

CHAPTER 11: WILDLAND FIRES

Converse County, because of its semi-arid climate, available fuels and rural character, is vulnerable to catastrophic wildland fires. Of all the 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. Before discussing wildland fire hazard in Converse County, some key terms should be identified. The term “wildland/urban interface” or WUI is widely used within the wildland fire management community to describe any area where 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.

As the population and the wildland/urban interface in Wyoming increases, the more significant the risk of wildland fire hazard. The past 100 years of wildland fire suppression has led to heavy vegetation growth and thus has greatly increased the potential fuel-load for a wildfire to burn. As the wildland/urban interface has grown into these densely packed forests, the potential for catastrophic wildland fires has increased as well.

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

1. Bureau of Land Management (BLM) Wyoming Fire Program
2. Geospatial Multi-Agency Coordination ([GeoMAC Wildland Fire](#) Support Maps)
3. Wyoming Fire Academy
4. Wyoming Wildland Fire Plan Action Team
5. National Park Service (NPS) Fire Management Program
6. US Fish and Wildlife Service (FWS) Fire Management Branch
7. National Interagency Fire Center (NIFC)
8. Bureau of Indian Affairs (BIA) Fire and Aviation Management – NIFC
9. USDA Forest Service (USFS) Fire and Aviation Management
10. Wyoming State Forestry Division

Currently, the principal action plan for the State is the Wyoming Wildland Urban Interface Hazard Assessment (the 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 (Wyoming HMP, 2008). 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, which is determined by analyzing population/housing density against hill slope, aspect, and fuels. The mapping analysis evaluates areas of varying wildfire vulnerability, and the final output is a Risk, Hazard, and Value (RHV) map displaying areas of concern (so-called “Redzones”) for catastrophic wildland fires. The RHV layers are comprised of the following factors:

- Risk – probability of ignition. This factor looks at lightning strike density and the existence of road buffers.
- Hazard – vegetative and topological features affecting intensity and rate of spread. This factor looks at slopes, aspect, and fuels, as interpreted from vegetative cover databases.
- Value – natural or man-made components of the ecosystem on which a value can be placed. This factor looks at housing density and life and property, and uses a combination of parcel data, well head location data, and Census information.

Additionally, a mask was created to identify nonflammable areas, such as rock and water. Urban areas that do not have enough vegetation to carry fire were covered with the nonflammable mask as well (USFS, 2010).

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. Figure 11.1 is from the Wyoming HMP (2008) and shows the Redzone for the State of Wyoming. In Converse County, the Town of Glenrock is the largest inhabited area to appear within the Redzone. There are also some pockets of high hazard ranking within the Thunder Basin National Grassland in the northeast corner of the County, and in the Medicine Bow National Forest to the south.

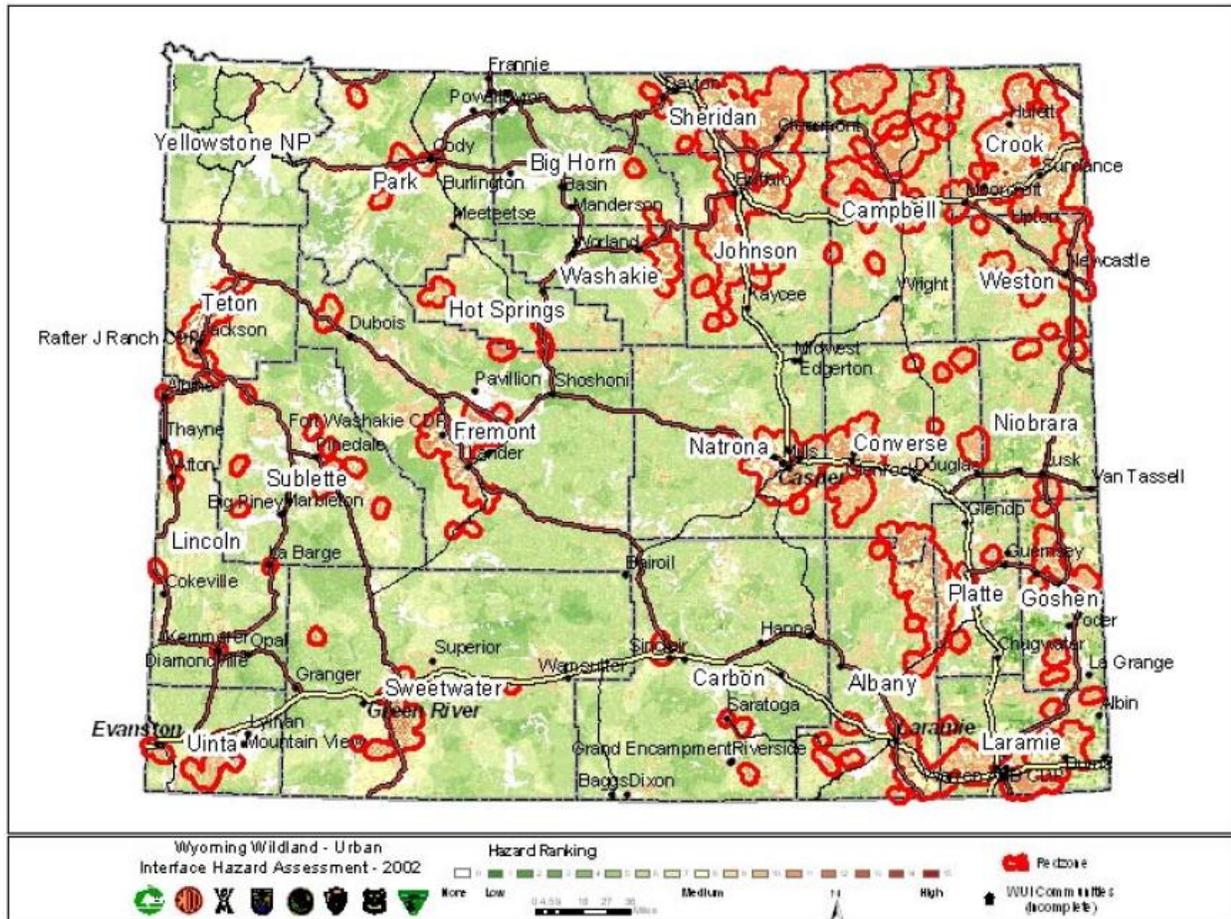


Figure 11.1 Redzone Map of Wyoming

(Wyoming Wildland-Urban Interface Hazard Assessment, 2002)

Mountain Community Wildfire Protection Plan

Converse County has developed a Mountain Community Wildfire Protection Plan (MCWPP) for communities identified as “at risk” of wildfire. These communities, all located within the Medicine Bow National Forest in the southern part of the County, were assessed for wildfire risk and mitigation strategies.

The MCWPP used a Wildfire Hazard Information Extraction (WHINFOE) model to calculate the wildfire hazard rating for parcels in the WUI. Primary factors that determine the hazard rating for each site include topography, structure construction, access, utilities, landscape, and water supply. Results give the percent of structures at low, moderate, high, and very high risk; and the percent of structures at risk if the mitigation measures are enacted. The document also describes how cooperation is needed between rural fire districts, year-round residents, part-time residents, and neighboring fire response districts if they are to be prepared to respond as quickly and safely as possible in case of a wildland fire.

History

The wildland fire history for the State of Wyoming has been compiled in the Wyoming Multi-Hazard Mitigation Plan from various State and federal sources, and shows the number of fires and the number of acres burned on both federal and state/private land for the years 1960 through 2003. Unfortunately the data do not provide detail to the County level. Figure 11.2 shows these data for the State of Wyoming.

As can be seen from the graph, Wyoming's damaging fire seasons often coincide with times of drought. One of the worst fire seasons occurred during 1988, when fifty fires started in Yellowstone National Park. These fires, along with other natural and human-caused fires that began outside the Park boundaries eventually burned more than a third of the Park, nearly 800,000 acres. Another 700,000 acres outside the Park also burned. Approximately 25,000 firefighters worked to put out the fires. The costs exceeded \$120 million. The years 1996 and 2000 also saw higher-than-average fire seasons.

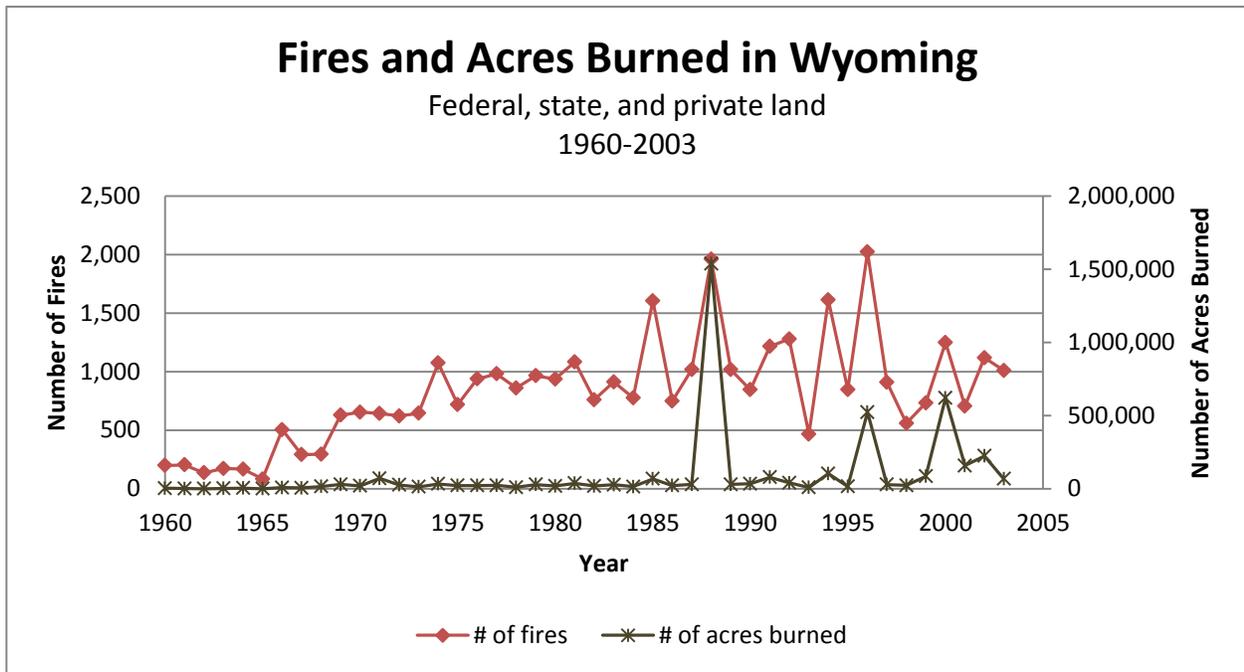


Figure 11.2 Fires and Acres Burned in Wyoming

Converse County's MCWPP focuses on the rural mountain communities of Esterbrook, Downey Park, Cold Springs, and Boxelder. Before modern settlement and the disruption of established fire patterns by grazing, timber harvesting, and fire suppression, these areas experienced regularly-occurring wildfires. Tree ring studies in the vicinity of Esterbrook show burn intervals as low as eight years.

High intensity fires resulting in tree mortality were less common, and occurred more often in areas such as draws and north-facing slopes where cooler, moister conditions reduced fire frequency and allowed a build-up of fuels (Converse County MCWPP, 2005). In general, the longer the interval between fires, the more fuel is allowed to accumulate, and the risk of a high-intensity, stand-replacing fire increases.

Table 11.1 below was taken from the MCWPP and shows historic large fires (greater than 300 acres) within the North Laramie Range and foothills.

Table 11.1 Historic Large Fires within North Laramie Range and Foothills

Year	Fire Name	Approximate size (acres)	Township	Range	Section
1934	Esterbrook, Roaring Fork, Horseshoe Complex	2,500 – 3,000	27N	71W	n/a
1934	Braae Mill	640	30N	72W	n/a
1934	Downey Park	300+	29N	74W	n/a
1934	Cold Springs (Daws place)	38,000	29N	75W	n/a
1934	Boxelder (Boxelder Canyon)	6,400	32N	75W	n/a
1945	Mill Creek	2,000	29N	71W	n/a
1948	Johnson (Mary Lees)	300+	27/28N	71W	n/a
1956	Maggie Murphy	1,200	28N	71W	n/a
1964	Cottonwood Park	1,640	27N	71W	n/a
1965 or 1970	Deer Creek	520 – 1,200	30N	78W	n/a
1969	Rattlesnake Draw	600	26N	72W	n/a
1971	Sunset Ridge	330	28/29N	71W	n/a
1973	Bear Head #1	2,000	26N	72W	n/a
1974	Held Creek	2,000	27N	70/71W	n/a
1974	Hagemeister	700	27N	70W	15
1979	Duck Creek #1	6,000	24N	72W	n/a
1979	Sheep Mountain #1	7,000	26N	70W	n/a
1984	Friend Park	800	26/27N	72W	n/a
1986	Collins Peak	4,500+	20N	71W	n/a
1986	Three Cripples	945	28N	71W	n/a
1990	Johnson Mountain	500	26N	70W	12
1991 or 1992	DB Uncontrolled	2,200	30N	70W	n/a
1994	Squaw Mountain (off map to the south, Albany County)	3,630	23N	70W	32
1996	Dog Leg (off map to the north, Natrona County)	22,000	?	?	n/a
1996	Murphy Ridge	3,218	26N	71W	5 & 7
1996	Bear Head #2	3,275	26N	72W	12 & 13
1996	Rabbit Creek #1	434	26N	70W	n/a
2000	Black Ridge	3,600	30N	72W	n/a
2001	Duck Creek #2	800	24N	72W	36
2001	Leroy	5,580	26N	70/71W	n/a
2002	Hensel	14,564	27N	71W	n/a
2002	Reese	10,000+	24N	71W	n/a
2003	Rabbit Creek #2	1,620	26N	70W	n/a
2004	Sheep Mountain #2	500	31N	72W	9
2005	Bixby	3,000+	33N	74W	n/a

Year	Fire Name	Approximate size (acres)	Township	Range	Section
2005	Windmill (off map to the south, Albany County)	1,050	23N	69W	n/a
2005	Table Mountain (off map to the east, Platte County)	1,000+	28N	69W	32

As this table shows, fire activity occurs with some regularity in the North Laramie Range/Medicine Bow National Forest. Lightning is the primary ignition source for wildland fires. In 2005, 34 fires were recorded for the Laramie Peak Range and foothills during the period of June through September (Converse County MCWPP, 2005). The Esterbrook area has the highest amount of fires of the four at-risk communities with at least six major fires occurring in or near the community since 1935. The 2002 Hensel Fire was the largest in recent years. That fire burned 17,000 acres and destroyed structures in Albany County. State and county fire-fighting costs were \$416,717.

Community Assessments

The Converse County MCWPP calculated the wildfire hazard rating for each of the four rural communities mentioned above. The land conditions in these areas are conducive to large-scale wildfires because of the topography, difficulty for emergency access, scarcity of water resources, and existing stands of dead trees, debris, and unburned slash piles. (Converse County MCWPP, 2005).

The results in Table 11.2 are directly from the MCWPP. For context, Esterbrook has 200 structures; Downey Park has 33 structures plus 24 structures across the county line in Albany County; Cold Springs has 25 structures; and Boxelder has approximately 20 structures (as of 2005). The majority of these structures are residential.

Table 11.2 Wildfire Hazard Rating for At-risk Communities

Community	Percent of Structures at Risk	Percent of Structures at Risk if Mitigated
Esterbrook		
Low Risk	0	3
Moderate Risk	21	52
High Risk	62	45
Very High Risk	17	0
Downey Park		

Community	Percent of Structures at Risk	Percent of Structures at Risk if Mitigated
Low Risk	0	3
Moderate Risk	31	41
High Risk	41	56
Very High Risk	25	0
Extreme Risk	3	0
Cold Springs		
Low Risk	6	7
Moderate Risk	7	27
High Risk	37	66
Very High Risk	37	0
Extreme Risk	13	0
Boxelder		
Moderate Risk	18	53
High Risk	53	41
Very High Risk	23	6
Extreme Risk	6	0

The results indicate that the majority of the structures are at high to very high risk from wildfire. However, if mitigation work were to be done at these sites, there would be an improvement in the overall risk rating. Individual assessments were sent to each property owner by the MCWPP team to offer suggestions on what they can do to improve their structure and surroundings in order to mitigate their risks from wildland fire. As of 2005, 253 structural wildland fire risk assessments were completed and 22 properties were mitigated with defensible space. Mitigation activities include clearing brush and fuel away from structures, thinning out dead trees and other fuel sources, and not storing firewood next to structures.

Concerns

The Converse County MCWPP listed some concerns for the four communities. A summary of these is provided below.

Esterbrook

- Emergency vehicle access and landowner evacuation routes are a major concern, as many of the cabins in the area are well away from major access roads.
- Common access problems are lack of maintenance, only one means of access, narrow roads with no room to pass or turn around, substandard bridges and culverts, locked gates, and heavy fuel concentration along routes.
- Most roads are not sign-posted, which would make it difficult for emergency personnel to locate structures.
- Some areas along public roads have dense vegetation, which could make them impassible during a wildfire.
- An epidemic of Mountain Pine Beetle in the 1980s left many areas with extremely high accumulations of dead and downed trees, along with old logging slash where infested trees were harvested.
- Absentee landowners and limited finances are obstacles to wildfire mitigation.

Downey Park, Cold Springs, and Boxelder

- Increasing development of remote areas, poorly-designed subdivisions, and lack of landowner involvement is placing an unacceptable burden on the volunteer fire-fighting system.
- The forests in which these structures are located and being built have not burned for decades, increasing the probability of catastrophic wildfires.
- Limited access is a major concern, as many of the private driveways and subdivision roads are too narrow to allow two-way traffic, and places to turn around are limited or non-existent.
- Lack of road maintenance, locked gates, and lack of sign-posts are other common problems.
- The distance from the nearest fire response unit is a major concern of the County Rural Fire Fighters – response times for the nearest emergency services range from one to two hours and could be substantially longer under certain circumstances.
- The Rural Fire Zones are completely manned by volunteers. Ranchers and permanent residents are very involved; however, with the increasing numbers of absentee landowners, seasonal occupants, and structures, the manpower is not available for protection.

Downey Park

- Many structures in this area are located on a ridge which is accessed by a very narrow, steep, and rocky road. This road is the only means of access to properties,

which can lead to a very dangerous situation of entrapment for landowners and fire fighting personnel during a wildfire.

- Water for fire suppression on this ridge is virtually non-existent.

Cold Springs

- A major concern is access and fuel loads within the Little Medicine Subdivision. Roads within this subdivision are extremely narrow, with no turn-outs, often leading to dead-ends and locked gates.
- Vegetation along these roads consists of extremely dense lodgepole pine stands and heavy accumulations of dead and down forest debris.

Boxelder

- This area is of slightly less concern due to the fact that structures are fewer and farther between.
- Fuel conditions are no better in this area, and high densities of trees and high accumulations of dead and down forest debris make this area equally susceptible to catastrophic wildfire.
- Access is a concern because nearly every structure is accessed through a locked gate.
- Landowner participation in the Firewise Program has been less responsive than the other three communities.

The MCWPP includes recommendations to improve the defensibility of the structures and land in these communities. In order of priority (from highest to lowest), these are:

- Fuels reduction on private lands
- Fuels reduction on public lands
- Shaded fuel breaks
- Fine fuels reduction and regeneration (encourages grazing within areas where forage production is adequate to maintain rangeland health)
- Improve access
- Improve private roads
- Improve public roads
- Educating the public
- Water resources for fire suppression

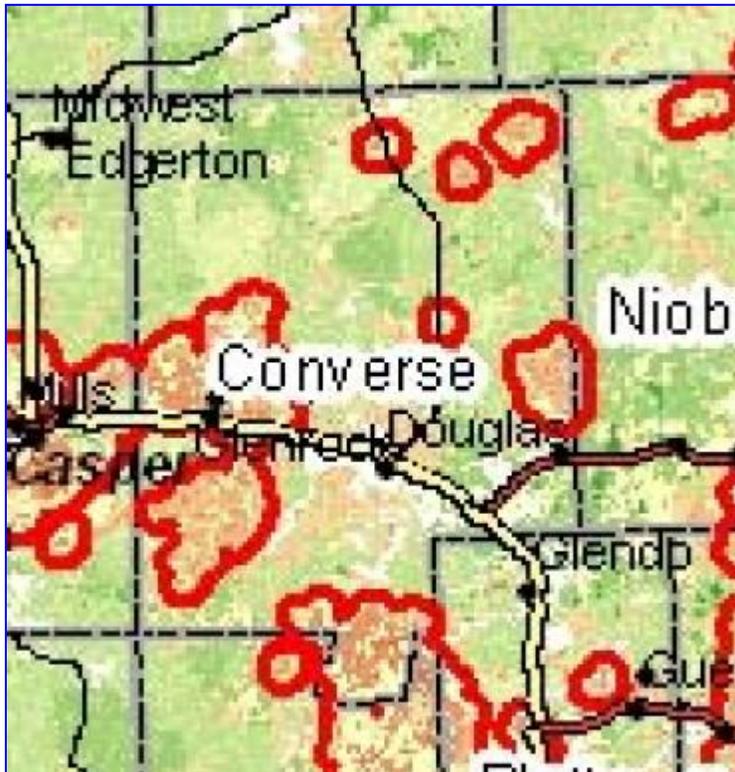


Figure 11.3 Converse County Redzone Map

Impacts

The statewide WUI Hazard Assessment and Redzone map was discussed previously. This tool is valuable in prioritizing and planning mitigation projects, and creating a communication medium in which agencies can relay common information and data. Redzone mapping in Converse County indicates that Glenrock is probably the most-populous at-risk community, followed by the mountain communities discussed in the MCWPP and seen within the Redzone in the south of the County. Figure 11.3 is a close-up view of the state-wide Redzone map shown in Figure 11.1.

Another method of estimating potential future impact is to determine the value of structures that are located within Redzones. The “building exposure” value estimates the value of buildings that can be potentially damaged by wildland fire in an area, and presents the amount of damage by county. Building exposure values are based on Census Block level data from HAZUS. The methodology utilized is similar to that used to model flood exposure described in Chapter 7-Floods of this document.

The Wyoming HMP presents wildland fire building exposure values by county (2008 estimate). These values are shown in Table 11.3, below.

Table 11.3 Wildland fire building exposure values by County

County	Amount of damage (US \$)
Big Horn	1,090,772
Niobrara	4,852,748
Washakie	11,368,310
Platte	18,264,504
Hot Springs	25,587,017
Goshen	37,962,569
Carbon	83,931,249
Sublette	95,442,304
Uinta	105,943,675
Converse	132,529,212
Lincoln	171,746,619
Crook	184,102,247
Park	194,432,223
Albany	261,395,171
Sweetwater	279,772,342
Weston	311,602,160
Fremont	322,353,040
Johnson	451,817,404
Campbell	741,143,167
Natrona	894,951,685
Laramie	1,107,754,091
Sheridan	1,544,049,533
Teton	1,546,011,448
TOTAL	\$8,528,103,488

Converse County falls in the middle of building exposure values to wildfire in the State. The County has a relatively low wildfire risk in some areas (where there is low population density and sparse or no forests), and high wildfire risk in others (the four at-risk communities within the Medicine Bow National Forest, for example).

In addition to the dangers directly associated with the fire, wildfires create dangerous atmospheric conditions by filling the air with smoke. The effects of wildfire smoke can be felt for miles, depending on the winds. Smoke may impact air quality, forcing vulnerable populations such as children, those with asthma, or those requiring additional oxygen support, to remain indoors. Livestock are also impacted by poor air quality. Smoke may cloud visibility on roads and create dangerous transportation conditions, as well.

Future Impacts

In general, wildfires occur somewhere within or near the County on an annual basis. Based on GIS analysis performed by the State of Wyoming, Converse County has about \$132.5 million in building value potentially at risk from wildland fires. However, it is unlikely that all identified risk areas will simultaneously face a completely destructive wildfire, so this number should be considered an exposure value as opposed to an estimate of total damage from a future event.

In addition to causing loss of structures, future wildfires could damage crops and watersheds within the County, interrupt traffic and commerce, and contribute to soil erosion and deposition problems.

Summary

PROPERTY AFFECTED: High

POPULATION AFFECTED: Low

PROBABILITY: High

JURISDICTION AFFECTED: unincorporated areas, mostly in the south of the County. Closest potentially affected urban area: Glenrock, Douglas

References

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