

Poncha Pass Fire Occurrence & Fire Hazard Mitigation

EXECUTIVE SUMMARY:

This study by Forest Stewardship Concepts, Ltd, analyzes wildfire occurrence and hazard mitigation along the existing Poncha Pass power transmission corridor, accessing the San Luis Valley in Colorado. The analysis reviewed fifty years of wildfire reports for the entire Rio Grande national forest and twenty three years of wildfire activity on BLM and US Forest Service lands within close proximity to the existing transmission lines on Poncha Pass. Wildfire hazard mitigation strategies are discussed.

Wildfire occurrence is very low along the corridor and the threat of wildfire damage to the existing and any future transmission lines in the area is also very low and can be mitigated using well established dead-down woody fuel treatment and forest thinning practices.

INTRODUCTION:

Forest Stewardship Concepts Ltd. has extensive expertise in wildland fire suppression, forestry management and prescribed burning through its principal James B. Webb. Mr. Webb worked for the US Forest Service for thirty-three years, and was responsible for all wildland fire operations in the Intermountain Region of the United States. He is a nationally recognized expert in forest fire management with nearly 40 years of experience in the field. He has extensive knowledge of the forest fire issues in the San Luis Valley, and retired from the US Forest Service as the Forest Supervisor for the San Juan and Rio Grande National Forests. Mr. Webb's resume and list of publications are attached to this report as exhibits 1 and 2.

The potential risk of forest fires damaging transmission lines that cross Poncha Pass is an issue that has been raised by Public Service Company of Colorado and Tri-State Generation and Transmission Association, but the companies have not made any attempt to quantify that risk. This report explores the general probability of a wildfire threatening the existing lines and describes ways to reduce that risk.

METHODOLOGY:

The analysis uses fire occurrence information gleaned from 889 individual fire reports covering fire activity from 1960 through 2009 on the Rio Grande national forest. These records are available at the Saguache Ranger District in hard copy format.

It then focuses on the area along Poncha Pass encumbered by existing power transmission lines. Twenty three years of electronic fire records are available for this area which covers both the Rio Grande and San Isabel national forests and parcels of Bureau of Land Management (BLM) ground administered by the Canon City District of the BLM.

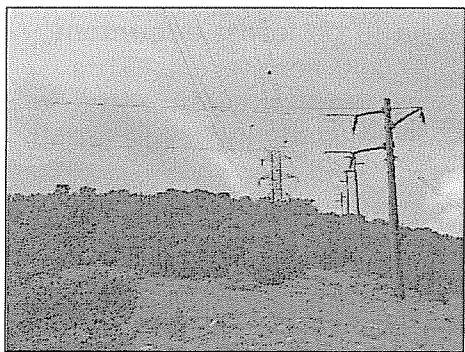
Probabilities of wildfire occurrence were expressed generally and not as specific ratios or percentages. Annual numbers of wildfires per thousands of acres is also included to enhance understanding.

Wildfire hazard mitigation treatments were designed based on vegetation types. The Poncha Pass corridor was plotted using DeLorme "TopoUSA" mapping software. The corridor was then laid out on Google Earth aerial photos. A field reconnaissance was done to gather information on vegetation, ground fuels, and terrain. Photographs were taken to document current conditions and to enhance the clarity of this report. Corridor distances by vegetation type were determined using on site knowledge and Google Earth imagery. Fuel models were assigned to each vegetative type based on field observations of prevailing conditions. The treatments proposed reduce fire intensity and crown fire potential for forested areas adjacent to the existing Poncha Pass power lines.

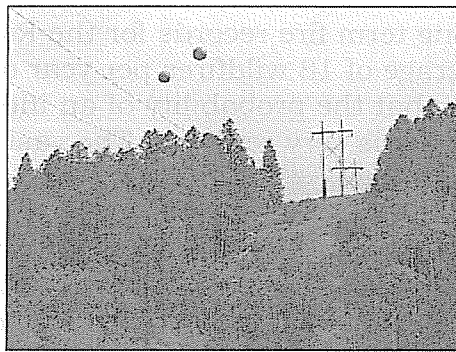
CORRIDOR DESCRIPTION:

Poncha Pass corridor currently has three transmission lines passing through it. The 69kV, 115kV and 230kV lines all originate at the Poncha Springs substation. The portion of the corridor addressed in this report is approximately ten miles long. Grass/and short sage dominates 44% of the corridor. 35% is covered by mixed conifer forests with Douglas-fir and ponderosa pine as the primary species. The remaining 21% of the corridor is covered by a savanna of piñon and sage. The lines originate at 7,570 feet elevation and reach 9,500 feet at the crest of the ridge between the San Luis Valley and the South Fork of the Arkansas River.

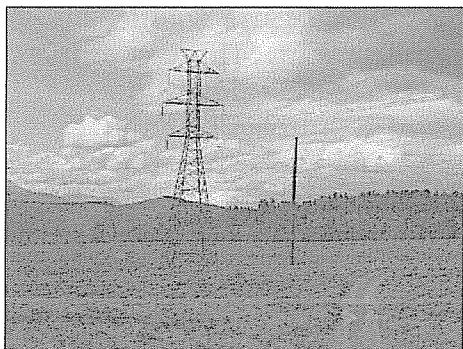
US Highway 285 provides access to various tertiary dirt roads that access the existing lines.



The 230kV & 69kV Lines as they cross near Grays Creek.



The 115 kV line on Poncha Pass.



This relatively benign grass/sage mix covers 44% of the Poncha Pass corridor.

WILDLAND FIRE OCCURRENCE:

The Poncha Pass corridor spends considerable time on public lands administered by the US Forest Service and Bureau of Land Management. Both these agencies have files containing individual fire reports. The Rio Grande national forest hard copy files go back to 1960. The San Isabel national forest and Canon City District of the BLM have electronic files that cover their portion of the Poncha Pass corridor for a period from 1978 to 2001. The lines do traverse a few parcels of private land for which reliable fire records are not available. The absence of private land information will not significantly affect the outcome of this analysis.

A review of these two sets of files provides insight into historical wildfire occurrence and subsequent potential threats to transmission lines in the Poncha Pass area.

The long term fire records for the Rio Grande national forest document an average of 18 wildfires per year on the 1,860,000 acre forest. This means that the probability of an individual acre having a wildfire in any given year is very remote. The vast majority of these wildfires are small 0.1 acre fires.

Fire occurrence along the Poncha Pass transmission line corridor was analyzed using electronically available data. The data shows an average fire frequency of 0.91 fires per year on an area of 76,800 acres within the corridor. This means that even without mitigation measures, there is only a very remote chance that an acre in this zone will experience a wildfire within any given year, and the vast majority of these fires are small 0.1 acre fires that would not threaten transmission lines.

The use of prior fire occurrences to assess the risk of future wildfires is common and accepted in the field of forest management. Three examples of using probabilities to describe wildfire occurrence include: The Activity Fuel Appraisal Process: Instructions and Examples (Stanley & Radloff et. al. 1981), which discusses a decision analysis process for activity fuel appraisals that factors the chance that a wildfire will occur into a process to determine appropriate fuel treatment levels. The Fremont Fuel Appraisal Process (Nesbitt, Nichols and Tyree, 1985), demonstrates how probability was actually incorporated into the fuel treatment program on the Fremont national forest. Probability Based Models for Estimation of Wildfire Risk (Haiganoush & Brillinger et. al. 2004) outlines a method of incorporating probability into estimation of fire risk.

Wildfire occurrence is very low along the Poncha Pass corridor and the threat of wildfire damage to the existing and any future transmission

lines in the area is also very low. The affect of the Mountain Pine Beetle in the Poncha Pass area does not change this risk. The Poncha Pass area includes a portion of the Rio Grande National Forest, which Mr. Webb managed until 1999. This area is not one of the heavily affected pine beetle regions, and the pine beetle impact that has occurred does not increase the risk of wildland fires. Also, the very low risk of fire that exists in the Poncha Pass area can be mitigated using well established dead-down woody fuel treatment and forest thinning practices.

MITIGATING WILDFIRE HAZARD ALONG PONCHA PASS TRANSMISSION CORRIDOR:

Wildfire damage to transmission lines can be reduced significantly by treating combustible materials along these lines. Cleaning up dead-down woody fuel on the ground, combined with thinning trees and brush to reduce crown fire potential next to the line, will reduce the heat and smoke produced by any wildfire that comes in close proximity to the line. This kind of activity also reduces the probability of a large tree falling across the lines.

Poncha Pass Vegetative Types* & Treatment Costs:

VEGETATION	115 KV MILES	230 KV MILES	TOTAL MILES	ACRES 48/MILES	COST \$1,500/AC
Douglas-fir & Ponderosa Pine	1.77	3.46	5.23	251	376,500
Piñon/sage	3.8	2.23	6.03	289	433,500
Grass, sage	4.43	4.36	8.79	0	0
Totals	10	10.05	20.05	540	\$810,000

*Source: (Webb. 2009)

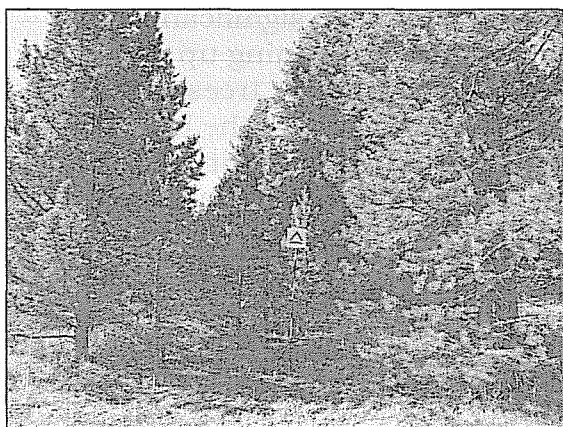
Mitigation activities are planned for two hundred feet on each side of the lines when they pass through forested areas. This results in a four hundred foot wide treatment area covering forty eight acres per mile. The \$1,500 per acre treatment cost is an average with costs ranging from \$500 to \$2,000 per acre depending upon forest stand densities and slope.

The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests, (Graham, Harvey, Jain and Tonn. 1999) and Basic Principles of Fuel Reduction Treatments, (Agee and Skinner. 2005) describe methods to mitigate wildfire hazards.

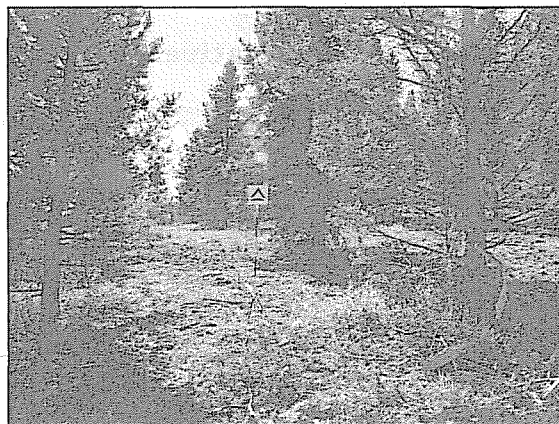
Two photo series on masticated fuels developed by Forest Stewardship Concepts, Ltd. describe the continuum of fire behavior benefits

attainable with various levels of thinning and fuel bed alteration. The photos below show the difference between treated and untreated stands.

Wildfire hazards can be mitigated for the existing transmission lines across Poncha Pass for approximately \$810,000. The treatments would focus on thinning and fuel reduction in forested areas containing piñon, Douglas-fir, ponderosa pine, white fir, and spruce.



Flame length was reduced from 6.3 feet to 1.7 feet. Trees were thinned from 397 to 77 per acre. Crown fire potential was reduced from high to low.



In conclusion, the risk of a fire in the Poncha Pass area that would be large enough to threaten multiple power lines over Poncha Pass is very remote. The Mountain Pine Beetle impact in the Poncha Pass area has been relatively small, and does not increase the risk of fire. This remote risk can be further reduced using commonly accepted wildfire hazard mitigation practices.

James B Webb
 Certified Forester® #1173
 Forest Stewardship Concepts, Ltd.
 January 14, 2010

REFERENCES:

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Haiganoush, PK, Brillinger, DR, Burgan, RE, and Benoit, JW. 2004. Probability Based Models for Estimation of Wildfire Risk. International Journal of Wildland Fire, CSIRO Publishing.

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Nesbitt, J, Nichols, B, Tyree, T. 1985. Fremont National Forest Fuel Appraisal Process. Briefing Paper USFS

Nesbitt, J. 1985. The Fremont Fuels Appraisal Process. Speech presented at the National Silvicultural Workshop in Rapid City South Dakota.

Webb, JB. 2006. Photo Guide for Appraising Downed Woody Masticated Fuels in Ponderosa Pine Forests on the Colorado Front Range. Colorado Forest Restoration Institute.

Webb, JB. 2006. Photo Guide for Appraising Downed Woody Masticated Fuels in Lodgepole Pine Forests on the Colorado Front Range. Colorado Forest Restoration Institute.

Webb, JB. 2009. Fire Hazard Analysis - San Luis Valley Power Transmission Corridors.

RESUME

James B. Webb

Bachelor of Science in Forestry, Northern Arizona University 1968.

Intensive Semester – Public Land Management, Lewis and Clark College 1978

Thirty three years USDA Forest Service, retired as Forest Supervisor San Juan & Rio Grande National Forests, 1999

Webb has been active in wildland fire suppression and prescribed burning since 1962. His first prescribed burn was on the Hualapai Indian Reservation in 1964. Webb has been responsible for the expanded use of prescribed fire to enhance natural resource management throughout the western US. He is recognized nationally for his professional approach to fire management. Over the last forty years Jim has prescribed burned well over one hundred thousand acres.

Jim initiated prescribed burning programs on the Coconino, Tonto, Okanogan and Fremont National Forests. Each program significantly expanded its scope and influence during Jim's tenure.

The first prescribed burns in the Flagstaff, Arizona area were a direct result of his emphasis to enhance Ponderosa pine stands and reduce fire severity. While at Tonasket, Washington Jim developed burning techniques to reduce thinning slash in Douglas-fir stands. He published an article in Fire Management Notes describing the methods used to remove heavy slash loads while protecting the residual trees. Webb was also instrumental in expanding the prescribed burning program on the Fremont National Forest from five hundred acres per year to over twenty thousand acres annually. These burns enhanced forage production for a migrating interstate deer herd and also reduced fire danger substantially.

Webb was active on National Incident Management Teams for over twenty five years. During that time he was on more than two hundred and fifty large, complex wildfires. He reached the pinnacle of qualifications as a Type I Incident Commander and Area Commander. He was also responsible for all wildland fire operations in Intermountain Region of the Forest Service. This area covers all of Nevada, Utah, southern Idaho and western Wyoming. During his tenure as Regional Fire Operations Officer he initiated new fire control protocols to acknowledge fires role in ecosystem dynamics. This fresh approach saved millions of dollars in suppression costs and allowed fire to resume its influence on landscapes throughout the region.

Webb has developed and instructed fire training courses nation wide. Jim is also known as an outspoken advocate of fireline safety. He was one of the principle investigators of the fourteen South Canyon Fire fatalities in 1994.

Exhibit 1

As President of Forest Stewardship Concepts, Ltd. Jim brings a wealth of prescribed burning skills to his clients. His objective is to expand their understanding of fire dynamics and influences on natural processes. His client list includes numerous private landowners, Colorado State Forest Service, Colorado Division of Wildlife, Colorado State Parks, Denver Water Board, Colorado Forest Restoration Institute, Western Governors Association, US Forest Service, National Prescribed Fire Training Center, San Luis Valley Resource Conservation and Development Group and numerous counties in Colorado, Wyoming and Nebraska.

Jim earned a Bachelor of Science degree in forestry from Northern Arizona University in 1967 and has done post graduate work at Lewis & Clark College in Oregon.

FSC has been in business since February of 1999.

James B. Webb
Certified Forester ® #1173
President
11/15/09

James Webb's Publications:

Photo Guide for Appraising Downed Woody Masticated Fuels in Lodgepole Pine Forests on the Colorado Front Range. Webb. 2009. Published by Colorado Forest Restoration Institute, Colorado State Forest Service and Front Range Fuels Treatment Partnership. Fort Collins, Colorado

Photo Guide for Appraising Downed Woody Masticated Fuels in Interior Ponderosa Pine Forests on the Colorado Front Range. Webb. 2006. Published by Colorado Forest Restoration Institute, Colorado State Forest Service and Front Range Fuels Treatment Partnership. Fort Collins, Colorado

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South Canyon Fire Investigation. Rosenkrance, Reimers, Johnson, Webb, Graber, Clarkson, Werth, Hsari, & Mangan. 1994. Bureau of Land Management & US Forest Service. Washington, DC.

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Prescribed Fire Management Training. 1985. Webb & Brown. Fire Management Notes. Volume 45, Number 3. US Forest Service. Washington, DC.

The Cole Broadcast Burn. Webb. 1980. Fire Management Notes. Volume 41, Number 3. US Forest Service. Washington, DC.