

Fire Regime Analysis of Army Garrison Camp Williams

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BACKGROUND AND RESEARCH QUESTIONS

Army Garrison Camp Williams (AGCW) is a military based located south of Herriman, UT. The base serves primarily as a training area for the Utah National Guard and is a fire-prone landscape located adjacent to urban development. The fire regime at Army Garrison Camp Williams (AGCW) was described in terms of fire frequency, annual area burned, sources of wildfire ignition, and historical fire patterns based on an analysis of historical fire perimeters (table 1). Additionally, Landscape Fire and Resource Management Planning Tools (LANDFIRE) data (Rollins and Frame 2006) were utilized to develop spatially explicit maps summarizing mean fire return interval, fire regime category, general vegetation type, and fire behavior fuel model type (Reeves et al. 2009). Using this data we addressed the following questions: 1) what is the typical pattern of fire in vegetation over time, including historical fire perimeters and the total area burnt per year, and 2) what is the predicted fire return interval?

LARGE AND SMALL FIRE MAPS

Sources of fire ignition at AGCW from 1985 to 2012 were driven primarily by training (49 percent), lightning (28 percent), and humans (15 percent). The fire history map (fig. 1) reveals that the eastern half of the AGCW base has experienced several large fires within the past 30 years (e.g., Big Fire of '87, the '95 Fire, Big Fire, Redwood Road Fire, Welder's Fire, Mustang, Pinion Fire). Large fires (burned area

greater than 40 hectares) have also occurred on the western portion of the base, most notably the 2010 Machine Gun Fire. The large fires on the steep slopes of the northeast portion of the base are typified by shrubby Gambel oak (*Quercus gambelii*, Nutt.) and drier climatic conditions relative to the western portion of the AGCW base. Gambel oak sprouts vigorously following fire and has returned over identical areas in as few as six years, exemplified by the '95 Fire in August of 1995 and the Big Fire in July of 2001.

MEAN FIRE RETURN INTERVAL AND FIRE REGIME GROUP

In the western portion of AGCW referred to as the "impact area", overlapping fires have occurred in grassland and shrub fuel types in 1996 (Impact Area Sage), 2006 (Impact Area), 2010 (Machine Gun), and 2012 (Nacho). The average fire return interval for this fuel type and geographic area is about once every four years. The extreme western portion of the base contains some of the steepest topography and most mature stands of Gambel oak and Utah juniper (*Juniperus osteosperma* (Torr.) Little). This area is higher in elevation than the eastern portion of AGCW with higher annual precipitation, which appears to influence the growth and maintenance of these mature stands. This area has experienced very little fire since 1978, except for the 1978 Sheps Fire and the 1991 Shep's Ridge West Fire. Low fire frequency in the extreme western portion of the base is likely linked to cool and moist climatic conditions experienced in the area coupled with the minimal live-fire training activity that occurs in this area.

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Table 1—List of large fires (greater than 40 hectares) by name, year of occurrence, start date (if available), area burned, ignition source, and any significant highlights associated with wildfires depicted in Figure 1.

Fire name	Year	Start date	Area (ha)	Ignition source	Significant highlights
Pre-1985 Tickville	1985	Unknown	56	Unknown	
Big Fire of '87	1987	Unknown	1508	Unknown	
Shep's Ridge-West	1991	Unknown	49	Unknown	
Impact Area-Sage2	1992	Unknown	88	Unknown	
The '95 Fire	1995	8 Aug.	1111	Lightning	Burned off base
Impact Area-Sage	1996	Unknown	78	Unknown	
Known Distance Range	2001	Unknown	48	Training	
Redwood Road	2001	17 June	271	Human	
The Big Fire	2001	16 July	3244	Training	Burned off base
Welders Fire	2003	8 July	478	Human	
South of Area 51	2005	Unknown	42	Lightning	
M31 Fire	2006	12 June	54	Training	
Impact Area Fire	2006	19 Sep.	278	Training	
Juniper Ridge Fire	2007	8 July	63	Lightning	
Mustang	2010	16 July	96	Human	
Machine Gun	2010	19 Sep.	1498	Training	Destroyed 3 homes off base
Nacho	2012	23 July	53	Lightning	
Pinion	2012	5 Aug.	2334	Lightning	Burned off base

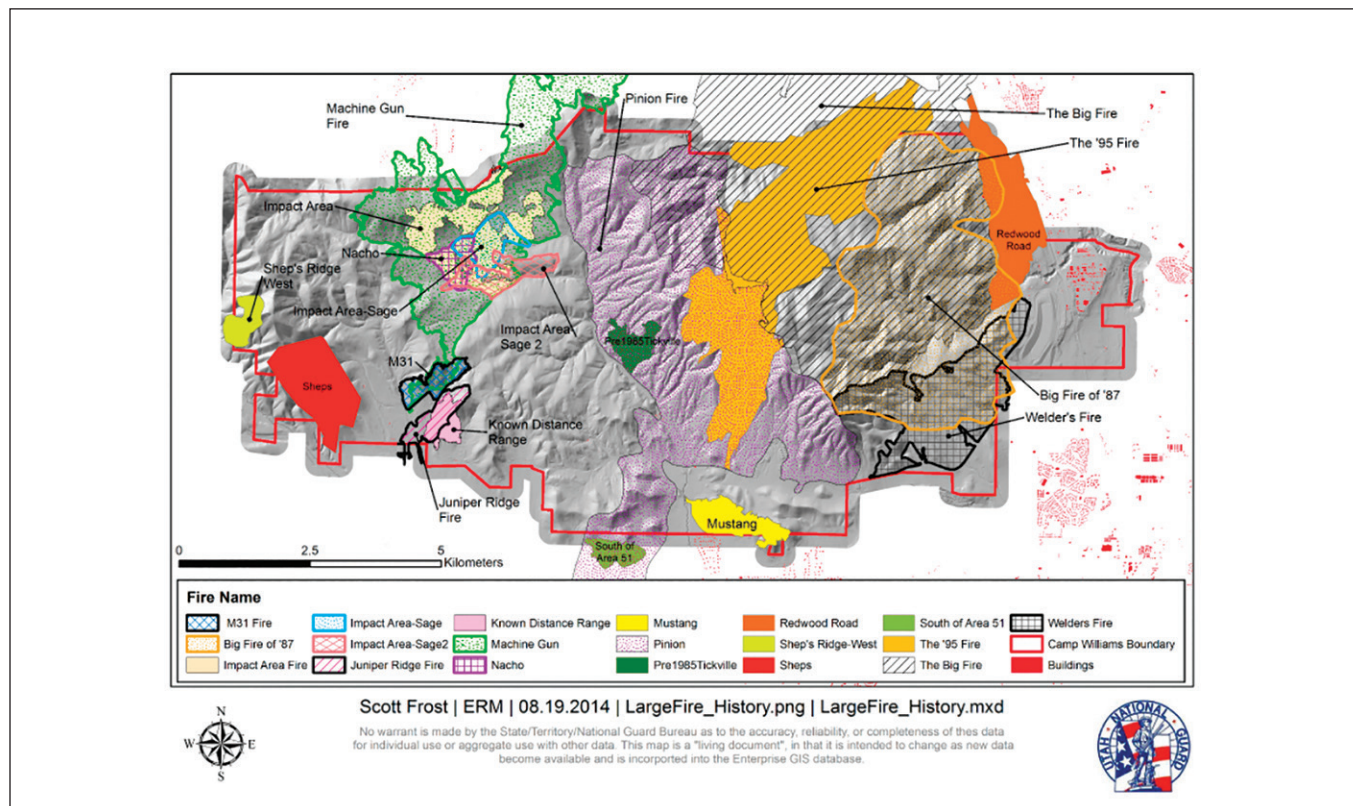


Figure 1—The “large fire” (40 hectares and above) history map for Army Garrison Camp Williams, 1978-2012.

The Mean Fire Return Interval (MFRI) map produced by LANDFIRE, indicates return intervals ranging from five to about 22 years at AGCW. The most widespread category is the interval from 9 to 12 years. The map also indicates that along the northwestern boundary of AGCW, intervals are classified as predominantly in the range of five to eight years. Meanwhile, in the extreme western portion of AGCW the map corroborates the recent fire history data, indicating that the longest fire return intervals are from 18 to 22 years. Regardless of the MFRI class, the LANDFIRE map product suggests that wildfire has and continues to be a frequent visitor across the AGCW landscape. The fire regime was classified into two predominant categories, namely Fire Regime groups three (35–200 year fire return interval, low and mixed severity) and four (35–200 year fire return interval, replacement severity). There are small linear, mostly creek or valley bottom areas that are categorized into fire regime group five (greater than 200 year fire return interval, any severity). The lower elevation terrain is categorized almost entirely as fire regime group four, indicating that fire is both frequent and of a replacement severity type. Meanwhile, higher elevation areas are typically categorized as fire regime group three, indicating frequent fire, but of low to moderate severity. Lastly, a small area on the western portion of the base, likely in mature Gambel oak and Utah juniper is categorized into fire regime group one (less than or equal to 35 year fire return interval, low and mixed severity). Thus, only a small portion of the land area at AGCW is categorized into an exclusively low severity category. More in depth analysis of the topic is available in Chapter 3 of Frost (2015).

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