XIV. Wildland Fire

Crook County, because of its semi-arid climate and rural character, is vulnerable to wildland fires. Of the all fires in Wyoming, over 50% involve wildland areas. As defined by the National Interagency Fire Center (NIFC), a "wildland fire" is any non-structure fire, other than prescribed fire, that occurs in the wildland. The term "wildland/urban interface" or WUI is widely used within the wildland fire management community to describe any area where man-made buildings are constructed close to or within a boundary of natural terrain and fuel, where high potential for wildland fires exists. "Aspect" refers to the direction in which a slope faces. "Fuel" consists of combustible material, including vegetation, such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire.

The Crook County Community Wildfire Protection Plan (2005) offers the following description of the county, "As in many other areas in the west, over the last few years Crook County has witnessed a large increase in human population which continues to result in rapid growth. This region is well known for its rugged natural scenery, open space and solitude, factors which appeal to a great many urban dwellers as well as to long-time residents. In the past residents tended to make their livings directly from the land, wood products, ranching, hunting, etc. Now, more people who have moved to this area are building vacation homes, retire here or commute to jobs in surrounding counties. This has created an entire class of dwellings that are only occupied part-time and a large amount of undeveloped land held by absentee owners. This is of considerable significance to the wildfire danger of the area, as the structures often do not receive adequate maintenance, and owners are not available to help with community efforts to reduce fire hazards. An important aspect of the human movement toward the forest is the general desire for solitude. This has led to a tendency for small, widely scattered communities or single residences that are difficult to organize or protect in the event of a wildfire. It has caused the people to be resourceful and independent, but also made emergency coordination and coherent planning on a large scale, difficult."

Typical timbered slope in Crook County

Crook County wildland fuels consist of lodgepole pine, oak, aspen/cottonwood and other deciduous shrubs, and grasses. Timberlands in the county are owned by the federal government, the state of Wyoming, corporations, and small private landowners. (Statewide Assessment of Forest Resources, Wyoming Division of Forestry, 2008)

The county is experiencing widespread mortality due to mountain pine beetle. The Black Hills National Forest, several hundred thousand acres of which which lies in Crook County, announced in December 2012, plans for extensive work on the acres they manage. The Forest intends to spend $70 million over the next 5-7 years to treat 248,000 acres of vulnerable woodlands using both commercial logging and non-commercial thinning. Most of these acres will be in South Dakota. According to Forest Supervisor, Craig Bobzien, "My decision allows us to act more quickly on more acres to combat mountain pine beetle and reduce hazardous fuels. It addresses concerns about safety and will help protect communities and resources from large-scale severe wildfires." (Aberdeen News, December 18, 2012)

The 2005 Crook County Community Wildfire Protection Plan (CWPP) was developed by Crook County Fire with support from Wyoming State Forestry Division. The stated goals of the plan were 1) to identify and implement projects that will protect residents living in the wildland urban interface as well as firefighter and emergency personnel, and 2) to minimize or eliminate damage or loss of property to wildfire.

Ten areas in the county were identified as high risk for wildland fire through a collaborative process between the county and the Wyoming Division of Forestry. These areas are as follows:

- Alladin
- Alva
- Bear Lodge
- Black Buttes
- Kara Creek, Pine Ridge
- Hulett
- New Haven
- Devils Tower
- Douglas
- Sand Creek

A combination of issues that include steep slopes, ingress and egress, lack of water for suppression efforts, ground and ladder fuels, forest insect and disease mortality, scattered structures, lack of defensible space, rural addressing problems, second home ownership, and complicated intermixed ownerships all contribute to these areas being identified as high risk for wildland fire.

Wyoming wildland fires are managed and supported to varying extents through cooperative efforts by the:

- Bureau of Land Management (BLM) Wyoming Fire Program
- Geospatial Multi-Agency Coordination (GeoMAC) Wildland Fire Support Maps
- Wyoming Fire Academy
- Wyoming Wildland Fire Plan Action Team
- National Park Service (NPS) Fire Management Program
- US Fish and Wildlife Service (FWS) Fire Management Branch
- National Interagency Fire Center (NIFC)
- Bureau of Indian Affairs (BIA) Fire and Aviation Management – NIFC
- USDA Forest Service (USFS) Fire and Aviation Management
- Wyoming State Forestry Division

Currently, the principal action plan for the State is the Wyoming Wildland Urban Interface Hazard Assessment produced by a joint venture of the Wyoming State Forestry Division, USFS, BLM, NPS, and other interested parties, with the BLM hosting the data. This is a Geographic Information System (GIS)-based mapping mission building on The Front Range Redzone Project in Colorado—the first fire-hazard mapping program of its kind.

The Assessment maps fire hazard, incorporating population density against slope, aspect, and fuels. With the mapping analysis evaluating areas of varying wildfire vulnerability, the final output will result in a Risk, Hazard, and Value (RHV) map displaying areas of concern (Redzones) for catastrophic wildland fires (Figure 13.3). The Wyoming Wildland Urban Interface Hazard Assessment builds on the work of earlier hazard methodologies and provides new and updated data to further enhance accuracy and scale.

History

The wildland fire history for the State of Wyoming has been compiled in the 2008 Wyoming Multi-Hazard Mitigation Plan from various state and federal sources. Unfortunately the 2008 Plan does not provide detail to the county level. For Crook County's hazard mitigation plan, additional data at the county level was obtained from the Black Hills National Forest, the Wyoming State Lands-Division of Forestry, and the County Fire Warden, Gari Gill.

The following figure lists and displays the location of fires in Crook County tracked by the Forest Service from 1936-2009. These are primarily, but not exclusively, fires that have occurred on National Forest lands. The red outlines indicate National Forest boundary. (source: Bryan Karchut, North Zone, Fire Management Officer, Black Hills National Forest) As evidenced by the map, fire occurrences have been widely distributed across the county over the past 80 years.

Figure 14.1 Historical Wildland Fires on National Forest Lands

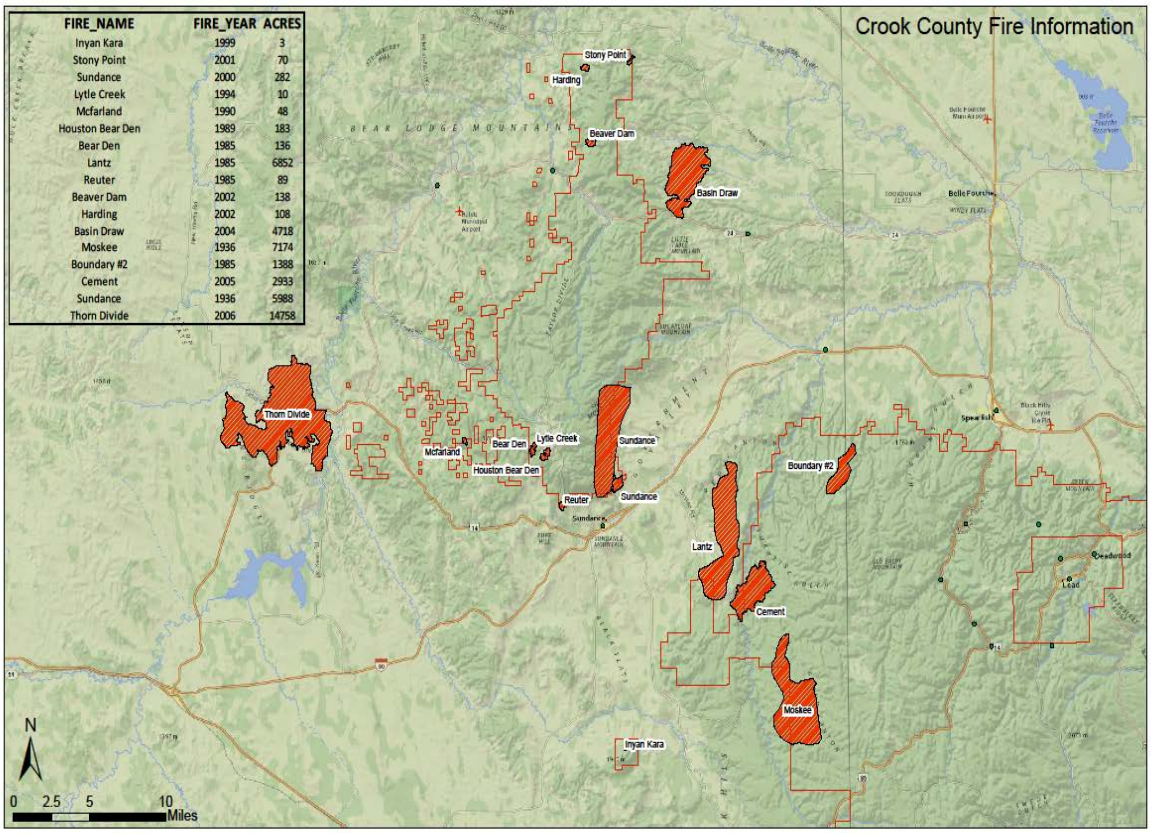


Figure 14.2

Northern Great Plains Dispatch Center		
YEAR	# of Fires	TOTALS Acres Burned
2005	46	490.5
2006	123	21,937.0
2007	91	2,064.0
2008	28	141.2
2009	22	86.0
2010	85	691
2011	64	516
2012	325	7896
	784	33,821.7

According to the Wyoming State Division of Forestry (WDF) and Crook County Fire Warden, 33,821.7 acres were burned in 784 wildfires between 2005 and 2012.

WDF collects fire statistics from counties across the state. The reporting format has been in transition over the past several years to make the data collected consistent with standards for the National Association of State Foresters.

There were 85 wildland fires in Crook County in 2010. Sixty-two were located on private lands, two on federal lands, and 11 on state lands. Twelve of these fires were equal to or less than 5 acres. Twelve of these fires occurred on private lands, two on federal lands. Eighty-one fires were caused by lightning, 2 by equipment use, 1 from smoking, and 1 was miscellaneous in origin. One civilian injury was reported in 2010 from wildfire, there were no firefighter injuries and no deaths.

In 2011, the county experienced 67 fires—all reported to WDF were on private land. The vast majority of the fires were lightning caused (56), with 7 caused by campfires, 3 had miscellaneous causes, 2 from incendiary devices, and 1 from smoking. All but 14 of these fires were 5 acres or smaller in size. No injuries or deaths were reported. One residence and one other structure were reported as threatened in the 83-acre Madison fire.

In 2012, 325 fires consumed 7,896 acres. 312 fires were lightning-caused, nine were equipment caused, and four were arson caused. In 2012 there were four injuries; two from heat exhaustion, one a medication reaction, and one injury occurred on a private pumper.

Ayers Fire, July 2012

Some generalizations can be made about the history of wildland fire occurrence in Crook County from the data available; the number of fires and acres burned vary by year, the large majority of fires are controlled before they reach a size greater than five acres (however large fires can also occur), the majority of fires are caused by lightning, and the likelihood of serious injury or death from wildland fire is very small in the county. (Wyoming State Division of Forestry)

Fire occurrence often coincides with times of drought which can create especially severe fire seasons. Figure 14.2 shows the acres burned and precipitation by year for the state from 1960-2005.

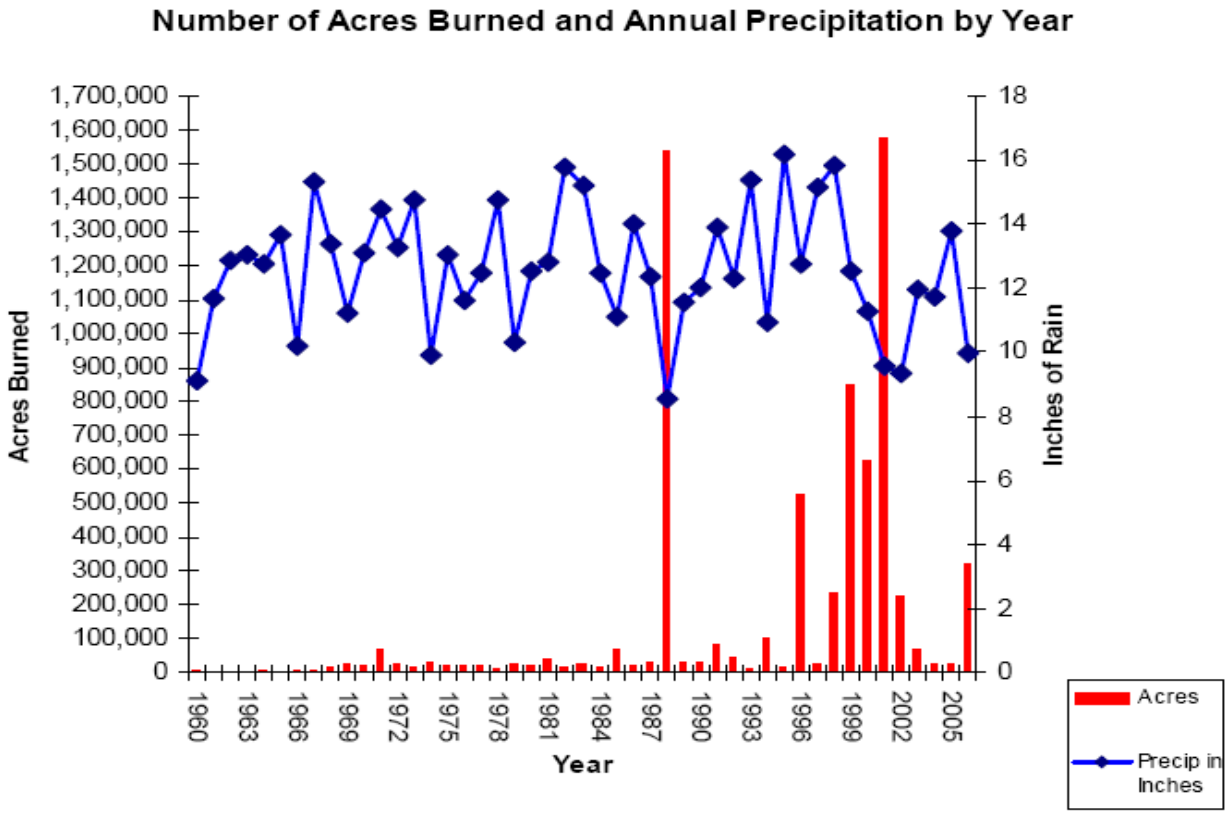


Figure 14.2 Annual Precipitation and Number of Acres Burned

Impacts, Future Impacts

While much of the impact from wildfires focuses on structures (see figure 14.4), pasture and grazing lands can also be lost to production as a result of fire. As with drought, this can create a need for emergency pasture and can cause ranchers to have to sell stock at an unplanned market time. Additionally, range improvements such as fences and watering structures can be lost to wildland fire. Crook County contains commercial timberlands that support a large mill. Any significant loss of saw timber can directly affect jobs in the wood products industry.

Wildlife is also affected by wildfires. There can be loss of life, as well as loss of habitat. The potential for erosion, landslides, and debris flow increases when vegetation and trees are lost. Water quality--included municipal watersheds--can be adversely affected by wildland fire when soil and debris is washed into creeks and streams.

Smoke and poor air quality from wildland fire puts humans at increased risk for respiratory problems and can force at-risk individuals to curtail activities or remain inside. Severely impaired visibility has the potential to both discourage recreation and tourism at the National Monument and other sites such as Keyhole Reservoir, and shut down roadways--temporarily halting commerce.

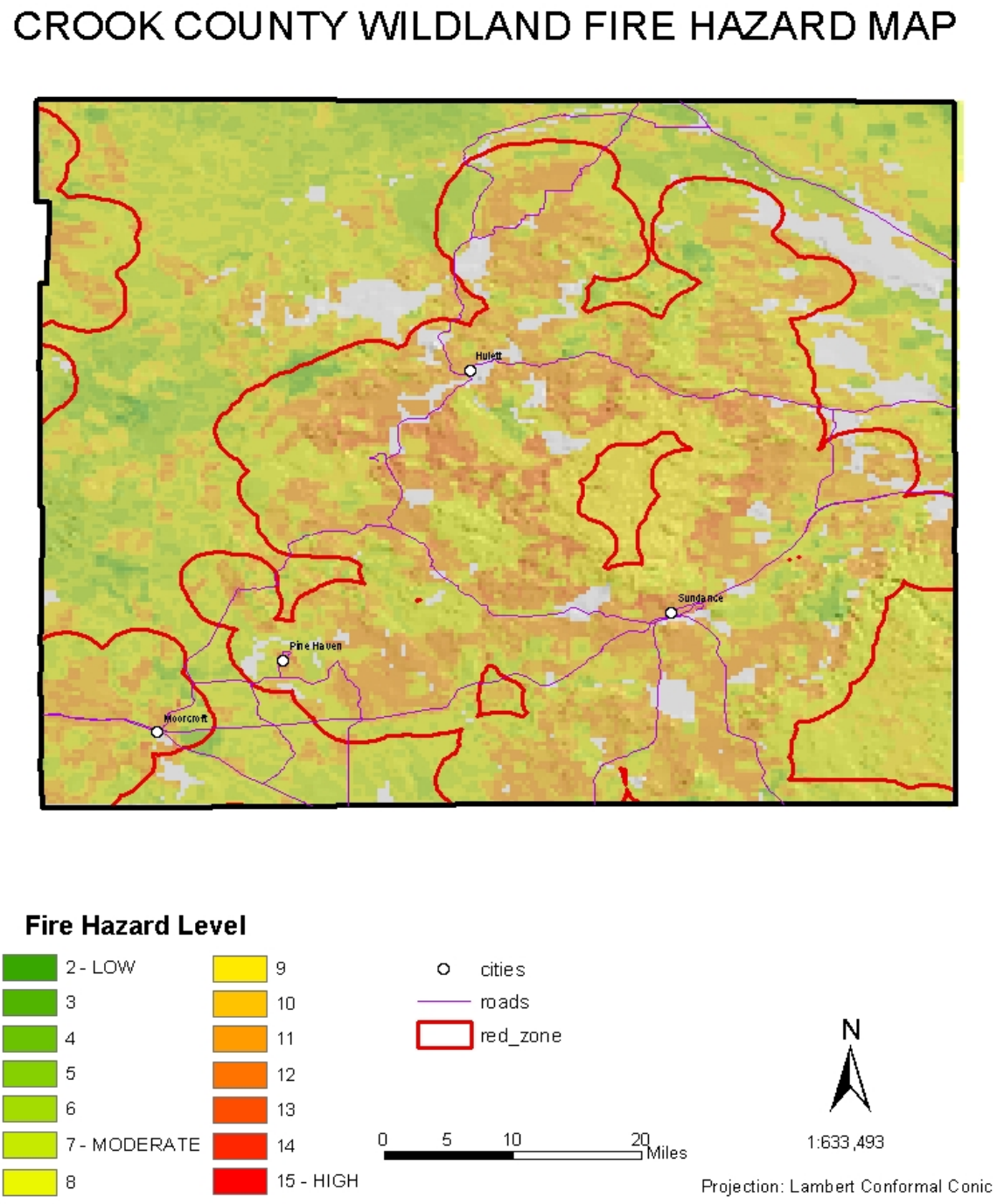
GIS is a tool that is used to compare, capture, input, output, store, manipulate, analyze, model, and display spatial data. In the case of the Wildland Urban Interface Hazard Assessment, wildfire hazard vulnerability is determined by comparing values such as slope, vegetation, housing density, and aspect. The following is from the *Wyoming Wildland Urban Interface Hazard Assessment Methodology*—a report written by the Wyoming State Forestry Division:

The Wildland Urban Interface Hazard Assessment uses three main layers to determine fire danger—Risk, Hazard, and Values. The following lists include the data used to create each of the three layers.

1. Risk – Probability of ignition
    a. Lightning strike density
    b. Road density
    c. Historic fire density
2. Hazard – Vegetative, topological features affecting intensity and rate of spread
    a. Slope
    b. Aspect
    c. Fuels – Interpreted from GAP Vegetation information.
3. Values – Natural or manmade components on which value can be placed
    a. Housing Density – Life and property
4. Non-flammable areas mask – A mask was created to aid in the analysis for areas that will not carry fire such as water and rock areas. These areas show in the final assessment as a zero value for hazard.

The statewide Wildland Urban Interface Hazard Assessment and its resultant outputs serve two primary purposes: assisting in prioritizing and planning mitigation projects and creating a communications tool to which agencies can relate to common information and data. With the mapping analysis evaluating areas of varying wildfire vulnerability, the final output will result in a Risk, Hazard, and Value (RHV) map displaying areas of concern (Redzones) for catastrophic wildland fires. The Redzone map for Crook County follows.

Figure 14.3 Crook County Wildland Fire Base Map with Redzones



Data derived from Wyoming State Forestry Division and the U.S. Forest Service

(Wyoming Wildland – Urban Interface Hazard Assessment)

Another method of estimating potential future impact is to determine the value of structures that are located within Redzones, or wildland fire building exposure values. Wildland fire building exposure value is the value of buildings that can be potentially damaged by wildland fire in an area.

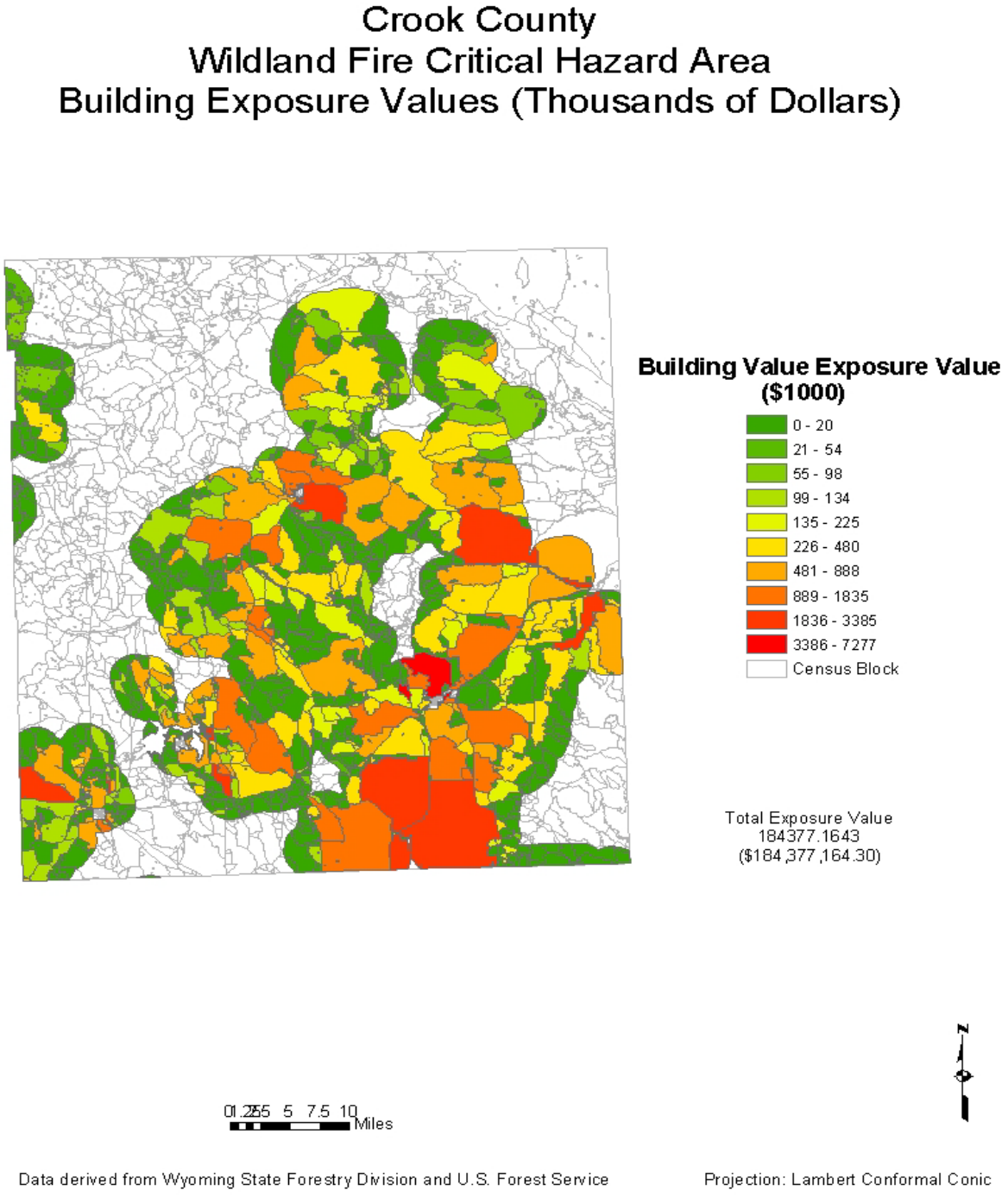


Figure 14.4 Wildland Fire Building Exposure Map

Vulnerability

According to the Wyoming Multi-Hazard Mitigation Plan (June 2011), Crook County is in the top ten Wyoming counties for both existing risk and potential risk. Crook is #1 for potential risk and #10 for existing risk. Risk in this case is measured by the number of square miles of both developed and undeveloped land in the wildland urban interface. This is more notable considering that Crook County is one of the smallest counties in the state for total square miles. The county has 0.3 developed square miles and 59.6 undeveloped square miles in the interface. There are 54 homes in the interface with 22% of the homes being second homes.

Based on GIS analysis performed by the State of Wyoming for the 2008 State Hazard Mitigation Plan, Crook County has over $184 million in building value alone potentially at risk to wildland fires. It is highly unlikely that the areas at risk will simultaneously face a completely destructive event. This figure provides the total for values at risk.

Probability

There are no fires over 100,000 acres listed for Crook County in the national fire data base for the period 1997-2011 and no historically significant fires listed for the county since record-keeping began. (National Interagency Fire Center, www.NIFC.gov)

However, based on historic occurrence, there are wildfires on an annual basis. Drought, which Crook County is susceptible to, increases the probability for wildland fire occurrence and the potential for larger, more destructive fires in terms of economic losses and potential for injury and loss of life.

Summary

PROPERTY AFFECTED: High
POPULATION AFFECTED: Medium
PROBABILITY: High
JURISDICTION AFFECTED: Pine Haven, Hulett, Sundance, County-wide