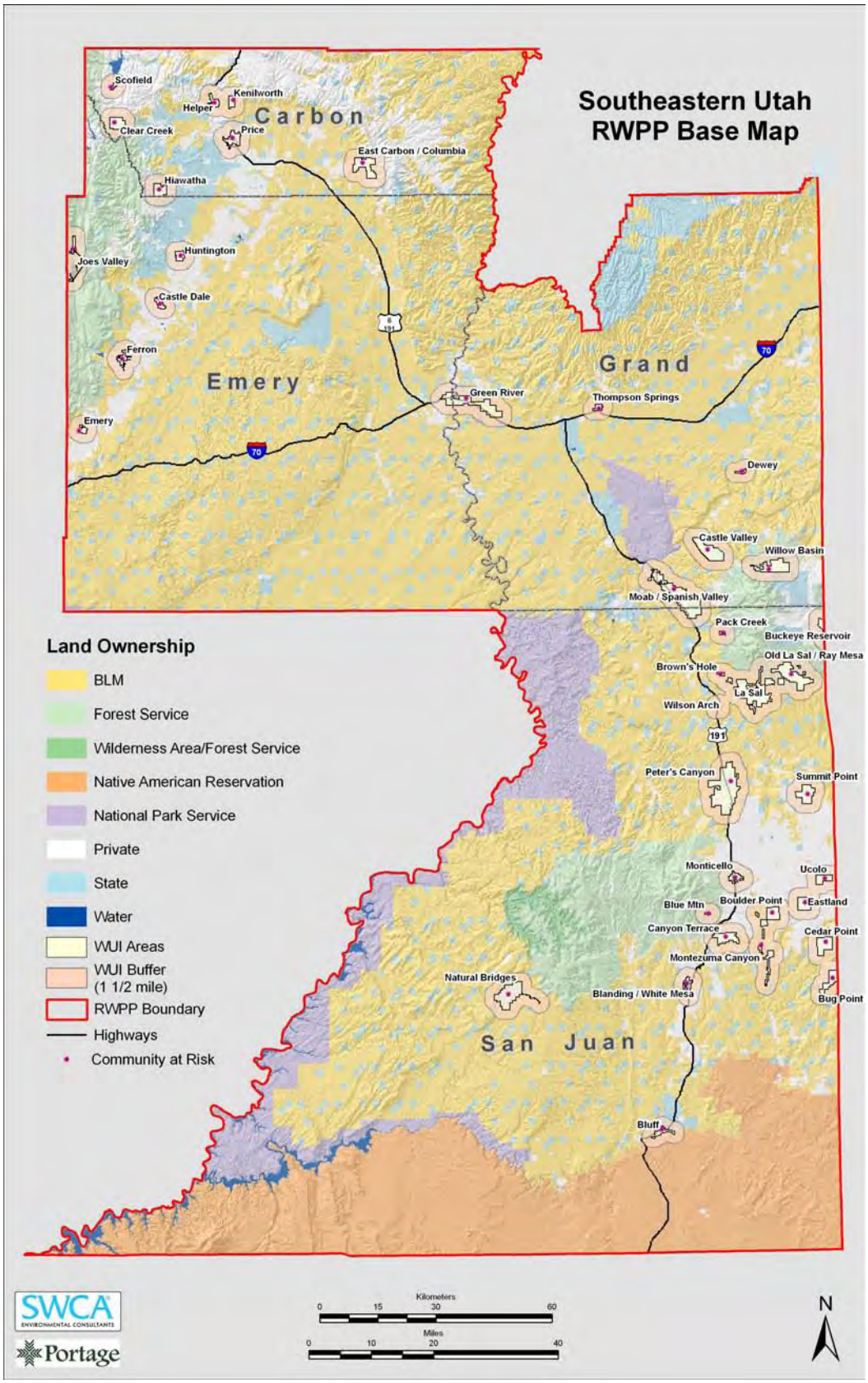

Figure 1.3. Southeastern Utah project area.

Table 1.2. Land Ownership in Southeastern Utah Project Area

Owner	Total Acres	Total Square Miles	Percent of Total
San Juan	5,075,226.64	7,930.04	45.97
Emery	2,851,909.91	4,456.11	25.83
BLM	1,558,269.98	2,434.80	14.12
Carbon	949,435.07	1,483.49	8.60
State	368,761.75	576.19	3.34
Private	100,292.92	156.71	0.91
NPS	76,560.95	119.63	0.69
Forest Service	57,038.39	89.12	0.52
Military	1,631.65	2.55	0.01
Water	146.13	0.23	0.00
Native American Reservation	125.68	0.20	0.00
Region Total	11,039,399.07	17,249.06	100.00

The core team also asked the residents for written comments in response to a wildfire questionnaire focusing on similar topics. Only one questionnaire was received, from a resident of Blanding, whose comments are summarized briefly below:

- Providing on-site education for homeowners a priority
- Need for reducing fuels, particularly in areas of beetle-killed trees
- Roads need to be maintained to provide protection and escape routes
- Giving locals the freedom to log to aid in fuels reduction

Very few community members attended the meetings, possibly because many people had recently been involved in writing their communities' CWPPs and had already discussed their concerns. The comments that were received were site specific and addressed local issues. In general, the community members who attended the meetings were concerned about the risk of wildland fire and in learning how the regional plan would impact their local CWPPs. Comments about reviewing the plan and determining ways to measure its success were also addressed.

1.9 COMMUNITIES AT RISK AND WILDLAND URBAN INTERFACE

Using the National Fire Plan guidelines, the State of Utah worked with wildland fire officials to create a list of communities at risk (CAR) from wildland fire throughout the state. In 2005, over 600 communities were listed, and the CAR in the project area can be found in Appendix A (FFSL 2005). This list identifies the communities listed at the time of this project, and more communities may be added to the list in the near future. This increase from the approximately 400 communities listed in 2001 (BLM 2005a) exemplifies the growing problem. Each community was given a score ranging from 0 (no risk) to 12 (extreme risk) based on the sum of multiple risk factors analyzed in every area. Fire history, local vegetation, and fire-fighting capabilities were some of the factors included. The scoring allows Utah's fire prevention program officials to assess relative risks and to open communication channels with these communities at risk to prepare for wildfire events (FFSL 2005).

The WUI has become an area of great concern for fire and safety officials, as development within and around forested areas during the past decade has increasingly exposed communities to fire risk, posing challenges to those who respond to fire, fight fire, and protect structures and lives. As a result, WUI areas are identified as high-priority areas for hazard and risk reduction activities.

1.10 RESPONSE TO FIRES ON FEDERAL LANDS

A concern for the southeastern Utah region is that large percentages of the land within the project area are administered by the BLM, BIA, NPS, USFS, and/or various divisions of the State of Utah, such as FFSL, and many of the communities at risk are adjacent to these public lands, which are managed by federal and state agencies. Suppression of wildland fires on these public lands is coordinated among the agencies and sometimes private entities that manage these areas through the Moab Interagency Fire Center dispatch team. Interagency coordination helps to synchronize initial attack as well as identify and implement essential mitigation (BLM 2005b).

All firefighters assigned to fires on land managed by any federal agency, and several state agencies as well, must have a red card. This card certifies that an individual is qualified to fight wildland fire and demonstrates that the cardholder has completed all required coursework and training. The red card is part of the fire qualifications management system used by many state and all federal wildland fire management agencies. Unfortunately, many fire departments are faced with limited funding for providing training and preparing community members to respond to wildland fires on federal or state-administered land.

CHAPTER 2
REGIONAL AND COUNTY-BY-COUNTY BACKGROUND

The following section describes the characteristics of the project area fire environment. Following an overview of the region as a whole, information is provided for each of the four counties within the region—Carbon, Emery, Grand, and San Juan.

2.0 REGIONAL BACKGROUND

2.1 REGIONAL TOPOGRAPHY

Utah's landscape is divided into three major physiographic provinces—Colorado Plateau, Basin and Range, and Middle Rocky Mountains—that are distinguished by geologic features unique to each area (U.S. Geological Survey [USGS] 2000). Southeastern Utah is located on the Colorado Plateau, which is characterized by largely undeformed, nearly flat lying sedimentary rocks that have been eroded into buttes, mesas, and deep, narrow canyons. Sediment has intermittently accumulated for hundreds of millions of years in and around the seas, rivers, swamps, and deserts that once covered parts of the present day Colorado Plateau. Gradually but persistently, the plateau began to rise about 10 million years ago, reaching elevations of over 10,000 feet in some places. Against the odds, this transformation took place with little deformation of its rock layers. With uplift, the erosive power of water began to sculpt and expose the layers of sedimentary rock. Exceptions to this "layer-cake" geology are seen in the igneous rocks formed by rising magma that created the core of the Henry, La Sal, and Abajo Mountains, as well as several folds such as the San Rafael Swell and Waterpocket Fold (USGS 2000).

2.2 REGIONAL CLIMATE

The term "climate" refers to a generalization of all major weather conditions throughout a long period of time, usually 30 years or more (Pope and Brough 1996, cited in UCCW 2006). The modified Köppen System of climate classification categorizes climate systems according to vegetation response to temperature and precipitation patterns. Under this system, climatic regions throughout the State of Utah fall into four types: desert, steppe, humid continental hot summer, and undifferentiated highlands. Distinct weather, temperature, and precipitation patterns are associated with each (Pope and Brough 1996, cited in UCCW 2006). While southeastern Utah experiences each of these climate types, it is primarily categorized as desert, steppe, and undifferentiated highlands.

About 33 percent of Utah is true desert, defined as "an area where the average annual precipitation is less than one-half of the annual potential evapotranspiration" (Pope and Brough 1996, cited in UCCW 2006). Deserts are found in two primary areas in Utah, one of which is the Colorado Plateau desert in the Canyonlands region of southeastern Utah. The southern portion of this desert area maintains average winter temperatures above 32 degrees (Pope and Brough 1996, cited in UCCW 2006).

Steppelands are found between the desert margins and the higher mountain regions. The average annual precipitation of steppelands is less than the potential evapotranspiration, but more than half of these regions receive between 8 and 14 inches of precipitation annually. This amount of moisture creates a semiarid climate sufficient for the growth of short and medium grasses, sagebrush, and other woody plants. In Utah the majority of this grassland region is the foundation for the state's ranching industry. Winter temperatures in most of the state's steppeland area average below 32 degrees, with only the southern margin experiencing less severe conditions. Steppeland constitutes approximately 40 percent of Utah's land area, making it the most extensive climatic zone in the state (Pope and Brough 1996, cited in UCCW 2006).

Utah's mountainous landscape, about 24 percent of the state, is characterized by an undifferentiated highland climate. Mid-latitude highland climates are humid regions with severely cold winters and cool to cold summers. Many of these mountain ranges are treeless and have a tundra climate, meaning that the temperatures are too cold for the growth of trees. In Utah's highland regions, mean monthly summer temperatures usually fall below 72 degrees. However, temperature and precipitation within the highland climate zone may vary widely (Pope and Brough 1996, cited in UCCW 2006).

Overall, the climate in southeastern Utah is variable. Average temperatures in the summer are generally in the mid to high 90s, and winters are characterized by mild temperatures in the 40s and 50s. During the summer there are occasional thunderstorms, but the average rainfall throughout the year ranges from 7 to 15 inches and snowfall ranges from 10 to 60 inches (Western Regional Climate Center [WRCC] 2005).

2.3 REGIONAL WILDLAND FIRE HISTORY

Fire and vegetation have an interconnected relationship. Throughout history fire has played an important role in regenerating and maintaining diverse mosaics of healthy ecosystems in riparian areas, grasslands, shrublands, woodlands, and forests. As a result of the changed fire ecology in southeastern Utah from a century of fire suppression, the diversity of vegetation mosaics has been diminished at both the community and landscape level (BLM 2005a).

The frequency and severity of fire regimes throughout Utah have depended on vegetation type, topography, and climate. When fire was a frequent part of the landscape, fire-adapted vegetation communities, including grasslands, sagebrush, and ponderosa pine, were created. By contrast, in vegetation communities where frequent wildfire was not part of the ecology because the return intervals were hundreds of years, the distance between shrubs was too great to carry fire until the plant mass filled the spaces among the plants. Examples of native plants with longer fire return-intervals are salt desert scrub, blackbrush, creosotebush, and bursage (BLM 2005a). Fire in these communities is considered detrimental because plant succession may require decades or centuries for recovery, if recovery is possible at all (BLM 2005a).

Wildfire occurrence drastically decreased in Utah as settlers suppressed fires. Fire exclusion, in addition to other land use management practices, such as logging and past grazing patterns (FFSL 2003), has created changes in the composition and structure of vegetation communities. One consequence has been that many non-native species are established throughout the

Intermountain West. For example, cheatgrass, a non-native species, has altered the fire ecology of some low-elevation vegetation communities, as it grows and cures early in the season, providing a fine fuel that remains flammable for longer periods than native vegetation (BLM 2005a).

As a result of these changes, forests are denser and less diverse, with greater abundance of late successional species, and have accumulated large amounts of woody debris and increased fuel loads. Drought conditions have exacerbated these conditions, and consequently Utah's forests have become more susceptible to intense wildfire, insects, and diseases (FFSL 2003).

These conditions have created an environment that is likely to burn with greater intensity than historic fires, increasing the level of damage and destruction to the natural and built environment. In terms of human impacts, the problem has been compounded by the incursion of homes and other built structures into the wildland urban interface, and the consequences of wildland fires are much greater today than in the past.

2.4 REGIONAL VEGETATION

Vegetation throughout the southeastern Utah project area was identified using Southwest Regional Gap Analysis Project (SWReGAP) (USGS 2004) data. To provide an overview and inventory of the various plant species that exist in the project area, SWCA reorganized the SWReGAP data, using the "Vegetative Community Grouping and Associated SWReGAP Cover Types for the Moab Fire District" developed by the BLM as a model, to group similar cover types or landcover classes. The broad groupings, which are described below, include several types of species and provide general descriptions of vegetative conditions. These general descriptions are appropriate for the purposes of southeastern Utah's landscape-level wildfire protection plan, which covers approximately 11,040,501.18 acres. The specific vegetation communities found in each county are located in Appendix B.

The data used to create the groupings shown in Table 2.1 originated with SWReGAP, a multi-institutional cooperative effort instituted in 1999 to map and assess the biodiversity of a five-state region in the southwestern United States (Arizona, Colorado, Nevada, New Mexico, and Utah) encompassing approximately 560,000 square miles. The Remote Sensing and GIS Laboratories at Utah State University, in collaboration with the U.S. Geological Survey (USGS), were the coordinating entities for SWReGAP, providing spatial information for the participants in the project area. Using both multi-season satellite imagery from 1999 through 2001 and digital elevation model datasets such as elevation, landforms, and aspect, among others, the SWReGAP modeled vegetative communities throughout the five-state region.

Table 2.1. Vegetative Community Groupings and Associated ReGap Cover Types for Southeastern Utah

Vegetation Type	SW ReGAP Analysis Vegetation Cover	Total Acres in Project Area	Percent of Planning Area
1 - Grassland	S090 - Inter-Mountain Basins Semi-desert Grassland	193,019.97	1.75
	S085 - Southern Rocky Mountain Montane-Subalpine Grassland		
2 - Salt Desert Scrub	S045 - Inter-Mountain Basins Mat Saltbush Shrubland	1,762,225.11	15.96
	S065 - Inter-Mountain Basins Mixed Salt Desert Scrub		
	S079 - Inter-Mountain Basins Semi-Desert Shrub Steppe		
	S096 - Inter-Mountain Basins Greasewood Flat		
3 - Blackbrush	S059 - Colorado Plateau Blackbrush-Mormon Tea Shrubland	2,123,022.38	19.23
	S054 - Inter-Mountain Basins Big Sagebrush Shrubland		
4 - Sagebrush	S056 - Colorado Plateau Mixed Low Sagebrush Shrubland	286,427.88	2.59
	S071 - Inter-Mountain Basins Montane Sagebrush Steppe		
	S128 - Wyoming Basins Low Sagebrush Shrubland		
5 - Piñon-Juniper Woodland	S039 - Colorado Plateau Pinyon-Juniper Woodland	4,561,578.07	41.32
	S052 - Colorado Plateau Pinyon-Juniper Shrubland		
	S010 - Colorado Plateau Mixed Bedrock Canyon and Tableland		
	S075 - Inter-Mountain Basins Juniper Savanna		
6 - Ponderosa Pine	S036 - Rocky Mountain Ponderosa Pine Woodland	368,769.67	3.34
	S046 - Rocky Mountain Gambel Oak-Mixed Montane Shrubland		
7 - Mountain Shrub	S047 - Rocky Mountain Lower Montane-Foothill Shrubland	13,644.79	0.12
	S050 - Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland		
8 - Douglas-fir/Mixed Conifer/Aspen	S023 - Rocky Mountain Aspen Forest and Woodland	489,317.04	4.43
	S028 - Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland		
	S030 - Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	S032 - Rocky Mountain Montane Dry- Mesic Mixed Conifer Forest and Woodland		
	S034 - Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland		
	S042 - Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland		
	S081 - Rocky Mountain Dry Tundra		
	S083 - Rocky Mountain Subalpine Mesic Meadow		

Table 2.1. Vegetative Community Groupings and Associated ReGap Cover Types for Southeastern Utah, continued

Vegetation Type	SW ReGAP Analysis Vegetation Cover	Total Acres in Project Area	Percent of Planning Area
9 - Riparian Wetland	S093 - Rocky Mountain Lower Montane Riparian Woodland and Shrubland	48,530.48	0.44
	S091 - Rocky Mountain Subalpine-Montane Riparian Shrubland		
	S097 - North American Warm Desert Riparian Woodland and Shrubland		
	S100 - North American Arid West Emergent Marsh		
	S102 - Rocky Mountain Alpine-Montane Wet Meadow		
10 - Invasives	D04 - Invasive Southwest Riparian Woodland and Shrubland	132,121.90	1.20
	D08 - Invasive Annual Grassland		
	D06 - Invasive Perennial Grassland		
	D09 - Invasive Annual and Biennial Forbland		
11 - Disturbed Areas	D11 - Recently Chained Pinyon-Juniper Areas	344,234.22	3.12
	D01 - Disturbed, non-specific		
	D02 - Recently burned		
	D03 - Recently mined or quarried		
	D10 - Recently logged areas		
	D14 - Disturbed, oil well		
	N21 - Developed, Open Space - Low Intensity		
	N22 - Developed, Medium - High Intensity		
	N80 - Agriculture		
12 - Dunes	S012 - Inter-Mountain Basins Active and Stabilized Dune	379,360.98	3.44
	S136 - Southern Colorado Plateau Sand Shrubland		
13 - Other	N31 - Barren lands, Non-specific	338,248.69	3.06
	N11 - Open Water		
	S002 - Rocky Mountain Alpine Bedrock and Scree		
	S006 - Rocky Mountain Cliff and Canyon		
	S014 - Inter-Mountain Basins Wash		
	S011 - Inter-Mountain Basins Shale Badland		
Total		11,040,501.18	100.00

2.4.1 GRASSLAND

According to SWReGAP data (USGS 2004), grasslands cover 1.75 percent of the planning area. Grasslands include native perennial grasses, seedlings of other native species, introduced perennial grasses (primarily crested wheatgrass), and cheatgrass, an exotic taxon (BLM 2005a). Cheatgrass plays a large role in Utah's grassland ecology (BLM 2005a) and is discussed further below.

Historically, native perennial grasslands formed part of the seral mosaic of the sagebrush steppe habitat; however, the portion of the landscape they once represented is not clear. Native perennial grassland is an intermediate successional stage that may eventually return to a diverse sagebrush steppe habitat if allowed to recover for an extended period (20–70 years) without impacts from wildland fires or other sources. Native perennial grass species include blue-bunch wheatgrass, Indian ricegrass, bottlebrush squirrel tail, Sandberg bluegrass, Nevada bluegrass, thick spike wheatgrass, western wheatgrass, galleta grass, blue grama, needle-and-thread grass, basin wildrye, sheep fescue, and others (BLM 2005a).

Cheatgrass was introduced from Eurasia in the late 1800s (FEIS 2004, cited in BLM 2005a). This grass species is an opportunistic winter annual that germinates between autumn and spring when temperatures and soil moisture are suitable. While cheatgrass may be present in relatively undisturbed plant communities, it usually dominates disturbed sites (Fielding and Brusven 2000, cited in BLM 2005a). It has been less successful in dominating sites that are above 7,000 feet, but does occur at that elevation in some areas. Perennial grasslands dominated by cheatgrass do not typically revert to the native community with passive restoration (BLM 2005a).

Grasslands dominated by crested wheatgrass are the deliberate result of historic range improvement projects and post-fire seedings. These grasslands have created stable communities due to increased fire intervals and subsequent loss of topsoil and do not progress toward recovery to sagebrush steppe habitat as quickly as native perennial grasslands (BLM 2005a).

2.4.2 SALT DESERT SCRUB

Salt desert scrub is probably the most arid vegetation type in the Intermountain West (Wood and Brotherson 1986, cited in BLM 2005a). It occurs in valley bottoms at elevations of 4,000–5,400 feet, typically in areas characterized by accumulations of salt and poorly developed soils (BLM 2005a).

These areas receive relatively low annual precipitation (5–10 inches), meaning that soil moisture available for plant growth is limited, and is often highly saline as well. These factors limit this type of vegetation's ability to recover from disturbances. These communities are generally associated with Mancos-derived clay soils, which are extremely susceptible to wind and water erosion following surface disturbances.

During the past 40 years, large expanses of salt desert scrub have been out-competed by invasive annual grassland species, primarily cheatgrass. According to SWReGAP data, this vegetation type accounts for 15.96 percent of the land cover in the Southeastern Utah Region and includes desert shrub and semi-desert shrub species.

2.4.3 BLACKBRUSH

Blackbrush communities are restricted to portions of the Colorado Plateau (BLM 2005a) and occupy approximately 19.23 percent of the Southeastern Utah Region. These communities are characterized by dense to open stands of evergreen shrub and are often interspersed with sparse vegetation such as galleta grass, snakeweed, or yucca. Blackbrush communities are often associated with non saline, often sandy soils, in areas where annual rainfall is less than 6 inches (Cronquist et al. 1986). Cheatgrass expansion into this vegetation type poses a serious threat by providing a continuous understory of fine fuels and reducing fire-return intervals in an otherwise non-fire-adapted community. Blackbrush provides cover, browse, and seeds for wildlife such as deer, elk, desert bighorn sheep, pronghorn, squirrels, rabbits, other game, and migratory birds (BLM 2005a).

2.4.4 SAGEBRUSH

Sagebrush grows in non-saline soil in well-drained valleys, generally above valley bottoms on slopes immediately above and below the piñon/juniper and juniper woodland type (Harper et al. 1978, cited in BLM 2005b), and forms monotypic stands. Sub-species of big sagebrush, including Wyoming big sagebrush and Basin big sagebrush, are found in the project area, as well as mountain shrub, which consists of four main vegetation types: Gambel oak, maple, mountain mahogany, and mixed mountain shrub. This vegetation type occurs as a transition vegetation type between mid-elevation sagebrush and conifer types at moderately high elevations of 7,000 to 8,000 feet (BLM 2005b).

Sagebrush cover types currently make up 2.59 percent of vegetation in the planning area. In the past 100 years, the area covered by sagebrush has been greatly reduced by conversion of private lands to irrigated agriculture, livestock grazing, cheatgrass conversion, juniper encroachment, and the deliberate eradication of sagebrush for range improvement. Recent drought conditions have also contributed to dramatic reductions of sagebrush cover across portions of the state. When cheatgrass is dominant in the understory, drought may convert these stands to an annual grassland type (BLM 2005a).

Healthy sagebrush is a patchwork mosaic of seral communities that can range from recovering perennial grass-shrublands following natural fire, to old growth, decadent sagebrush steppe with high canopy cover and reduced herbaceous understory (Wyoming Interagency Vegetation Committee 2002, cited in BLM 2005a).

2.4.5 PIÑON-JUNIPER WOODLAND

Piñon-juniper woodlands account for the highest percentage of the land cover in the project area, at 41.32 percent. These woodland species generally grow at elevations between 4,700 and 8,600 feet where precipitation totals 12–18 inches per year. Piñon-juniper and juniper woodlands are characterized by trees that are less than 33 feet tall (BLM 2005a).

The supporting landscape varies in topography from level to steep slopes (0–80 percent). Piñon-juniper dominates the overstory as stands reach the upper limits of the elevation range, while juniper dominates the lower elevations. Primary associated shrub species include sagebrush, Mormon tea, and blackbrush. The dominant grass species is saline wildrye. Undergrowth is

variable and dependent upon canopy closure, soil texture, elevation, and aspect (Welsh et al. 1993, cited in BLM 2005a).

Piñon-juniper and juniper woodlands have increased almost ten-fold over the past 130 years throughout the Intermountain West due to historic land use practices, including fire suppression and also due to climatic change (Miller and Tausch 2001, cited in BLM 2005a). Many areas have experienced an invasion of cheatgrass in the understory, which raises concerns regarding the increase of cheatgrass expansion following a fire (BLM 2005a).

Above the sagebrush zone, at elevations of 5,000–8,000 feet, the subalpine woodlands on the mountain slopes are dominated by piñon-juniper pine and juniper communities. Typically, the understory consists of shrub species, such as big sagebrush and native bunchgrasses (BLM 2005a).

Old growth is estimated to make up less than 10 percent of the current area classified as piñon/juniper and juniper woodland (Miller and Tausch 2001, cited in BLM 2005a). These old-growth areas are often restricted to fire-resistant habitats (e.g., steep, dissected, rocky terrain and thin substrates along ridges). Old-growth piñon-juniper and juniper can be characterized by rounded, spreading canopies; large basal branches; large, irregular trunks; and furrowed, fibrous bark (Miller and Rose, 1999 cited in BLM 2005a). Fire frequency has been estimated at 200 to more than 300 years for old-growth piñon-juniper and juniper (Goodrich and Barber 1999, cited in BLM 2005a; Romme et al. 2002, cited in BLM 2005a).

2.4.6 PONDEROSA PINE

Rocky Mountain ponderosa pine woodland covers 3.34 percent of the project area. These woodlands occur at lower ecotones or tree lines between grassland and shrubland and in more mesic coniferous forests, in warm, dry, exposed sites. While this vegetation type may be found on any aspect or slope, it is most commonly found on moderately steep to very steep slopes or on ridgetops. This ecological system is generally found on soils derived from igneous, metamorphic, and sedimentary materials, with good aeration and drainage, coarse texture, circumneutral to slightly acid pH, an abundance of mineral material, rockiness, and periods of drought during the growing season. Ponderosa pine is the principal conifer, and the understory is usually shrubby, mixed with grasses. Mixed fire regimes and ground fires with variable return intervals depending on climate, degree of soil development, and understory density sustain this vegetation type (USGS 2004).

2.4.7 MOUNTAIN SHRUB

Mountain shrub occupies about .12 percent of the land in the project area, occurring as a transition vegetation type between sagebrush and conifer types. It is found at moderately high elevations (7,000–8,500 feet), usually on north and east slopes, which tend to be cooler and moister than south and west aspects. Mountain shrub is a highly diverse community, consisting of Gambel oak, chokecherry, serviceberry, currant, mountain snowberry, elderberry, bitterbrush, and mountain sagebrush. The mountain shrub community, with its high productivity and diverse herbaceous understory, provides important biodiversity, wildlife habitat, and protective ground cover. Mountain shrub communities rapidly recycle nutrients into fruits, seeds, and juicy leaves,

providing animals with an abundance of food. Given its high productivity and diverse herbaceous understory, this vegetation type provides important biodiversity, wildlife habitat, and protective ground cover to the ecosystem (BLM 2005a).

Deciduous shrubland is dominated primarily by alder-leaf mountain mahogany, cliff-rose, bitterbrush, serviceberry, buckbrush, chokecherry, snowberry, point-leaf manzanita, and bearberry. Primary associated shrub species include Gambel oak, Palmer oak, Tucker's oak, turbinella live-oak, sagebrush, and maple. Primary associated tree species include quaking aspen and curl-leaf mountain mahogany.

2.4.8 MIXED CONIFER (DOUGLAS-FIR/MIXED CONIFER ASPEN)

Mixed conifer is defined as a conifer forest or woodland with Douglas-fir, ponderosa pine, or quaking aspen as dominants/associates or co-dominants with mountain shrub. These communities occupy 4.43 percent of the land in the project area. They generally occur at elevations of 6,000–9,000 feet, where slopes are often extremely steep, soils are often more fertile than in other areas, and annual precipitation is 14–25 inches (BLM 2005b). These forest types have a high value for recreation, aesthetics, special status species habitat, and wood product production (BLM 2005a).

The principal tree species are Douglas-fir, ponderosa pine, and quaking aspen. Principal shrub species include Gambel oak, bitterbrush, bigtooth maple, snowberry, serviceberry, manzanita, and ninebark. Primary associated tree species include subalpine fir, white fir, Engelmann spruce, and limber pine. Primary associated shrub species include common juniper, sagebrush, rabbitbrush, and curl-leaf mountain mahogany.

Aspens can be climax or seral to conifer communities (e.g., Douglas-fir) and are found between 6,500 and 10,500 feet. Aspen occurs as pure stands or in association with various conifers such as Engelmann spruce, ponderosa pine, white fir, sub-alpine fir, and Douglas-fir. Conifer invasion is a natural pattern in many aspen stands throughout Utah due to long-term fire suppression in the state, and this widespread increase has resulted in a reduction in aspen-dominated stands (Mueggler 1989, cited in BLM 2005a). Overall wildlife habitat quality has declined, while acreage of decadent stands and fuel loadings have increased (BLM 2005a). A fast-growing and short-lived species, aspen is fire dependent, and in the absence of aboveground stems tends to become weakened and diseased (BLM 2005a).

2.4.9 RIPARIAN WETLAND

Riparian vegetation typically occurs as water-dependent communities along both sides of rivers and streams and adjacent to wetlands. Fremont cottonwood communities with understories of shrubs (such as sandbar, whiplash, and Booth's willows) and herbaceous species usually dominate the native riparian communities within the project area (BLM 2005a). While riparian areas occupy only a small portion of the overall landscape, 0.44 percent of the planning area (USGS 2004), they provide important fish and wildlife resource values, especially in arid landscapes.

Invasive species such as salt cedar, tall whitetop, and Russian olive have become well established in Utah's riparian communities and are slowly replacing the native vegetation across

much of the state. Salt cedar is especially problematic because it is much more flammable than the native vegetation that it replaces (BLM 2005a).

Alpine wetland vegetation in montane meadows consists of high-elevation tundra vegetation, including grasses, forbs, sedges, and shrubs. Principal species include Ross' avens, sedges, tufted hair grass, Colorado fescue, American bistort, and willow. The primary associated tree species is Engelmann spruce-krummholz.

2.4.10 INVASIVES

Invasive species comprise 1.20 percent of the vegetation in the project area. Invasive and noxious weeds are an increasing problem throughout Utah, as they rapidly displace desirable plants that provide habitat for wildlife and food for people and livestock, and some are poisonous.

Many noxious weeds and invasive species were originally inadvertently brought to the United States by European settlers in grain seed, livestock feed, and ship ballasts (Harvey and Ruyle 2002, cited in BLM 2005a). As various parts of the country were settled, these weeds slowly spread across the nation's landscape (BLM 2005a). Further accidental introductions have occurred through, for example, contaminated crop seed or livestock forage. Invasives species include cheatgrass (see Grassland, above), halogeton, Russian thistle and many others. Some invasive weeds, such as salt cedar, were deliberately introduced, for livestock forage, horticultural reasons, or soil stabilization, then escaped into natural vegetation communities. These invasive and noxious weeds are likely to have spread mainly through cross-country travel (e.g., using off-highway vehicles), hiking and camping activities, and through the movement of wildlife and/or livestock.

Invasive and noxious weeds may readily establish in highly disturbed areas (e.g., where the cumulative impacts of fire, grazing, and recreation activities are compounded). The spread of invasive weeds poses a hazard to vegetation communities on rangelands because weeds are aggressive, broadly adaptive, and without natural predators; and thus can displace native plants as they compete for space, sunlight, water, and nutrients. Noxious weeds can cause drastic changes in the composition, structure, and productivity of vegetation communities and can reduce ungulate forage quality or be poisonous to livestock (BLM 2005a).

2.4.11 DISTURBED AREAS

Disturbed areas are barren and have relatively low vegetation cover that is often associated with some form of generic human alteration and management regime, such as large amounts of grazing (USGS 2004)

2.4.12 DUNES

Dunes usually occur in the Intermountain West basins and are composed of moderately vegetated (<10-30% plant cover) active and stabilized dues and sandsheets. The species that occupy these types of environments are often adapted to shifting coarse textured substrates and form patchy or open grasslands, or shrublands (USGS 2004).

2.4.13 OTHER

The “other” category includes barren lands and open water. These types of land covers are different in nature from other vegetation types and needed to be classified in a separate category. The "other" is 3.06 percent of the project area.

2.4.14 NOXIOUS WEEDS

Noxious weeds are listed by state and federal law and are generally considered to have a negative impact on agriculture, native vegetation, fish, wildlife and/or public health (Howery and Ruyle 2002, cited in BLM 2005a). Table 2.2 lists weed species that have been officially designated as noxious weeds and published as such for the state of Utah, per the authority vested in the Commissioner of Agriculture under Section 4-17-3 of the Utah Noxious Weed Act of 2007. Many counties have specific lists of noxious weeds present within that area. The county lists may be more detailed than the state list, and may be used when recommendations are being implemented. Invasive weeds displace and reduce the normal composition and productivity of native vegetation, which can heighten the risk of wildland fire because of increased flammability and biomass accumulation throughout the landscape, particularly in WUI areas.

Table 2.2. Utah Regulated and Restricted Noxious Weeds

Scientific Name	Common Name
Agropyron repens	Quackgrass
Cardaria draba	Globe-podded hoary cress (whitetop)
Carduus mutans	Musk thistle
Centaurea diffusa	Diffuse knapweed
Centaurea maculosa	Spotted knapweed
Centaurea repens	Russian knapweed
Centaurea solstitialis	Yellow starthistle
Centaurea squarrosa	Squarrose knapweed
Convolvulus arvensis	Field bindweed
Cynodon dactylon	Bermudagrass
Cirsium arvense	Canada thistle
Euphorbia esula	Leafy spurge
Isatis tinctoria L	Dyers woad
Lepidium latifolium	Perennial pepperweed
Lythrum salicaria L	Purple loosestrife
Onopordum acanthium	Scotch thistle
Sorghum halepense	Johnsongrass
Sorghum halepense L (=Sorghum almum)	Perennial sorghum
Taeniatherum caput-medusae	Medusahead

2.5 CARBON COUNTY

2.5.1 BACKGROUND

Carbon County, located at the northern boundary of the project area, was created by the territorial legislature in 1894 from the northern fourth of Emery County. It was the last county organized in Utah prior to statehood. Most of the county's current residents live in the Price River valley and at the foot of the Book Cliffs (Beehive History 1988).

Carbon County is a true melting pot of nationalities, religions, and cultures, claiming to be Utah's most ethnically diverse small community. The county's unique nature in the state stems from its early settlers, who migrated here for economic rather than religious reasons (Beehive History 1988).

During the early 1880s the Denver and Rio Grande (D&RG) Railroad, seeking a route from Denver to Salt Lake City, discovered and opened up the vast coal lands of Carbon County. Coal mining became the major catalyst for development in the area, and coal companies often built and ran the new towns (Beehive History 1988).

As coal mining intensified in the waning years of the nineteenth century, the mines and the railroads recruited labor overseas. Wave after wave of immigrants from all over Europe and East Asia brought their languages, recipes, and cultural traditions with them. While the ethnic differences of the immigrants sometimes led to conflict, in time those differences came to be appreciated, even celebrated. Today, the Carbon County Chamber of Commerce's annual International Days festival pays tribute to those who originally came here to make a living and ended up building a vibrant, progressive community (Beehive History 1988).

Coal mining continues to play a vital role in the county's economic and social development. Its railroad links, originally established to haul coal to national markets, are well maintained and ready to transport manufactured goods to and from the region. As the hub of commerce for southeastern Utah, Carbon County has wholesale and retail establishments offering a wide range of consumer and industrial products (Carbon County 2007).

2.5.1.1 VEGETATION

The dominant vegetation communities in Carbon County are Colorado Plateau Piñon/juniper-Juniper Woodland, Inter-Mountain Basins Montane Sagebrush Steppe, and Rocky Mountain Aspen Forest and Woodland. Please see Appendix B for a list of plant species found in the county.

2.5.1.2 GEOGRAPHY

Carbon County encompasses 949,435.06 acres or 1,483.49 square miles of richly diversified landscapes on the Colorado Plateau. It is contiguous with Emery County to the south and west, and on its eastern boundary the Green River separates the county from the Uintah-Ouray Ute Indian Reservation. Carbon County is at the junction of the Wasatch Range and the San Rafael Swell, and thus both mountain and desert terrain are available within a few miles of each other. Price, the largest town and county seat, with a population of 8,712 people, is at an elevation of 5,500 feet.

2.5.1.3 WATERSHED CONCERNS

Carbon County crosses four watersheds (EPA 2006). The groundwater in the area is unusable because of high salinity, and the county is thus highly dependent on the Price River (Utah Governor's Office of Planning and Budget 2003), relying on the Price River drainage and Grassy Trail for all of its usable water (Bear West Co. 1997). Watershed protection is therefore an important concern, and the county created the Carbon Water Committee to work in collaboration with public land agencies to find common-sense approaches for new business development while

simultaneously considering how to uphold the community's values and rural character (Utah Governor's Office of Planning and Budget 2003).

Watersheds and the watershed maps included here for Carbon County (Figure 2.1) and the other three counties in the Southeastern Utah Region are delineated by the USGS using a nationwide system based on surface hydrologic features identified by Hydrologic Unit Codes (HUC). This system divides the country into 21 regions, 222 subregions, 352 accounting units, and 2,262 cataloguing units. A hierarchical HUC consisting of two digits for each level in the hydrologic unit system is used to identify any hydrologic area. The six-digit accounting units and the eight-digit cataloguing units are generally referred to as basins and sub-basins (EPA 2006).

2.5.1.4 POPULATION

According to the U.S. Census Bureau (2000), Carbon County has 19,437 residents, 0.79 percent of Utah's total population of 2,469,585. There are approximately 13.8 people per square mile. The principal cities/towns are Price (8,712), Helper (2,148), Wellington (1,632), East Carbon (1,270), and Sunnyside (339).

2.5.1.5 LAND OWNERSHIP

The BLM and private entities are the primary landowners in Carbon County (Table 2.3). Within the project area, Carbon County has the highest percentage of privately owned land. Native American Reservations make up a very small part of the land area.

Table 2.3. Land Ownership in Carbon County

Landowner	Acres	Square Miles	Percent of Total
BLM	418,613.07	654.08	44.09
Native American Reservation	188.26	0.29	0.02
Private	373,684.85	583.88	39.36
State	123,998.76	193.75	13.06
USFS	30,334.55	47.40	3.20
Water	2,615.57	4.09	0.28
Carbon County Total	949,435.06	1,483.49	100.00

2.5.1.6 CLIMATE

Approximately 56 percent of the county consists of mountainous regions with an undifferentiated highland climate, with severely cold winters and cool to cold summers. The treeless mountain summits have a tundra climate, where the temperatures are too cold to permit the growth of trees. Mean monthly summer temperatures in Utah's highland regions are usually below 72ºF. Approximately half of Carbon County is classified as steppe, according to the modified Köppen System of classification (Pope and Brough 1996, cited in Utah Center for Climate and Weather 2006).

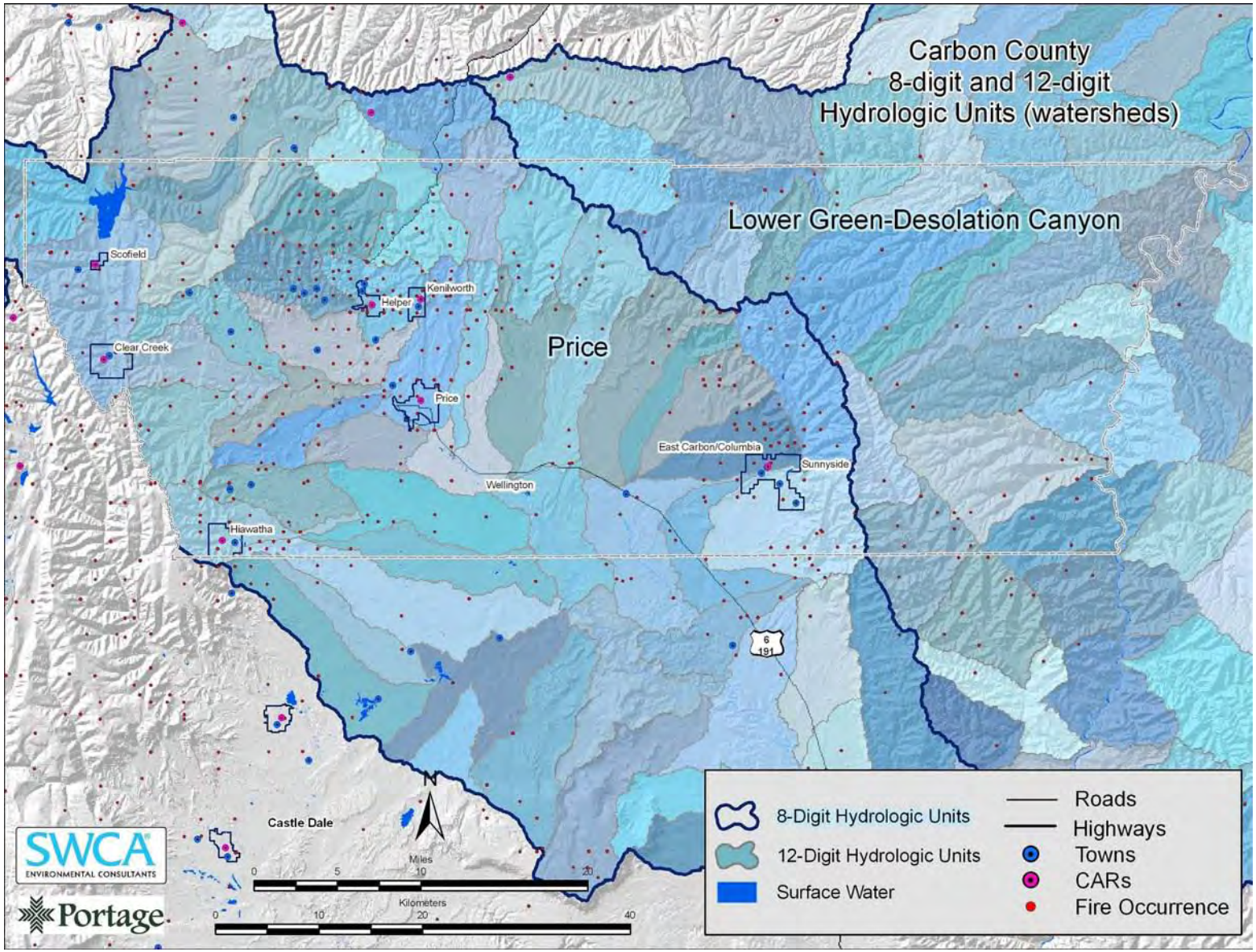

Figure 2.1. Carbon County watersheds.

2.5.1.7 FIRE-RESPONSE CAPABILITIES

There are six volunteer fire departments in Carbon County, with one full-time chief; all other fire responders are volunteers. Seventeen firefighters currently hold red cards. It is anticipated that an additional 35 to 40 volunteers will receive cards in May 2007, as wildland training had been scheduled in response to HB 146. Please see Appendix C (Fire-Response Capabilities for Carbon County).

2.6 EMERY COUNTY

2.6.1 BACKGROUND

Emery County is in the northwestern portion of the project area. Human habitation in this area dates back thousands of years to the Desert Archaic Culture. The people of the Fremont Culture inhabited present-day Emery County from about A.D. 500 to 1300. Evidence of both these cultures can still be found in artifacts and in the numerous pictograph and petroglyph panels that are found at Temple Mountain Wash, Muddy Creek, Ferron Box, Black Dragon Canyon, Buckhorn Wash, and in hidden canyons throughout the county. In historic times, Ute Indians occupied sites in what is now Castle Valley, and travelers on the Old Spanish Trail marveled at the "castles" as they passed through present-day Emery County to and from California (Emery County 2005).

It was not until 1875 that ranchers from Sanpete County recognized the settlement potential of the region. In the fall of 1877, young Latter-day Saints (LDS) families were directed by Brigham Young to move into Castle Valley and take up homesteads in what would become the settlements of Huntington, Ferron, Castle Dale, and Orangeville (Emery County 2005).

Although livestock and farming remained the mainstay of Emery County's economy throughout most of its history, two related events affected the region's economic activities: the completion of the D&RG Railroad through the county in 1883, and the establishment of coal mines at Scofield, Castle Gate, and Sunnyside in Carbon County by the mid 1890s. The railroad provided transportation to other parts of the state and nation for locally grown produce and livestock, and the miners provided a booming local market for animals and vegetables. The mines also provided an opportunity for these early residents of Emery County to diversify their economy by working in the mines during the winter months and farming in their own fields during the summer. The D&RG also led to the establishment of the town of Green River in Emery County's beautiful San Rafael Swell country (Emery County 2005).

Riding the crest of national economic growth during the 1970s, Emery County's population grew significantly as a result of the construction of large coal-fired power plants in Castle Dale and Huntington by the Utah Power & Light Company (Rocky Mountain Power) and the expansion of coal mines to fuel these important utilities. Emery County's economy was built and is based today on agriculture, livestock production, coal mining, and coal-fired electric power generation (Emery County 2005).

2.6.2 VEGETATION

The dominant vegetation communities in Emery County are Colorado Plateau Mixed Bedrock Canyon and Tableland, Colorado Plateau Piñon/juniper-Juniper Shrubland, and Inter-Mountain Basins Mixed Salt Desert Scrub. Appendix B lists plant species found in the county.

2.6.3 GEOGRAPHY

Emery County is west of Grand County, with the Green River as their common boundary and with the same latitudes forming their northern and southern boundaries. The western boundary of Emery County runs north-south through the Wasatch Plateau, to the northern edge of Capitol Reef National Park. The county encompasses 2,851,910.91 acres or 4,456.11 square miles of richly diversified landscapes: red rock canyons, high alpine mountain meadows, high desert wildlands, trout streams and lakes, white-water rivers, and rugged badlands (Emery County 2005).

2.6.4 WATERSHED CONCERNS

Emery County crosses six watersheds (EPA 2006) (Figure 2.2). A significant factor for Emery County is that its western boundary bisects the upland watersheds that supply much of the county's drinking water. As in much of the Southwest, a fresh-water supply is of great concern for Emery County, which has no substantial aquifers. The importance of managing these watersheds cannot be overstated. However, management activities are made more complex by political boundaries likely drawn for expedience rather than following the natural lay of the land. Therefore, management of these upland watersheds may be more complex than in other areas and may require greater cooperation with neighboring counties and multiple entities.

2.6.5 POPULATION

According to the U.S. Census Bureau (2000), Emery County has 10,860 residents, representing 0.44 percent of the total state population (2,469,585). The county has approximately 2.4 people per square mile. The principal cities/towns are Huntington (2,131), Castle Dale (1,657), Ferron (1,623), Orangeville (1,398), Green River (868), Cleveland (508), Elmo (368), Emery (308), and Clawson (153). Another 1,846 residents live in unincorporated areas.

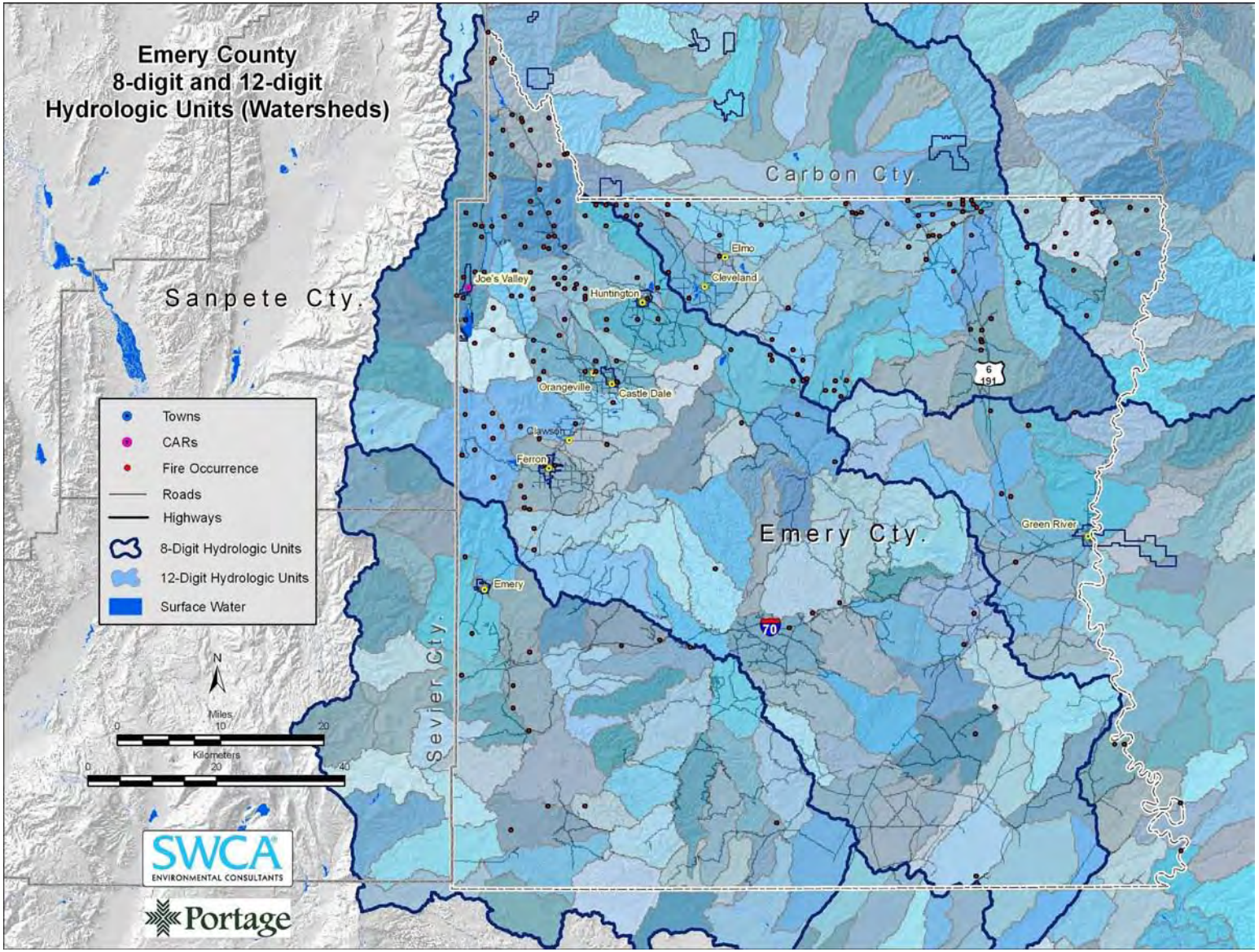

Figure 2.2 Emery County watersheds.

2.6.6 LAND OWNERSHIP

Lands in Emery County are primarily public lands administered by the BLM (Table 2.4). Private land ownership accounts for 11.94 percent of the area. Native American Reservations and NPS land ownership are negligible.

Table 2.4 Land Ownership in Emery County

Landowner	Acres	Square Miles	Percent of Total
BLM	2,059,787.29	3,218.42	72.22%
State	340,571.44	532.14	11.94%
Private	236,196.25	369.06	8.28%
USFS	210,514.64	328.93	7.38%
Water	2,679.95	4.19	0.09%
National Parks & Monuments	2,087.27	3.26	0.07%
Tribal	73.08	0.11	0.00%
Emery County Total	2,851,909.91	4,456.11	100.00%

2.6.7 CLIMATE

Emery County has a variable climate. Summer months are characterized by warm, sunny days, while winter can bring heavy snowstorms. During a typical year, a full range of temperatures and weather is experienced throughout the county. The summer sun, which brings roughly 150 clear days a year, gradually melts the snow pack that accumulates in the mountains during the winter months. Both spring and fall are characterized by cooler days, light rain showers, and gusty breezes.

Areas of more humid climate are found within the higher mountain ranges between the deserts of the Great Basin to the west and the Canyonlands region in the southeast, and steppelands occur between the desert margins and the higher mountain regions. According to the modified Köppen System, approximately one-third of Emery County is classified as desert and half is classified as steppe (Pope and Brough 1996, cited in Utah Center for Climate and Weather 2006).

In Castle Dale, the county seat, the average annual high temperature is 63ºF and the low is 31.3ºF. The mean rainfall is 7.75 inches, and the mean snowfall is 15.8 inches, based on records from 1928 to 2005 (WRCC 2006).

2.6.8 FIRE-RESPONSE CAPABILITIES

There are eight fire departments in Emery County, and four volunteer firefighters currently hold red cards. However, red card training will be offered in April 2007, and 25 to 30 more volunteers are expected to attend and receive red cards to comply with HB 146 requirements. Please see Appendix D for a detailed list of the volunteer fire departments, chiefs, assistant chiefs, and equipment in Emery County.

2.7 GRAND COUNTY

2.7.1 BACKGROUND

Grand County is in the east-central portion of the project area. The Anasazi (Ancestral Puebloans) were the first inhabitants of the area surrounding Moab, the county seat, near the southern boundary of the county. Moab lies on the ruins of Pueblo farming communities dating from the eleventh and twelfth centuries. These people left the area in the thirteenth century; while the reason for their departure is not definitively known, it was most likely due to drought. Nomadic Ute tribes subsequently occupied this region and were the first to encounter Europeans arriving in the Canyonlands area. In 1855, LDS missionaries attempted to settle the area, but a Ute Indian attack forced them to leave after just three months. Over the course of the next 30 years, the Moab area was intermittently used by trappers, prospectors, and cattlemen, but it was not permanently settled until the 1870s, by LDS pioneers.

By 1881 the area had a "wild west" reputation and was often used as a hideout by several outlaws, including Butch Cassidy and the Wild Bunch. As the settlement grew, the economy was based on farming and ranching, until the 1890s when mining began and a railroad was built. Oil exploration in the 1920s led to the development of the Moab Oil Field, which continues to contribute to the local economy. The discovery of uranium in 1952 began an era of extensive mineral extraction for Grand County, with the population growing from 3,000 to nearly 10,000 in only three years. Potash and salt mining and milling operations added to the local economy. In 1983 the market for uranium plunged, and most mining and milling operations ceased at that time. Today Grand County is diversifying its economy by targeting light manufacturing, tourism and recreation, the fine arts, educational programs, television and motion picture production, agriculture, and the development of natural resources (Grand County 2006).

2.7.2 VEGETATION

The dominant vegetation communities in Grand County are Colorado Plateau Piñon/juniper-Juniper Woodland, Inter-Mountain Basins Mat Saltbush Shrubland, and Colorado Plateau Piñon/juniper-Juniper Shrubland. Please see Appendix B for a list of the species found in the county.

2.7.3 GEOGRAPHY

Grand County extends from the east bank of the Green River to the western border of Colorado, and from the East Tavaputs Plateau on the north to the north boundary of Canyonlands National Park on the south. The county encompasses 2,162,827.45 acres or 3,379.42 square miles.

The Colorado River runs through the southeastern corner of Grand County, an area known for its deserts, cliffs, and plateaus. Grand County was named for the river, which was once known as the Grande River. Moab, the county seat, is the county's largest city.

2.7.4 WATERSHED CONCERNS

Grand County crosses nine watersheds (EPA 2006) (Figure 2.3). Whether the water supply will meet the water demand in the county is an issue of concern. A safe and sustainable water supply is required for any growth. The domestic water needs of the City of Moab and residents of unincorporated Spanish Valley are supplied from wells. Most wells owned by individuals draw on the shallow aquifer in the unconsolidated sands and gravels of the valley floor. The wells serving the city and the Grand County Water Conservancy District draw on the Glen Canyon Group of sandstones. This aquifer recharges in the foothills of the La Sal Mountains, then discharges to springs and wells along Mill Creek and the east wall of Spanish Valley. It yields comparatively high quality water, but the total amount of available water and the production capability are unknown. Water levels are available only in the Mill Creek–Pack Creek area, and the thickness of the aquifer is not well known in any part of the area (Four Corners Planning 2004). The uncertainty of the available water supply is a concern for both current and future residents of this watershed.

2.7.5 POPULATION

In 2005, Grand County had a population of 8,759, a 3.2 percent increase from 2000 (U.S. Census 2000). This latest population figure represents 0.35 percent of the total state population (2,469,585). In 2004, there were 4,374 household units, and in 2000, there were 2.3 persons per square mile (U.S. Census 2000). The principal towns located in Grand County are Moab (4,779) and Castle Valley (349). The population in Grand County increases in summer months due to second-home ownership and the influx of a seasonal workforce. Certain events, such as Jeep Week, attract so many visitors that Moab's population may triple for the duration of the event.

2.7.6 LAND OWNERSHIP

Grand County is 2,162,827 acres in area or 3,379.42 square miles (Table 2.5). Federally administered lands (BLM, Forest Service, Department of Defense, and NPS) make up 78.31 percent of the project area, and private land accounts for 4.64 percent.

Table 2.5 Land Ownership Grand County

Landowner	Acres	Square Miles	Percent of Total
BLM	1,558,269.98	2,434.80	72.05%
State	368,761.75	576.19	17.05%
Private	100,292.92	156.71	4.64%
National Parks & Monuments	76,560.95	119.63	3.54%
USFS	57,038.39	89.12	2.64%
Dept. of Defense	1,631.65	2.55	0.08%
Water	146.13	0.23	0.01%
Tribal	125.68	0.20	0.01%
Grand County Total	2,162,827.45	3,379.42	100.00%

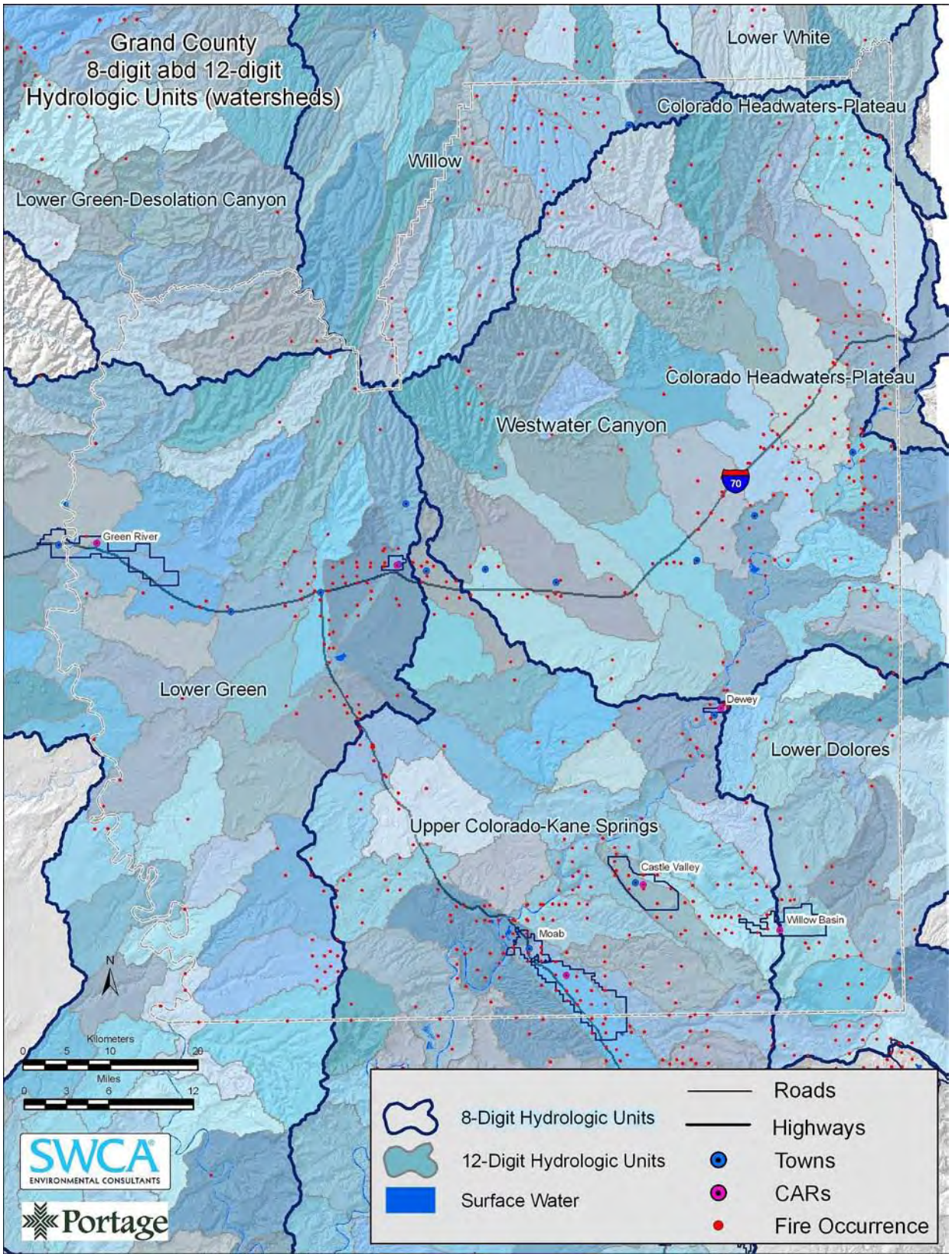

Figure 2.3. Grand County watersheds.

2.7.7 CLIMATE

For Moab, the county seat, average maximum temperature based on records from January 1890 through December 2005 is 71.4ºF, and the average minimum temperature is 40.3 ºF. The average rainfall is 9.01 inches, and the average snowfall is 9.8 inches (WRCC 2006).

2.7.8 FIRE-RESPONSE CAPABILITIES

This information will become available when a Memorandum of Understanding (MOU) is completed between the FFSL and Grand County. The MOU will provide a detailed list of the number of fire responders (including how many individuals are red-card certified), location of fire departments, and existing equipment. This information will help Grand County communities determine the ability of the local firefighters to respond to wildland fires and plan how community members and fire responders can coordinate their efforts to make the best use of existing resources and coordinate efforts to protect and preserve landscape, structures, and community values.

2.8 SAN JUAN COUNTY

2.8.1 BACKGROUND

San Juan County, at the southeastern corner of the project area, is named for the San Juan River, which flows east to west across the southern part of the county to Lake Powell. San Juan County was established in 1880; Monticello is the county seat. In 1880 a group of LDS settlers arrived in Bluff. As the settlement expanded, some pioneers relocated to Blanding and Monticello, where they practiced dry-land farming and ranching (Alldredge 2005). Bluff was the first organized Anglo-american community in the area (San Juan County Economic Development 2007). The Navajo Indian Reservation includes the portion of the county from the San Juan River south to the Arizona border.

Homesteading was possible in San Juan County through the early 1930s, and today many families in the area farm their original homesteads, primarily raising wheat (San Juan County Economic Development 2007). San Juan County's modern economy is based on livestock, agriculture, mining, and tourism (Alldredge 2005).

The dominant vegetation communities within San Juan County are Colorado Plateau Mixed Bedrock Canyon and Tableland, Colorado Plateau Piñon/juniper-Juniper Woodland, and Colorado Plateau Blackbrush-Mormon-tea Shrubland. Please see Appendix B for a list of the vegetation species present in the county.

2.8.2 GEOGRAPHY

Located in the Southeastern corner of Utah, San Juan is the largest county in the state and one of the largest in the country. It spans 5,075,226.64 acres or 7,930.04 square miles of high desert, sandstone canyons, and forested mountains on the Colorado Plateau. On the north San Juan County abuts Grand County, the western boundary is the Colorado River, the eastern border is the Utah/Colorado state line, and the southern boundary is the Utah/Arizona state line.

2.8.3 WATERSHED CONCERNS

San Juan County crosses 11 watersheds (EPA 2006) (Figure 2.4). The amount of growth in the industrial, recreational, agricultural, and residential sectors will be determined by water quality and quantity. The county is working to develop water storage areas within its boundaries (Utah Governor's Office of Planning and Budget 2003). Residents of San Juan County currently receive their drinking water from both surface and groundwater sources (EPA 2007).

2.8.4 POPULATION

San Juan County's estimated population in 2004 was 13,901, a 3.6 percent decrease since 2000 (U.S. Census 2000). The current figure represents 0.56 percent of the total state population (2,469,585). The county is sparsely populated, averaging about 1.7 persons per square mile. Roughly half the population is Diné (Navajo), with a smaller number of Utes. Most residents live in one of the 11 communities in the county, and the remainder reside on farms or ranches, in remote areas of the Navajo Reservation, or on the Ute Reservation (San Juan County Economic Development 2007). There were 5,588 housing units in the year 2004 (U.S. Census 2000). The Utah Office of Planning and Budget estimates that the population of San Juan County will increase to 15,512 by 2010 and to 16,538 by 2015 (San Juan County Economic Development 2007). The principal towns in San Juan County are Blanding (3,162) and Monticello (1,958).

2.8.5 LAND OWNERSHIP

The majority of land in San Juan County is managed by federal agencies or is part of a Native American Reservation. Private lands comprise only 8.08 percent of the total area (Table 2.6).

Table 2.6 Land Ownership in San Juan County

Landowner	Acres	Square Miles	Percent of Total
BLM	2,077,046.23	3,245.38	40.93%
Tribal	1,278,074.62	1,996.99	25.18%
Private	410,226.92	640.98	8.08%
USFS	404,125.78	631.45	7.96%
National Parks & Monuments	266,188.97	415.92	5.24%
State	263,104.71	411.10	5.18%
National Recreation Area	262,251.37	409.77	5.17%
Water	68,196.24	106.56	1.34%
Wilderness	46,011.80	71.89	0.91%
San Juan County Total	5,075,226.64	7,930.04	100.00%

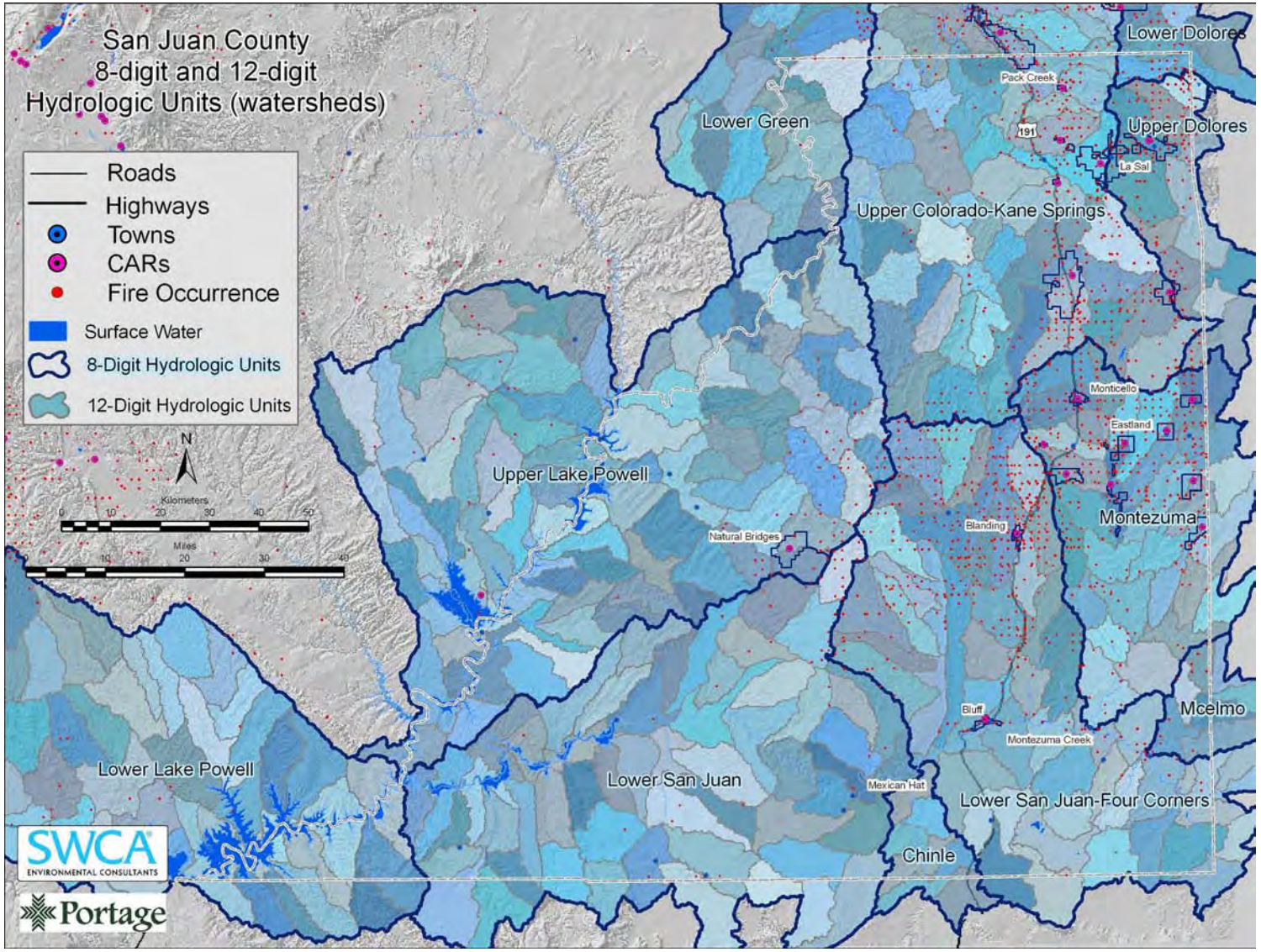

Figure 2.4. San Juan County watersheds.

2.8.6 CLIMATE

Climate varies with elevation and aspect, but generally this region experiences sunny days throughout the year. In the summer, thunderstorms can produce downpours, strong winds, and hail, while the winter months are characterized by snow accumulations in the higher elevations. The average growing season begins June 1 and ends October 1 but can be slightly longer at lower elevations. The average annual precipitation range is 1.5–14.9 inches per year (NRCS 2006). Based on records from July 1948 through December 2005, in Monticello the average maximum temperature is 59.7ºF and the average minimum is 32.6ºF, the average total precipitation is 15.19 inches per year, and the average snowfall is 59.6 inches (WRCC 2006).

2.8.7 FIRE-RESPONSE CAPABILITIES

This information will become available when an MOU is completed between the FFSL and the county. Development of the MOU is currently underway.

CHAPTER 3
RISK ASSESSMENT

3.0 OVERVIEW OF RISK ASSESSMENT

The purpose for developing the wildland fire risk assessment model was to provide a unique model for evaluating the risk of wildland fires to communities living within the WUI areas of the Southeastern Utah RWPP region. "Risk" is the likelihood that a wildfire will impact a community through damage to or loss of property or life. A risk assessment provides spatial information, using Geographic Information Systems (GIS), about level of risk associated with wildfire in relation to WUI areas and the consequences of wildfire for residents and built structures within a WUI.

Using this assessment, land-use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members to educate them about methods for reducing the damaging consequences of fire. The fuels reduction treatment areas can be implemented on both private and public land, so community members have the opportunity to actively practice treatments on their property, as well as recommend treatments on public land that they use or care about.

3.1 WILDLAND FIRE BEHAVIOR OVERVIEW

Understanding how fuels, topography, and weather interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the wildland urban interface. In the wildland environment, vegetation is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the interface is heightened. Fire spreads in three basic ways: (1) surface fire spread, where the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and resistance to control is comparatively low; (2) crown fire, where the surface fire "ladders" up into the upper levels of the forest canopy and spreads through the tops (or crowns), independent of or along with the surface fire (and when sustained is beyond the capability of suppression resources); and (3) spotting, where embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels. Resistance to control can be much higher with profuse and/or long-range spotting (more than one-half mile), meaning that this type of extreme fire behavior is of the greatest concern to communities in the path of a wildland fire.

The vegetation of an area determines critical fire characteristics such as flame length and rate of spread. It is important to recognize the limitations of the available data in predicting detailed characteristics of the vegetative fuel in the RWPP project area. Assumptions can be made about the relative fuel loading in different vegetative communities, but many other factors can be highly variable across the same general fuel type. The volume of dead and downed fuel, for example, is not part of the available data. Also, the horizontal and vertical continuity of the fuel can vary greatly based on aspect, soils, and other site-specific variables. More detailed fuel

information could greatly improve the accuracy of this assessment because the fuel is such a large contributor to the risk assessment outcome.

Treating fuels in the WUI can help to moderate intense or extreme fire behavior. Studies and observations of fires burning into appropriately treated areas have shown that the fire either drops to or remains on the surface, thus avoiding destructive crown fire. Also, treating fuels decreases spotting potential, as well as increasing the ability to detect and suppress any spot fires that do occur. Fuels mitigation efforts therefore should be focused specifically where these critical conditions could develop in or near communities at risk.

Topography is also important in determining fire behavior. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather, and rate of spread of wildfire. For example, winds can "channel" fire through valleys, canyons, and narrow drainages, where fire tends to run faster upslope than downslope.

Of the three fire-behavior components, weather is the most likely to change. Accurately predicting fire-season weather remains a challenge for forecasters, particularly during drought conditions. As spring and summer winds and rising temperatures dry fuels, particularly on south-facing slopes, conditions can often deteriorate rapidly, creating an environment that is very susceptible to wildland fire. Cured grasses, for example, can become highly flammable in as little as one hour following precipitation. With a high wind, grass fires can spread faster than a moving vehicle and can reach into a community quickly. To provide protection, a moderate-width "fuel break" carefully constructed and placed could protect a row of homes or possibly an entire community from fire. This type of defensible space can also save the lives of firefighters, as well as community members.

3.2 RISK ASSESSMENT

3.2.1 COMMUNITY BASE MAPS

A set of four community or regional base maps provides baseline information to help in assessing risk and making recommendations regarding protection and fuel reduction priorities (SAF 2004). For the Southeastern Utah RWPP, the first regional base map shows project boundaries, land ownership, wildland urban interface areas, communities at risk, transportation, and topography. The second map shows vegetation and fuels, the third shows fire occurrence, and the fourth shows the WUIs. These maps appear in Appendix E.

After initial review of the draft risk assessment, the core team decided that maps of the individual components of the risk assessment would be helpful in visualizing the steps used in the modeling progression. The RWPP maps show the modeling components (fuels, fire occurrence history, wildland urban interface) separately, so the reader can ascertain how the comprehensive model was created. In addition to these maps, the core team also decided to reference other base maps that provided useful information that was absent from the model. The weight of each layer is explained below as part of the discussion of the maps representing separate components of the model.

3.2.2 DESCRIPTION OF MODEL

SWCA created this particular risk assessment model for the Southeastern Utah RWPP by building upon past models the company has developed, with significant input from the BLM. The specific references used were the Sandoval County New Mexico Wildland Urban Interface (WUI) Area Inventory Assessment (Barz et al. 2004), the Greater Cuba New Mexico Community Wildfire Protection Plan (Forest Guild 2006), and the Utah Statewide Fire Assessment Project (Bureau of Land Management 1996).

To determine relative risk of wildfire throughout southeastern Utah, factors determining the rate of fire spread based on vegetation or fuel were combined with risk factors related to WUI areas, Communities at Risk (CARs), and Fire Occurrence data. To accurately combine these datasets and determine their appropriate and relevant weights in the modeling process, models from the reports referenced above were referred to, and whenever possible elements from these models were used to guide the development of the components of the Utah RWPP Risk Assessment.

The RWPP core team chose to analyze the relationships among three parameters, listed in order of importance: (1) fuel hazards, (2) WUI areas, and (3) fire history. Of the three factors that primarily influence the spread of wildfire—fuels, weather, and topography —only fuels were considered in the analysis.

Weather was not included because it is highly variable across the project area, exhibiting no consistent, large-scale trends. Topography (slope and aspect) were not included because many of the topographic features with steep slopes have a mixture of aspects. Furthermore, these features are often located in very remote, unpopulated areas and therefore do not present an immediate threat to communities located in the WUI. Giving these factors significant weight in the model would have decreased the weights assigned to other factors (fuels, WUI areas, and fire occurrence), potentially skewing the risk assessment results, since all of the factors in the weighted model need to add to 100 percent. Conversely, WUI areas were assigned a significant weight because of the potential loss of life and property.

Once the datasets were modified, the process of testing and weighting different variables in the model was completed with input from the core team. Using existing fire modeling literature, CWPPs, and guidance from wildland fire professionals, the core team and GIS specialists from SWCA developed the weighted model. The RWPP model was assembled using a spatially weighted overlay model with GIS technology. A weighted overlay takes data with the same scale and combines them with user-defined weights for each dataset, so that the outputs will be on the same scale as the inputs and the influence, or weight, of any one dataset is related to its significance in the output. The overall goal was to integrate multiple datasets into a comprehensive map of risk.

Table 3.1 lists the individual datasets and the relative weights assigned within the modeling framework. The steps in developing the weighted model are described.

Table 3.1. Data Used in Developing Model

Dataset/Layer	Data Source and Year	Weight	Risk Classes
Fuels/Vegetation	Southwest Regional Gap Analysis Project, USGS 2004	40%	See Appendix F Risk Values Assigned to SWReGAP Vegetation
Wildland Urban Interface Areas	Southeastern Utah WUI polygons, 2005	40%	4 = within the WUI polygon 3 = between the WUI polygon and the 0.5-mile buffer 2 = between the 0.5- and 1.50-mile buffers 1 = beyond the 1.50-mile buffer
Fire Occurrence	BLM, USFS, and State Fire History Data, 1973–2005	20%	4 = More than 1.0 fire per square mile 3 = 0.2–1.0 fire per square mile 2 = 0.0–0.2 fire per square mile 1 = 0.0 fire per square mile

Spatial Modeling: The weighted overlay process used to create the output data for the risk assessment was carried out in ArcGIS 9.1 Spatial Analyst. The model used different variables as model inputs, first giving them an evaluation scale and an influence factor. Each of the datasets used in the model first had to be converted from its native file format into a GRID format, a raster layer comprising rows and columns of same-sized pixels, or mapping units. For the purposes of this project, each pixel contained one discrete value, and each mapping unit was 30 × 30 m (900 m2). This data type yields complementary datasets in which the grids, when overlapped, are vertically integrated. The model was generated using the most accurate and current pre-existing GIS data available, and the data were assessed for quality, accuracy, and scale.

Evaluation Scale (1–4): Each of the original cell values (e.g., vegetation, proximity to a populated area, fire occurrence density) was reclassified with a new value between 1 and 4, based on the significance of the data (1 = lowest, 4 = highest). The output of these models, therefore, consisted of datasets with cell values between 1 and 4 (1 = Low, 2 = Medium, 3 = High, 4 = Extreme) denoting fire risk.

Influence Factor (percent): The influence factor is the weight value given to each data layer in the model based on the relative importance of the layer in the model.

3.2.3 FACTORS IN RISK ASSESSMENT

After much collaboration between core team members and other stakeholders, the list of factors/variables to be used in the risk assessment model was narrowed down to three or five, depending on the region. Discussions for many regions centered on variables that might be used for larger-scale, community-based wildfire protection plans. Ultimately the core team and other stakeholders for the Southeastern Utah region decided to adopt an approach best suited for a region-wide risk assessment and limited to three the number of variables to be considered: fuel hazards, communities at risk, and fire history. These factors were deemed to best identify the level of risk associated with wildland fire for communities within the WUI. Each factor was assigned a weight that correlated with its role in the level of risk associated with wildland fire.

3.2.4 DESCRIPTION OF FACTORS INCLUDED IN THE MODEL

3.2.4.1 FUELS/VEGETATION

The fuels/vegetation model factors were derived from the SWReGAP vegetation data (USGS 2004). The maps showing the fuels and vegetation, WUI areas, and wildfire occurrence are included in Appendix G. The table in Appendix F shows each vegetation group and its associated risk value. Risk values for the vegetation groups were determined by Wildland Fire Associates, a subcontracted consulting firm specializing in fire management and planning.

3.2.4.2 WILDLAND URBAN INTERFACE AREAS

The model considered ranges of distances from the WUI area as a factor in the analysis. A multi-ring buffer analysis was performed on the WUI areas. The buffer rings around the WUI areas ranged from 0.5 miles and 1.50 miles, creating four zones. Each zone was classified with a risk value between 1 and 4, with 1 being low risk and 4 being extreme risk.

- WUI areas = 4 (Extreme)
- 0.5 mile range from WUI areas = 3 (High)
- 0.5 to 1.50-mile range from WUI areas = 2 (Medium)
- 1.50-miles and greater from WUI areas = 1 (Low)

3.2.4.3 WILDFIRE OCCURRENCE

The wildfire occurrence data used in the model were collected from federal and state sources. Multiple datasets were needed to include fire occurrences on private, state, and federal lands and be utilized in the risk model. Fire occurrence data were for the years 1973–2006. The application of the evaluation scale (risk value) for fire occurrence was based on the following criteria:

- More than 1 fire / square mile= 4 (Extreme)
- 0.2–1 fire / square mile= 3 (High)
- 0–0.2 fire / square mile= 2 (Medium)
- 0 fires / square mile = 1 (Low)

3.2.4.4 OVERALL RISK

The overall risk was derived using the following formula:

- Risk = 0.40 Fuels + 0.40 WUI + 0.2 Fire Occurrence

3.3 RISK OF IGNITION AND REDUCING STRUCTURAL IGNITABILITY

A regional wildfire protection plan addresses in a general way actions community members can take to reduce the risk of structural ignitability. The specific details and strategies for reducing risk should be identified and discussed in local community wildfire protection plans. Appendix H, Defensible Space Checklist, provides guidelines for creating defensible space around a built structure. Other actions that may be implemented to reduce the risk include firewise landscaping, removal of invasives, building with fire-resistant construction materials, harvesting timber to improve fuels reduction, developing fuel breaks, and removing flammable materials that are adjacent to buildings.

3.4 RESULTS AND FINDINGS

The risk assessment ranked 33.62% of the project area as low risk, 60.00% as medium risk, 5.91% as high risk, and 0.47% as extreme risk. The significance of these data is that while southeastern Utah has a low population density overall, the areas at high and extreme risk surround population centers in communities, towns, and cities throughout the region. Some small communities in remote locations are at high risk as well. For these isolated areas the wildfire response time is much greater than for population centers, creating a potentially more difficult scenario for wildland fire responders.

Figure 3.1 shows the results of the fire risk assessment. The areas in red identify the areas at extreme risk, orange identifies high-risk areas, yellow identifies moderate risk, and green identifies low risk.

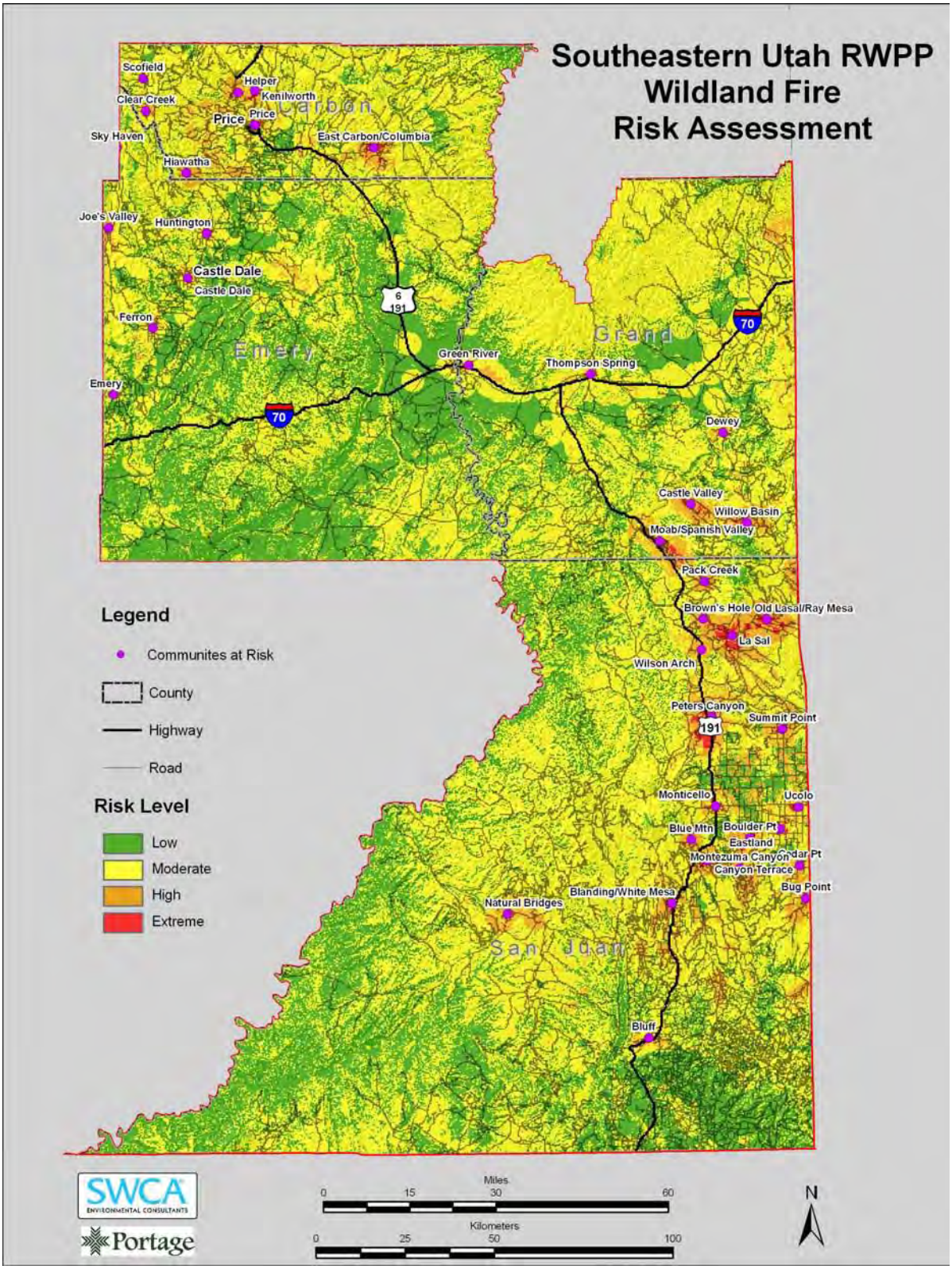

Figure 3.1 Results of fire risk assessment for Southeastern Utah region.

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CHAPTER 4
PRIORITIES AND RECOMMENDATIONS

4.0 INTRODUCTION

The primary goals of the Southeastern Utah RWPP are to provide general recommendations for fuels reduction projects and for education and awareness about preparing for wildland fire. The recommendations are aimed at protecting the landscape and infrastructure, as well as other community values. These recommendations also provide guidance and direction for counties and communities within the region in preparing CWPPs addressing specific local needs regarding fuels, topography, and public knowledge. The recommendations are general in nature and may be used throughout the entire region.

4.1 RECOMMENDATIONS FOR EDUCATION AND AWARENESS

4.1.1 WRITE CWPPs AT THE COUNTY AND COMMUNITY LEVELS

All counties that do not have a county-level wildfire protection plan in place or in process (Carbon, Grand, San Juan) should complete one. Communities within the counties, particularly those with extreme risk factors, are also encouraged to write a CWPP. Local plans should define the WUI, identify the location of the community in relation to the WUI, make site-specific recommendations, identify land ownership within the community, and address any issues specific to that area.

Twelve communities in southeastern Utah have completed CWPPs: Castle Valley, Pack Creek, Wray Mesa/La Sal, Blanding, Eastland, Canyon Terrace, Montezuma Canyon, Blue Mountain Ranch, Scofield Mountain Homes, Clear Creek, Joes Valley, and East Carbon/Columbia. One county and eight communities will have completed CWPPs by December 2007: Emery County, Green River, Bluff, Price, Monticello, Kenilworth, Spring Glen, Aspen Cove, and Tavaputs.

4.1.2 PLAN EVACUATION ROUTES

In reviewing existing CWPPs and in conversations with state and local fire wardens and emergency services offices, it became apparent that no formal evacuation routes exist for southeastern Utah. Therefore, the core team recommends planning such routes at both the regional and county level, and making this information easily accessible to community members in the project area. Ingress and egress roads are commonly used as evacuation routes, and some local CWPPs identify the routes that should be used in the event of wildland fire.

4.1.3 INCREASE USE OF SIGNS

In rural southeastern Utah, many roads do not have signs. Although this issue is being addressed in some areas, particularly in communities in San Juan County, the issue needs to be addressed at regional level. This lack of identification may cause unnecessary confusion for fire responders, particularly for those coming to the area for the first time, leading to dangerous delays. In the

event of a fire, the response time may be the difference between saving or losing a structure or life.

Although some homeowners who live in the WUI have chosen to live there for the seclusion and privacy these locations offer, homeowners and fire wardens should work together to identify roads and home numbers with proper signage. GIS, primarily a mapping tool, can also be used to identify the location of homes and structures with precision so that fire responders can reach endangered locations as quickly as possible.

4.1.4 IDENTIFY UTILITIES IN PROJECT AREA

Wildland fires can threaten utilities and power sources, the loss of which impacts communities. Figure 4.1 identifies utilities and power sources in southeastern Utah and should be used in planning how to protect communities in the event of wildland fire.

4.1.5 ORGANIZE WILDFIRE RESPONSE

Successful fire response begins with sound organization. To effectively carry out their responsibilities, fire responders need accurate, detailed information. Furthermore, both fire responders and community members need to be well informed about how to react to fire. The suggestions listed below can help firefighters and community members improve their wildfire-response capabilities:

- Provide adequate fire-fighting training for both volunteer and professional fire responders (including red card training)
- Provide training reimbursement for volunteer firefighters
- Improve roads to provide access
- Improve GIS data acquisition for roads and location of residences in rural communities for use of local fire departments
- Obtain accurate e-911 data
- Acquire adequate equipment (some may be purchased from federal agencies)
- Improve communication between local and federal agencies for wildland fire response

4.1.6 ACTIONS FOR HOMEOWNERS

These recommendations are designed to change the traditional attitudes toward fire protection and planning that perpetuate the destructive cycle of wildland urban interface fires. The cycle is created when an individual builds a home in the WUI, a wildfire occurs, the home is destroyed or severely damaged, and the homeowner then rebuilds in the same area without making appropriate modifications to protect the new house. In many cases, people use low-cost loan programs and insurance funds that are available for rebuilding to construct the same house, or an even larger one, with the same vegetation, creating the same conditions that existed around the original home. In spite of their experience with fire, they do not prepare for future fires.

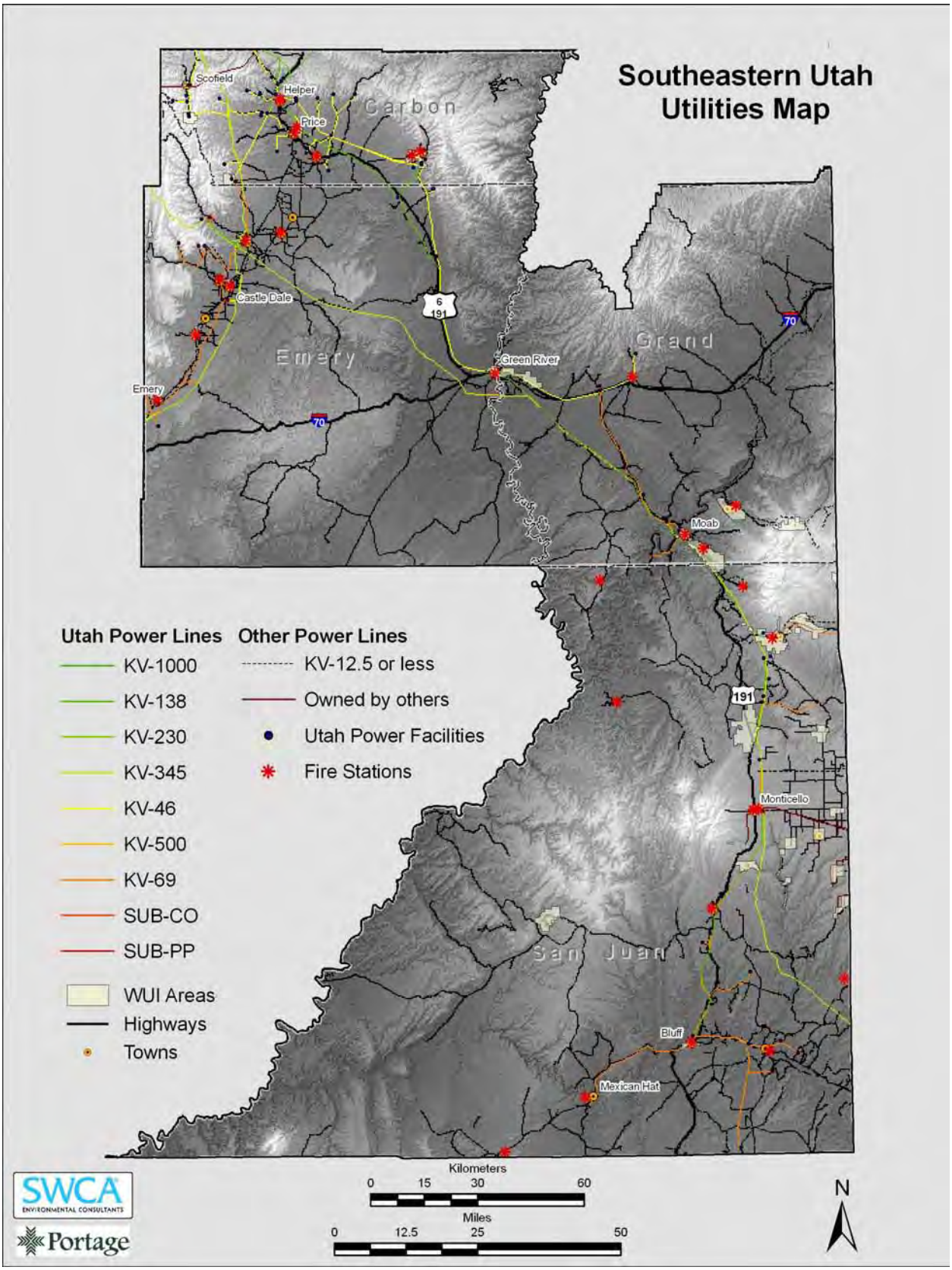

Figure 4.1 Southeastern Utah utilities map.

Creating defensible space around one's home is one strategy for taking responsibility for the management, preservation, restoration, and mitigation associated with wildland fires. Defensible space is "an area typically the width of 30 feet or more, between an improved property and a potential wildfire where the combustibles have been removed or modified" (Firewise Communities 2003). Creating defensible space is one of the primary methods for preparing for a wildland fire. Keeping the yard lean, clean, and green, eliminating ladder fuels, cleaning the roof of debris, and maintaining an emergency supply of water are some of the many techniques used to prepare for fire. Detailed information and how-to guides can be obtained at www.firewise.org and www.utahfireinfo.gov, and in Firewise Landscaping for Utah by Michael Kuhns and Barbara Daniels, Extension Utah State University.

4.1.7 EDUCATE YOUTH THROUGH SCHOOL PROGRAMS / CURRICULA

Education on fire safety is recommended beginning in elementary school. Programs such as Smokey the Bear have been highly effective. Educators and fire experts have the opportunity to collaborate to create fire education curricula that could be incorporated into local elementary schools.

4.1.8 USE PHONE LISTS

Phone lists allow community members to communicate with one another and transfer information quickly. They are effective in small communities, where people tend to be known to or know of other residents. The phone numbers of all emergency responders should also be included on the list.

4.2 RECOMMENDATIONS FOR PRIORITY FUELS TREATMENTS

Some recommendations for fuels-reduction projects are appropriate for the scale of this RWPP and are listed below. However, actual fuel hazards, and thus potential pre- and post-treatment fire behavior, call for more detailed on-site evaluation by knowledgeable officials. In addition, areas in and adjacent to identified high-priority treatment locations should be evaluated for fuels-treatment suitability. Aesthetics and community acceptance, recreational values, erosion potential, fuels type and arrangement affecting local fire behavior, availability of suppression resources, and natural barriers are a few examples of on-site evaluation criteria. Prioritized fuels treatments are briefly discussed in this section.

4.2.1 METHODS FOR FUELS REDUCTION

The purpose of any fuels reduction treatment is to protect life and property by reducing the potential for catastrophic wildfire. Moderating extreme fire behavior, reducing structural ignitability, creating defensible space, providing safe evacuation routes, maintaining roads for firefighting access, and minimizing resistance to control are some methods of fuels reduction. In forested areas, these objectives can be met by reducing surface fuels, increasing canopy base heights, decreasing crown density, and incorporating natural barriers and fuel breaks into treatment plans. For woodlands, grasslands, and shrublands, a variety of additional methods can be considered (Table 4.1).

Table 4.1. Fuels Reduction Treatment Types

Treatment Method/ Strategy	Description	Desired Outcome	Limitations/Advantages
Thinning – Manual	Removal of selected trees with chainsaws; can be full, partial, or patch-cuts	Reduces competition, crown fire potential (laddering, canopy spacing); increases resistance to drought, insect infestation	Thinning without slash removal or burning can create greater fire hazard than before; good in areas machines cannot reach; production generally slower than machine thinning; stumps should be flush-cut where appropriate
Thinning – Machine	Removal of selected trees with machinery; can be full, partial, or patch-cuts	Same as above	Must remove or consume slash; use of machinery may be more cost-effective and faster than manual method; potential for environmental damage; access may be limited in some areas
Pruning	Raising the crown base to reduce laddering potential	Keeps wildfires on surface, lowers resistance to control	Generally done manually along with surface fuel reduction; must remove/consume debris
Hand Piling	Staging debris from thinning, pruning, or dead/down surface fuels	Removes/consumes excess fuels from area, generally by burning (see below)	High per-acre costs; method used on steeper slopes
Machine Piling	Same as above	Same as above	Environmental damage possible; may be more cost-effective than hand piling; works best on flatter terrain with stable soils and open areas
Lop and Scatter/Crushing	Manual or machine tree/branch cutting and spreading debris over area for later burning; crushing reduces material size and shape, prevents fuels concentrations	Reduces crown fire potential, changes fuel size and shape, allows for reduced resistance to control of wildfires once dispersed and burned	Less labor intensive with machinery; used in areas where other natural resource issues are not a concern
Mastication (chipping/grinding)	Using a chipper or grinder to reduce the size of woody debris	Reduces woody fuels, moderates potential fire behavior	Chipping is comparatively expensive; chips decompose slowly in project area, may produce high smoke volumes if burned; can be used for mulching, landscaping
Pile Burning	Consumes debris on site	Consumes ideally 80–100% of piled fuels in project area; moderates potential fire behavior	Winter burning results in least soil damage; possible scorch of nearby live trees; can be used in preparation for later broadcast / underburn

Table 4.1. Fuels Reduction Treatment Types, continued

Treatment Method/ Strategy	Description	Desired Outcome	Limitations/Advantages
Broadcast/ Underburning	Application of fire on a landscape to accomplish specific fuels management objectives	Reduces potential for extreme fire behavior and reduces resistance to control	Can use aerial or hand ignition to create light or more intense burn; cost per acre comparatively low; can be accomplished during cooler periods for ease of control; requires careful pre-burn preparation and adequate resources
Chemical Treatment	Application of approved biocide to kill target species and reduce fuels	Successful treatments can help modify fuels and reduce potential fire intensity to a limited degree	Additional environmental clearances required; may also impact non-target species, adversely affect water quality and animal habitat; costly to apply across large areas
Mowing	Mechanical reduction of small shrubs and grasses	Can provide temporary fuel breaks along roadsides or around values at risk	Cost is relatively high; must mow every growing season
Treatment Method/ Strategy	Description	Desired Outcome	Limitations/Advantages
Biological Treatment (grazing)	Consumption of surface herbaceous fuels in a given area to create fuel breaks or reduce fuel loading	Same as above	Costs comparatively low; must provide fencing or other confinement structure; must graze animals every growing season; goats have been successfully used in some areas
Maintenance/ Monitoring	Each treatment method requires periodic maintenance and monitoring to maintain effectiveness	Varies by treatment method	A maintenance schedule and monitoring plan should be included with each treatment prescription, including estimated costs

It is important to note the numerous beneficial effects of fuels treatments on living ecosystems. Treatments that include one or more methods and consider natural resources management as well as fuel reduction objectives are likely to be most sustainable in the long term. Further, treatments must also maintain their effectiveness over time with a maintenance plan designed for future re-entry into the project area. For example, depending on the initial treatment, maintenance of an original prescribed burn area with a second entry burn is typically less complex than the original treatment.

The goal of fuels treatments is not to eliminate fire, but rather to reduce the potential for catastrophic fire and its associated impacts. Table 4.1 describes a variety of possible treatment methods that are currently being applied or have been applied in the past, along with the desired outcome and the possible limitations and advantages of each option. This list is by no means exhaustive; again, a combination of methods is often the most successful strategy on the ground. It is the responsibility of the local fire management official to determine, with input from the stakeholders affected, which method(s) will safely accomplish the fuels management objectives

for a given project area. Finally, a well-conceived monitoring strategy should be integral to any treatment prescription to ensure that objectives are being met in a cost-effective manner.

The notion of "partial" protection of an at-risk community or area from catastrophic wildfire needs to be considered when designing fuels treatments. A less-than-thorough fire treatment program may create an illusion of community protection. In particular, areas classified as extreme risk or high risk require the type and level of treatment and maintenance that achieves the fuels reduction objective necessary to maximize protection of life and property.

4.2.2 RECOMMENDATIONS FOR AT-RISK COMMUNITIES

The following section identifies the communities within the project area assessed as being at high to extreme risk for which current information available. Fuels-reduction treatments are recommended for these communities. The core team has prioritized the need for fuels treatments for these communities based on whether they have a CWPP. Communities with CWPPs are first priority (#1), those with a CWPP in progress are second priority (#2), and those without a CWPP in place or in progress are third priority (#3). Figure 4.2 shows the locations of the priority treatment areas.

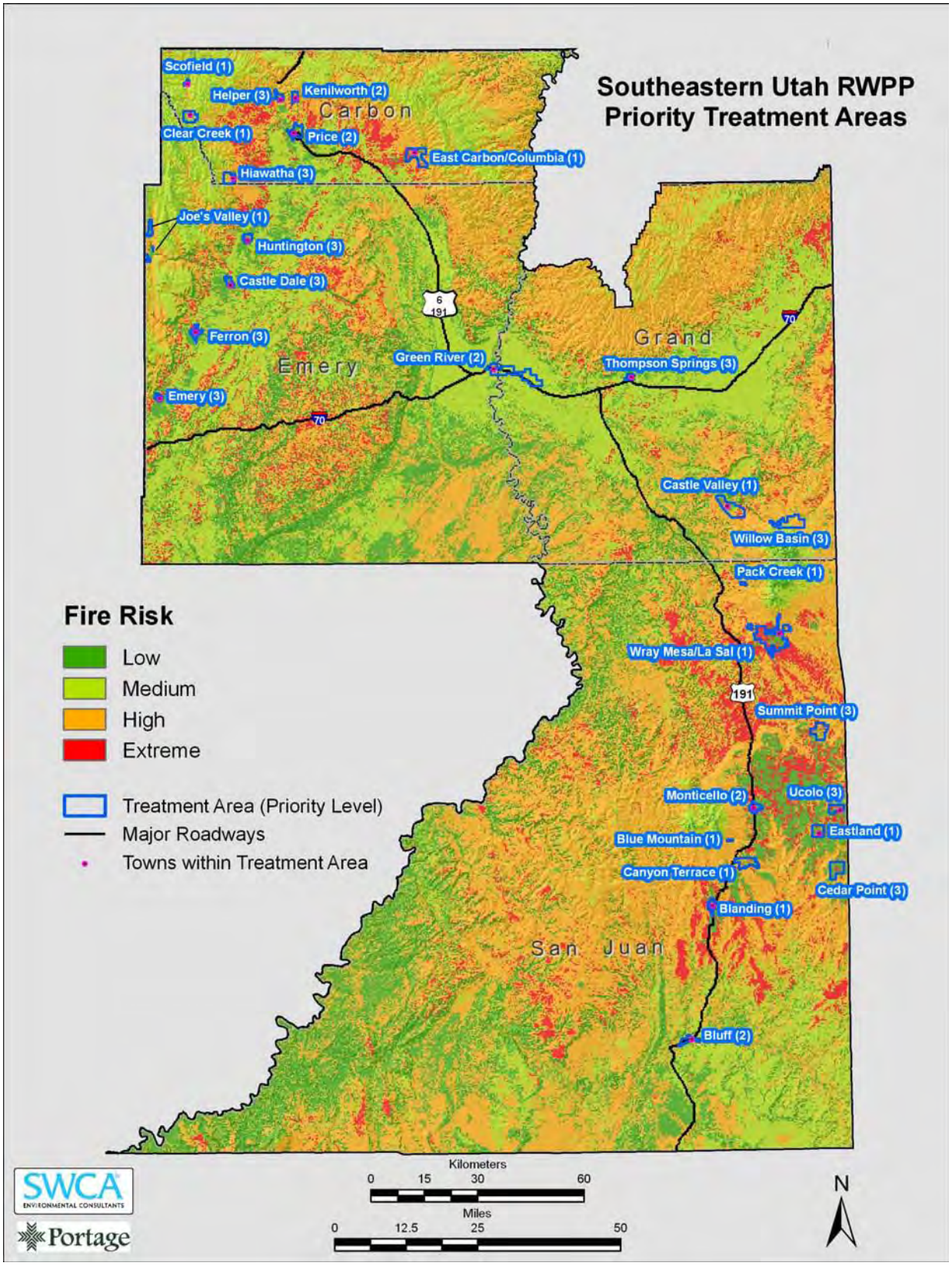

Figure 4.2. Southeastern Utah RWPP priority treatment areas.

CLEAR CREEK, CARBON COUNTY

Priority Level: #1

Fuels: Clear Creek is dominated by mixed sub-alpine fir, Douglas-fir, and aspen forest fuel types.

General and local weather patterns: Prevailing winds are from the north, and local winds are influenced by the nearby canyons, with annual precipitation occurring mainly in the winter and spring months as snow and rain. Precipitation usually occurs year-round, though there are years of drought. The average annual precipitation is 23.05 inches. The annual average maximum temperature is 52 ºF, and the annual average minimum temperature is 23 ºF.

Topography: The average elevation in this area is 8,303 feet. The predominant aspect is north, with an average slope of 60 percent.

Why treatment is needed: Fuels need to be decreased within and around Clear Creek to create defensible space in and around the community.

What is currently in place: The community has a working CWPP with identifiable goals and objectives. The goals and objectives include but are not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating/maintaining facilities and equipment.

What is needed: The Clear Creek CWPP needs to be updated to reflect completed and planned projects, and education efforts need to be continued.

EAST CARBON/COLUMBIA, CARBON COUNTY

Priority Level: #1

Fuels: The dominant fuels are sagebrush and grass. Cottonwood and piñon/juniper-juniper are also present.

General and local weather patterns: Prevailing winds are from the north and northeast, with local canyon-influenced winds. Annual precipitation averages 13.52 inches and occurs mainly in the winter and spring months as snow and rain. The annual average maximum temperature is 60.5ºF and the annual average minimum temperature is 36.5ºF.

Topography: The average elevation is 6,300 feet. There is no readily identifiable aspect, as the terrain is flat and rolling, with an average slope of 15 percent.

Why treatment is needed: Dead, down, and dying trees/brush need to be removed and fuel breaks need to be created around the community. These actions will decrease the impacts of wildfire on the community.

What is currently in place: The community has a working CWPP with identifiable goals and objectives. The goals and objectives include but are not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating or maintaining facilities and equipment.

What is needed: East Carbon's CWPP needs to be updated to reflect new and existing planned projects, and education efforts need to be continued.

HELPER, CARBON COUNTY

Priority Level: #3

Fuels: The fuels surrounding Helper are dominated by piñon-juniper steppe type vegetation. Sagebrush and grass occur in places where the dominant fuel type is not continuous.

General and local weather patterns: Prevailing winds are from the north, and canyon winds are gusty in the morning. Annual precipitation occurs mainly in the winter/spring months as snow and rain, averaging 3–6 inches in the summer and 6–10 inches in the winter. The average annual precipitation is 14.4 inches. The average daily temperatures range from 0 to 77ºF (average annual maximum and minimum temperature data not available).

Topography: The average elevation in this area is 5,800 feet. The aspect is generally east/northeast, with an average slope of 30 percent.

Why treatment is needed: Defensible space needs to be created in and around the community.

What is currently in place: Currently this community does not have a CWPP.

What is needed: A CWPP is needed to address all wildfire-related issues that are important to this community.

HIAWATHA, CARBON COUNTY

Priority Level: #3

Fuels: The predominant fuel types are piñon-juniper and sagebrush steppe discontinuous grass cover. Mixed deciduous scrub oak, rabbitbrush, and bitterbrush are also present, with cottonwoods in some areas.

General and local weather patterns: Prevailing winds are from the north, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average precipitation is 6–10 inches in the summer and 10–12 inches in the winter. The annual average precipitation is 13.79 inches. The annual average maximum temperature is 56.2ºF and the annual average minimum temperature is 33.8ºF.

Topography: The average elevation in this area is 7,350 feet. The aspect is east, with an average slope of 30–40 percent.

Why treatment is needed: Fuels need to be decreased in and around the community to create defensible space, improve fire response time, and protect community values at risk.

What is currently in place: This community does not have a CWPP at this time.

What is needed: A CWPP is needed to address all wildfire-related issues that are important to this community.

KENILWORTH, CARBON COUNTY

Priority Level: #2

Fuels: Piñon-juniper and sagebrush steppe is the predominant fuel type, intermixed with sagebrush and annual grasses.

General and local weather patterns: Prevailing winds are from the west, with annual precipitation occurring mainly in the winter and spring months as snow and rain. The average annual precipitation is 9 inches. The average annual maximum temperature is 54ºF and the annual minimum temperature is 30ºF.

Topography: The average elevation is 6,485 feet. The predominant aspect is southwest, with an average slope of 15 percent.

Why treatment is needed: Fuels need to be decreased to reduce potential wildfire intensity and impact in and around the community.

What is currently in place: A CWPP for Kenilworth was in draft form as of January 2007 and was to be completed by March 2007. The CWPP identifies goals and objectives, which include but are not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating/maintaining facilities and equipment.

What is needed: When the CWPP is finished, it will provide the community with the tools and capabilities to complete future wildfire protection projects.

PRICE, CARBON COUNTY

Priority Level: #2

Fuels: The predominant fuel types are piñon-juniper sagebrush steppe, with discontinuous grass cover. The Price River is currently dominated by Russian olive and salt cedar. Historically the riparian area surrounding the river would have supported cottonwood and willow.

General and local weather patterns: Prevailing winds are from the north and west, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average annual precipitation is 9.41 inches. The annual average maximum temperature is 63.7ºF and the average minimum is 36.1ºF.

Topography: The average elevation is 5,500 feet. The topography is flat and rolling, with an average slope of 0–10 percent. The predominant aspect is southwest.

Why treatment is needed: The Price River corridor needs to be protected and enhanced to reduce wildfire potential and intensity throughout the community. The presence of Russian olive and salt cedar in the riparian area needs to be reduced to protect the components of the foundation of the community, such as water and the economy.

What is currently in place: A Price River Enhancement Committee is in place to address how best to restore the Price River corridor. The committee is considering preparing a CWPP as one possibility.

What is needed: A CWPP is needed to address all of the wildfire-related issues important to this community.

SCOFIELD, CARBON COUNTY

Priority Level: #1

Fuels: The vegetation is dominated by mixed sub-alpine fir, Douglas-fir, and aspen forest.

General and local weather patterns: Prevailing winds are from the west/northwest, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Precipitation usually occurs year-round, though there are periods of drought. The average annual precipitation is 17.22 inches. The average maximum temperature is 52.9ºF and the average minimum temperature is 20.4ºF.

Topography: Average elevation in this community is 7,702 feet. There is no readily identifiable predominant aspect, though there is a general trend toward the north. The average slope is 20–25 percent in the valley and 40–50 percent in adjacent communities.

Why treatment is needed: Hazardous fuels need to be decreased within and around Scofield. Creating defensible space in and around the community will decrease the threat of wildland fire, which is significant due to the large area of trees damaged or killed by beetles.

What is currently in place: The community has a working CWPP with identifiable goals and objectives, including but not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating/maintaining facilities and equipment.

What is needed: The Scofield CWPP needs to be updated to reflect completed, planned, and proposed projects. A second viable ingress/egress route and continued education are also needed.

CASTLE DALE, EMERY COUNTY

Priority Level: #3

Fuels: The predominant fuel types are piñon-juniper and sagebrush steppe, with discontinuous grass cover. Mixed deciduous, scrub oak, rabbitbrush, bitterbrush, and cottonwoods are also present in some areas.

General and local weather patterns: Prevailing winds are from the north/northwest, with annual precipitation occurring mainly in the winter and spring months as snow and rain. The average annual precipitation is 7.75 inches. The average annual maximum temperature is 63ºF and the average annual minimum temperature is 31.3ºF.

Topography: Average elevation is 5,700 feet. The aspect is east/southeast with an average slope of 20 percent.

Why treatment is needed: Fuels need to be reduced inside the adjacent drainages to reduce fire risk and protect the watershed to the west of Castle Dale.

What is currently in place: A CWPP does not exist at this time. However, Emery County has created a county wildfire protection plan, which was expected to be completed in February 2007. This plan addresses many of the larger issues in relation to the protection of the watersheds in the county.

What is needed: A CWPP is needed to address all of the issues related to wildfire that are important to this community.

EMERY, EMERY COUNTY

Priority Level: #3

Fuels: The dominant fuels in Emery are piñon-juniper woodland and sagebrush steppe types, with discontinuous grass cover.

General and local weather patterns: Prevailing winds are from the northwest, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average annual precipitation is 7.33 inches. The average annual maximum temperature is 60.6ºF and the average minimum temperature is 31.3ºF.

Topography: The average elevation is 6,300 feet. The aspect is east/southeast, with an average slope of 20 percent.

Why treatment is needed: Fuels need to be reduced in most of the adjacent drainages, in the town, and in the watershed west of the community to reduce potential fire intensity.

What is currently in place: The Town of Emery does not have a CWPP at this time. However, Emery County has a wildfire protection plan in preparation that was expected to be completed in February 2007. This plan addresses many of the larger issues related to the protection of the watersheds in the county.

What is needed: A CWPP is needed to address all of the wildfire-related issues important to this community.

FERRON, EMERY COUNTY

Priority Level: #3

Fuels: The dominant fuel types are piñon-juniper and sagebrush steppe, with discontinuous grass cover. Mixed deciduous scrub oak, rabbitbrush, and bitterbrush are also present, with cottonwoods in some areas.

General and local weather patterns: Prevailing winds are from the north/northwest, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average annual precipitation is 8.47 inches. The average annual maximum temperature is 62.2ºF and the average minimum temperature is 34.6ºF.

Topography: The average elevation in this area is 6,000 feet. The aspect is east/southeast, with an average slope of 10–20 percent.

Why treatment is needed: Hazardous fuels and the potential for fire intensity need to be reduced in drainages and in and around the community, including Cottonwood Creek.

What is currently in place: Ferron does not have a CWPP at this time. Emery County has a wildfire protection plan in preparation, with completion expected in February 2007. This plan addresses many of the larger issues related to the protection of the watersheds in the county.

What is needed: A CWPP is needed to address all of the wildfire-related issues important to this community.

GREEN RIVER, EMERY COUNTY

Priority Level: #2

Fuels: The predominant fuel types are sagebrush and grass. Russian olive and salt cedar are also present in riparian zones.

General and local weather patterns: Prevailing winds are from the northwest, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average annual precipitation is 6.34 inches. The average annual maximum temperature is 69.6ºF and the average minimum temperature is 35.6ºF.

Topography: The average elevation is 5,000 feet. There is no readily identifiable aspect, as the terrain is flat and rolling, with an average slope of 15 percent.

Why treatment is needed: Russian olive and salt cedar in the major drainage systems need to be reduced to restore the riparian ecosystem, reduce the potential for soil erosion, and protect the infrastructure of the community.

What is currently in place: A CWPP was in draft form as of January 2007 and should be completed by March or April 2007. The CWPP identifies goals and objectives, which include but are not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating/maintaining facilities and equipment.

What is needed: The completed CWPP will give the community the tools and capabilities needed to complete wildfire-protection projects.

HUNTINGTON, EMERY COUNTY

Priority Level: #3

Fuels: Piñon-juniper and sagebrush steppe are the predominant fuel types, with discontinuous grass cover. Mixed deciduous scrub oak, rabbitbrush, and bitterbrush are also present. In riparian areas, cottonwoods, Russian olive, and salt cedar are prevalent.

General and local weather patterns: Prevailing winds are from the north/northwest. Local winds are influenced by down-slope and down-canyon winds. Annual precipitation occurs mainly in the winter/spring months as snow and rain. Average annual precipitation is 8 inches. Average annual maximum temperature is 60ºF, and average annual minimum temperature is 30ºF.

Topography: The average elevation is 5,800 feet. The aspect is east, with rolling hills and small creeks through the town and an average slope of 20 percent.

Why treatment is needed: Fuels need to be decreased in and around the community to create a fuel break in the piñon/juniper-juniper areas and to protect the watersheds in Huntington Canyon from catastrophic fire.

What is currently in place: Huntington does not have a CWPP at this time. However, Emery County has a wildfire protection plan in the final stages of preparation that was expected to be completed in February 2007. This plan addresses many of the larger issues related to the protection of the watersheds in the county.

What is needed: A CWPP is needed to address all of the wildfire-related issues important to this community. The CWPP would also need to address the encroachment and potential treatment of salt cedar and Russian olive.

JOE'S VALLEY, EMERY COUNTY

Priority Level: #1
Fuels: The dominant fuel types around this community are perennial grass and timber. Cottonwood, sagebrush, oak brush, and sub-alpine fir are also present.

General and local weather patterns: Prevailing winds are from the north and east, with annual precipitation occurring mainly in the winter/spring months as snow and rain. Average annual precipitation is 8–25 inches. The average annual maximum temperature is 60ºF, and the average annual minimum temperature is 30ºF.

Topography: The elevation is 7,000 feet. The predominant aspect is east, with an average slope of 20 percent.

Why treatment is needed: Fuels need to be decreased by removing dead, down, and dying trees to create defensible space within the community and to protect the community's primary source for both municipal and irrigation water, Reeder Creek.

What is currently in place: The community has a working CWPP with identifiable goals and objectives, which include but are not limited to decreasing fuels through state-funded projects and in-kind work, community education, and updating/maintaining facilities and equipment. Also, the first phase of a two-phase project to remove the dead, down, and dying trees in Reeder Creek is 95 percent complete.

What is needed: The Joe's Valley CWPP needs to be updated to reflect both completed and planned projects, and a plan for continued education needs to be prepared.

CASTLE VALLEY, GRAND COUNTY

Priority Level: #1

Fuels: The predominant fuel types present in Castle Valley are piñon-juniper, sagebrush, rabbitbrush, and annual and perennial grasses. Some hardwoods exist on the north end of the valley where water is readily available.

General and local weather patterns: The average annual precipitation is 10.73 inches. The annual average maximum temperature is 67ºF and the average annual the minimum temperature is 41ºF.

Topography: The predominant aspect is northwest. The average slope is 6 percent, ranging from 3 to 10 percent.

Why treatment is needed: Treatment is needed to decrease fuels to reduce potential wildfire intensity and impacts in and around the community.

What is currently in place: The community has a working CWPP with identifiable goals and objectives, which include but are not limited to decreasing fuels through state-funded projects and in-kind work, education, and updating/maintaining facilities and equipment.

What is needed: The CWPP needs to be updated to reflect completed, planned, and proposed projects.

PACK CREEK, GRAND COUNTY

Priority Level: #1

Fuels: The fuel types that dominate Pack Creek include piñon-Juniper, riparian hardwoods, and sagebrush, as well as annual and perennial grasses.

General and local weather patterns: Prevailing winds are from the west in the morning and the east in the evening, with average annual precipitation of 9 inches. The average annual maximum temperature is 40ºF and the average annual minimum temperature is 70ºF.

Topography: Average slope is 5 percent, ranging from 0 to 10 percent. The predominant aspect is northwest.

Why treatment is needed: Treatment is needed to decrease fuels to reduce potential wildfire intensity and impacts in and around the community.

What is currently in place: The community has a working CWPP with identifiable goals and objectives, which include but are not limited to decreasing fuels through state-funded projects and in-kind work, education, and updating/maintaining facilities and equipment.

What is needed: The CWPP needs to be updated to reflect completed, planned, and proposed projects.

THOMPSON SPRINGS, GRAND COUNTY

Priority Level: #3

Fuels: The predominant fuel types are sagebrush and grass.

General and local weather patterns: Thompson Springs experiences weather patterns that are similar to those in other communities in Grand County, with average annual precipitation of 9 inches and an average annual temperature range of 40–70ºF.

Topography: The topography is flat and rolling, and there is no readily identifiable predominant aspect. The average slope is 5 percent.

Why treatment is needed: Treatment is needed to decrease fuels to reduce potential wildfire intensity and impacts in and around the community.

What is currently in place: Thompson Springs does not have a CWPP.

What is needed: A CWPP is needed to address the wildfire-protection issues important to this community.

WILLOW BASIN, GRAND COUNTY

Priority Level: # 3

Fuels: The vegetation in Willow Basin is predominantly Gamble oak and ponderosa pine.

General and local weather patterns: Willow Basin experiences weather patterns that are similar to those in other communities in Grand County, with average precipitation of 9 inches and an average temperature range of 40–70ºF.

Topography: The average slope is 30 percent, with a range of 20-40 percent. The predominant aspect is north.

Why treatment is needed: Treatment is needed to decrease fuels to reduce potential wildfire intensity and impacts in and around the community.

What is currently in place: Willow Basin does not currently have a CWPP.

What is needed: A CWPP is needed to address the issues important to this community in relation to wildfire and wildfire protection.

BLANDING, SAN JUAN COUNTY

Priority Level: #1

Fuels: Piñon-juniper, with an understory of cheatgrass and sage, is the primary fuel type present in Blanding and the one that poses the greatest fire risk.

General and local weather patterns: The average annual maximum temperature is 63.8ºF and the average annual minimum temperature is 36.7ºF. Winds generally are out of the south-southeast. During the summer months monsoonal moisture affects the area, creating violent thunderstorms that are often accompanied by dry lightning and strong downdrafts. The average annual precipitation is 13.32 inches.

Topography: The elevation is 6,105 feet. The community is on a south-southeast-facing aspect, with a drainage that is referred to as Westwater.

Why treatment is needed: If a wildfire were to occur within the Westwater drainage or in the adjacent cheatgrass and sage vegetation communities, the fire would be swift-moving, intense, and difficult to control.

What is currently in place: Blanding currently has a CWPP. The city's volunteer fire department (VFD) has four members who are qualified for wildland firefighting. The VFD plans to build on these basic skills with future training opportunities.

What is needed: Blanding has established a strong foundation to protect residents from unplanned wildfire, although continued education of private homeowners and volunteer fire fighters must continue. Project coordination needs to be established between federal land managers and city managers.

BLUE MOUNTAIN RANCH, SAN JUAN COUNTY

Priority Level: #1

Fuels: Blue Mountain Ranch is surrounded by ponderosa pine with an understory of oak brush.

General and local weather patterns: Blue Mountain Ranch has an average annual maximum temperature of 60ºF and an average minimum temperature of 32ºF. During most summers, this area is impacted by monsoonal storm moisture from the southwest. During these weather events, large thunderstorms develop that often produce lightning with little or no moisture. Gusty winds associated with these thunderstorms can be in excess of 40 miles per hour (mph). Local winds in the area are usually associated with heating and cooling of the surrounding terrain, creating up-canyon winds during the day (3–5 mph) and down-canyon winds in the evening (3–7 mph). Throughout the year this community experiences strong wind events with average wind speeds of 25–30 mph and gusts of 50 mph due to the change of high- and low-pressure systems within the Great Basin. The average annual precipitation is 16 inches.

Topography: The average elevation at Blue Mountain Ranch is 7,440 feet. The community lies within Verger Canyon, with an average slope of 5 percent, and does not have a predominant aspect.

Why treatment is needed: Although there is not an abundance of dead or downed fuels within Blue Mountain Ranch, an unplanned-for wildfire event could have a catastrophic effect. When conditions such as extreme drought, high winds, or low relative humidity are combined with the high basal density that exists within portions of the surrounding ponderosa pine community, there is the potential for a wildfire to become very intense in a short period of time. Twenty summer and 10 year-round homes are in this community, as well as an LDS camp that has high visitation throughout the summer months.

What is currently in place: Blue Mountain Ranch has a CWPP, and several ongoing fuels-treatment projects are being implemented by the USFS and FFSL on behalf of the local residents. These projects focus on reducing fuels in and around the wildland urban interface and reintroducing fire back into the ponderosa pine stands to improve stand health. Private landowners have also begun to implement the recommendations in the CWPP, with assistance from the FFSL.

What is needed: The community of Blue Mountain Ranch needs continued education in areas such as forest health. In addition, the USFS must maintain reduced fuel loads by re-burning the project area once every 10 years, and the USFS and the community should maintain open lines of communication. The FFSL will continue to ensure that both parties' concerns are being addressed.

BLUFF, SAN JUAN COUNTY

Priority Level: #2

Fuels: The primary fuel loading within Bluff that poses a risk to the community with respect to wildfire safety consists of decadent, highly flammable tamarisk with an understory of mature knapweed, both of which are invasive species. The native vegetation types in the area are cottonwood, willow, sage, and grass. Over the last 50 years the tamarisk and knapweed have out-competed the native vegetation, which has a lower fuel load and a more frequent fire return interval. With each passing year that fuels are not reduced by either human activity or nature, the potential fire severity increases.

General and local weather patterns: The average annual maximum temperature is 70.5ºF and the average annual minimum temperature is 38.9ºF. Winds during the summer are primarily out of the south-southwest, switching to northeast during the winter. Average annual precipitation is 7.75 inches.

Topography: The elevation of Bluff is 4,440 feet. The town is located in a valley on the north side of the San Juan River, which flows through the San Juan River canyon. One side of the town faces southwest and the other northeast, but the predominant aspect is southwest. Bluff is located in the center of the confluence of Cottonwood Wash with the San Juan River.

Why treatment is needed: The majority of the fuels in this area are found adjacent to the south side of the town. If a wildfire event were to occur in the tamarisk area, the tactics that could be implemented to fight the fire would be very limited, given the currently available resources and the intensity and rapid rate of spread of a tamarisk wildfire. In addition to the threat to the community of Bluff, there is also a three-phase industrial power line that runs through the proposed project area and crosses the San Juan River, rising to an elevation of approximately 600 feet, to supply power to a communications tower on the south side of the river. If the communications tower were to become inaccessible, the threat posed by wildfire would become much greater. Furthermore, the continued fuel loading of the invasive species inhibits the ability of natural species to find suitable habitat.

What is currently in place: At this time Bluff has no CWPP in place. For response and equipment, the Bluff Fire Department (BFD) has a 4,000-gallon water tender, one type-two fire truck, one type-six fire truck, and one type-four heavy fire truck. There are multiple fire hydrants throughout the town, with more than adequate gallons-per-minute ratings. The volunteers at the fire department have had training in basic wildland firefighter skills.

What is needed: A CWPP needs to be completed to address the overwhelming tamarisk invasion within this community. In addition, the BFD needs cross training with the BLM wildland firefighters because the BFD would be the initial responder to wildland fires on BLM land. A short class or conference is also needed to educate local community members on the risk that tamarisk poses to their property before implementation of project work could begin.

CANYON TERRACE, SAN JUAN COUNTY

Priority Level: #1

Fuels: Within the community of Canyon Terrace there are numerous fuel types, continuities, and arrangements. The primary fuel type that would carry a substantial fire would be piñon-juniper, with an understory of sage, cheatgrass, rabbitbrush, and scrub oak. Approximately 20–40 years ago, prior to development of the community, the project area was chained. Most of the chaining slash was burned or removed from the area, but an abundant amount of disfigured and unnaturally growing vegetation still remains. The naturally occurring fire regime for this piñon-juniper woodland has been replaced with a vegetation composition and fuel loading that has the potential to propagate a large fire that could threaten life and property.

General and local weather patterns: The average annual maximum temperature is 64ºF and the average annual minimum temperature is 37ºF. During the summer temperatures are impacted by monsoonal moisture that comes in from the southwest, developing large thunderstorms that often produce lightning but carry little or no moisture. Winds associated with these storms can produce gusts in excess of 40 mph. Local winds in the area are usually associated with heating and cooling of the surrounding terrain, up-canyon during the day at 3–5 mph and down-canyon in the evening at 3–7 mph. Throughout the year this community experiences strong wind events with average speeds of 25–35 mph and gusts of 50 mph due to the changes of high- and low-pressure systems within the Great Basin. The average annual precipitation is 14 inches.

Topography: The elevation of Canyon Terrace is 7,075 feet. The community lies between two major canyons, Devil's Canyon on the south and Long Canyon on the north. Most of Devil's Canyon is owned by the BLM. Ownership in Long Canyon is a combination of private and BLM holdings. The many smaller tributary canyons to Devil's Canyon and Long Canyon that intersect with the community of Canyon Terrace, support a dense growth of vegetated shoots that would be ideal for rapid fire spread. The predominant aspect is southeast.

Why treatment is needed: This area is highly susceptible to long droughts that decrease the moisture that naturally occurs in woody vegetation, making the piñon-juniper woodland extremely flammable despite the fact that the vegetation is still alive. Compounding this situation is the abundance of dead and downed fuel that lies within the community and on adjacent federal lands, with the potential to promote rapid fire spread with flame lengths exceeding 100 vertical feet under drought conditions. Currently, the defensible space in the community is not adequate to safely protect its homes from wildfire.

What is currently in place: Canyon Terrace currently has a CWPP that is overseen by the FFSL. The need for treatment has been addressed in the CWPP, and the community currently is participating in meetings to discuss the locations where defensible space is needed, as well as road access issues. A stated goal of the CWPP that has been brought to the County Fire Warden's attention and unfortunately has not yet been addressed is the response time and availability of resources from the outlying communities of Blanding and Monticello.

What is needed: A large amount of work is needed on the private lands that lie within Canyon Terrace. For the federal lands and canyons adjacent to the community, fuels-reduction projects are needed to reduce the amount of fuel loading. A mobilization plan needs to be established for the communities in and around Canyon Terrace in the event of a large wildfire incident.

CEDAR POINT, SAN JUAN COUNTY

Priority Level: #3

Fuels: Cedar Point residents are dryland farmers, and the land in and around this community has been cleared for dryland agricultural use. In places where the soils are shallow or the terrain is too steep to use for agriculture, the mature piñon-juniper woodland still exists. Historic livestock grazing and fire suppression have altered the natural fire regime, allowing the fine fuels that would support high-frequency, low-intensity fires to be supplanted by dense woody vegetation that burns infrequently and with extreme intensity. In addition to the piñon-juniper woodlands, there are stands of oak on the steeper slopes with a cheatgrass understory. In addition, the annual wheat fields cure and provide more available fuels for ignition and burning. The dryland bean crops, however, create fuel breaks and do not promote wildland fires.

General and local weather patterns: The average annual maximum temperature for Cedar Point is 60.8ºF, and the average annual minimum temperature is 33.3ºF. During the summer months monsoonal moisture and winds out of the south-southeast affect the area, creating violent thunderstorms with dry lightning and strong downdrafts, and there have been several large, intense, stand-replacing fires in the piñon-juniper woodlands adjacent to this community in the last 15 years. The annual average precipitation is 14.92 inches.

Topography: The elevation at Cedar Point is 6,600 feet. Because the community sits on top of a mesa surrounded by steep, deep canyons that run northeast–southwest, with a deep drainage—Coal Bed Canyon and Monument Canyon—on either side, there are two predominant aspects, north-northwest and east-southeast.. Cedar Point is not incorporated, but it does have year-round residents and a volunteer fire department. Cedar Point residents often identify with Dove Creek, Colorado, as their home town, and most children residing in Cedar Point attend the Dove Creek schools.

Why treatment is needed: During the winter and spring, the community is surrounded by thousand of acres of barren farmland that present very little wildland fire threat. However, during the summer and fall the fields are covered with cured wheat 3 feet or more in height, creating conditions that are conducive to high-intensity wildfires with rapid rates of spread within the adjacent piñon-juniper stands. If a wildfire were to establish itself and consume a large acreage within this community, the resulting loss of crops and private residences could potentially have a substantial economic impact on San Juan County.

What is currently in place: The federal lands that border private land within this community are managed by the BLM, and the agency has been making extensive efforts to reduce the amount of fuel loading adjacent to private lands. The Monument WUI project that is currently in the planning stages will address difficult suppression access issues as well as provide an indirect line of defense in the event of a wildfire occurring down-drainage in Monument Canyon. Cedar Point currently has a volunteer fire department, which is usually readily available, and by the fire season of 2007 most volunteers will hold red cards. This volunteer department is set up to respond only to wildland fires.

What is needed: A CWPP needs to be developed, and training needs to be coordinated between the Cedar Creek and Dove Creek VFDs. Mapping and signing of county roads is also a serious need, as is identification of available water sites and of values at risk, such as structures and utility lines.

EASTLAND, SAN JUAN COUNTY

Priority Level: #1

Fuels: Eastland is surrounded by piñon-juniper woodlands, with an understory of oak brush, sage, and cheatgrass. In the summer months cured wheat fields also make up a large portion of available fuels. Within the near future, sunflowers will be a common crop in this area because of the growth in the biodiesel market.

General and local weather patterns: The average annual maximum temperature for Eastland is 60ºF, and the average annual minimum temperature is 33ºF. The average annual precipitation is 15 inches. Beginning in July, monsoons begin to bring moisture and severe thunderstorms to the region. These thunderstorms often have high, erratic downdrafts accompanied by lightning, often with little precipitation.

Topography: The elevation of Eastland is 6,880 feet. Although Montezuma Canyon is broad and deep, the community is on primarily flat and rolling terrain, with a southeast aspect, and multiple drainages lead into it. The average slope is 3 percent.

Why treatment is needed: There is little concern about wildfires in this area during the winter and spring months. During the summer months, several wildfires have started on the canyon edges, then moved to the piñon-juniper woodland on the steep slopes and spread to areas with pine stringers or natural strips of woodlands that grow along drainages. Many farms are located in these piñon-juniper stringers, making them vulnerable to wildfire. During the summer and fall months, cured wheat up to 3 feet high is in the fields, providing an additional flashy fuel that will support fires with fast rates of spread and high intensity, making suppression from the ground difficult. Wildfire history in this area has proven that the piñon-juniper woodlands in the adjacent canyons burn as intense fires that damage soils, causing subsequent erosion and allowing cheatgrass to become the dominant vegetation. Once cheatgrass takes over, wildfire frequency increases, damaging previously unburned areas. In Eastland, when crops are lost due to fire the economic impacts are felt throughout the community because of its small size.

What is currently in place: The community of Eastland currently has a CWPP, and the FFSL has been working with numerous private landowners to implement projects that will provide defensible space around homes. The federal lands that border the private lands within this community are managed by the BLM, which is currently implementing a project to reduce fuel loading in the wildland urban interface. Eastland has a volunteer fire department that is usually readily available when called upon, and by the 2007 fire season most volunteers will have been trained and certified in wildland firefighting.

What is needed: The continuation of proactive efforts and coordination is important. In addition, locations of water sites, private roads, and structures need to be mapped for a more efficient suppression response in the event of a wildfire.

MONTICELLO, SAN JUAN COUNTY

Priority Level: #2

Fuels: Piñon-juniper intermingled with dense stands of oak brush and ponderosa pine is the predominant vegetation type in and around the City of Monticello, a vegetation community that poses a fire risk.

General and local weather patterns: The average annual maximum temperature in Monticello is 59.7ºF and the average annual minimum temperature is 32.6ºF. The average annual precipitation is 15.19 inches. Winds are generally out of the south-southeast during the summer months. During the summer months monsoonal moisture affects the area, creating violent thunderstorms that are often accompanied by dry lightning and strong downdrafts.

Topography: The elevation of Monticello is 7,066 feet. The community sits at the base of the Abajo Mountains, on an east-facing aspect.

Why treatment is needed: Fuels treatment is needed in Monticello because of the overwhelming abundance of oak brush that lies to the south of the community and the heavily forested lands that lie on the west side. All of these areas are private lands.

What is currently in place: The community currently does not have a CWPP, but does have an effective volunteer fire department.

What is needed: In addition to needing a CWPP, both the private landowners and the city managers need more education on the risks a wildfire can pose.

SUMMIT POINT, SAN JUAN COUNTY

Priority Level: #3

Fuels: Summit Point is surrounded by an over-mature piñon-juniper woodland with an understory of oak brush, sage, and cheatgrass. During the summer months cured wheat fields also constitute a large area of available fuels.

General and local weather patterns: The average annual maximum temperature is 60ºF and the average annual minimum temperature is 32ºF. The annual average precipitation is 15 inches. During the summer months monsoonal moisture and winds out of the south affect the area, creating violent thunder storms with dry lightning and strong downdrafts.

Topography: The elevation of Summit Point is 7,113 feet. The community is on primarily flat and rolling terrain, with the predominant aspect to the south-southeast and southwest... Multiple drainages make up the head of Montezuma Canyon.

Why treatment is needed: There is little concern about wildfires in this area during the winter and spring months. During the summer months, several wildfires have started on the canyon edges, then moved into the piñon-juniper woodlands on the steep slopes and continued where there are tree stringers adjacent to farmland. Many homes are located in these piñon-juniper stringers, making them vulnerable to wildfire. During the summer and fall months, fields of cured wheat up to 3 feet high provide an additional flashy fuel that will support fires with fast rates of spread and high intensity, making suppression efforts from the ground difficult. Wildfire history in this area has proven that the fires that burn in the piñon-juniper woodlands in the adjacent canyons become intense fires that damage soils, causing subsequent erosion and allowing cheatgrass to become the dominant vegetation. Once cheatgrass takes over, wildfire frequency increases further, damaging previously unburned areas. In Summit Point, when crops are lost due to fire or other natural occurrences, the economic impacts are felt throughout the community because of its small size.

What is currently in place: Summit Point currently has no CWPP to improve the defensible space within the community, nor does this community have a volunteer fire department. The closest volunteer fire departments are in Eastland and Monticello, with a response time of approximately 15 minutes. Water access within this community is also very limited.

What is needed: Summit Point needs a CWPP, a volunteer fire department, and a map indicating values at risk, water-source locations, and access routes.

UCOLO, SAN JUAN COUNTY

Priority Level: #3

Fuels: The vegetation in and around Ucolo is over-mature piñon-juniper woodlands with an understory of oak brush, sage, and cheatgrass. In the summer months cured wheat fields also make up a large portion of the available fuels.

General and local weather patterns: The average annual maximum temperature is 60ºF and the average annual minimum temperature is 32ºF. The average annual precipitation is 15 inches. During the summer months monsoonal moisture and winds out of the south affects the area, creating violent thunderstorms with dry lightning and strong downdrafts.

Topography: The elevation of Ucolo is 6,875 feet. The community is on primarily flat and rolling terrain, with multiple drainages that lead into Montezuma Canyon. There is no predominant aspect.

Why treatment is needed: There is little concern about wildfires in this area during the winter and spring months. During the summer months, several wildfires have started on the canyon edges, then moved into the piñon-juniper woodlands on the steep slopes and continued where there are tree stringers adjacent to farmland. Many farms are located in these piñon-juniper stringers, making them vulnerable to wildfire. During the summer and fall months, fields of cured wheat up to 3 feet high provide additional flashy fuel that will support fires with fast rates of spread and high intensity, making suppression efforts from the ground difficult. Wildfire history in this area has proven that fires burning in the piñon-juniper woodlands in the adjacent canyons are intense, damaging soils, causing subsequent erosion, and allowing cheatgrass to become the dominant vegetation. Once cheatgrass becomes dominant, wildfire frequency increases, further damaging previously unburned areas. In Ucolo, when crops are lost due to fire the economic impacts are felt throughout the community because of its small size.

What is currently in place: Ucolo does not have a CWPP to improve the defensible space within the community or protect farmers' crops when they are at their most flammable during the summer and fall months. Furthermore, there currently is no volunteer fire department within Ucolo. The closest volunteer fire department is in Dove Creek, Colorado, with a response time of approximately 15 minutes. Water access within this community is also very limited.

What is needed: Ucolo needs a community wildfire protection plan, a volunteer fire department, and a map indicating values at risk, water-source locations, and access routes.

WRAY MESA/LA SAL, SAN JUAN COUNTY

Priority Level: #1

Fuels: The primary fuel type in the upper elevations of this community is ponderosa pine, intermingled with piñon-juniper and an understory of very dense oak brush and rabbitbrush.

General and local weather patterns: The average annual maximum temperature in Wray Mesa/La Sal is 59.3ºF, and the average annual minimum temperature is 32.9ºF. The average annual precipitation is 12.83 inches.

Topography: The elevation in Wray Mesa/La Sal is 7,125 feet. The predominant aspect is southwest. The community lies on a bench valley between the La Sal Mountains and Pine Ridge.

Why treatment is needed: The fuel loading within this area is unnaturally high due to an interruption in the naturally occurring fire return interval. The natural vegetation in this area would be ponderosa pine and sagebrush parks with grass understory. In areas where the slopes are steeper or the soils are shallow, piñon-juniper and oak naturally occur. Since fire has been eliminated from this area by previous grazing practices and fire suppression management, piñon-juniper and oak have encroached on the ponderosa pine and sagebrush areas. Not only have the fuel loads increased, they now provide a continuous fuel arrangement from the ground to the tree canopies that will burn with high intensity and cause high tree mortality in the event of a wildfire. The fuel load now threatens homes located in these areas.

What is currently in place: Wray Mesa/ La Sal currently has a CWPP, although many aspects of the plan have yet to be implemented. There are two volunteer fire stations with about seven members, all of whom are readily available when paged.

What is needed: This community has put an extensive amount of time, labor, and effort into the implementation of its CWPP. However, coordination between the state and federal agencies and homeowners needs to improve for full implementation of the plan.

4.2.3 ADDITIONAL RECOMMENDATIONS RELATED TO FUELS TREATMENTS

Use Demonstration Sites

Demonstration sites are small tracts of land located in highly visible areas where at least one treatment method has been used. Demonstration sites speak for themselves, as they provide a tangible view of the effect of the treatment that community members can see before making a decision to implement the treatment on private property. This method can be highly effective in building support for fuels treatments. Often the spread of the implementation of the treatment begins slowly, then rapidly expands as more people become aware of the positive effects of practicing these fire prevention methods. Demonstration sites have been used in this area and should continue to be used.

CHAPTER 5
MONITORING AND IMPLEMENTATION

On-the-ground implementation of the recommendations in the Regional Wildfire Protection Plan will require developing an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the involved people and agencies in the project area, as well as funding needs and timetables for completing highest-priority projects (SAF 2004).

5.0 IDENTIFY TIMELINE FOR UPDATING THE CWPP

As the needs of community members shift or environmental conditions change, the RWPP will need to be modified. While a specific timeline for updating the plan has not been determined as part of this document, the core team should continue to communicate after the plan is completed to discuss the best method for making revisions. The HFRA provides for maximum flexibility in the CWPP planning process, allowing the core team to determine the timeframe for updating the RWPP.

5.1 IMPLEMENTATION AND MONITORING

The RWPP makes recommendations for prioritized fuels-reduction projects. However, each project will be unique and require distinct steps to complete the identified tasks. The tasks will be further identified and treatments may evolve and change as the projects begin to be implemented.

The monitoring of each fuels-reduction project will be site specific, and decisions regarding the timeline for monitoring and the type of monitoring to be carried out will be project-specific. The importance of monitoring should not be underestimated, as it provides feedback on the effectiveness of the project and insight on how to improve projects for future endeavors. Monitoring and reporting also contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base of how natural resources management decisions impact both the environment and the people who live in it.

Funding Opportunities

Implementing recommendations for fuels reduction treatments and monitoring begins with seeking funding, which may be available from multiple sources. A current list of funding opportunities is provided in Appendix I.

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Appendix A
Communities at Risk in Southeastern Utah

Communities at Risk 2005

Community	County	Score[1]
Clear Creek	Carbon	9
East Carbon / Columbia	Carbon	10
Helper	Carbon	6
Hiawatha	Carbon	8
Kenilworth	Carbon	8
Price	Carbon	7
Scofield	Carbon	7
Castle Dale	Emery	7
Emery	Emery	6
Ferron	Emery	7
Green River	Emery	6
Huntington	Emery	7
Joe's Valley	Emery	7
Castle Valley	Grand	8
Dewey	Grand	7
Moab / Spanish Valley	Grand	7
Thompson Spring	Grand	7
Willow Basin	Grand	8
Blanding / White Mesa	San Juan	9
Blue Mountain	San Juan	8
Bluff	San Juan	7
Boulder Point	San Juan	10
Brown's Hole	San Juan	9
Buckeye Res	San Juan	8
Bug Point	San Juan	11
Canyon Terrace	San Juan	11
Cedar Point	San Juan	10
Eastland	San Juan	9
La Sal	San Juan	9
Montezuma Canyon	San Juan	9
Monticello	San Juan	8
Natural Bridges Headquarters & Concession	San Juan	8
Pack Creek	San Juan	8
Peters Canyon	San Juan	10
Summit Point	San Juan	9
Ucolo	San Juan	8
Wray Mesa / La Sal	San Juan	9
Wilson Arch Subdivision	San Juan	8

[1]Ratings are based on a scale of 1 to 11, with 1 least at risk and 11 most at risk.

Appendix B
Vegetation Communities in Southeastern Utah Counties

Vegetative Community Groupings and Associated SWReGAP Cover Types, Southeastern Utah					
		Carbon	**Emery**	**Grand**	**San Juan**
Vegetation Type	SWReGAP Analysis Vegetation Cover	Acres	Acres	Acres	Acres
1 - Grassland	S090 - Inter-Mountain Basins Semi-desert Grassland	2,314.24	62,692.12	58,850.48	59,414.47
	S085 - Southern Rocky Mountain Montane-Subalpine Grassland	7,101.50	2,043.36	603.80	
2 - Salt Desert Scrub	S045 - Inter-Mountain Basins Mat Saltbush Shrubland	9,935.47	273,470.73	294,559.07	8,948.93
	S065 - Inter-Mountain Basins Mixed Salt Desert Scrub	51,843.05	280,091.64	172,529.43	211,339.05
	S079 - Inter-Mountain Basins Semi-Desert Shrub Steppe	2,500.60	112,923.25	13,204.23	87,265.60
	S096 - Inter-Mountain Basins Greasewood Flat	27,474.84	83,097.48	89,488.66	43,553.07
3 - Blackbrush	S059 - Colorado Plateau Blackbrush-Mormon Tea Shrubland	554.87	243,223.97	218,831.74	906,502.67
	S054 - Inter-Mountain Basins Big Sagebrush Shrubland	86,209.45	182,812.95	73,356.60	411,530.12
4 - Sagebrush	S056 - Colorado Plateau Mixed Low Sagebrush Shrubland	10,179.22	4,985.42	2,698.09	584.45
	S071 - Inter-Mountain Basins Montane Sagebrush Steppe	134,554.90	70,042.04	45,214.14	18,164.74
	S128 - Wyoming Basins Low Sagebrush Shrubland				4.89
5 - Piñon-Juniper Woodland	S039 - Colorado Plateau Pinyon-Juniper Woodland	192,323.87	163,931.21	320,159.34	941,585.62
	S052 - Colorado Plateau Pinyon-Juniper Shrubland	73,749.80	367,906.55	282,711.00	456,051.72
	S010 - Colorado Plateau Mixed Bedrock Canyon and Tableland	29,083.86	489,761.62	214,323.80	1,027,838.88
	S075 - Inter-Mountain Basins Juniper Savanna				2,150.78

Vegetative Community Groupings and Associated SWReGAP Cover Types, Southeastern Utah, continued					
		Carbon	**Emery**	**Grand**	**San Juan**
Vegetation Type	SWReGAP Analysis Vegetation Cover	Acres	Acres	Acres	Acres
6 - Ponderosa Pine	S036 - Rocky Mountain Ponderosa Pine Woodland	152.79	139.22	8,092.27	76,856.20
	S046 - Rocky Mountain Gambel Oak-Mixed Montane Shrubland	48,540.49	10,438.75	89,281.61	135,268.34
7 - Mountain Shrub	S047 - Rocky Mountain Lower Montane-Foothill Shrubland	0	0	9,029.44	50.26
	S050 - Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland	915.15	3,649.94	0	0
8 - Douglas Fir/Mixed Conifer/Aspen	S023 - Rocky Mountain Aspen Forest and Woodland	86,720.07	39,582.44	20,184.97	29,137.02
	S028 - Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	11,436.41	22,243.23	4,398.07	8,708.08
	S030 - Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	13,087.92	14,189.44	3,574.55	4,791.27
	S032 - Rocky Mountain Montane Dry- Mesic Mixed Conifer Forest and Woodland	41,330.02	17,471.09	42,396.40	5,760.46
	S034 - Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	27,231.54	12,490.79	17,475.09	7,731.32
	S042 - Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	16,894.87	9,148.42	8,852.19	15,491.56
	S081 - Rocky Mountain Dry Tundra	44.48	498.83		
	S083 - Rocky Mountain Subalpine Mesic Meadow	617.14	1,406.87	1,204.27	5,218.26

Vegetative Community Groupings and Associated SWReGAP Cover Types, Southeastern Utah, continued					
		Carbon	**Emery**	**Grand**	**San Juan**
Vegetation Type	SWReGAP Analysis Vegetation Cover	Acres	Acres	Acres	Acres
9 - Riparian Wetland	S093 - Rocky Mountain Lower Montane Riparian Woodland and Shrubland	4,039.80	9,668.60	3,857.65	23,968.12
	S091 - Rocky Mountain Subalpine-Montane Riparian Shrubland				3.78
	S097 - North American Warm Desert Riparian Woodland and Shrubland				391.86
	S100 - North American Arid West Emergent Marsh				2.45
	S102 - Rocky Mountain Alpine-Montane Wet Meadow	4,181.91	1,440.67	975.64	0
10 - Invasives	D04 - Invasive Southwest Riparian Woodland and Shrubland	2,486.15	15,601.20	16,569.95	43,179.00
	D08 - Invasive Annual Grassland	260.42	529.30	22,882.39	9,665.49
	D06 - Invasive Perennial Grassland	0	0	129.66	33.36
	D09 - Invasive Annual and Biennial Forbland	1,541.86	14,242.59	4,190.58	809.96
11 - Disturbed Areas	D11 - Recently Chained Pinyon-Juniper Areas	16,792.56	11,800.92	2,581.33	14,185.43
	D01 - Disturbed, non-specific	0	0	192.37	3.11
	D02 - Recently burned	0	0	1,262.53	18.68
	D03 - Recently mined or quarried	0	20.46	53.37	599.58
	D10 - Recently logged areas	0.00	0	536.64	937.17
	D14 - Disturbed, oil well	894.47	290.67	198.82	308.91
	N21 - Developed, Open Space - Low Intensity	7,766.91	6,687.85	4,733.67	2,473.47
	N22 - Developed, Medium - High Intensity	2,516.84	4,000.65	5,340.80	2,535.30
	N80 - Agriculture	16,028.42	60,389.22	8,943.15	172,140.90

Vegetative Community Groupings and Associated SWReGAP Cover Types, Southeastern Utah, continued					
		Carbon	**Emery**	**Grand**	**San Juan**
Vegetation Type	SWReGAP Analysis Vegetation Cover	Acres	Acres	Acres	Acres
12 - Dunes	S012 - Inter-Mountain Basins Active and Stabilized Dune	0	111,260.19	14,805.47	78,597.55
	S136 - Southern Colorado Plateau Sand Shrubland	0	32,283.01	10,965.61	131,449.16
13 - Other	N31 - Barren lands, Non-specific	0.89	2.22		1,675.52
	N11 - Open Water	3,936.61	6,184.12	8,418.97	72,594.24
	S002 - Rocky Mountain Alpine Bedrock and Scree	39.59	701.43	4,549.30	7,192.91
	S006 - Rocky Mountain Cliff and Canyon	10,471.67	13,649.91	5,461.79	20,843.48
	S014 - Inter-Mountain Basins Wash				124.10
	S011 - Inter-Mountain Basins Shale Badland	3,685.08	94,884.17	55,376.68	28,456.04

Appendix C
Carbon County Fire Response Capabilities

Volunteer Fire Departments

Price City VFD 87 North 200 East 636-3187			
Radio	**Title**	**Name**	**Work Phone**
2R400	Chief	Paul Bedont	636-3187
2R401	Asst. Chief	Greg Lowder	636-6329
2R463	Captain		

Radio	**Equipment**	**Gallons**	**G.P.M.**
2R410	2000 Pierce Pumper Type 1	750	1250
2R407	1992 Pierce Pumper Type 1	1000	1500
2R408	1983 FMC Pumper Type 1	750	1000
2R405	1979 Ladder Type 1	400	1500
2R409	1979 Mini Brush Type 6 4x4	250	250
2R402	1962 International Brush Type 5	500	1000

Helper VFD 97 South Main 472-3572			
Radio	**Title**	**Name**	**Work Phone**
3R400	Chief	Mike Zamantakis	472-3572
3R401	Asst. Chief	Wayne Dimick	472-5391
3R460	Asst. Chief	Rich Colombo	472-3301

Radio	**Equipment**	**Gallons**	**G.P.M.**
3R410	2003 Pierce Pumper Type 1	750	1500
3R411	1989 FMC Pumper Type 1	1000	1250
3R412	2004 4x4 Brush Truck Type 6	300	450
3R413	1979 Mac Pumper Type 1	750	1500
	Hazmat 1	300	450

Wellington VFD 150 West Main 637-5213			
Radio	**Title**	**Name**	**Work Phone**
5R400	Chief	Scott Rowley	801-560-1147
5R401	Asst. Chief	Richard Ghrist	637-3421
5R403	Captain	Damion Smith	

Radio	**Equipment**	**Gallons**	**G.P.M.**
5R421	American La France Metro Type 1	1000	1500
5R422	6x6 Tender Type 3	1000	750
5R424	Mack Truck Type 1	750	1500
5R425	Brush Truck 4x4 Chev Type 6	300	40

East Carbon VFD 150 West Geneva Drive 888-2100			
Radio	**Title**	**Name**	**Work Phone**
4R400	Chief	Darrell Valdez	888-0111
4R467	Asst. Chief	Spencer Bullard	
4R466	Training Officer	Cody Valdez	

Radio	**Equipment**	**Gallons**	**G.P.M.**
	2004 Kenworth Type 1	1000	1250
	1985 American LaFrance Type 1	1000	1000
	1982 Ford Brush Type 6	350	250
	1986 Chevy Brush (fepp) 4x4 Type 6		

Sunnyside VFD 701 Market Street 888-2100/ 888-4444			
Radio	**Title**	**Name**	**Work Phone**
7R400	Chief	Gene Madrid	
7R401	Asst. Chief	Jason Madrid	

Radio	**Equipment**	**Gallons**	**G.P.M.**
	1987 American LaFrance Type 1	1000	1150
	1988 Pierce Arrow Type 1	1000	1250
	1952 American LaFrance Type 2	1000	1000

Scofield VFD 155 Ivy Highway 96 448-9221			
Radio	**Title**	**Name**	**Work Phone**
6R400	Chief	Paul Helsten	
6R401	Asst. Chief	Mel Rostron	

Radio	**Equipment**	**Gallons**	**G.P.M.**
	1989 Freightliner Type 1	3000	1500
	1957 6x6 Tender Type 3	500	500

Appendix D
Emery County Fire Response Capabilities

Volunteer Fire Departments

Emery VFD 150 East 100 North 286-2444			
Radio	**Title**	**Name**	**Work Phone**
460	Chief	Glen Vantussenbrook	
460A	Asst. Chief	Pat Sundstrom	

Radio	**Equipment**	**Gallons**	**G.P.M.**
441	1992 Ford Mini 4x4 Type 6	200	250
462	1996 Freightliner Type 1	1250	1250
463	1981 GMC FMC Type 1	1200	1000
464	2003 Ford w/ CAFS Type 6 4x4	300	250

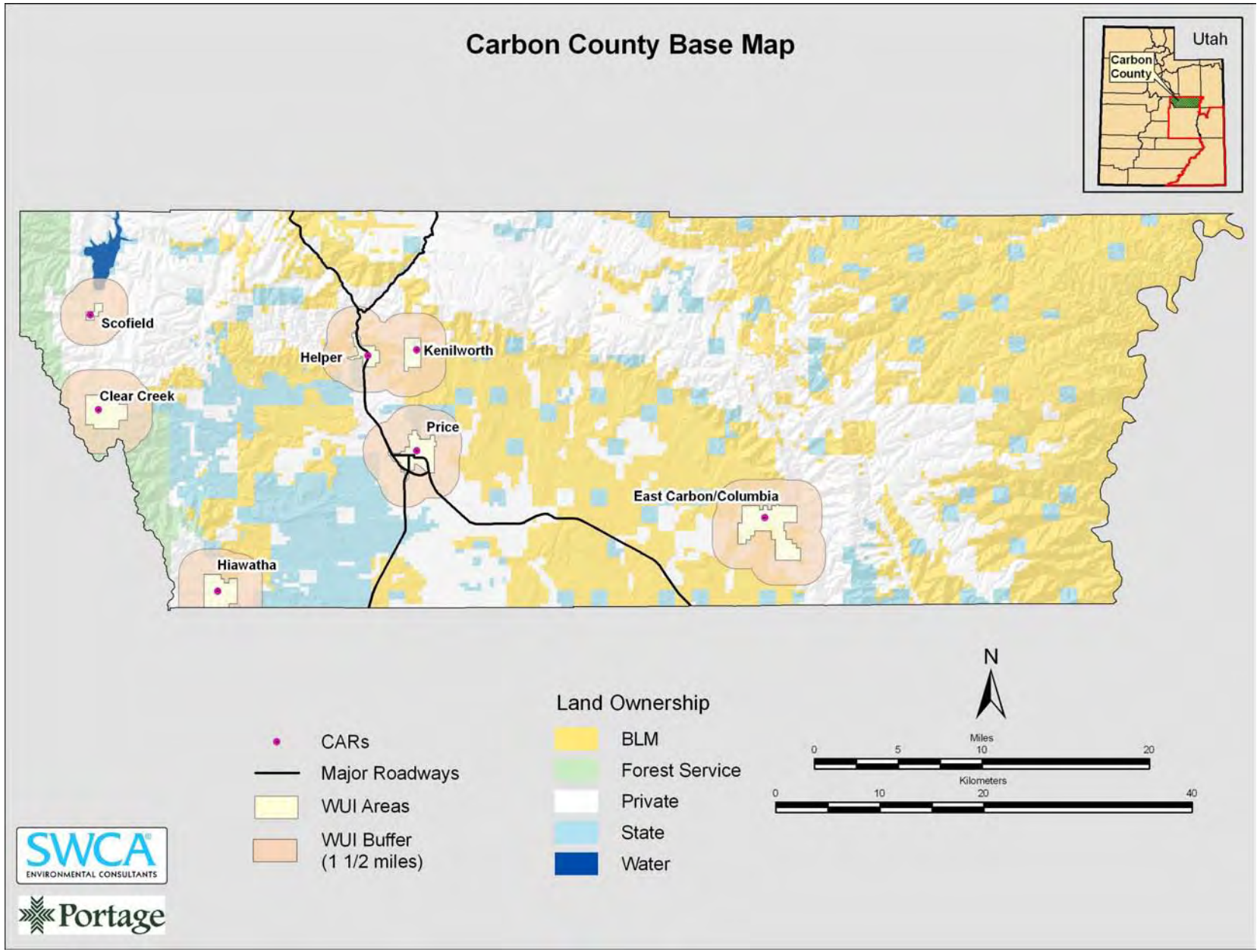
Ferron VFD 150 West Mill Road 384-2498			
Radio	**Title**	**Name**	**Work Phone**
440	Chief	Randy Nielson	820-0957
440A	Asst. Chief	Gayland Dugmore	

Radio	**Equipment**	**Gallons**	**G.P.M.**
441	1992 Ford Mini 4x4 Type 6	200	250
442	1998 Freightliner Type 1	1250	1250
443	1981 GMC FMC Type 1	1200	1000
444	1997 Chevy Mini w/ CAFS 4x4 Type 6	300	150

Green River VFD 135 West Green River Avenue 564-8270			
Radio	**Title**	**Name**	**Work Phone**
480	Chief	Howard Burnett	
480A	Asst. Chief	Philip Engleman	

Radio	**Equipment**	**Gallons**	**G.P.M.**
1 S483	1997 Freightliner Type 1	1250	1000
1 S488	1994 Freightliner Tender Type 2	4000	
1 S481	1992 Ford Mini 4x4 Type 6	200	250
1 S482	1978 American LaFrance Type 1	750	1250
1 S487	1979 GMC Mini w/CAFS 4x4 Type 6	300	325

Appendix E
Community Base Maps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Carbon County
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Helper
Kenilworth
Clear Creek
Price
East Carbon/Columbia
Hiawatha
N
Land Ownership
CARs
Major Roadways
WUI Areas
WUI Buffer
(1 1/2 miles)
BLM
Forest Service
Private
State
Water
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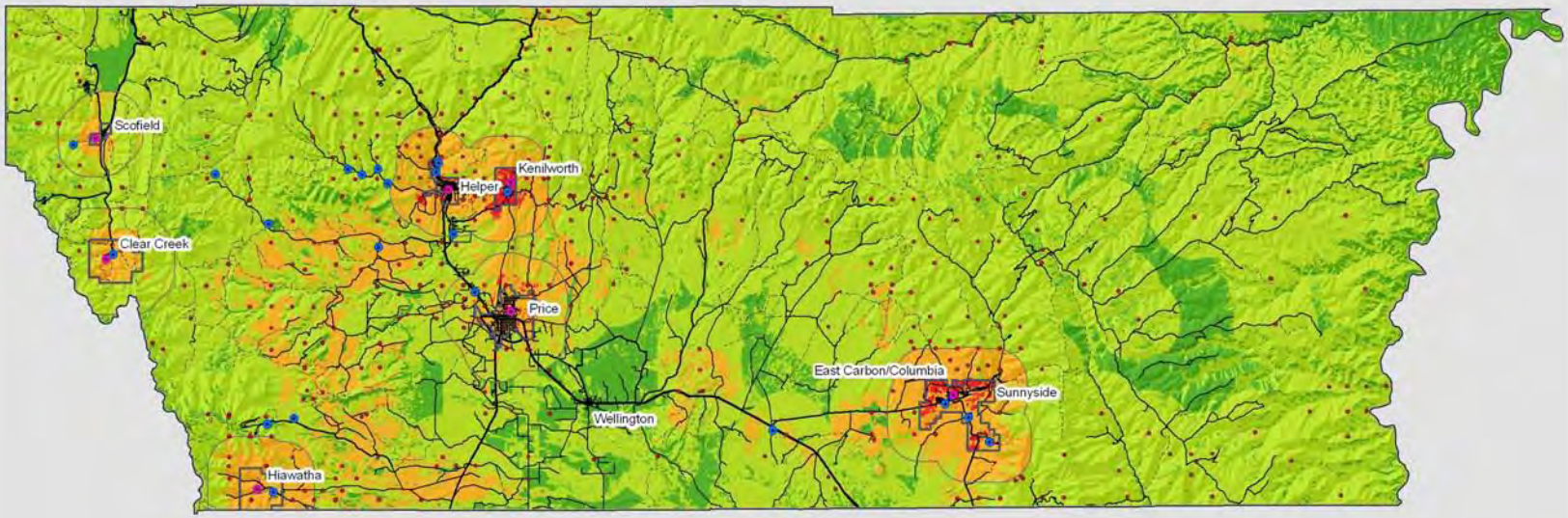
ENVIRONMENTAL CONSULTANTS
Portage

Results of Fire Risk Model for Carbon County



Fire Risk Level

- LOW
- MEDIUM
- HIGH
- EXTREME

- Roads
- Highways
- Towns
- CARs
- Fire Occurrence

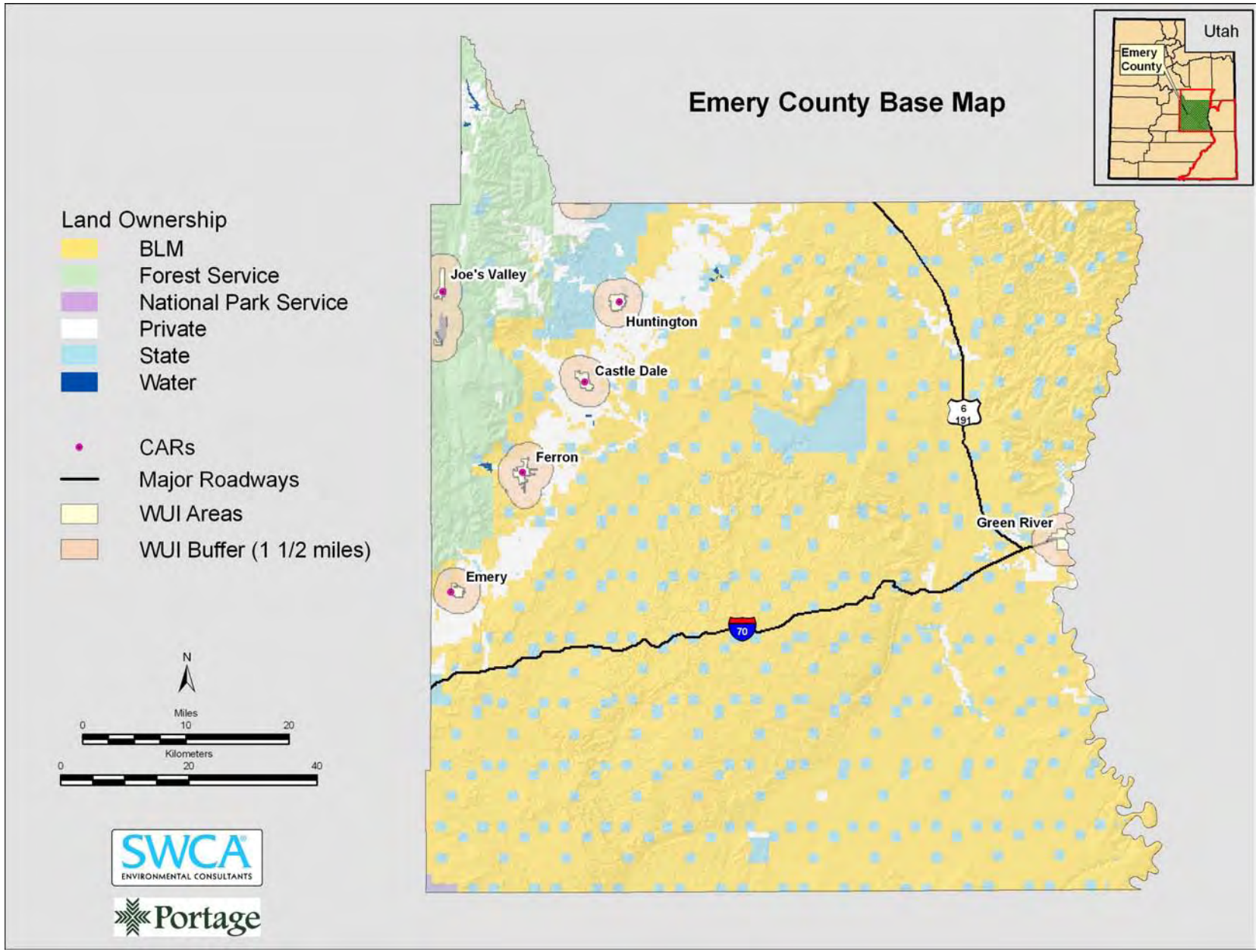
N

Miles
0 5 10 20

Kilometers
0 10 20 40

SWCA ENVIRONMENTAL CONSULTANTS

Portage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Emery County
Land Ownership
BLM
Forest Service
National Park Service
Private
State
Water
CARs
Major Roadways
WUI Areas
WUI Buffer (1 1/2 miles)
Joe's Valley
Huntington
Castle Dale
Ferron
Emery
Green River
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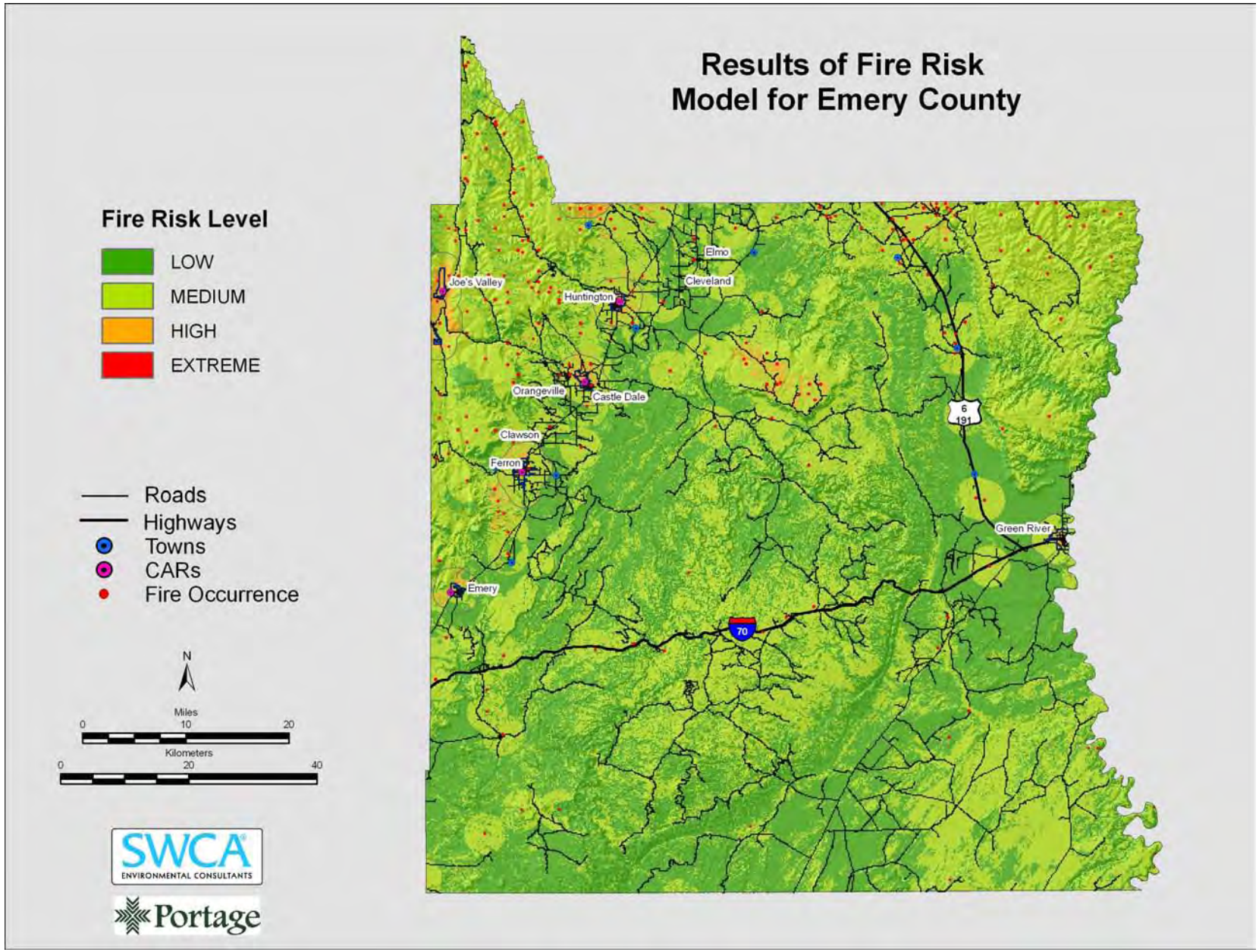
ENVIRONMENTAL CONSULTANTS
Portage


Results of Fire Risk
Model for Emery County
Fire Risk Level
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MEDIUM
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EXTREME
Roads
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Fire Occurrence
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Kilometers
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SWCA
ENVIRONMENTAL CONSULTANTS
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Huntington
Elmo
Cleveland
Orangeville
Castle Dale
Clawson
Ferron
Emery
Green River
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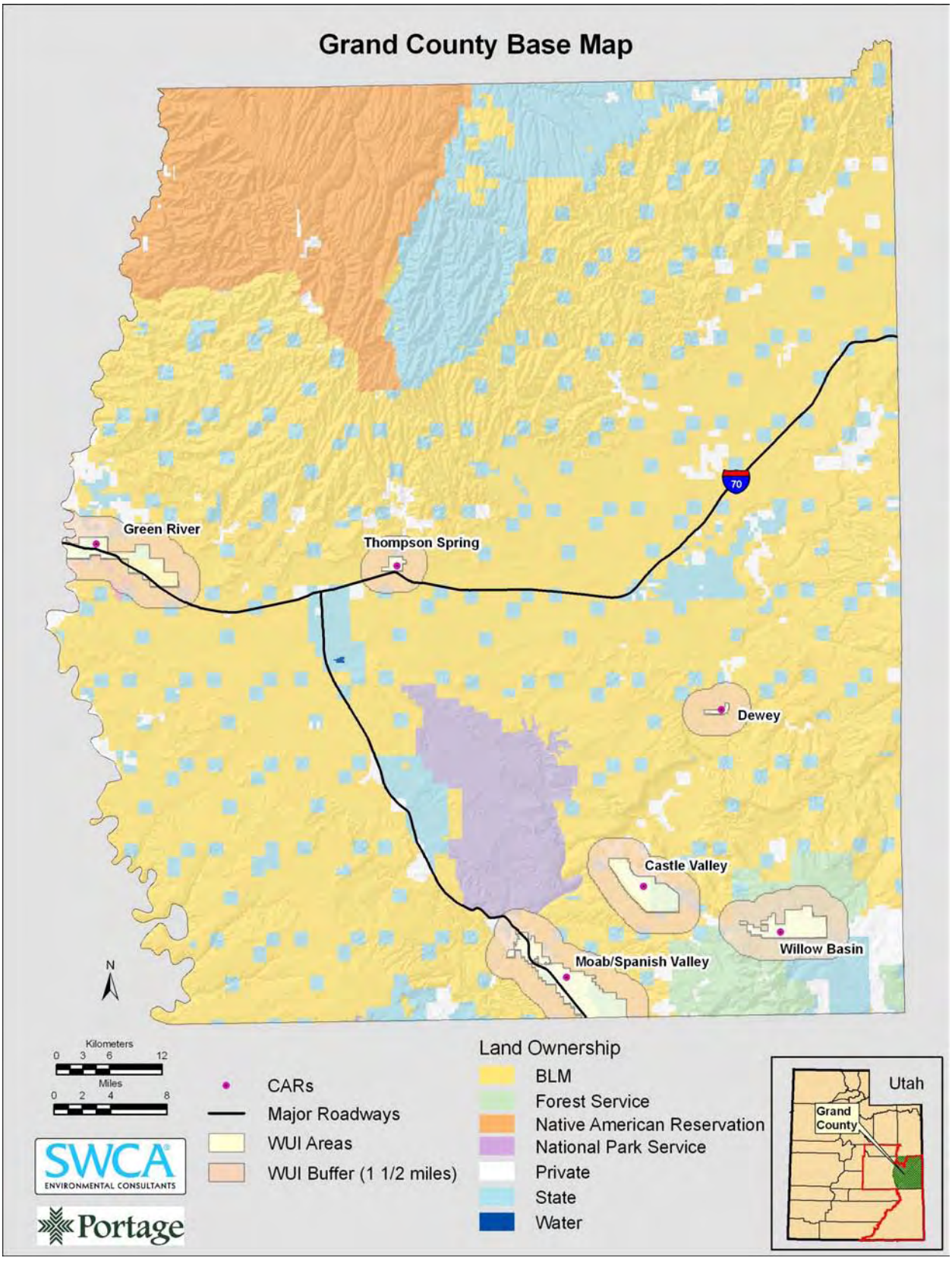
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Green River
Thompson Spring
Dewey
Castle Valley
Willow Basin
Moab/Spanish Valley
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Miles
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CARs
Major Roadways
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WUI Buffer (1 1/2 miles)
Land Ownership
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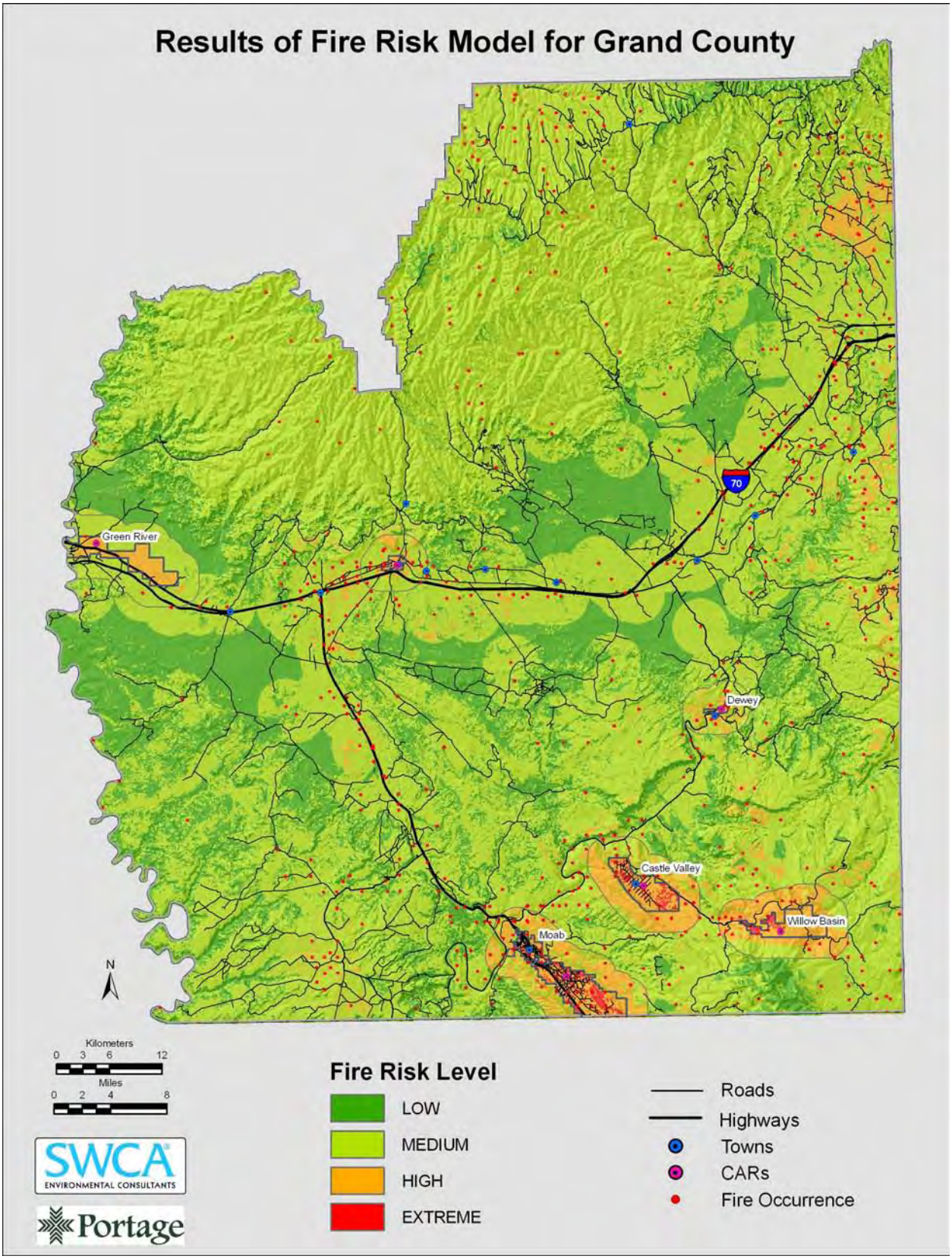
ENVIRONMENTAL CONSULTANTS
Portage
Utah
Grand County


Results of Fire Risk Model for Grand County
Green River
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Dewey
Castle Valley
Willow Basin
Moab
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ENVIRONMENTAL CONSULTANTS
Portage
Fire Risk Level
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MEDIUM
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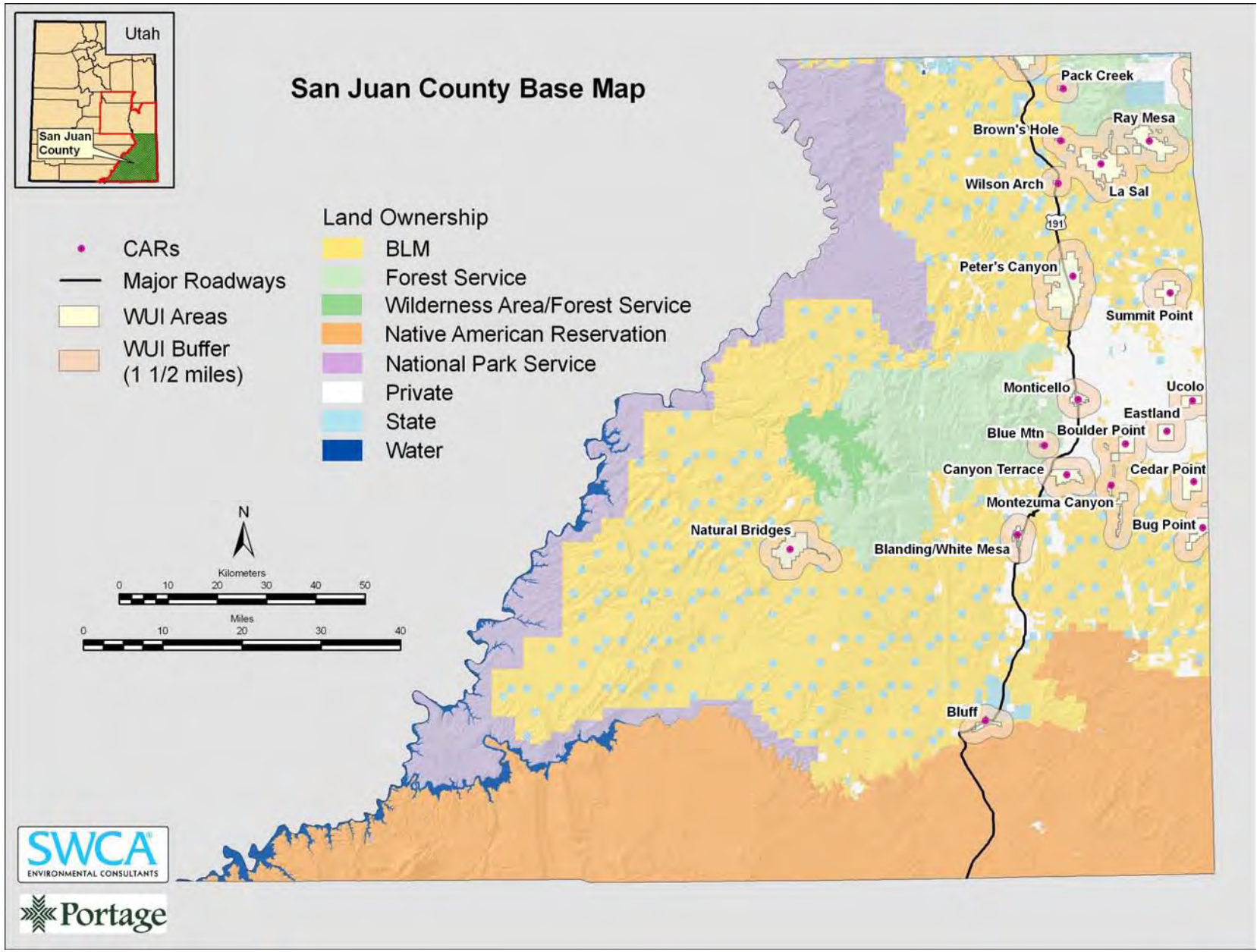
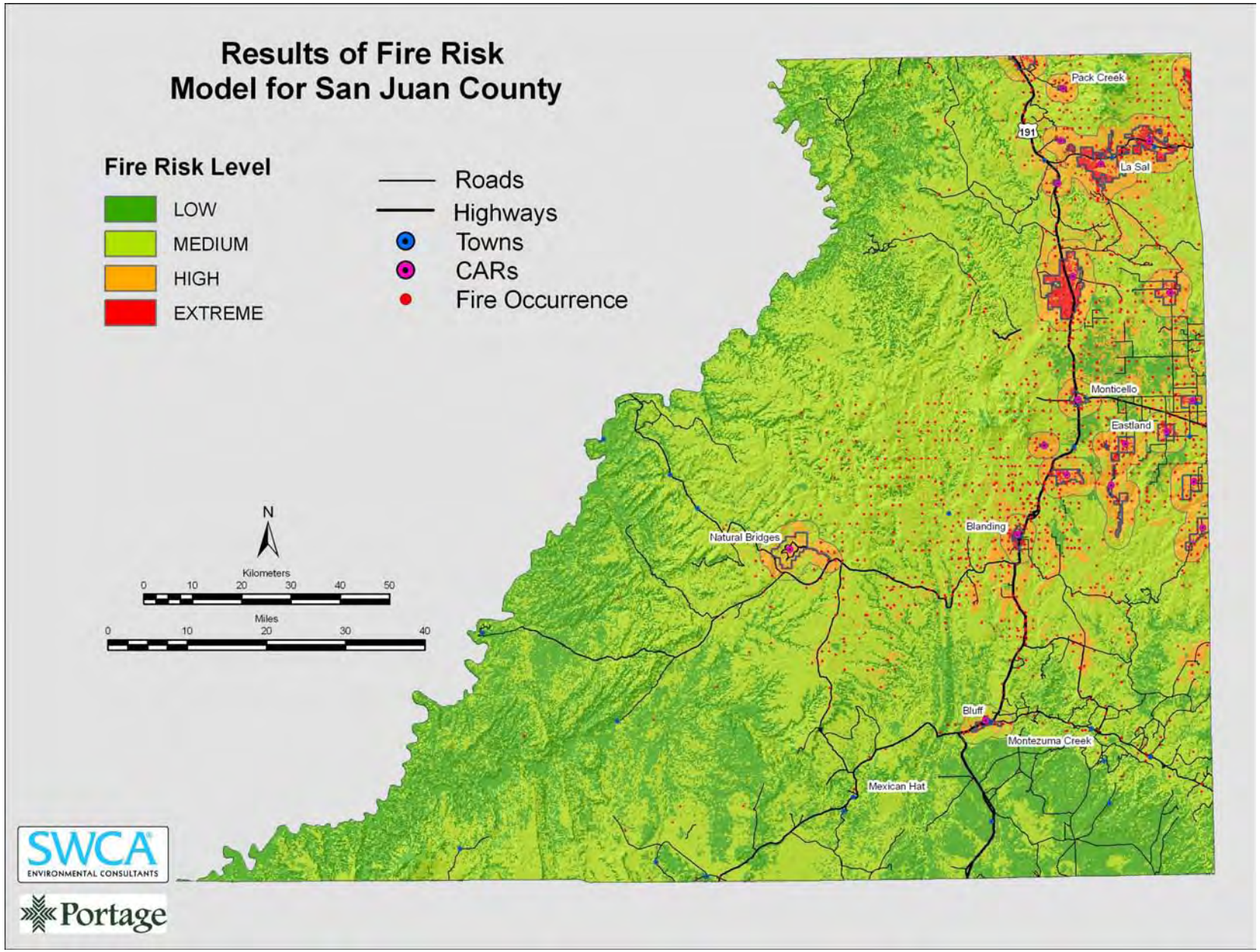
EXTREME
Roads
Highways
Towns
CARs
Fire Occurrence


Utah
San Juan County
San Juan County Base Map
CARs
Major Roadways
WUI Areas
WUI Buffer
(1 1/2 miles)
Land Ownership
BLM
Forest Service
Wilderness Area/Forest Service
Native American Reservation
National Park Service
Private
State
Water
N
Kilometers
0 10 20 30 40 50
Miles
0 10 20 30 40
Pack Creek
Ray Mesa
Brown's Hole
Wilson Arch
La Sal
191
Peter's Canyon
Summit Point
Monticello
Ucolo
Eastland
Blue Mtn
Boulder Point
Canyon Terrace
Cedar Point
Montezuma Canyon
Bug Point
Natural Bridges
Blanding/White Mesa
Bluff
SWCA
ENVIRONMENTAL CONSULTANTS
Portage


Results of Fire Risk
Model for San Juan County
Fire Risk Level
LOW
MEDIUM
HIGH
EXTREME
Roads
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Towns
CARs
Fire Occurrence
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Miles
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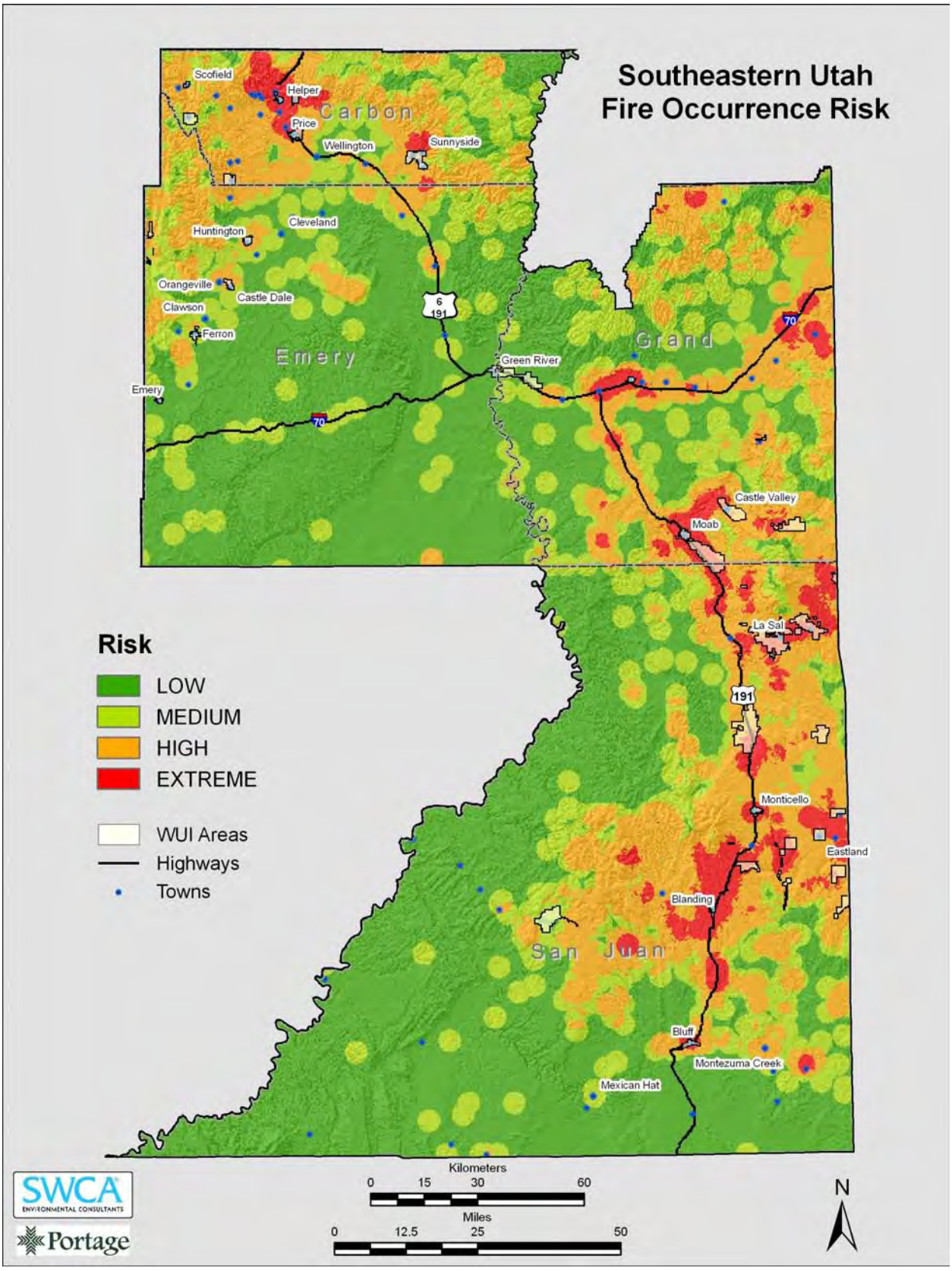
Pack Creek
191
La Sal
Monticello
Eastland
Blanding
Natural Bridges
Bluff
Montezuma Creek
Mexican Hat
SWCA
ENVIRONMENTAL CONSULTANTS
Portage

Appendix F
Risk Values Assigned to SWReGAP Vegetation

Risk Values Assigned to Southwest Regional Gap Analysis Project (SWReGAP)

SWReGAP Code	SWReGAP Vegetation Description	Risk Value
S011	Inter-Mountain Basins Shale Badland	1
S010	Colorado Plateau Mixed Bedrock Canyon and Tableland	1
S047	Rocky Mountain Lower Montane-Foothill Shrubland	1
S030	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	1
S102	Rocky Mountain Alpine-Montane Wet Meadow	1
S012	Inter-Mountain Basins Active and Stabilized Dune	1
D14	Disturbed, Oil well	1
N31	Barren Lands, Non-specific	1
D02	Recently Burned	1
D03	Recently Mined or Quarried	1
D01	Disturbed, Non-specific	1
N80	Agriculture	1
N11	Open Water	1
S006	Rocky Mountain Cliff and Canyon	1
N21	Developed, Open Space - Low Intensity	1
N22	Developed, Medium - High Intensity	1
S002	Rocky Mountain Alpine Bedrock and Scree	1
S083	Rocky Mountain Subalpine Mesic Meadow	1
S014	Inter-Mountain Basins Wash	1
S040	Great Basin Pinyon-Juniper Woodland	1
S090	Inter-Mountain Basins Semi-Desert Grassland	2
S065	Inter-Mountain Basins Mixed Salt Desert Scrub	2
S045	Inter-Mountain Basins Mat Saltbush Shrubland	2
S096	Inter-Mountain Basins Greasewood Flat	2
S079	Inter-Mountain Basins Semi-Desert Shrub Steppe	2
S071	Inter-Mountain Basins Montane Sagebrush Steppe	2
S056	Colorado Plateau Mixed Low Sagebrush Shrubland	2
S085	Southern Rocky Mountain Montane-Subalpine Grassland	2
S023	Rocky Mountain Aspen Forest and Woodland	2
S034	Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	2
S042	Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	2
S028	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	2
S136	Southern Colorado Plateau Sand Shrubland	2
D10	Recently Logged Areas	2
D09	Invasive Annual and Biennial Forbland	2
S075	Inter-Mountain Basins Juniper Savanna	2
S081	Rocky Mountain Dry Tundra	2
S128	Wyoming Basins Low Sagebrush Shrubland	2
S091	Rocky Mountain Subalpine-Montane Riparian Shrubland	2
S100	North American Arid West Emergent Marsh	2
S059	Colorado Plateau Blackbrush-Mormon-tea Shrubland	3
S039	Colorado Plateau Pinyon-Juniper Woodland	3
S052	Colorado Plateau Pinyon-Juniper Shrubland	3
S036	Rocky Mountain Ponderosa Pine Woodland	3
S046	Rocky Mountain Gambel Oak-Mixed Montane Shrubland	3
S050	Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland	3
S032	Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	3
S093	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	3
D04	Invasive Southwest Riparian Woodland and Shrubland	3
D11	Recently Chained Pinyon-Juniper Areas	3
S097	North American Warm Desert Riparian Woodland and Shrubland	3
S054	Inter-Mountain Basins Big Sagebrush Shrubland	4
D08	Invasive Annual Grassland	4
D06	Invasive Perennial Grassland	4

Appendix G
Maps of Factors in Model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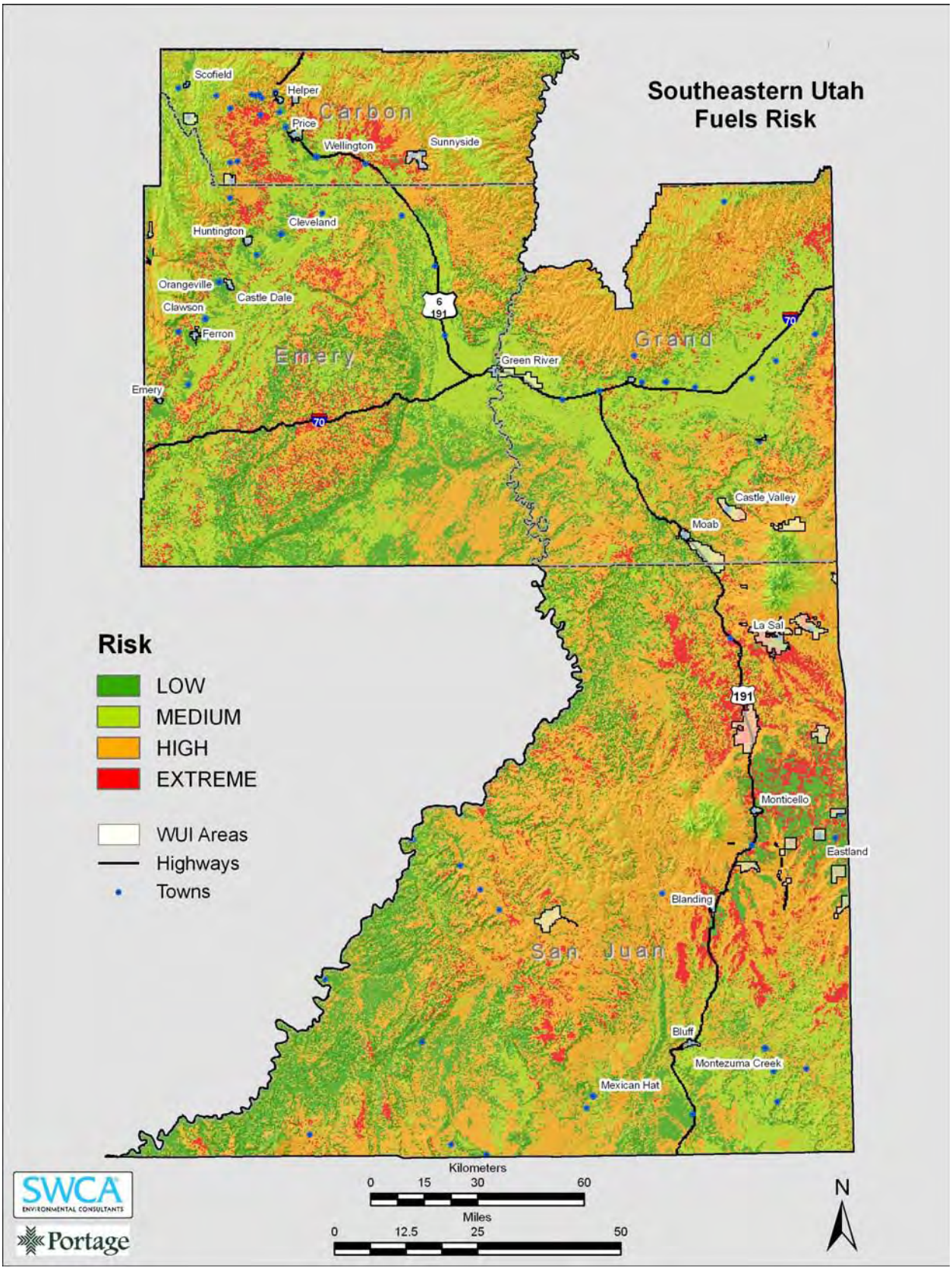
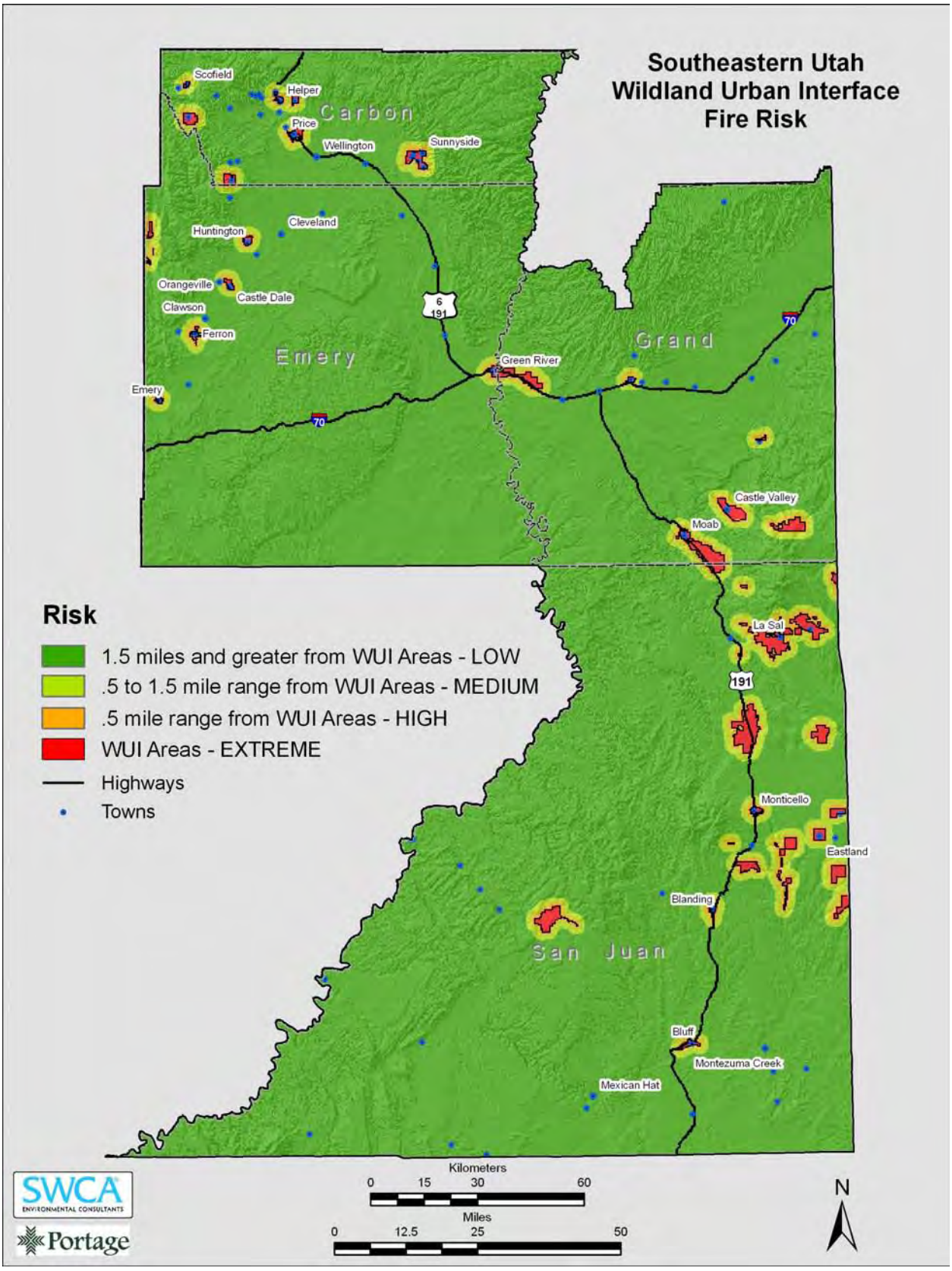
Fire Occurrence Risk
Scofield
Helper
Carbon
Price
Wellington
Sunnyside
Cleveland
Huntington
Orangeville
Castle Dale
Clawson
Ferron
Emery
Emery
6
191
70
Green River
Grand
Castle Valley
Moab
La Sal
191
Monticello
Eastland
Blanding
San Juan
Bluff
Montezuma Creek
Mexican Hat
Risk
LOW
MEDIUM
HIGH
EXTREME
WUI Areas
Highways
Towns
Kilometers
0 15 30 60
Miles
0 12.5 25 50
N
SWCA
ENVIRONMENTAL CONSULTANTS
Portage


Southeastern Utah
Fuels Risk
Scofield
Helper
Carbon
Price
Wellington
Sunnyside
Huntington
Cleveland
Orangeville
Castle Dale
Clawson
Ferron
Emery
Emery
6
191
70
Green River
Grand
70
Castle Valley
Moab
La Sal
191
Monticello
Eastland
Blanding
San Juan
Bluff
Montezuma Creek
Mexican Hat
Risk
LOW
MEDIUM
HIGH
EXTREME
WUI Areas
Highways
Towns
Kilometers
0
15
30
60
Miles
0
12.5
25
50
N
SWCA
ENVIRONMENTAL CONSULTANTS
Portage


Southeastern Utah
Wildland Urban Interface
Fire Risk
Scofield
Helper
Carbon
Price
Wellington
Sunnyside
Cleveland
Huntington
Orangeville
Castle Dale
Clawson
Ferron
Emery
Emery
6
191
70
Green River
Grand
70
Castle Valley
Moab
La Sal
191
Monticello
Eastland
Blanding
San Juan
Bluff
Montezuma Creek
Mexican Hat
Risk
1.5 miles and greater from WUI Areas - LOW
.5 to 1.5 mile range from WUI Areas - MEDIUM
.5 mile range from WUI Areas - HIGH
WUI Areas - EXTREME
Highways
Towns
Kilometers
0 15 30 60
Miles
0 12.5 25 50
N
SWCA
ENVIRONMENTAL CONSULTANTS
Portage

Appendix H
Defensible Space Checklist

Nearly every state has been devastated by wildfires in the last century. More than 140,000 wildfires occur on average each year. Since 1990, more than 900 homes have been destroyed each year by wildfires.

So, what can you do to protect yourself, your home, and your property from wildfires? This UtahFireInfo.gov Fire Prevention site will help you understand why your home is at risk and what you can do to reduce the risk to your home and property.

THE DEFENSIBLE SPACE CHECKLIST

1. Clean roof surfaces and gutters of pine needles, leaves, branches, etc., regularly to avoid accumulation of flammable materials.
2. Remove portions of any tree extending within 10 feet of the flue opening of any stove or chimney.
3. Maintain a screen constructed of non-flammable material over the flue opening of every chimney or stovepipe. Mesh openings of the screen should not exceed 1/2 inch.
4. Remove branches from trees to height of 15 feet.
5. Dispose of stove or fireplace ashes and charcoal briquettes only after soaking them in a metal pail of water.
6. Store gasoline in an approved safety can away from occupied buildings.
7. Propane tanks should be far enough away from buildings for valves to be shut off in case of fire.
8. Keep area clear of flammable vegetation.
9. All combustibles such as firewood, picnic tables, boats, etc. should be kept away from structures.
10. Garden hose should be connected to outlet.
11. Addressing should be indicated at all intersections and on structures.
12. All roads and driveways should be at least 16 feet in width.
13. Have fire tools handy such as: ladder long enough to reach the roof, shovel, rake and bucket for water.
14. Each home should have at least two different entrance and exit routes.

Appendix I
Funding Opportunities

The following section provides information on federal, state and private funding opportunities that may be utilized to obtain financial resources to implement projects.

I. Federal Funding Information

Source: **Pre-Disaster Mitigation Grant Program**

Agency: **Department of Homeland Security Federal Emergency Management Agency (DHS FEMA)**

Website: **http://www.fema.gov/government/grant/pdm/index.shtm**

Description: The Department of Homeland Security includes the Federal Emergency Management Agency (FEMA) and the U.S. Fire Administration. FEMA's Federal Mitigation & Insurance Administration is responsible for promoting pre-disaster activities that can reduce the likelihood or magnitude of loss to life and property from multiple hazards, including wildfire. The Disaster Mitigation Act of 2000 created a requirement for states and communities to develop pre-disaster mitigation plans, and established funding to support the development of the plans and to implement actions identified in the plans. This competitive grant program, known as PDM, has funds available to state entities, tribes and local governments to help develop multi-hazard mitigation plans and to implement projects identified in those plans. The grant would be supported by FFSL and State Dept of Emergency Services. Ryan Pietremali is the contact at 801-538-9718.

Source: **Section 319 Grant**

Agency: **Environmental Protection Agency**

Website: **http://www.epa.gov/owow/nps/cwact.html**

Description: Funding is often used for reduction of nonpoint source pollution, however one community successfully used the grant to obtain funding to reduce hazardous fuels to protect the municipal watershed. For additional information on this success story visit, www.santefewatershed.com. To see about obtaining this type of funding for your community, contact Mike Reichert with the Division of Water Quality at 801-538-6954.

Source: **Funding for Fire Departments and First Responders**

Agency: **Department of Homeland Security US Fire Administration**

Website: **http://www.usfa.dhs.gov/fireservice/grants/**

Description: Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program (AFGP), Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

Specific information for the **Assistance to Firefighters Grant (AFG)** can be found at**: http://www.firegrantsupport.com/afg/.** The primary goal of the Assistance to Firefighters Grants (AFG) is to meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical services organizations.

Source: **Conservation Innovation Grants (CIG)**

Agency: **National Resource Conservation Service**

Website: **http://www.wa.nrcs.usda.gov/programs/cig/index.html**

Description: Conservation Innovation Grants (CIG) State Component. CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program (EQIP) funds are used to award competitive grants to non-Federal governmental or non-governmental organizations, Tribes, or individuals. CIG enables NRCS to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with Federal, State, and local regulations. NRCS administers the CIG program. The CIG requires a 50-50 match between the agency and the applicant. The CIG has two funding components - national and state. Funding sources are available for Water Resources, Soil Resources, Atmospheric Resources, and Grazing Land and Forest Health.

Source: **Volunteer Fire Assistance**

Agency: **USDA Forest Service**

Website: **http://www.fs.fed.us/fire/partners/vfa/**

Description: USDA Forest Service funding will provide assistance, through the states, to volunteer fire departments to improve communication capabilities, increase wildland fire management training, and purchase protective fire clothing and firefighting equipment. For more information contact your state representative, which can be found on the National Association of State Foresters website

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Source: **Economic Action Programs**

Agency: **USDA Forest Service**

Website: **http://www.fs.fed.us/spf/coop/programs/eap/index.shtml**

Description: USDA Forest Service funding will provide for Economic Action Programs that work with local communities to identify, develop, and expand economic opportunities related to traditionally underutilized wood products and to expand the utilization of wood removed through hazardous fuel reduction treatments. Information, demonstrations, application development, and training will be made available to participating communities. For more information contact a Forest Service Regional Representative.

Source: **Catalog of Federal Funding Sources for Watershed Protection**

Agency: **N/A**

Website: **http://cfpub.epa.gov/fedfund/**

The following grants are examples of the types of grants found at this site:

- Native Plant Conservation Initiative www.nfwf.org/programs/npci.cfm
- Targeted Watershed Grants Program www.epa.gov/owow/watershed/initiative/
- Pre-Disaster Mitigation Program www.fema.gov/fima/pdm.shtm
- Environmental Education Grants www.epa.gov/enviroed/grants_contacts.html

Source: **Firewise**

Agency: **Multiple**

Website: **http://www.firewise.org**

Description: Wildland/Urban Interface Working Team (WUIWT) of the National Wildfire Coordinating Group, a consortium of wildland fire organizations and federal agencies responsible for wildland fire management in the United States. The WUIWT includes: USDA Forest Service, USDI Bureau of Indian Affairs, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, Federal Emergency Management Agency, US Fire Administration, International Association of Fire Chiefs, National Association of State Fire Marshals, National Association of State Foresters, National Emergency Management Association, National Fire Protection Association. There are many different Firewise activities that can help homes and whole neighborhoods become safer from wildfire without significant expense. Community clean-up days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local fire departments, at little or no cost. The Firewise Communities/USA recognition program page (www.firewise.org/usa) provides a number of excellent examples of these kinds of projects and programs.

While there are various activities individuals and communities can choose to pursue, the following actions often benefit from seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property – particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to noncombustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

Some additional examples of what communities, counties and states have done can be found in the National Database of State and Local Wildfire Hazard Mitigation Programs at www.wildfireprograms.usda.gov. You can search this database by keyword, state, jurisdiction or program type to find information about wildfire mitigation education programs, grant programs, ordinances, and more. The database includes links to local websites and email contacts.

Source: **The National Fire Plan**

Website: **www.fireplan.gov**

Description: Many states are using funds from the National Fire Plan to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. Usually this is in the form of thinning or pruning trees, shrubs and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, state, and volunteer fire assistance.

II. STATE FUNDING INFORMATION

Source: **National Association of State Foresters**

Agency: **State and Private Forestry Programs**

Website: **http://www.stateforesters.org/S&PF/coop_fire.html**

The National Association of State Foresters recommends that funds become available through a competitive grant process, on Wildland-Urban Interface hazard mitigation projects. State Fire Managers see opportunities to use both the State Fire Assistance and Volunteer Fire Assistance Programs to improve the safety and effectiveness of firefighters in the interface as well as other wildland fire situations. In order to insure firefighter safety, minimize property and resource loss, and reduce suppression costs, land management agencies, property owners, local leaders, and fire protection agencies must work cooperatively to mitigate interface fire risks, as well as to ensure that wildland firefighters receive the training, information, and equipment necessary to safely carry out their responsibilities

Source: **State Fire Assistance (SFA) program**

Agency: **USDA Forest Service's State and Private Forestry budget**

Website: **HTTP://www.firegrantsupport.com/**

Description: Directs federal funds to State agencies for work on community assistance and fire mitigation. These competitive cost-share funds are leveraged by communities for CWPP creation and implementation. In the West, it is now a requirement under the SFA that proposed projects be tied to a CWPP in order to be competitive. Without reliable federal funding to support communities' CWPP planning and implementation, there is a very real risk that the most vulnerable, low capacity communities will also become the least protected from fire. The Council believes the demand for State Fire Assistance greatly outstrips current availability of SFA funding for CWPP development and implementation and that increases in SFA or other dedicated funding can be put to demonstrated good use. The SFA program provides State forestry agencies with assistance in delivering a coordinated wildfire response and in complying with national safety and training standards which allow State and local crews to be deployed on Federal fires and other emergency or disaster situations. The program also assists States with hazard assessments, fuels treatment projects, and public education efforts. Contact your State Forester's office for grant application forms and deadlines.

USDA Forest Service funding will provide for technical and financial assistance to the states to enhance firefighting capacity at the state and local levels. This funding also supports fire hazard mitigation projects in the wildland urban interface and will facilitate an expanded series of Firewise workshops to help communities across the country implement Firewise practices that reduce fire risk. It will also support an expanded national public service fire prevention program. For more information contact your state representative, which can be found on the National Association of State Foresters website.

The **2007 Western WUI Grant Program** is a specific grant available under the SFA program. It includes opportunities for hazard fuels reduction, education, and community and homeowner actions. An application and instructions can be found at: http://www.firesafecouncil.org/news/attachments/2007_CDF_application-proccess_final168.pdf

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Source: **Utah's Watershed Restoration Initiative**

Agency: **Utah Division of Wildlife Services**

Website: **http://wildlife.utah.gov/watersheds/**

Description: Utah Partners for Conservation and Development, (UPCD) have launched an aggressive campaign across the state called the Watershed Restoration Initiative. Their work is focused on the sagebrush and pinyon-juniper areas that are especially at risk. In 2005, the first year of the conservation initiative, the UPCD partners committed more than $8 million to restore more than 120,000 acres of public and private land in 22 counties. The Utah Legislature kicked things off with a $2 million contribution in support of the state's ongoing watershed conservation program. The Bureau of Land Management has taken the lead on public lands by allocating more than $3.5 million to range restoration, mostly through their fuel load reduction program. The Natural Resources Conservation Service has taken the lead on private lands by making $1.5 million in matching funds available to landowners through various Farm Bill programs..

Source: **Secure Rural Schools Act funding**

Agency: **State**

Website: **http://www.fireplan.gov/reports/361-369-en.pdf**

Description: Counties would have previously elected to receive funding under the Secure Rural Schools Act, particularly Titles II and III. These Titles offer a funding stream for both collaborative processes and hazardous fuels reduction work on federal and private lands. Reauthorization and funding of the Act with continued flexibility for counties to undertake resource stewardship projects is a significant complement to HFRA authorities. For additional information on whether or not your county has made this election, contact your local county commissioners or county budget/finance departments.

III. PRIVATE FUNDING INFORMATION

Source: **The Urban Land Institute**

Website: **www.uli.org**

Description: ULI is a 501(c) (3) nonprofit research and education organization supported by its members. The institute has more than 22,000 members worldwide representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. The mission of the Urban Land Institute is to provide responsible leadership in the use of land to enhance the total environment. ULI and the ULI Foundation have instituted Community Action Grants http://planet.uli.org/DK/DisCoun/pl_DisCoun_CAG_fst.html that could be used for Firewise activities. The deadline for the next round of applications is March 31, 2005. Applicants must be ULI members or part of a ULI District Council. Contact actiongrants@uli.org or review the web page to find your District Council and the application information.

Source: **Environmental Systems Research Institute (ESRI)**

Website: **www.esri.com/grants**

Description: ESRI is a privately held firm and the world's largest research and development organization dedicated to GIS (Geographic Information Systems). ESRI provides free software, hardware, and training bundles under ESRI-Sponsored Grants that include such activities as conservation, education and sustainable development, and posts related non-ESRI grant opportunities under such categories as agriculture, education, environment, fire, public safety and more. You can register on the website to receive updates on grant opportunities.

Source: **StEPP Foundation**

Website: **http://www.steppfoundation.org/default.htm**

Description: StEPP is a 501(c)(3) organization dedicated to helping organizations realize their vision of a clean and safe environment by nationally matching projects with funders. The StEPP Foundation provides project oversight to enhance the success of projects increasing the number of energy efficiency, clean energy and pollution prevention projects implemented at the local, state and national levels for the benefit of the public. The website includes an online project submittal system and a Request for Proposals page.

Source: **The Public Entity Risk Institute (PERI)**

Website: **www.riskinstitute.org**

Description: PERI is a not for profit, tax exempt organization. Its mission is to serve public, private, and nonprofit organizations as a dynamic, forward thinking resource for the practical enhancement of risk management. With its growing array of programs and projects, along with its grant funding, PERI's focus includes supporting the development and delivery of education and training on all aspects of risk management for public, nonprofit and small business entities and serving as a resource center and clearinghouse for all areas of risk management.

IV. OTHER FUNDING INFORMATION

The following list of websites includes resources that may also provide helpful information for funding opportunities.

Forest Service Fire Management Website - http://www.fs.fed.us/r3/sfe/fire/index.html

Insurance Services Office (town fire ratings) - http://www.isomitigation.com

National Fire Protection Association - http://www.nfpa.org

National Interagency Fire Center, Wildland Fire Prevention/Education
http://www.nifc.gov/preved/rams.html

U.S. Department of Agriculture "How to Get Information" (contacts)
http://www.usda.gov/news/howto/nre.htm

Utah BLM Fire Management Website
http://www.ut.blm.gov/fire/Assessment/assessment.html

Utah Twenty-First Century Communities Program
http://utahreach.usu.edu/comm21/index.htm

DOI, Department of the Interior, Bureau of Land Management
Noxious Weed Control Integrated Weed Mgt Program on Public Lands Modification 1
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12566

DOI,,Department of the Interior, Bureau of Land Management
Aerial Surveys Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12670

DOI, Department of the Interior, Bureau of Land Management
Reduce Risk and Impact of Wildfire - Idaho Communities Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12673

DOI, Department of the Interior, U. S. Fish and Wildlife Service
Migratory Bird Joint Ventures - Mountain Prairie Region - FY2007 Opportunities Modification 1
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12653

DOI, Department of the Interior, U. S. Fish and Wildlife Service
Migratory Bird Joint Ventures - Mountain Prairie Region - FY2007 Opportunities Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12653

DHS, Department of Homeland Security
Office of Procurement Operations - Grants Division Center of Excellence for Explosives Detection, Mitigation, and Response Modification 2
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12464

DHS, Department of Homeland Security
Office of Procurement Operations - Grants Division Center of Excellence for Border Security and Immigration Modification 1
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12465

DHS, Department of Homeland Security
Office of Procurement Operations - Grants Division Center of Excellence for Maritime, Island and Extreme/Remote Environment Security Modification 2
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12466

DHS, Department of Homeland Security
Office of Procurement Operations - Grants Division Center of Excellence for the Study of Natural Disasters, Coastal Infrastructure and Emergency Management Modification 2
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12467

EPA, Environmental Protection Agency
Region 06 Wetland Program Development Grants Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12519

USDA, United States Department of Agriculture
Natural Resources Conservation Service
South Dakota State Office
South Dakota Rapid Watershed Assessment Partnership Initiative Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12520

DOI, Department of the Interior
Bureau of Land Management
Prairie Ecosystem Restoration Grant
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12521

DOT, U.S. Department of Transportation
DOT/Federal Transit Administration
Alternative Transportation in Parks and Public Lands Modification 2
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12201

DHS, Department of Homeland Security
Preparedness - OG&T
FY 2007 Infrastructure Protection Program: Transit Security Modification 1
http://www.grants.gov/search/search.do?mode=VIEW&oppId=12216

Internship Possibilities:

Agencies and local communities might consider volunteers for internships to assist with public and community education. Often students are interested in volunteer opportunities to help meet their graduation requirements. Agencies and local communities may consider utilizing this resource. Advertisements for internships may include information such as Organization background, internship details, expectations, and how to apply.

Another helpful resource for community education can be found on the Utah Society for Environmental Education (USEE) website found at: http://www.usee.org/database.html. There are a number of brochures and fire education resources that could be used by agencies and communities either directly or through the internship process.

How to find/apply for/write a grant

Grants.gov at www.grants.gov allows organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies.

"Writing Grants to Get Things Done" was presented at the National Wildland/Urban Interface Fire Education Conference in November 2004, by André LeDuc, Director of the Oregon Natural Hazards Workgroup. As a University of Oregon professor and researcher, Mr. LeDuc over $1 million in planning and technical assistance grants in the past three years. His presentation covers twelve steps to successfully developing and implementing grant proposals.

Your organization may be interested in becoming a tax-exempt nonprofit organization to qualify for federal grants. If so, visit the U.S. Internal Revenue Site for the details: http://www.irs.gov/publications/p557/ch03.html.

Additionally, for information on how to write effective grant proposals, see the "2005 Project Funding Recommendations and Proposal Evaluation Comments" which can be found at: http://www.fs.fed.us/r3/spf/cfrp/2005program/tac-report/complete.rtf