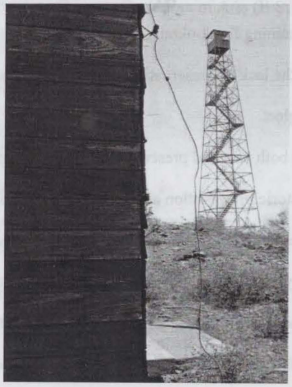
OWER: IDENTIFYING TRENDS IN HISTORIC FIRE LOOKOUT PRESERVATION THROUGH SELECTED CASE STUDIES AND A STATISTICAL ANALYSIS

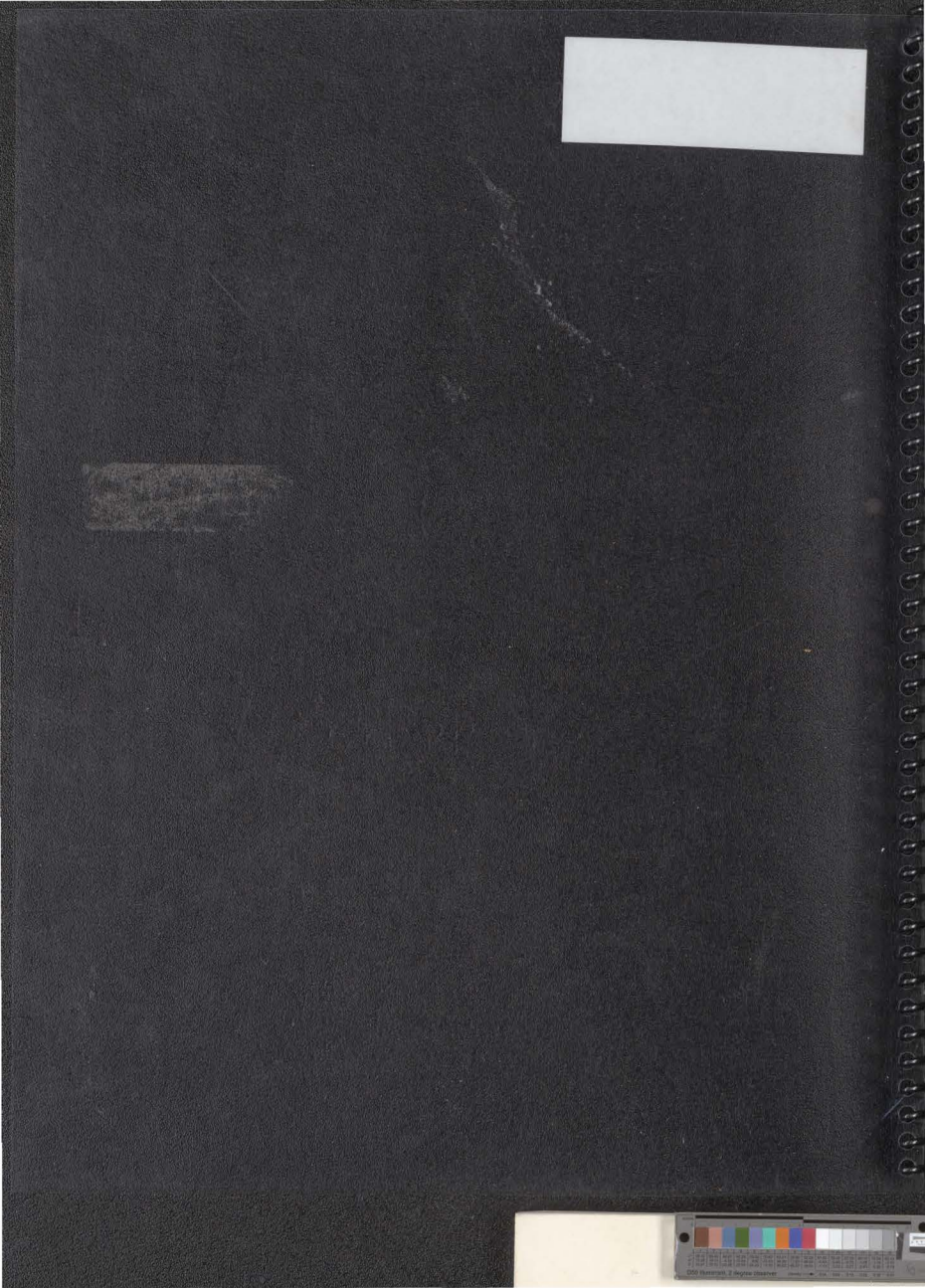
By JOHN PEREGRINE HILL



A TERMINAL PROJECT

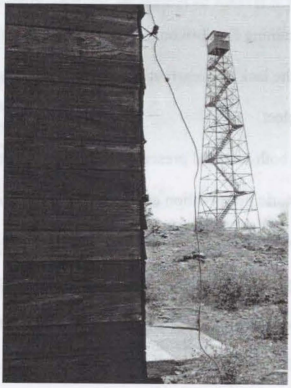
Presented to the Historic Preservation Program at the University of Oregon
in partial fulfillment of the requirements for the degree of
Masters of Science

June 2013



ALL ALONG THE WATCHTOWER: IDENTIFYING TRENDS IN HISTORIC FIRE LOOKOUT PRESERVATION THROUGH SELECTED CASE STUDIES AND A STATISTICAL ANALYSIS

By JOHN PEREGRINE HILL



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ABSTRACT

Although time, weather, and the lack of public visibility present great challenges in the preservation of historic fire lookouts, other issues such as preservation policy and incoherent trends in lookout preservation contribute to the vanishing state of these purpose-built structures. Not only do fire lookouts represent a brief historical period where men and women actively occupied thousands of remote stations throughout the country, but they also convey the subsequent decline of fire lookout observation, culture, and preservation. At the beginning of the 21st century, many of the remaining fire lookouts are disappearing into the landscape as both limited federal funding, and the lack of preservation attention, creates conditions which promote lookout deterioration and neglect.

This study chronicles both past and present patterns in lookout preservation while exploring and developing historic preservation approaches in order to further promote future fire lookout preservation. A collection of statistical data has been analyzed in order to identify and quantify fire lookout typology, rarity, and vulnerability based on a set of predetermined parameters. Selected case studies will provide a narrative element to the statistical analysis, and provide support for the hypothesis that certain fire lookout building construction types fair better than others. Lookout case studies and examples include fire lookouts from two states (Oregon and Washington), though field research and site visit documentation has also been conducted in five (California, Oregon, Idaho, Montana and Arizona).

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This Terminal Project is dedicated to all of the Wildland Firefighters with whom I have had the privilege to work

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CHAPTER I

INTRODUCTION

The fire lookout is an exceedingly unique and rare building form which is distinctive not only for its construction and building type, but also for its exceptional relationship with the natural landscape. Rarely do building types so effortlessly incorporate into the natural environment, while also maintaining their utilitarian and practical functions. This dichotomy is epitomized by the typically conservative and restrained building style that lookouts exhibit. Far above the forest floor, the fire lookout continues to inspire the curious researcher, hiker and historian in a manner which is uncommon among other building types.

Wildfire lookouts were constructed during a brief period of significance in American history as they were part of management strategies that quickly evolved due to both technological innovation and policy shifts. Remaining fire lookouts symbolize a much simpler era, an era which demanded and required the forest manager to have an intimate connection with the natural environment through the embedded dedication required to serve as a fire lookout. As Mark Thornton states, "fire lookouts represent one of the most intrinsically recognizable symbols of the ever watchful care of forestry agencies over the forests and rangelands of America."[1]

THE LOOKOUT DEFINED

According to the Merriam-Webster's dictionary, a lookout is defined "as an elevated place or structure affording a wide view for observation."[2] A fire lookout is a ground level or elevated structure (typically on a mountain top), that serves as a platform from which wildland

[1] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Sacramento, CA: The Office, 1993. Page 5.
[2] Merriam-Webster, Inc. Merriam-Webster's Collegiate Dictionary. Springfield, MA: Merriam-Webster, Inc, 2003.

fire detection and spotting can take place. The term "lookout" as used in this study can also describe the operator and or employee who staffs and operates the fire lookout structure in order to detect and report wildfire. The word lookout is commonly used interchangeably when referring to both the fire lookout structure, and the person who staffs and/or mans a lookout structure.

SCOPE OF PROJECT

As historic fire lookouts present a distinct set of historic preservation challenges, a specific research approach is required to understand and identify trends in lookout preservation. This project consists of three major parts: historical context, case studies, and a statistical analysis. First, the historical context portion of this study provides an encompassing and thorough historical examination of the fire lookout, in order to provide contextual information from which later statistical analyses and case studies can be built upon. A literature review and short historiography of lookout research describes the methodology used by previous researchers, as well as the limitations apparent in their research. The literature review identifies strengths and weaknesses concerning the available studies and documents available on fire lookouts in order to highlight gaps in current lookout knowledge. This section includes discussions of fire management policy, lookout typology, as well as a chronological narrative of fire lookouts to the present.

The second and third components of this project are centered on case studies and a statistical analysis in order to identify trends in lookout preservation. A comprehensive set of data points is used to provide an expansive statistical analysis. This quantitative approach

promotes a critical assessment on the current state of fire lookout preservation, and identifies the most endangered extant lookout types.

Initially, the geographical scope of the statistical analysis intended to encompass all of U.S. Forest Service Region 6 (R-6) (Figure 1). However, this proved to be unrealistic given the high number of lookouts in Washington, and instead, this study focuses on lookouts in Oregon for the statistical analysis. By interpreting lookout survivability rates based on form type helps preservationists and resource managers to better identify and articulate the need for preservation efforts on certain lookout construction types based on their rarity, social significance, and vulnerability.

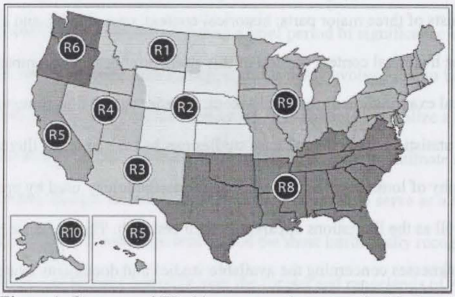

Figure 1. Oregon and Washington together comprise Region 6 (R-6) as shown on this U.S. Forest Service Regional Map.[3]

This research both complements existing scholarly work, as present's new findings by expressing a "vulnerability hierarchy" supported by hard data and case studies. To add both breadth and an expansive aspect to the project, a brief narrative history of lookouts precedes the case studies and statistical analysis. It is my hope that this work will become a crucial piece in

[3] "United States Forest Service Regional Map." U.S. Forest Service, Department of Agriculture. http://www.fs.fed.us/invasivespecies/contactus.shtml. Accessed 2-9-13.

the scholastic contribution to fire lookout research, providing both the inquisitive outdoors person, and future researchers a large body of significant data and research on historic lookouts in Oregon.

CHAPTER II

CONTEXTUAL HISTORY

LITERATURE REVIEW

Mark Thornton's *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*, published in 1993, is a valuable resource regarding the historical context of fire lookouts in America, and has been relied upon as a secondary source during this study. Thornton's passion and expertise regarding lookouts is unparalleled (and has contributed much to the collective understanding of lookouts) as his work actively documents hundreds of lookouts and associated structures in California. Thornton conducted a "statewide survey and thematic study of the fire lookouts of California from 1983 to 1987."[4] This widespread research was

> "… intended to preserve (at least in writing and photographs) the remaining vestige of California's fire detection heritage. The project was carried out under the auspices of the Forest Service's, Region 5 office. The study produced a contextual understanding for both fire lookout architecture and fire detection history. It also provided a complete inventory of California's standing lookouts, including Federal, State and locally owned facilities."[5]

Thornton created "a historic significance evaluation" of 173 Forest Service lookout stations in California, and his research "methodology for evaluation was reviewed and approved by the Forest Service and the California Office of Historic Preservation."[6] Thornton's research identified 75 properties owned by the United States Forest Service as eligible for the National Register of Historic Places.[7] Though Thornton's work was both methodical and comprehensive, "… as of December 1991, not one of these lookout stations has been listed in the National Register. More distressing is the fact that several of these lookouts have been seriously damaged

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[4] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 5.
[5] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 5.
[6] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 5.
[7] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 5.

or destroyed since the 1987 evaluations."[8] Thornton's work not only provides detailed contextual lookout information but also addresses the struggle lookout preservationist's face. Given the emphasis Thornton places on lookout deterioration between 1987 and 1991, one can guess that many more lookouts have been "damaged or destroyed" since his publication.

Donna Hartmans' thesis titled: *Historic Lookout Stations on the Willamette National Forest: Management Plans for Preservation* also has been an invaluable resource for my research. As her thesis examines the immediate geographical area surrounding the University of Oregon, it has been instrumental in providing context for my comparative analysis of lookout preservation and research. This thesis was completed in 1991 and offers an excellent record of the Historic Preservation process, as well as the preservation shortcomings which have emerged since the thesis was completed. Hartmans' focus in her study was to "provide management plans for the preservation of four lookout stations," all of which were located on the Willamette National Forest, Oregon.[9] Two of the lookouts used in Hartmans' thesis will also be used as case studies in this project. Hartmans' thesis provides an excellent opportunity to compare her particular findings and recommendations with the preservation outcomes that followed. Hartmans' work is a useful framework against which the results of this study can be compared.

Perhaps the most comprehensive works relating to fire lookouts are Ray Kresek's 1985, *Fire Lookouts of Oregon & Washington,* and his 1984 *Fire Lookouts of the Northwest*.[10] Kresek systematically explored and documented every lookout (both extant lookouts and former lookout sites) in Oregon and Washington, and provided additional information on selected lookout case studies. As Kresek has visited over 900 lookouts, his personal understanding and dedication to

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[8] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 5.
[9] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest: Management Plans for Preservation.* Thesis (M.S.) University of Oregon, 1991. Page 4.
[10] Kresek, Ray. *Fire Lookouts of Oregon & Washington.* Fairfield, Wash: Ye Galleon Press, 1985. Page 8.

lookout research is unrivaled. Rare photos, maps, stories, and lookout narratives accompany his work producing the most painstaking and thorough body of publicly available lookout research. As this book was written in 1985, it is somewhat dated due to the inevitable changes that have taken place to lookouts after the book was published. The aging nature of both *Fire Lookouts of the Northwest*, and *Fire Lookouts of Oregon & Washington*, should be taken into consideration when relying on Kresek's works for specific information.

THE POLICY AND DEVELOPMENT OF THE LOOKOUT SYSTEM

Between the mid-nineteenth and early twentieth century, the United States was developing at an unprecedented level. Railroads, heavy industry and manifest destiny drove expansion far to the west, while simultaneously driving native peoples off their lands as both an effect of growth, and government policy. Through this characteristically American narrative, the need for federal land managers and institutions became apparent. Not only would the American growth machine need to be controlled and regulated, but officials and agencies soon realized that the resources in the United States were not infinite and needed to be managed accordingly. The emergence of agencies such as the U.S. Forest Service and National Park Service during this time period illustrates the maturation of the United States on an institutional and bureaucratic level.

Fire lookouts also developed in conjunction with the creation of various government agencies and state governments due to newly implemented policies. As the United States experienced a population boom, a nexus between urban populations and expansive wooded areas became the norm. Commonly, logging towns sprang up across America as lumber became an important commodity for development and progress. These communities were typically placed in

the center of an active fire regime, an area where wildfire constituted an important and integral part of the forest's ecology. The intersection between urbanism and the fuel-rich environment is referred to by wildland fire professionals as the "wildland-urban interface." The wildland-urban interface presents great dangers to not only the residents of such areas, but to the men and women who are tasked with the suppression of wildfire in these distinctly hazardous zones. The inherent dangers associated with large communities in fire prone areas were not immediately recognized until catastrophic wildfire events culminated in the great loss of human life, as well as natural resources (such as the Great Fire of 1910). The Great Fire of 1910 burned approximately 3 million acres and killed close to one hundred civilians and wildland firefighters. This catastrophic fire polarized the nation and became the "battle cry" for wildfire suppression on the landscape during the twentieth century.

The National Park System was created in 1872 with the creation of Yellowstone National Park. National involvement and legislation regarding natural resources during this period greatly expanded.[11] Initially, the "United States Army was assigned the responsibility to patrol and protect this area. The Army's role included the detection and suppression of wildfire within park boundaries. This was no small task considering the size of the park, the crude equipment at hand and the few troops that were assigned."[12] The Army's activities in Yellowstone resulted in the creation of the nation's first formalized fire protection program. Though a far cry from today's modern firefighting suppression tactics, these early Army wildland firefighters combated wildland fires commonly associated with unattended campfires. The U.S. Army developed a

[11] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 9.
[12] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 10.

system of "campgrounds" which addressed the "nuisance" of the frequently abandoned campfires.[13]

Though the U.S. Department of Agriculture was created in 1862, the agency was small and understaffed during its first few decades. In 1889, the U.S. Department of Agriculture finally "was raised to Cabinet level status."[14] This helped the agency to obtain funding for management purposes, but still the vast majority of federal land "remained under the control of the Department of Interior, specifically the General Land Office (GLO)."[15]

The foremost leader and champion of "forest reserve" creations was the "father" of the United States Forest Service, Gifford Pinchot. Pinchot served as the first "Chief Forester from 1898 to 1910."[16] He worked closely with then President Theodore Roosevelt and undoubtedly had a high level of influence regarding President Roosevelt's executive order of 1905, "which finally transferred the growing collection of Forest Reserves from the Interior Department to the Department of Agriculture."[17] Pinchot's philosophy was one of pragmatism and practicality; placing emphasis on the ethical management of timber resources rather than simply setting forest reserves aside as an object of visual recreation. Pinchot was responsible for the "reorganization of Agriculture Department's Bureau of Forestry into the United States Forest Service (USFS)."[18]

In 1907 Forest Reserves were renamed to the familiar term, "National Forest."[19] From that point on, the Forest Service was used as a tool to administer the expansive and previously mismanaged forest lands. Pinchot shared the widely accepted philosophy at the time that all wildland fires should be actively suppressed on the landscape, (excluding the removal of logging

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[13] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 10.
[14] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 10.
[15] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 10.
[16] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 11.
[17] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 11.
[18] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 11.
[19] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 11.

slash). This mindset "necessitated the creation of an effective prevention, detection and suppression organization."[20] Pinchot's sentiment towards wildfire suppression was common at the time, it fundamentally disregarded wildfire as an ecological necessity, and ignored wildfire as an integral part of the complex National Forest landscape. As Kristina Vogt remarks, "the public is not used to thinking of either a large-scale bark beetle infestation or a large-scale intense fire as natural disturbances that should be allowed to happen, particularly if there is no risk to life or property."[21]

Following the catastrophic fire of 1910, the Forest Service began to assemble a national infrastructure to manage both the timber industry and the suppression of the nation's wildfires. It was during 1910 when the National Forest Service Districts were created.[22] These newly created districts divided the country on a regional level and further organized how policy would be implemented. The First District Forester of Region 5 (California), Coert duBois, was the first to develop a regional fire management plan, and many of his region's fire suppression policies were used as a starting point for policies in other regions. Besides building thousands of miles of new forest roads and telephone lines, duBois oversaw the construction of 81 lookout structures.[23] It was this model created by duBois that was followed by the rest of the Nation's District Foresters and Regions. DuBois also implemented an accurate "recording system for fire statistics. From this information would grow a better understanding of where and why fires occurred."[24]

Among his other accomplishments, DuBois created and implemented the first standards for the specifications required of lookout towers. DuBois

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[20] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 11.
[21] Vogt, Kristina A. *Forests and Society: Sustainability and Life Cycles of Forests in Human Landscapes*. Wallingford, UK: CABI Pub, 2007. Page 162.
[22] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 12.
[23] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 12.
[24] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 12.

> "penned his endorsement of the construction of 144 square foot (or larger), wood frame 'live-in' cabs. Where topography dictated, duBois approved of the construction of Aeromotor Company towers (or timber tower equivalents) with "observation only" cabs. The Aeromotor Company had been manufacturing steel windmill towers and military observation towers since the 1890's. Shortly after the turn of the century, they began marketing their military towers for fire control use."[25]

DuBois not only set the first standards for lookout construction, but also identified the degree and scope needed for effective fire protection and observation.

During the 1920s, the United States Forest Service began to actively research and develop a national fire lookout system due to the apparent inadequacies and ineffectiveness of the limited detection system. A new system was created based on the philosophy of both detecting and suppressing wildfires in an extremely timely manner. National attention shifted to increasing the number of both wildfire suppression crews, and wildfire detection systems.[26] Comprehensive maps were created which used early scientific principles in fire occurrence zones, as well as the frequency of wildfire on the landscape (fire intervals). These maps enabled agencies to determine appropriate fire lookout sites based on the effectiveness of the proposed vantage point. Thornton shows that "during the 1920s additional research into the fire detection system revealed that fire lookouts could be expected to reliably detect smokes within a 15 mile radius of the observation point and that detection should occur within 15 minutes of fire ignition to affect a reasonable chance for rapid fire control."[27] These expansive fire detection and suppression efforts of the 1920s created the first wave of standardized wildfire lookouts.

The U.S. stock market crash on "Black Tuesday," October 29, 1929 had a severe and widespread effect on both the United States and the world in general. Fire suppression and detection operations during the 1930s changed rapidly and fundamentally as new government

[25] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 12.
[26] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 13.
[27] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 13.

programs were used to put a vast number of unemployed people back to work. California soon implemented a home grown program named the State Emergency Relief Administration (SERA). SERA allocated funding throughout California for a variety of projects, many of which involved the construction of fire lookouts. Thornton remarks that SERA may have been the impetus for Franklin Roosevelt's creation of the Civilian Conservation Corps (CCC) in 1933.[28] The CCC was a National labor force "assigned to perform conservation projects," and was soon put to the task of constructing hundreds of wildfire lookouts throughout the country.[29] CCC units were assigned three categories of "work projects: firebreak construction, lookout station building, and general improvements."[30] The CCC program, which spanned the years from 1933 to 1942, built over 300 wildfire lookouts, strung 9,000 miles of telephone lines, and constructed over one million miles of roads and trails.[31] The contribution of the CCC program to the fire suppression and detection system is unrivaled in American history.

AIRCRAFT WARNING SYSTEM

America's entrance into the Second World War (following the December 7, 1941 Japanese surprise attack on Pearl Harbor) had an unusual effect on the war time usage of American wildfire lookouts. As fears of global conflict stirred America to increase defense measures in the 1930s, "a network of "spotters" were positioned in existing fire lookouts at scores of ancillary sites."[32] This network was known as the Aircraft Warning Service, (AWS) and was developed by the U.S. Army. These spotters were initially placed in large numbers along the west coast, and soon fire lookouts across the nation were being trained and tested in the

[28] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 17.
[29] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 17.
[30] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 17.
[31] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 20.
[32] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 302.

art of aircraft identification. A spotter would be responsible for understanding how to identify and alert authorities to the presence of enemy aircraft in the event of an attack on U.S. soil. Not only would an aircraft spotter be expected to visually identify friendly and enemy aircraft, but they were also responsible for identifying audible evidence of nearby aircraft.[33] By 1941 the system had spread across the nation.[34]

Following America's entrance into the war, the AWS was put on active status and "observers were rushed to their respective posts."[35] New structures associated with the AWS were constructed in order to better accommodate observers, and efforts were made to winterize lookouts for the harsh seasonal snow pack that was not usually a problem for seasonal fire lookouts. Continual around the clock vigilance was necessary, and two observers would take shifts scanning for enemy aircraft. The life of an aircraft spotter was tough as "during the winter months food supplies and support equipment were either air dropped or hauled in by snow cat to the sequester spotting crews."[36]

Aside from the infamous attack on Pearl Harbor, there were other less known Japanese attacks on American soil, some of which involved fire lookouts. American defense agencies had good reason to fear aerial attack, as it was the most strategically viable and practical method of attack at the disposal of the Japanese. An incident on September 9, 1942 occurred on the Siskiyou National Forest near Brookings, Oregon. At 6:24 a.m., a lookout named Howard Gardner spotted an unidentified low-flying plane from his Mount Emily Lookout. It was later found that a Japanese plane had dropped a single 170-pound incendiary bomb with the intent of

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[33] Newman, Doug. *Finding Fire: A Personal History of Fire Lookouts in Lane County, Oregon*. Eugene, Or: Lane County Historical Society, 2007. Page 53.
[34] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 20.
[35] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 20.
[36] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 21.

igniting a large wildfire.[37] A small fire was started, but was quickly extinguished due to the quick response of lookout Keith Johnson who staffed the Bear Wallow Lookout and spotted the fire.[38] This incident illustrates the value of the AWS as similar enemy attacks were considered likely. One can only imagine the dedication and perseverance required of AWS spotters to remain focused and attentive. In California, every single fire lookout was used in part of the AWS program.[39] With the conclusion of World War II the AWS program was discontinued, but their use by the AWS during the war highlight the functional diversity, as well as the adaptability, of wildfire lookouts.

THE "TORCH AND BURN ERA"

Following World War II, great changes came to the National lookout system. Coupled with a large amount of returning service men that joined fire suppression agencies, and new advances in technology, lookouts became less crucial in fire detection and suppression activities. Thornton shows that "after this time, a steady decline in the number of operating lookouts took hold."[40] Cerney states, "as technology has changed, lookout towers have become less of a linchpin in fire detection and many were removed."[41] The post war period marks the beginning of the lookout "torch and burn era" (a phrase coined by Hartmans). This era is accountable for the loss and destruction of thousands of wildfire lookouts across the United States. Wildland fire management emphasis was placed on suppression, and the Forest Service began to field new elite firefighters. Hotshots, smoke jumpers and helitack crews became the new crux of wildfire

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[37] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 53.
[38] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 53.
[39] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*.. Page 21.
[40] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 22.
[41] Cerney, Janice Brozik, and Roberta Sago. *Black Hills National Forest: Harney Peak and the Historic Fire Lookout Towers*. Charleston: Arcadia Pub, 2011. Page 8.

suppression. These new firefighters of the post-war period can be viewed as the first generation of "modern wildland firefighters," utilizing fundamental principles and tactics which are still employed today.

Wildfire forest managers directed these new suppression teams, and were also aided by new aerial detection services. What is known as "air attack" by wildfire management agencies, actively began to fill the role previously met by wildfire lookouts. Hartmans explains that "the Forest Service deemed these structures (lookouts) obsolete and began destroying them when other methods of fire detection were adapted by the 1960s."[42] Thornton summarizes these developments eloquently:

> "These factors along with new and improved hand tools and fire trucks, plus a better transportation system, were reducing both response time to a fire incident and the time needed to effect perimeter control of a fire. As a result, remote guard stations and secondary fire lookouts appeared to no longer be an essential ingredient in the fire plan."[43]

With the passage of the 1966 National Historic Preservation Act (NHPA), federal involvement and management of historic resources became a legal matter. The NHPA effectively made historic preservation a national priority and institutionalized the process by which resources were acquired, funded, and recognized as historic.[44] As the NHPA required government agencies to both inventory and "protect" eligible resources, federal agencies such as the U.S. Forest Service unenthusiastically looked at aging and outdated lookouts as not cost effective to maintain and as a liability. In order for a resource to be eligible for listing on the National Register of Historic Places, it typically must be over 50 years old. This date should be noted as many lookouts were removed during the post NHPA era, but before these structures

[42] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest...* Page i.
[43] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 23.
[44] Stipe, Robert E. *A Richer Heritage: Historic Preservation in the Twenty-First Century*. Chapel Hill: University of North Carolina Press, 2003. Page 11.

could reach their 50 year mark. For example, an early 1918 D-6 cupola style lookout would reach "eligibility" by definition (according to the NHPA) in 1968. It is curious that the date by which many lookouts reach eligibility happens to fall directly during the "torch and burn period."

LOOKOUTS TODAY

Today, lookouts face a variety of preservation challenges and management decisions. Extant lookouts are often exposed to a multiplicity of potentially destructive forces. The obvious danger to fire lookouts is destruction from fire. Both wildland fire and accidental incineration are a large concern for preservationists. As lookouts are, by intent, placed in areas prone to wildfire, it is predictable that they are also susceptible to the inherent danger of this placement.

Often fire managers will construct fire line and protect fire lookout structures when possible. During a series of fires in 2004 on the Coronado National Forest, Arizona, Webb Peak Lookout (an extant Aermotor lookout) was in the path of a fire, but through quick action (and much needed dozer line by fire suppression crews) the structure was saved.[45] Even though the lookout was constructed of steel, the extraordinary heat and destructiveness generated by a wildfire would have presumably irreversibly damaged the lookout. The author visited the lookout while on assignment during the 2008 fire season, and was pleased to find the lookout in great condition due to the efforts of other fire suppression personnel. Webb Peak Lookout thus illustrates the ideal outcome in safeguarding lookouts from wildfire. (Figure 2)

[45] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Flagstaff, AZ: Morten Moore Pub, 2006. Page 16.

Figure 2. Webb Peak Lookout, Arizona. Photo taken by John Hill. June 2008.

However, lookouts often suffer from catastrophic destruction by wildfire events. During the record setting fire season of 2011, the Southwest experienced devastating wildfire events. The largest wildfire in Arizona's history, the Wallow Fire (a fire the author was assigned to with the Salmon River Hotshot Crew for over a month) took precedent during this season, though other destructive fires destroyed two beloved fire lookouts in Arizona. Both the Barfoot Lookout, situated in the Chiricahua Mountains, and Atascosa Lookout, northwest of Nogales, were destroyed by two separate wildfire incidents.[46] Fire managers often struggle with balancing crew safety, and the preservation of both natural and built resources, firefighters attempted to save the Atascosa Lookout because they "recognized the historic and recreational value of the site," but they were ultimately unsuccessful.[47]

Besides weather, fire, and vandalism, other dangers have taken a toll on lookouts. In March of 1988, a "Marine Corps CH-46E Sea Knight helicopter clipped an abandoned 150-foot fire observation tower in the Cleveland National Forest near Camp Pendleton seconds before it crashed."[48] This helicopter severely damaged this California lookout known as Santa Margarita Lookout, illustrating the sometimes bizarre way in which lookouts have been irreversibly damaged. The lookout no longer stands today.

Today, there is a strong need for the seasonal staffing of selected lookouts across the country. Lookout personnel, who serve in lookouts during the fire season, provide real time observation that can be life saving. The foundation for all fire suppression tactics rests in the acronym L.C.E.S. This stands for lookouts, communication, escape routes, and safety zones. These four integral aspects of wildfire suppression tactics are complemented when an active fire

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[46] Kreutz, Doug. "2 Historic Fire Lookouts Go Up In Flames." *Arizona Daily Star*. http://azstarnet.com/news/local/historic-fire-lookouts-go-up-in-flames/article_9b2e3816-6706-53d1-8cb5-97d33d6e8234.html. Accessed 3-23-13. June 9, 2011.
[47] Kreutz, Doug. "2 Historic Fire Lookouts Go Up In Flames."
[48] Frank, George. "Crash of Marine Helicopter Near Pendleton Investigated" *Los Angeles Times.* March 4, 1988.

lookout is staffed. This adds a great deal of observation capability and safety during fire suppression activities. As a wildland firefighter, I cannot express how important the role of a staffed fire lookout can be during suppression operations. As wildland firefighting is one of the most dangerous jobs in the country, it cannot be overstated how important an experienced lookout can be in ensuring up to date fire information for fire crews. Not only are lookout structures historically significant, but they are still greatly functional, and in my opinion, necessary for ensuring firefighter safety on the fire line.

CHAPTER III

LOOKOUT TYPOLOGY

The process by which wildfire lookout structures and sites have evolved and transformed throughout the twentieth century is an important aspect of fire lookout history. Through the examination of lookout typology, distinctive fire lookout building periods can be identified and correlated to historic trends and patterns in the national fire prevention and suppression system. In the same manner by which the lookout system evolved and developed over the twentieth century, lookout structures progressed from simple vernacular adaptations to standardized building forms. The following typological examination discusses the various lookout forms, though particular attention will be given to form types present in Oregon. It should be noted that there are many "non-standard" lookout types across the country. However, for the purposes of this study, identifiable and uniform types will be discussed in order to draw later conclusions.

TREE CROW'S NEST, PLATFORMS, AND RAG CAMPS

During the early years of the 20th century, fire lookout sites were chosen for dominant views of the landscape, though it should be noted that summits were often considered somewhat undesirable due to harsh weather conditions. Many of these early sites were structurally undeveloped and are known today as "patrol points." Patrol points were staffed by Bureau of Forestry (pre U.S. Forest Service) Rangers, and were stopping points for horseback patrols, and as Moore shows, "many of the early lookout sites were first established by Reserve Rangers."[49] Often these early 20th century sites were chosen for the use of alidades. An alidade is a "line of site" instrument used to measure distance (through the computation of both vertical and or

[49] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Flagstaff, AZ: Morten Moore Pub, 2006. Page 5.

horizontal angles, and a reference point) in conjunction with a topographical map. It was common for these early lookout sites to have a simple platform from which an alidade would be mounted. If smoke was spotted from one of these early sites, "a patrol member would ride to the smoke and put out the fire."[50] These early detection systems were rather informal and non-standardized as the national framework for fire detection had not fully matured.

The oldest lookout structures and towers were crow's nests. Crow's nests were simple observation points of wooden construction from which a lookout could observe the landscape. These straightforward structures were often simply cut and limbed trees (one or more) which provided the basis for a platform and or small structure for the fire lookout operator. Moore explains these early crow's nests and platforms: "The design included a central vertical beam with cross braces extending outward, set at 45 degrees to a platform mounted on a central pole or tree."[51] This basic design was adapted and reiterated in a variety of methods. Nest height, features, and design differed throughout the nation. Crow's nests and platform lookouts illustrate both regional adaptations and vernacular building types where lookouts were constructed largely in a response to specific geographical and environmental conditions. The needs of lookout operators were site specific, and these needs often dictated the building form. For example, a lookout site with poor visibility due to a high timber stand might need to have a uniquely tall construction method. For these reasons, crow's nests and platforms were very dynamic and sometimes very distinctive. Lookouts who found themselves staffing crow's nest and platform lookouts would have been exposed to the blistering sun and to other elements as these early lookouts were not sheltered and protected. Later, some of these crow's nests and platforms

[50] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 5.
[51] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 7.

eventually were enclosed in order to protect the lookout operator.[52] As these early lookouts were not necessarily built as permanent structures, very few survive today. Supporting these non live-in structures were "rag camps." Rag camps were simply soft structure encampments which provided lookout operators a degree of shelter. Essentially consisting only of tents, rag camps left much to be desired in terms of comfort.

THE D-6 AND D-1

The first truly standardized lookout type to emerge in the United States was Lige Coalman's D-6 cupola style lookout in 1915. The first prototype of this lookout was placed atop Mount Hood, Oregon and served as a test run for the building form.[53] The lookout was manned by Elijah Coalman, who was also an avid climber (having scaled Mt Hood over three hundred times in his life).[54] Before the construction of the D-6 lookout, Coalman lived in a tent at the fire finding site. His exploits in fire detection were described in an account published in the *Morning Oregonian* August 10, 1915, with the sub title, "Mount Hood Fire Observatory Said to Have Proved Value."[55,56] (Figure 3).

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[52] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 7.

[53] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.

[54] "Mazamas Scale Mountain. Morning Oregonian. July 4, 1915. Page 13. Link: http://oregonnews.uoregon.edu/lccn/sn83045782/1915-07-04/ed-1/seq-13/

[55] "Lookout Saves Timber." *Morning Oregonian.* August 10, 1915.Page 9. Link: http://oregonnews.uoregon.edu/lccn/sn83025138/1915-08-10/ed-1/seq-9/. Accessed 3-4-13.

[56] "Lookout Saves Timber." *Morning Oregonian.* August 10, 1915. Page 9.

Water street, from East Burnside to East Ankeny street, will also be up for consideration. Commissioner Dieck will recommend that the request be denied on the ground that the proposed street would pass through the Southern Pacific yards and consequently would be dangerous.

The proposed change of grade at East Twenty-eighth and Clinton streets which has been before the Council for the last two sessions, will come up again Wednesday. The change from the proposed grade was petitioned for by Mrs. J. A. Kraenick, who has property on that corner.

LOOKOUT SAVES TIMBER

Mount Hood Fire Observatory Said to Have Proved Value.

According to information from the district forester's office, the lookout station at the summit of Mount Hood has proved of so great value in the location of fires that it will be continued indefinitely during the fire season. "It has far surpassed our expectations," said Shirley Buck, acting assistant district forester, yesterday.

Mr. Buck said that the man in charge of the station, Elijah Coalman, had been able to detect fires from 50 to 75 miles distant and notify interested people in the near vicinity of the fires before they discovered that any fires had started. The lookout on the mountain enables the forestry department to keep a close watch on timber, even outside the Bull Run watershed.

EPISCOPAL BISHOP VISITS

Rev. William Lawrence Is Here On Way to See Exposition.

Mrs. Lewis Mills, of this city, is entertaining for a few days her father, Right Rev. William Lawrence, an Episcopal bishop of Boston. Bishop Lawrence is accompanied by his wife, son and daughter and is on his way to the San Francisco Exposition.

As a theologian and a writer of biography Bishop Lawrence has a National reputation. Among his books are: "Life of Roger Wolcott, Governor of Massachusetts," "Study of Phillips Brooks" and "Life of Amos A. Lawrence." For years Bishop Lawrence has been connected with the Episcopal

Much Lower Than

LC

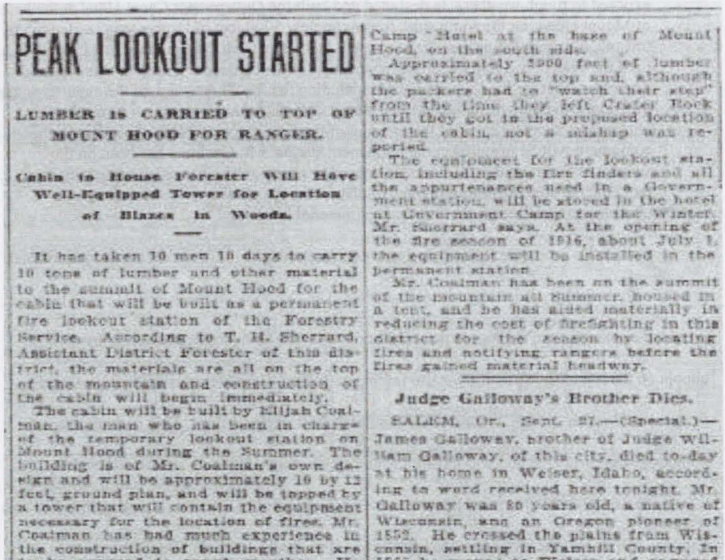
FA

Figure 3. Newspaper Article Reporting Detection of Fire From Mt. Hood Lookout.[57]

In the article, acting assistant forester Shirley Buck states the lookout "far surpassed our expectations."[58] Possibly due to the geographical success of this lookout, the Forest Service decided it was a suitable location for a new, more permanent fire lookout. Under the supervision of Coalman the first D-6 lookout was constructed during September of 1915. Figure 4.

[57] "Lookout Saves Timber." *Morning Oregonian.* August 10, 1915. http://oregonnews.uoregon.edu/lccn/sn83025138/1915-08-10/ed-1/seq-9/. Accessed 3-4-13.

[58] "Lookout Saves Timber." *Morning Oregonian.* August 10, 1915. Page 9.



PEAK LOOKOUT STARTED

LUMBER is CARRIED TO TOP OF MOUNT HOOD FOR RANGER.

Cabin to House Forester Will Have Well-Equipped Tower for Location of Blazes in Woods.

It has taken 10 men 10 days to carry 10 tons of lumber and other material to the summit of Mount Hood for the cabin that will be built as a permanent fire lookout station of the Forestry Service. According to T. H. Sherrard, Assistant District Forester of this district, the materials are all on the top of the mountain and construction of the cabin will begin immediately.

The cabin will be built by Elijah Coalman, the man who has been in charge of the temporary lookout station on Mount Hood during the Summer. The building is of Mr. Coalman's own design and will be approximately 10 by 12 feet, ground plan, and will be topped by a tower that will contain the equipment necessary for the location of fires. Mr. Coalman has had much experience in the construction of buildings that are to be exposed to rough weather. He designed and built the Government Camp Hotel at the base of Mount Hood, on the south side.

Approximately 2000 feet of lumber was carried to the top and, although the packers had to "watch their step" from the time they left Crater Rock until they got in the proposed location of the cabin, not a mishap was reported.

The equipment for the lookout station, including the fire finders and all the appurtenances used in a Government station, will be stored in the hotel at Government Camp for the Winter, Mr. Sherrard says. At the opening of the fire season of 1916, about July 1, the equipment will be installed in the permanent station.

Mr. Coalman has been on the summit of the mountain all Summer, housed in a tent, and he has aided materially in reducing the cost of fire-fighting in this district for the season by locating fires and notifying rangers before the fires gained material headway.

Judge Galloway's Brother Dies.

SALEM, Or., Sept. 27.—(Special.)—James Galloway, brother of Judge William Galloway, of this city, died to-day at his home in Weiser, Idaho, according to word received here tonight. Mr. Galloway was 80 years old, a native of Wisconsin, and an Oregon pioneer of 1852. He crossed the plains from Wisconsin, settling in Yamhill County. In 1865 he moved to Weiser and engaged in farming and stock raising. He has

Figure 4. Newspaper Article Reporting Construction of Mt. Hood Lookout. [59]

The following newspaper article was written about the undertaking:

> "It has taken 10 men 10 days to carry 10 tons of lumber and other material to the summit of Mount Hood for the cabin that will be built as a permanent fire-lookout station of the Forestry Service. According to T.H. Sherrard, Assistant District Forester of this district, the materials are all on the top of the mountain and construction of the cabin will begin immediately. The cabin will be built by Elijah Coalman, the man who has been in charge of the temporary lookout station on Mount Hood during the summer. The building is of Mr. Coalman's own design and will be approximately 10 x 12 feet, ground plan, and will be topped by a tower that will contain the equipment necessary for the location of fires. Mr. Coalman has had much experience in the construction of buildings that are to be

[59] "Peak Lookout Started." *Morning Oregonian*. September 28, 1915. Page 13. http://oregonnews.uoregon.edu/lccn/sn83025138/1915-09-28/ed-1/seq-13/. Accessed 3-4-13.

exposed to rough weather. He designed and built the Government Camp Hotel at the base of Mount Hood, on the south side. Approximately 5000 feet of lumber was carried to the top and, although the packers had to 'watch their step' from the time they left Crater Rock until the time they got to the proposed location of the cabin, not a mishap was reported. The equipment for the lookout station, including the fire finders and all the appurtenances used in a Government station, will be stored in the hotel at Government Camp for the winter, Mr. Sherrard says. At the opening of the fire season of 1916, about July 1, the equipment will be installed in the permanent station. Mr. Coalman has been on the summit of the mountain all summer, housed in a tent, and he has aided materially in reducing the cost of firefighting in this district for the season by locating fires and notifying rangers before the fires gained material headway."[60]

Coleman's prototype lookout design was acknowledged for its success as it implemented principles in building modularity and permanence. The D-6 lookout measured 12 by 12 feet and provided a space for the lookout to both live and work. The D-6 incorporated a six by six foot cupola on the top of the structure for fire finding activities. The D-6 was almost always made from milled lumber or logs, though some examples exist made of stone. This lookout was popularized in the 1910s and was constructed throughout the 1920's on a national level. In 1922 a "version using a gable roofed cabin and cupola emerged from District 1, now Region 1."[61] This regional adaption of the D-6 cupola is often referred to as a D-1 cupola. The D-1 cupola borrowed design elements from the D-6, but was constructed of logs and measured 14 by 14 feet. This design was more suitable for the generally harsher winters and conditions present in Idaho and Montana. The D-1 lookout design is generally credited to D.L. Beatty.[62] The D-6 lookout is an iconic and simplistic lookout form which represents the first truly standardized live-in lookout structure.

THE L-4

[60] "Peak Lookout Started." *Morning Oregonian*. September 28, 1915. Page 13. Persistant link: http://oregonnews.uoregon.edu/lccn/sn83025138/1915-09-28/ed-1/seq-13/. Accessed 3-4-13.
[61] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest*... Page 27.
[62] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.

In 1929 the versatile L-4 lookout made its first appearance. The L-4 lookout measured 14 by 14 feet and was typically assembled from a pre-cut frame that was packed to the lookout location, and cost a mere $500.[63] The early L-4 lookouts had a gabled roof and are referred to as "Grange Hall" lookouts. Unlike the D-6, the L-4 does not have a cupola or elevated viewing area within the structure (Figure 5).

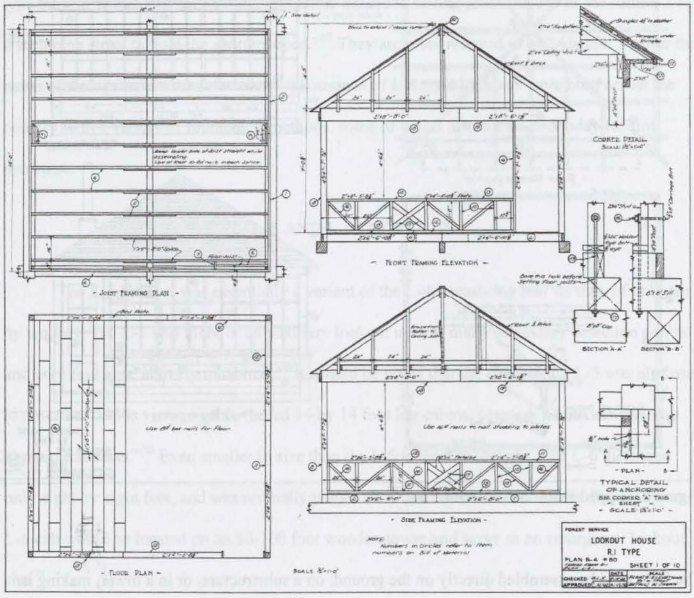


Figure 5. Hipped Roof L-4 Interior Plan.[64]

[63] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[64] "Hipped Roof L-4 Plan." United States Forest Service, U.S. Department of Agriculture. April 21, 1933. Provided by Bill Cobb. Webmaster, Forest Fire Lookout Association.

These lookouts had banks of windows which were protected by a series of shutters. (The shutters would also provide a great deal of shade during the hot summer months). Figure 6.

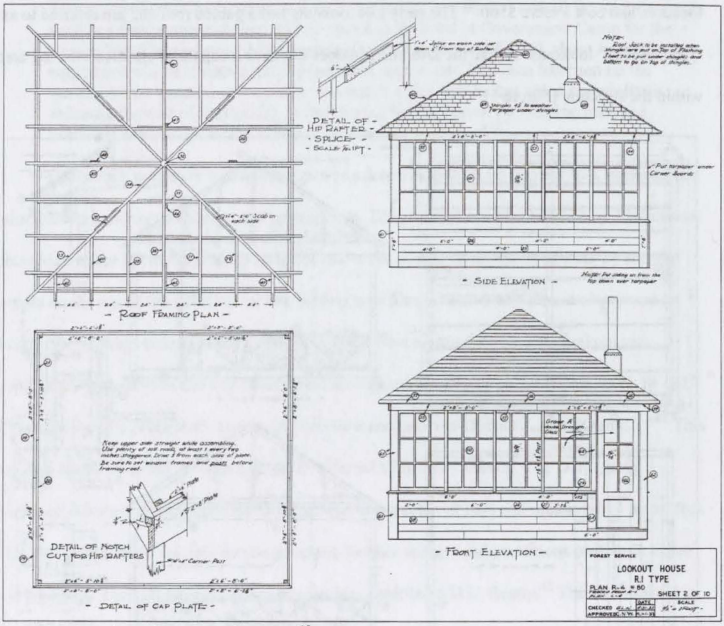


Figure 6. Hipped Roof L-4 Exterior Plan. [65]

The L-4 could be assembled directly on the ground, on a substructure, or in a tower, making it flexible for different terrain and location specific parameters. Kresek states, "for a long time fire managers had realized the need for tall towers which would permit a person to safely and

[65] "Hipped Roof L-4 Plan." United States Forest Service, U.S. Department of Agriculture. April 21, 1933. Provided by Bill Cobb. Webmaster, Forest Fire Lookout Association.

comfortably live in during his perpetual watch."[66] Both lookout duties and living quarters were integrated into one space with the L-4 (whereas previous designs such as the Cathedral style lookout failed to gain great popularity with a similar design approach).

Between 1932 and 1933, hipped roof L-4 lookouts began to be built, and only small changes to the shutter system would be made to the lookout in the future. Lookouts of the L-4 type built in 1936 and later exhibit "bolts from extended ceiling joists instead of the former 2 by 2 inch pine struts to hold the shutters open."[67] They are often referred to as "Aladdin's" after the name of their principal manufacturer.[68] Thousands of L-4 style lookouts were built across the country with a variety of foundation methods, some of which are still staffed today for fire detection.

L-5 AND L-6 LOOKOUTS

The L-5 lookout was essentially a variant of the L-4, measuring half its size, of only ten by ten feet. The L-5 was more of an auxiliary lookout used at many secondary detection points, and very few were actively inhabited.[69] It should be noted that the designation L-5 was also used to describe "1930s vintage gable roofed 14 by 14 foot log cabins, courtesy of the industrious Nezperce fellows."[70] Even smaller in size than the L-5 is the L-6 lookout. The L-6 measured only eight by eight feet, and was normally placed on much taller wooden towers. Typically, an L-6 cab would be located on an 80-100 foot wooden tower and serve as an emergency lookout site.[71]

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[66] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[67] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[68] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[69] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[70] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.
[71] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.

During the 1930s and the CCC era, new observation only lookouts became popular on a national level. Due to the national standardization process of lookout forms, "In the 1930s, the towers were no longer designed and constructed at the local level."[72] Commonly, these observation only lookouts were built by the Aermotor Company from Chicago Illinois (Figure 7).

Figure 7. Aeromotor Windmill Company advertisement. [73]

[72] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 9.
[73] Aeromotor Windmill Company advertisement. http://www.aermotorwindmill.com/products/11-products/31-installation-instructions-4-post-standard-towers.html. Accessed 3-4-13.

The Aermotor Company had become successful through the manufacturing of steel windmills for agricultural purposes. Aermotor was "…the first widely known firm to market observation towers for fire control purposes."[74] Other companies soon followed but Aermotor remained the most prolific producer of this kind of lookout type. As inherent design characteristics of windmills lend themselves to be adapted for use in fire observation practices, the Aermotor Company became the chief supplier of all steel lookout towers during the 1930s.

These lookouts featured a seven by seven foot cab, and were constructed in a variety of heights (Figure 8).

[74] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 28.

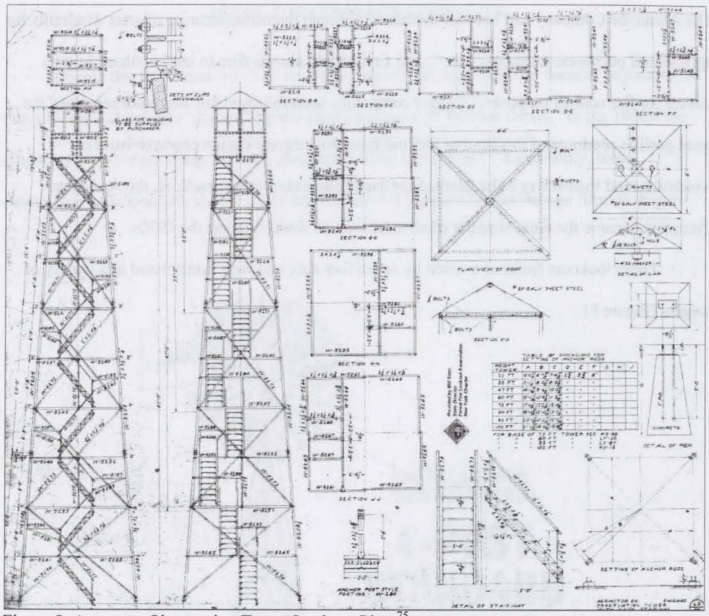

Figure 8. Aermotor Observation Tower Lookout Plan.[75]

A 1937 booklet published by the Forest Service on tower designs designated "Aermotor Company towers as the L-1400 series plans."[76] Aermotor lookouts were designed and constructed in 45, 60, 80, 100 and 120 foot increments.[77] Typically, these lookouts would rest on a concrete slab, and/or concrete footings where the four supporting corners of the tower would be

[75] "Aermotor Co. Observation Tower With Inside Stairway Plan." January 10,1917.Provided by Bill Cobb, Webmaster, Forest Fire Lookout Association and Bill Starr. State Director, Forest Fire Lookout Association, New York Chapter.
[76] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 28.
[77] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 28.

anchored. Often a construction date can be found etched into the once soft concrete; understandably, this date is greatly helpful to lookout researchers (Figure 9).

Figure 9. Blue Ridge Lookout, California. Foundation Construction Date. (Photo by Author, 2009).

Early Aermotor cabs utilized a ladder to gain access into the cab.[78] Later Aermotor lookouts used a stepped staircase. These steps into the cab were either wood or steel, though wood examples have often become very unstable and dangerous today. (If one *were* to climb into an Aermotor lookout with rotten steps, it should be advised that one steps on the small metal flanges on the outside of the steps which supported the step itself, though the author does not condone, recommend or have experience with such behavior). Aermotor lookout steps terminated at a trap door entry at the bottom of the cab. This door would swing to the inside, and also serve as the

[78] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*.

floor when closed. The towers were durable and, when disassembled, could be shipped almost anywhere."[79]

Aermotor lookouts were highly modular, and in turn, the Forest Service found that "the steel towers were less expensive to erect and maintain."[80] The Aermotor lookout was relatively simple to install, and in turn, many of these sturdy galvanized structures were erected across the forest landscape. It should be noted that "The Pacific Steel Company and the International Derrick Company also supplied material for these towers within Arizona," and delivered the materials by rail where they were then shipped by wagon and assembled.[81] In California, Aermotor lookouts were constructed due to state policy, although live in cabs were more desired than observation only lookouts. "The use of these towers (Aermotor) was restricted to those few sites in the State which, due to topographic conditions, necessitated the erection of an observation deck greater than 30 feet above the ground."[82] As Aermotor lookouts were observation only, cabins were constructed in conjunction with these resources. During the 1950s in California, small changes were made to Aermotor lookouts as "…CDF began installing catwalks around the cabs resting upon the Aermotor Company towers. This retro-fit is apparently unique to California."[83]

R-6 FLAT AND AMORT LOOKOUTS

In 1953 the United States Forest Service adopted a new lookout form type known as the R-6 Flat.[84] The structure was square and measured 15 by 15 feet. Interestingly, the R-6 Flat

[79] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 26.
[80] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 9.
[81] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 9.
[82] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 27.
[83] Thornton, Mark V. *An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations*. Page 31.
[84] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 12.

featured a unique and puzzling flat roof design which projected over and covered the balcony which typically surrounded the structure (Figure 10).

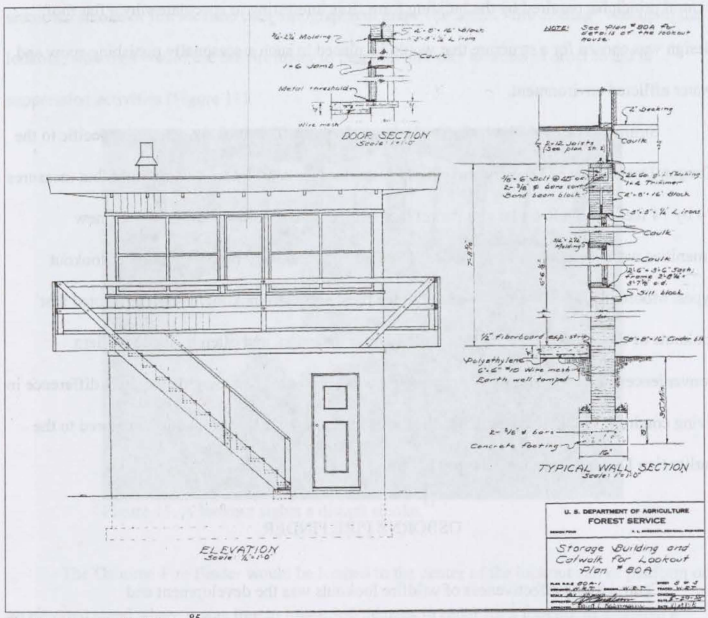

Figure 10. R-6 Flat Plan. [85]

Kresek calls the R-6 Flat "the tarpaper-topped cube" that "is built of plywood."[86] The R-6 Flat also had many closely spaced windows which limited the effectiveness of observation from within the cab due to blind spots created by the window frames. Kresek is quite critical of the R-

[85] "R-6 Flat Plan." United States Forest Service, U.S. Department of Agriculture. August 29, 1958.Provided by Bill Cobb. Webmaster, Forest Fire Lookout Association.
[86] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 12.

6 Flat as he states "its window frames offer the poorest ventilation and more blind spots than any observatory yet designed."[87] The R-6 Flat was not necessarily a great step forward in the development of improved fire lookout observation, particularly as it seems to almost ignore central principles required by the building form. It is interesting to speculate why a flat roof design was chosen for a structure that would be placed in such a seasonally punishing snow and water afflicted environment.

Similar to the R-6 Flat is Oregon's Amort lookout. This lookout pattern is specific to the Oregon Department of Forestry and closely resembles an R-6 Flat with its flat roof, but measures 14 by 14 feet. As the R-6 Flat and Amort lookouts represent post-war era lookouts; new amenities were included in these designs that had not previously been seen in other lookout types. Moore identified the post-war era as the third period in lookout history, and noted that lookouts of this era were "much more solid, larger in design, and often included modern conveniences like counters, appliances and bunk beds."[88] One can imagine the great difference in living conditions lookouts experienced when living in new post war lookouts compared to the earlier tiny D-6 and L-5 lookout types.

OSBORNE FIRE FINDER

Central to the effectiveness of wildfire lookouts was the development and implementation of the Osborne Fire Finder. This new tool was developed by William B. Osborne who worked for the U.S. Forest Service in the Mount Hood engineering office, Oregon, and was also a graduate "forester from the School of Forestry at Yale."[89] The Osborne Fire Finder proved to be extremely effective and was a great advancement over earlier alidade type devices.

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[87] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 12.
[88] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 12.
[89] Newman, Doug. *Finding Fire: A Personal History of Fire Lookouts in Lane County, Oregon*. Page 1.

Osborne's instrument was initially developed as early as 1911, though much like fire lookouts, many renditions of this instrument were later produced with a significant new version introduced in 1934.[90] It is interesting that the device was called a "firefinder" as it simply plotted an unknown smoke or fire location on a topographical map. The actual "fire finding" was up to the lookout, who then would use the firefinder to pinpoint an exact location in order to aid in suppression activities (Figure 11).

Figure 11. A lookout sights a distant smoke.[91]

The Osborne Fire Finder would be located in the center of the lookout cab or platform on an elevated stand where it was free to rotate 360 degrees in order for a lookout to establish a directional bearing. In conjunction with the Fire Finder, a map was located below the instrument

[90] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 29.
[91] Keith, Whitney. "Reflections: Fire Towers." "A fire spotter uses an Osborne Fire Finder to Triangulate Fire Location in 1940." Photo. *Douglas County Herald*. http://douglascountyherald.com/2010/11/04/reflections-fire-towers/. Accessed 1-13-13.

in a manner which allowed a lookout to center one's exact location on a north-south axis.[92] It is helpful to think of a Fire Finder as having similar attributes as the sights on a rifle (Figure 12).

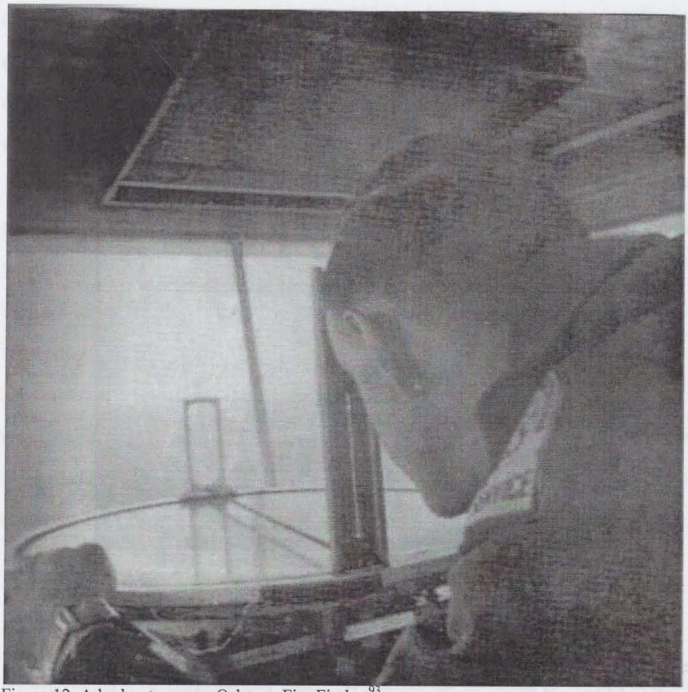

Figure 12. A lookout uses an Osborne Fire Finder.[93]

[92] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 11.
[93] Cerney, Janice Brozik, and Roberta Sago. *Black Hills National Forest: Harney Peak and the Historic Fire Lookout Towers*. Charleston: Arcadia Pub, 2011. Page 9.

Both horizontal and vertical directionals were imperative for fire finding accuracy. Lookouts would first master their environment and learn the topographical features which surround the lookout site. Kresek explains:

> "When the sights are fixed upon a distant peak or the base of a thin smoke column, a tightly stretched steel tape measure centers itself over the smoke's position on the map, as well as that of the lookout. Whatever direction the sights are aimed, the tape always pivots over the lookout's position in the exact center of the map. It is then possible to determine the smoke's distance from the station by relating it to known peaks, valleys, roads, and other landmarks in its vicinity and on the map."[94]

Once a lookout obtained the location of a smoke or active fire, they would relay the range, township and section to the appropriate fire management officer for suppression decisions. Precision is paramount in spotting a fire as inaccuracy can lead to increased suppression reaction times, and in turn, a greater potential for loss of both urban and natural resources. When multiple lookouts could get eyes on a smoke, the level of accuracy in pinpointing the fire could be exact. Using two or more lookout directionals, azimuth readings could be triangulated on a map to get a very accurate location. Kresek states that Fire Finder accuracy could be as specific as "one-sixtieth of a degree."[95]

Maintaining a lookout's Fire Finder was a centrally important and critical aspect of lookout duties. Strict Fire Finder care and maintenance practices were implemented by the Forest Service, requiring specific and stringent guidelines that lookouts were expected to follow. Lookouts were to resist using the Fire Finder as a flat surface to rest objects in their cramped and space limited quarters. Cerney finds that "before closing the station for the night, lookouts were sometimes required to clean the Fire Finder, release tension on cross wires and distance tape, and remove the map and store in a dry place."[96] The relationship between a lookout and their Fire

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[94] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 213.
[95] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 29.
[96] Cerney, Janice Brozik, and Roberta Sago. *Black Hills National Forest...* Page 12.

Finder is one not all that dissimilar from that of a soldier and their rifle. Today, only one company manufactures Fire Finders as the Coronado National Forest found out when they had to recently replace a unit. [97]

[97] Moore, Eileen. *Standing Watch: The Fire Towers of Arizona*. Page 11.

CHAPTER IV

CASE STUDIES

Specific case studies have been selected to illustrate different lookout preservation outcomes. The criteria by which these lookouts were selected were not based on their specific construction type, but rather the extent of historic preservation efforts given to the structures. These specific lookout narratives are exclusively based on different degrees of preservation, (as pertinent to the field of Historic Preservation) and will provide an opportunity to cross examine a predetermined set of variables. Four case study types are presented: (1) successful lookout preservation, (2) a lookout in need of preservation and or stabilization, (3) unsuccessful lookout preservation, (4) and a current legal battle over a lookout in a wilderness area (Table 1).

Table 1. Case Study Comparative Table.

Lookout Name	**Carpenter Mountain, OR**	**Olallie Mountain, OR**	**Frissell Point, OR**	**Green Mountain, WA**
Lookout Age	1935	1932	1928	1933
Lookout Location (Natioal Forest, Wilderness)	Willamette National Forest	Willamette National Forest, Three Sisters Wilderness	Willamette National Forest	Glacier Peak Wilderness
Lookout Type-	L-4	L-4-Grange Hall	D-6 Cupola	L-4
Level of Documentation, Preservation Efforts, and Scholarly Work	Extremely High	Good	Low	Extremely High
Integrity	Good	Excellent	Demolished 1968 (Burned)	Good

These case studies are supported by various primary and secondary sources which consist of historic newspaper articles, published books, official reports, and scholarly works. By examining

these four preservation outcomes, it is hoped that researchers and preservationists can better understand the four preservation related possibilities that lookouts face.

When possible, site visits to the lookouts selected for these case studies were undertaken. The findings and conclusions of this study are based on personal observation and condition assessments. Current photographs of case study lookouts are included in order to document the condition of the lookout, as well as to provide evidence for successful preservation efforts. These photos are both experiential and documentary in character. As lookouts suffer from lack of consistent observation, recent photo documentation provides both a recent record. This will aid in determining lookout deterioration and or preservation through the comparison of historic photos.

SUCCESSFUL PRESERVATION:

CARPENTER MOUNTAIN LOOKOUT

Carpenter Mountain Lookout site is located on the Willamette National Forest, in Section 7, Township 15S, Range 6E.[98] The lookout site stands at 5349 feet above sea level, and is a complex site lookout.[99] The site was established in 1915 when an alidade was placed on the "summit of the basalt plug."[100] In 1917 an open-sided shelter was constructed on top of the steep rock scree (Figure 13).

[98] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 77.
[99] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 77.
[100] Cox, James B. *Historic Fire Lookouts on the Willamette National Forest. A Determination of Eligibility to the National Register of Historic Places."* USDA- Forest Service, Pacific Northwest Region, Willamette National Forest. Lane, Linn and Marin Counties, Oregon, 1991. Page 19.

USFS 1917

Figure 13. Historic open-sided Fire Finder shelter on Carpenter Mountain.[101]

This simple structure held an Osborne Fire Finder, and had a shingled gabled roof supported by four rough hewn poles. This early lookout shelter provided only limited protection from rain storms and inclement weather (Figure 13).

[101] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 70.

During a storm in 1921, the shelter was destroyed by lighting. This result illustrates the often dangerous environmental forces that fire lookouts face atop high mountain peaks.

For 14 years after the dramatic destruction of the shelter the site remained undeveloped. In 1935 a new structure was erected on the peak.[102] The new structure on the Carpenter Mountain site was a ground L-4 cab style lookout which still stands today (Figure 14).

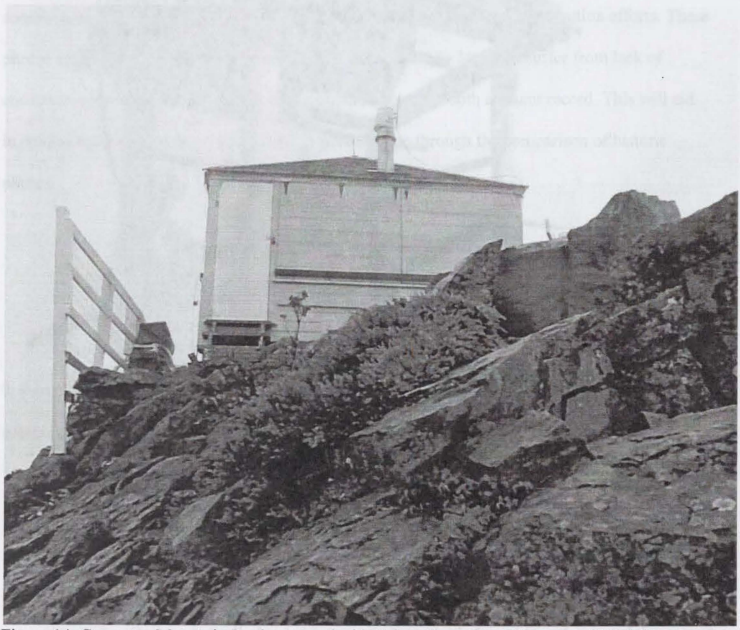

Figure 14. Carpenter Mountain Lookout, north side (photo by author, November 7, 2012).

[102] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 77.

This lookout has a hipped roof, and essentially occupies the entire space available on the peak. The structure remains seasonally staffed by Willamette National Forest personnel. (Figure 15).

Figure 15. Carpenter Mountain Lookout Trail Sign (photo by author, November 7, 2012).

To gain access to the lookout, one must traverse a relatively steep and jagged basalt rock face which brings one to the north face of the lookout. A fence surrounds the east, south, and west sides of the lookout which provides a great deal of protection from a certainly fatal fall (Figure 16).

Figure 16. Carpenter Mountain Basalt Cliffs, facing southwest (photo by author, November 7, 2012).

In a Determination of Eligibility for the National Register of Historic Places statement prepared in 1991, James B. Cox noted in *Historic Fire Lookouts on the Willamette National Forest, A Determination of Eligibility to the National Register of Historic Places* that Carpenter Mountain Lookout has good integrity as limited alterations to the structure had been made.[103] Small alterations such as door and shutter replacements were the only changes made to the original lookout. Cox remarked that "while these alterations have had some affect on integrity of design and materials, they are relatively minor."[104] The author visited this lookout in November of 2012 and found it in excellent condition. Cox assessed the lookout as National Register eligible, and the author believes that this assessment is still accurate as little has changed since 1991.

If anything, Carpenter Mountain Lookout's integrity has improved with a recent building addition. A recent reconstruction of the lookout's outhouse was even completed by a private conservation group. This outhouse was built with special attention given to insure it was built in the fashion of the original outbuilding (Figure 17).

[103] Cox, James B. *Historic Fire Lookouts on the Willamette National Forest*...Page 19.
[104] Cox, James B. *Historic Fire Lookouts on the Willamette National Forest*...Page 19.

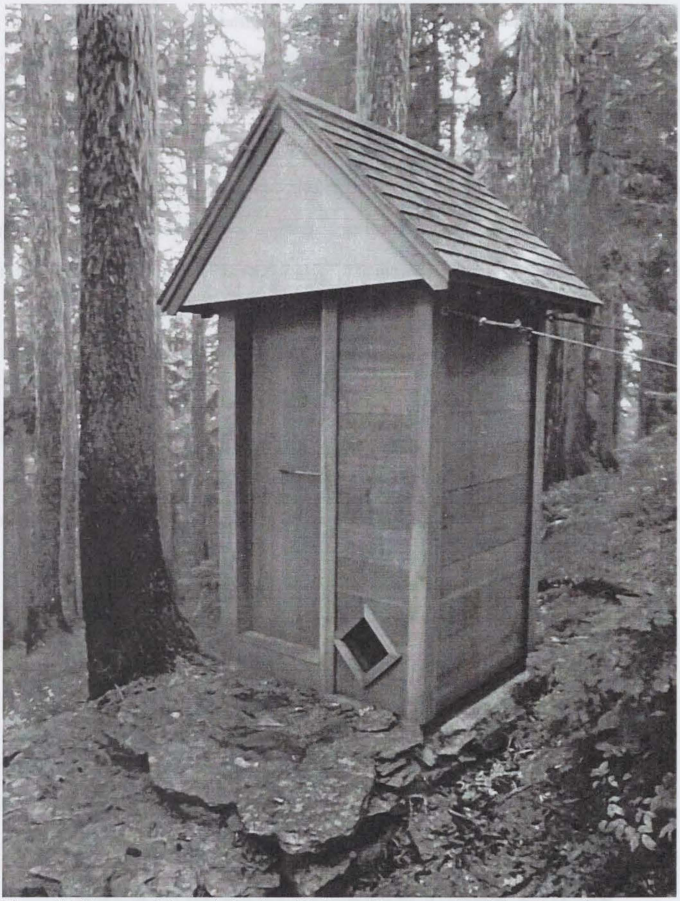

Figure 17. Carpenter Mountain Lookout Outhouse Reconstruction (photo by author, November 7, 2012).

Though not crucial to specific attributes of lookout integrity, the newly reconstructed outhouse provides a greater sense of feeling and ambiance as described in the National Register Bulletin's seven aspects of integrity.[105]

Hartmans noted that in 1991 Carpenter Mountain Lookout was planned to be used as an interpretive site, and staffed with a volunteer. Planned rehabilitation of the lookout was also implemented, as well as upgrades to the trail leading to the site.[106] It was imagined that with these upgrades Carpenter Mountain Lookout could be used as both an interpretive opportunity and a rental site.[107] Hartmans recommended a number of rehabilitation priorities, many of which were later successfully implemented. Some of these efforts included the reconstruction and repair of the existing perimeter fence and other stabilization efforts.

Carpenter Mountain Lookout illustrates a well preserved example of an L-4 hipped roof lookout with excellent integrity. Through consistent maintenance, reconstruction projects and seasonal staffing, Carpenter Mountain Lookout has remained in superb condition. The outstanding state of this lookout demonstrates the important junction between private preservation efforts and forest management policy. As Carpenter Mountain Lookout has been placed on the National Historic Lookout Register by the Forest Fire Lookout Association, newly gained notoriety has aided in preservation efforts (Figure 18).

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[105] National Register Bulletin. "How to Apply to the National Register Criteria Considerations." United States Department of the Interior. National Park Service. 1990; revised 1991,1995,1997. Revised for Internet 1995. Page 45.

[106] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest*...Page 135.

[107] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest*...Page 135.

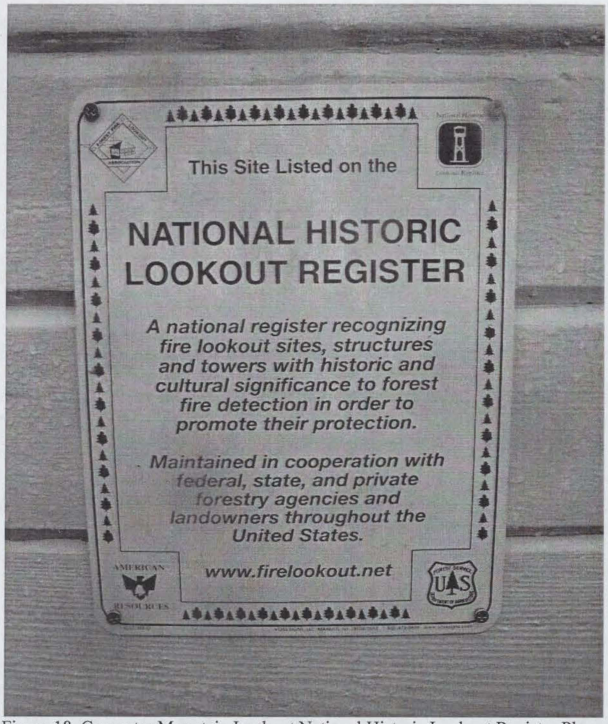

Figure 18. Carpenter Mountain Lookout National Historic Lookout Register Plaque (photo by author, November 7, 2012).

The Carpenter Mountain Lookout outcome is one that is optimal, and demonstrates the best case scenario for fire lookout preservation.

NEEDED LOOKOUT PRESERVATION AND STABALIZATION:

OLALLIE MOUNTAIN LOOKOUT

Olallie Mountain Lookout is located on the Willamette National Forest, 11 miles southeast of McKenzie Bridge, in Section 3 Township 18S. R6E.[108] Olallie Mountain Lookout is situated at an elevation of 5700 feet in the Three Sisters Wilderness, which significantly increases the remoteness of the site.[109] The author made the projected three and a half mile hike to the lookout during the last days of October, 2012. This timing of this hike proved to be questionable as the trek was met with the first snow storm of the year. Enough snow accumulated during the supposedly short hike that the author missed a turn on the trail and hiked an extra two miles past the desired turn. With map and compass in hand, the appropriate navigational correction was made delivering the author to Olallie Mountain, though as Henry David Thoreau once said, "Not until we are lost do we begin to understand ourselves."

In 1922 a cabin was constructed and an alidade stationed on the site. This configuration remained on the site until 1932 when a new L-4 lookout was constructed. This new lookout was built in the "grange hall" style, and remains the only gabled L-4 lookout on the Willamette National Forest. (Figure 19).

[108] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Fairfield, Wash: Ye Galleon Press, 1985. Page 78.
[109] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Fairfield, Wash: Ye Galleon Press, 1985. Page 78.

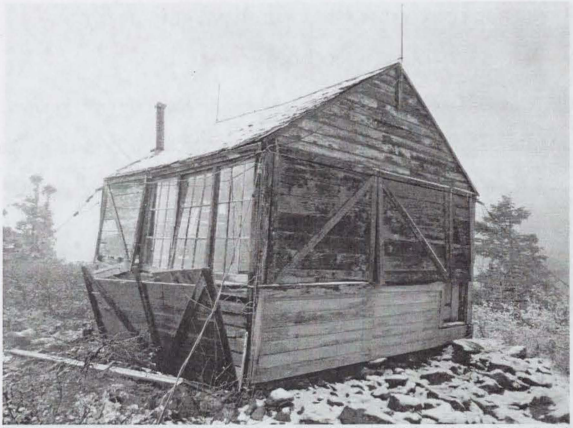

Figure 19. Olallie Mountain Lookout, northeast corner (photo by author, October 20, 2012).

Olallie Mountain Lookout is a ground cab that rests on a stone foundation, and was seasonally staffed until 1971. In James B. Cox's *Historic Fire Lookouts on the Willamette National Forest, A Determination of Eligibility to the National Register of Historic Places* report, Olallie Mountain Lookout was assessed as eligible for listing on the National Register of Historic Places. Today, the lookout retains excellent integrity as only slight alterations to the structure, involving replacement of the shutters have been made.[110] However, deterioration and destabilization have occurred to a considerable extent, especially over the last two decades.

The precarious condition of Olallie Mountain Lookout was first recognized by Hartmans in 1991. Using photographic illustrations, Hartmans identified and documented many of the structural problems exhibited by the lookout (Figure 20).

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[110] Cox, James B. *Historic Fire Lookouts on the Willamette National Forest...* Page 16.

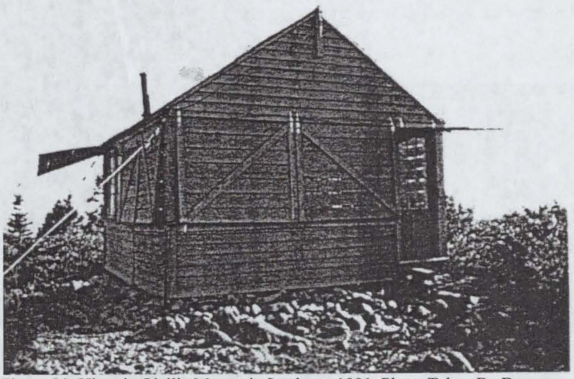

Figure 20. Historic Olallie Mountain Lookout. 1991. Photo Taken By Donna Hartmans.[111]

Using a hierarchical structure, Hartmans recognized seven specific stabilization tasks necessary to preserve the Olallie Mountain Lookout. Since this initial condition assessment, Olallie Mountain Lookout has exponentially deteriorated. All the exterior paint (and most of the interior paint as well) has fallen off exposing the wood to the elements. Guy wires which once braced the four corners of the lookout have all lost their tension. All of the original glazing remains intact though the shutter on the east side has fallen to the ground. The greatest problem the lookout faces is the structural asymmetry of the east, south and west walls. Vertical forces on the roof structure are creating pressure that is buckling and pushing the walls outward (Figure 21).

[111] Hartmans, Donna Marie. *Historic Lookout Stations on the Willamette National Forest*... Page 140.

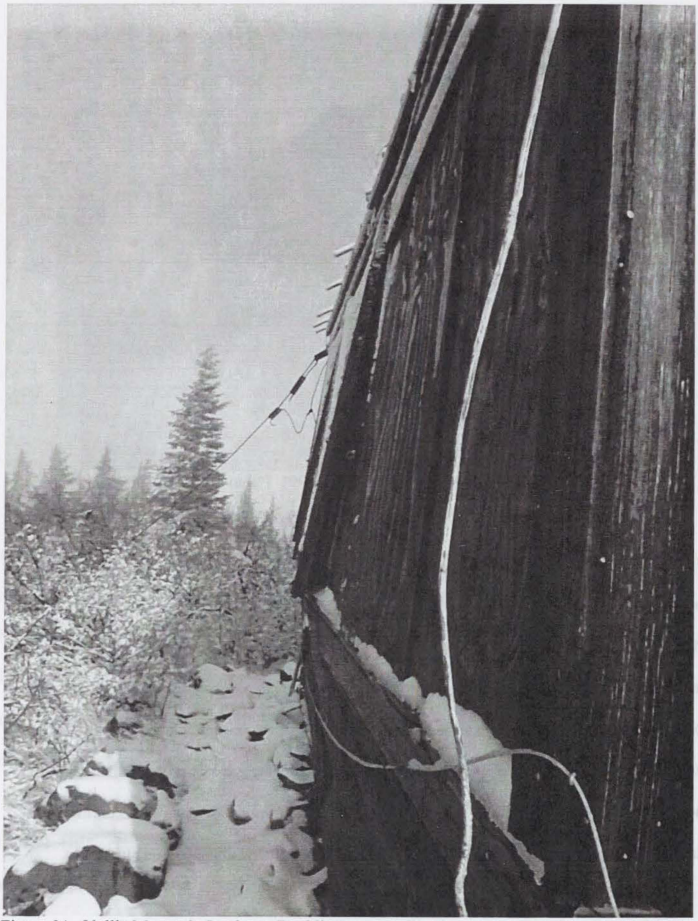

Figure 21. Olallie Mountain Lookout. Buckling west wall, (photo by author, October 20, 2012).

Recent private preservation/stabilization efforts have begun to slow this process by adding an internally framed support system to the lookout in order to give more integrity to the roof structure. This recent framing system braces the entire distance of the interior west wall, and spans from the floor to the ceiling (Figure 22).

Figure 22. Olallie Mountain Lookout interior bracing work, (photo by author, October 20, 2012).

The interior of the lookout retains the original Fire Finder platform, but a high degree of water penetration was observed at the time of the visit. To address the problem of water leakage in the structure, private conservation groups have planned restoration efforts for the roof. Construction materials consisting of tar paper, and a large amount of wooden roofing shingles, were present at the site at the time of the authors visit in October of 2012 (Figure 23).

Figure 23: Olallie Mountain Lookout. Shingles and tar paper, (photo by author, October 20, 2012).

Both the expected roof construction and the internal framing are steps in the right direction, though it is evident that these measures alone will not fully stabilize Olallie Mountain Lookout. The popularity of Olallie Mountain Lookout was highlighted by the weathered sign-in book on the Fire Finder platform. Many hikers and visitors have written in the book indicating a high degree of interest in the site, even in months of poor weather (Figure 24).

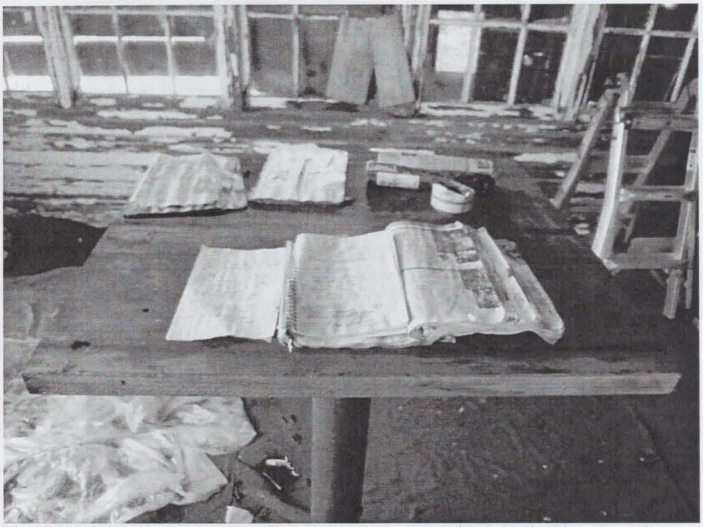

Figure 24. Olallie Mountain Lookout Fire Finder platform and sign in book, (photo by author, October 20, 2012).

Olallie Mountain Lookout represents a common and unfortunate structural condition that is representative of thousands of fire lookouts across the nation.

UNSUCCESSFUL LOOKOUT PRESERVATION:

FRISSELL POINT LOOKOUT

Frissell Point Lookout was formerly located on the Willamette National Forest, in Section 33, T15S. R6E.[112] The site of this lookout was located four miles northeast of McKenzie Bridge. A one mile hike along a ridge was required to gain access to the site, which was at 5144 feet elevation. Around 1914, an alidade was placed on the site. In 1928, a D-6 cupola lookout was constructed on the site where it remained in service for 40 years. In 1968 Frissell Point Lookout was destroyed by local forest managers as it was victim of the "torch and burn" era.[113] As with many fire lookouts, torching was selected as the method to remove Frissell Point Lookout. Practically no documentation exists for Frissell Point Lookout, making this lookout one of thousands that share a similar account.

The author visited the site of Frissell Point Lookout during November of 2012, and found a variety of interesting evidence associated with the former lookout. (Figure 25)

[112] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 78.
[113] Cox, James B. *Historic Fire Lookouts on the Willamette National Forest*...Page 29.

Figure 25. Frissell Point Lookout site, facing south (photo by author, November 3, 2012.)

The site is littered with debris associated with the structure including melted window glass, nails, and charred wood. (Figure 26).

Figure 26. Structural remains at Frissell Point Lookout site (photo by author, November 3, 2012).

Four steel guy wire anchors indicate the four corners and orientation of the D-6 cupola lookout structure. These steel guy wire anchors were placed in both rock and earth and offer the greatest tangible evidence of the former existence of this historic structure (Figure 27).

Figure 27. Steel guy wire anchor at Frissell Point Lookout site (photo by author,November 3, 2012).

However, other more tacit evidence also can be found on the site. The northeast guy wire anchor is placed in a large boulder and exhibits an array of characteristics that reflect the structure that once presided on the site (Figure 28).

Figure 28. Northeast guy wire anchor at Frissell Point Lookout site; note paint, graffiti, and fire-damaged rock (photo by author, November 3, 2012.

This rock has both blue and white paint adhered to its surface, presumably from decades of repeated lookout maintenance and painting. The northeast guy wire rock is also heavily fire damaged and cracked from the fast and intense fire that consumed the historic D-6 lookout. Upon close examination of this rock, historic graffiti was also observed.

The presence of graffiti at this site is noteworthy, as the largest boulder on the north east corner of the site contains decades of well preserved graffiti in the form of rock carvings (Figure 29).

Figure 29. View to north of "Graffiti Rock" at Frissell Point Lookout site (photo by author, November 3, 2012).

The majority of this graffiti is most likely from hikers making their mark (though the author frowns upon such behavior, however historic). Such graffiti is now something of a curiosity as it exists today without the context of the historic fire lookout. The earliest inscription reads, "Survey 1933" (Figure 30).

Figure 30. Frissell Point Lookout site. Close up of "Graffiti Rock." The writing reads: "SURVEY 1933." Facing north. Photo taken by John Hill. 11-3-12.

It is not clear what "survey" this was referring to, but it is possible that it was made by a U.S. Geological Survey personnel.

In particular, one specific and elaborate carving in the rock stands out. It reads "Mr. and Mrs. Gene Ertel, 1956" (Figure 31).

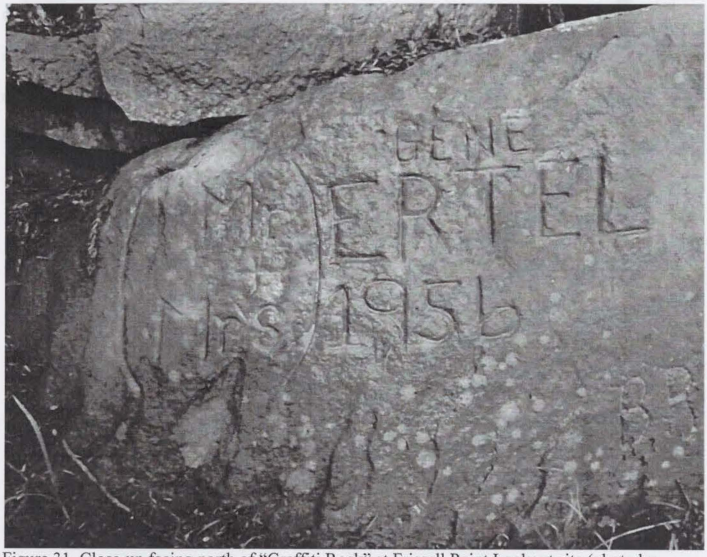

Figure 31. Close-up facing north of "Graffiti Rock" at Frissell Point Lookout site (photo by author, November 3, 2012).

This graffiti alone may not have much meaning, but when coupled with a compelling historic photograph, a new and untold narrative emerges. Doug Newman's excellent book titled *Finding Fire: A Personal History of Fire Lookouts in Lane County, Oregon* chronicles the fire lookouts of Lane County, and contains the only known historic photo of the D-6 Frissell Point Lookout (Figure 32).

Figure 32. Historic Photo (date unknown) of Frissell Point Lookout.[114]

In this undated black and white photograph, a man and woman stand in front of the lookout with their small boy. Though purely speculative, the man and woman in this photograph may be Mr. and Mrs. Ertel. As a lookout operator often had large amounts of "free time," one could imagine that the intricate carving was done by such a person. Attempted research on Mr. and Mrs. Ertel revealed no data, though as many have noted about lookout operators, their service went largely undocumented.

Today, only non lookout related scientific and communications related instruments are present on the site. Frissell Point Lookout is a perfect example of a victim of the torch and burn era. Like thousands of other historic lookouts across the country, Frissell Point Lookout was a

[114] Newman, Doug. *Finding Fire: A Personal History of Fire Lookouts in Lane County, Oregon*. Eugene, Or: Lane County Historical Society, 2007. Page 5.

casualty of obsolescence and changing forest management policies which culminated in its destruction. The site also serves as a solemn reminder of the potential fate faced by many abandoned and/or poorly preserved lookouts in the future.

CURRENT LEGAL BATTLE WITH SIGNIFICANT PRESERVATION IMPLICATIONS:

GREEN MOUNTAIN LOOKOUT

Green Mountain Lookout is a hipped roof L-4 lookout situated on the Mount Baker-Snoqualmie National Forest, Washington, at Section 3, T32N. R12E.[115] The site has been an active lookout location since 1919, though the current lookout structure was not erected until 1933.[116,117] At the western boundary of Glacier Peak Wilderness (created in 1984), the lookout rests on a small wood platform foundation anchored to a rock outcropping, and overlooks grand views at an elevation of 6,500 feet above sea level.[118] (Figure 33).

Figure 33. Green Mountain Lookout.[119]

[115] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 129.
[116] Spring, Ira, and Byron Fish. *Lookouts: Firewatchers of the Cascades and Olympics*. Seattle, WA: Mountaineers, 1996. Page 193.
[117] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 129.
[118] Spring, Ira, and Byron Fish. *Lookouts: Firewatchers of the Cascades and Olympics*.
[119] "Court Battle Threatens Historic Green Mountain Lookout." National Trust for Historic Preservation. http://blog.preservationnation.org/2011/05/27/court-battle-threatens-historic-green-mountain-lookout/#. May 27th, 2011. Accessed 2-2-13.

"A guy anchorage system is also utilized to provide additional stability against severe wind and snow loads."[120] During a snow storm in the winter of 1949-1950, severe damage occurred to the structure's roof, but a reconstruction in-kind replaced the damaged members.[121] The lookout was actively staffed to detect forest fires until 1984, and in February of 1988, Green Mountain Lookout was nominated and successfully listed on the National Register of Historic Places.[122] As the lookout is situated in a wilderness area, it remains very remote, as a 3,000 foot climb is required to access the structure.[123]

By the 1990s it was apparent that the condition of Green Mountain Lookout was declining, sparking an expansive and thoughtful preservation effort by volunteers and federal agencies. In 1999 a $50,000 matching grant from Save America's Treasures provided necessary funding, and the U.S. Forest Service "relied on an extraordinary outpouring of public support."[124] Through thousands of hours of volunteer labor, the lookout was carefully dismantled in order to make repairs offsite. "With the approval of the State Historic Preservation Office, the Green Mountain lookout was reconstructed in 2010 using a majority of original materials that were lovingly refurbished and rebuilt by the volunteers."[125] During this process, a helicopter was used to reinstall the newly rehabilitated lookout. This decision proved to be a mistake as it would later be used as ammunition for the misguided opposition of to preservation of the lookout.

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[120] "Green Mountain Lookout." National Register of Historic Places Nomination. United States Department of the Interior, National Park Service. January 14th, 1988. Page 1.
[121] "Green Mountain Lookout." National Register of Historic Places Nomination.
[122] "Green Mountain Lookout." National Register of Historic Places Nomination.
[123] Spring, Ira, and Byron Fish. *Lookouts: Firewatchers of the Cascades and Olympics*. Page 193.
[124] "Court Battle Threatens Historic Green Mountain Lookout." National Trust for Historic Preservation. http://blog.preservationnation.org/2011/05/27/court-battle-threatens-historic-green-mountain-lookout/#. May 27th, 2011. Accessed 2-2-13.
[125] "Court Battle Threatens Historic Green Mountain Lookout." National Trust for Historic Preservation. http://blog.preservationnation.org/2011/05/27/court-battle-threatens-historic-green-mountain-lookout/#. May 27th, 2011. Accessed 2-2-13.

In November of 2010 a surprising (and rather shocking) court case was filed over the rehabilitation of Green Mountain Lookout. A diminutive 1,050 member nonprofit group named "Wilderness Watch" sued the Forest Service on the premise that the rehabilitation of Green Mountain Lookout had violated both the 1964 Wilderness Act, and NEPA, while reassembling the repaired lookout on the site. The court found that the Forest Service had indeed violated the Wilderness Act and NEPA, and Judge John Coughenour ordered that "the Forest Service remove the new lookout."[126] To historic preservationists and cultural resource conservationists, the term "new lookout" is puzzling. In the legal brief, the plaintiff also unsuccessfully argued that the rehabilitation was not made "in kind," and that due to the new materials used during the rehabilitation process, the structure was not necessarily historically accurate. It is to be expected that those who are not versed in both the Historic Preservation Act of 1966, and the Secretary of the Interiors Standards for the Treatment of Historic Properties (such as Wilderness Watch), would be unaware of the process and criteria by which to judge the success of a rehabilitation endeavor. Due to the court decision, "On Tuesday, May 24, 2011, the Washington Trust for Historic Preservation announced that the Green Mountain Lookout was named to the state's 'Most Endangered Historic Properties' list."[127]

Amid an inspiring public effort to save Green Mountain Lookout from its fate, support came from Congressman Rick Larsen as he "introduced legislation in Congress to overturn the effect of the judge's ruling."[128] The Forest Service, rather than filing an appeal, asked the judge

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[126] "Wilderness Watch v. Robert Iwamoto, United States Forest Service." United States District Court, Western District of Washington, at Seattle. Filed 11-4-10. Page 5.

[127] "Court Battle Threatens Historic Green Mountain Lookout." National Trust for Historic Preservation. http://blog.preservationnation.org/2011/05/27/court-battle-threatens-historic-green-mountain-lookout/#. May 27th, 2011. Accessed 2-2-13.

[128] Turner, Brian."Update: New Hope For Historic Green Mountain Lookout." Preservation Nation Blog. September 24, 2012. http://blog.preservationnation.org/2012/09/24/update-new-hope-for-historic-green-mountain-lookout/#. Accessed 2-3-13.

to modify his ruling in order "to give the agency the opportunity to decide how to respond to the court's decision."[129] On September 20, 2012, the judge agreed to "modify his decision," giving the Forest Service valuable time in deciding how to go forward with the situation. Currently, the fate of Green Mountain Lookout is uncertain, as legal battles have most likely not reached their conclusion.

Figure 34. View of Glacier Peak from Green Mountain Lookout (date unknown).[130]

[129] Turner, Brian."Update: New Hope For Historic Green Mountain Lookout." Preservation Nation Blog. September 24, 2012. http://blog.preservationnation.org/2012/09/24/update-new-hope-for-historic-green-mountain-lookout/#. Accessed 2-3-13.

[130] Spring, Ira, and Byron Fish. *Lookouts: Firewatchers of the Cascades and Olympics*. Page 53.

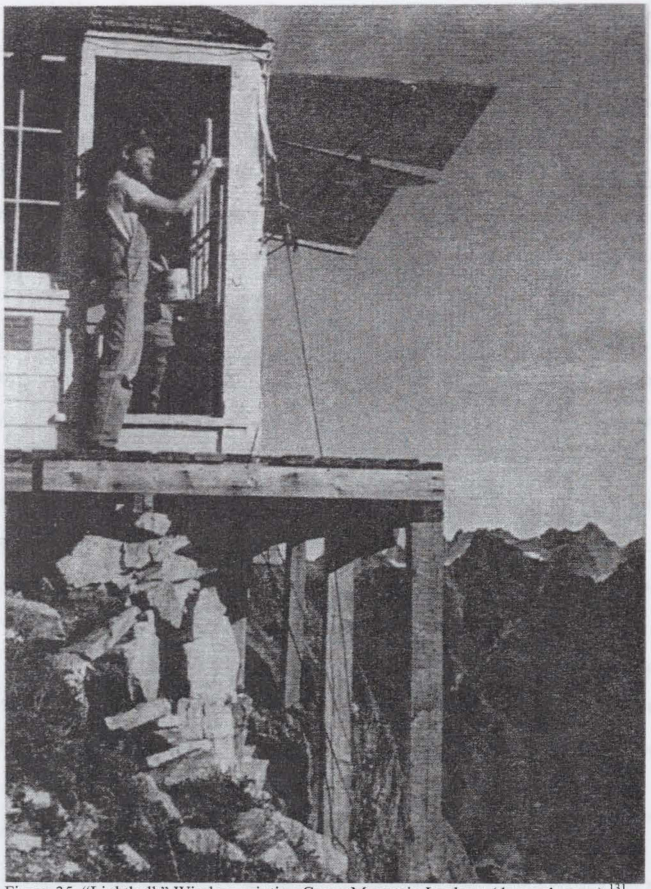

Figure 35. "Lightbulb" Winders painting Green Mountain Lookout (date unknown).[131]

[131] Spring, Ira, and Byron Fish. *Lookouts: Firewatchers of the Cascades and Olympics*. Page 53.

CHAPTER V

STATISTICAL ANALYSIS

METHODS

Substantiating the need to preserve historic structures on the merits of significance alone can sometimes be difficult, as quantifying the intangible aspects of importance is often complex. For this reason a statistical analysis was used to better understand the extent to which various lookout types have been preserved. This statistical analysis provides a new body of data that can be coupled with more traditional forms of significance evaluation commonly used the field of Historic Preservation.

Initially, the scope of the statistical analysis encompassed all of the lookouts in U.S. Forest Service Region 6, Oregon and Washington, but this geographic area proved to be far too expansive. Washington alone has roughly the same amount of lookouts, and studying both Oregon and Washington would have doubled the sites to be considered. Instead, lookouts in the state of Oregon were chosen as the sample for statistical analysis. Through a request to the Forest Fire Lookout Association (FFLA), the author obtained a comprehensive set of data from the current Western Deputy of the FFLA, Howard Verschoor. This data provided detailed information regarding every known lookout and lookout site in the state of Oregon. In order for this data to be subject to statistical analysis, it was reentered and reorganized. This restructuring allowed for formulaic equations and provided a conducive format from which specific data points regarding lookouts could be interpreted. As each lookout site was originally described in a single field in an original spreadsheet, it was necessary to subdivide this information to reflect the not uncommon occurrence of multiple lookout types on a single site.

After the painstaking process of reentering data, a grand total of 1,601 individual historic lookout renditions were identified in Oregon. This number illustrates the many renditions of lookout structures that have been historically present on lookout sites across Oregon. This body of data was then subdivided by lookout type. Seven lookout types were selected for further analysis due to their uniformity and patterned structural standardization. As many early lookouts were simply crow's nests and platforms, these vernacular lookouts exhibit too much variation and non-standardization to accurately compare and analyze with other nationally standardized lookout building forms. Though all lookout forms are represented in the body of Oregon lookout data, seven specific and standardized forms are scrutinized for further statistical examination. These seven lookout types are: L-4, L-5, L-6, R-6, D-6, Amort, and Aermotor type lookouts. The focus of this typological study is on the lookout cab structure, and not the various supporting platform structures, which vary in both height and construction material.

By segregating lookouts by type, specific lookout information (such as average date constructed) can be identified. Unknown variables such as dates and date ranges were omitted from mean average calculations as it would skew the data set. For improved accuracy, only known dates are included in the statistical analysis for accuracy. As it is expected that future researchers may find new information on Oregon lookouts, it is anticipated that this body of data may further evolve and become even more accurate. A new term, a "complex lookout site," has been created to refer to a lookout site where multiple fire lookout types were constructed on a singular location. This term is important for research on historic lookouts and describes a phenomenon that has little been recognized and or discussed.

The predominant method by which lookout types will be analyzed is based on average calculations of the following known data points: (1) lookout date constructed, (2) date removed,

(3) years standing, (4) percent complex site, and (5) lookout percent surviving. These calculations are derived from the mean averages of known dates. Data under the title of "average year removed" and "average years standing" refers to the average amount of time a lookout type stood extant before being removed and or destroyed. These numbers do not reflect lookouts that remain extant, but simply the ones that were removed. Through these calculations of the mean averages, it is possible to directly compare different uniform lookout types and develop observations regarding lookout preservation and survivability. Although the following data represents all lookouts in the state of Oregon, the subsequent observations have strong implications to national lookout issues regarding preservation and survivability.

FINDINGS

Table 2. Average year built, removed, and years standing by type.

Lookout Type	Average Year Built	Average Date Removed	Average Years Standing
R-6	1963	1978	17.00
Aermotor	1940	1975	36.75
Amort	1959	1981	27.71
L-4	1939	1964	25.51
D-6	1924	1947	24.46
L-6	1936	1955	21.46
L-5	1936	1961	25.28

Table 3. Average number built, remaining, number and percent complex site, and percent surviving.

Lookout Type	Number Built	Number Remaining	Number Complex Site	Percent Complex Site	Percent Surviving
R-6	65	33	58	89%	51.0%
Aermotor	39	16	18	46%	41.0%
Amort	51	19	41	80%	37.3%
L-4	378	51	249	66%	13.5%
D-6	70	8	64	91%	11.4%
L-6	45	3	30	67%	6.7%
L-5	57	3	34	59%	5.3%

Through the statistical analysis of the seven selected lookout types in Oregon, a great deal of previously unknown information was discovered. The most popular and numerically predominant lookout type in Oregon is the L-4 type lookout. A total of 378 L-4 lookouts were built in Oregon, a reflection of the extent to which this lookout type was found across the nation. (Figure 36).

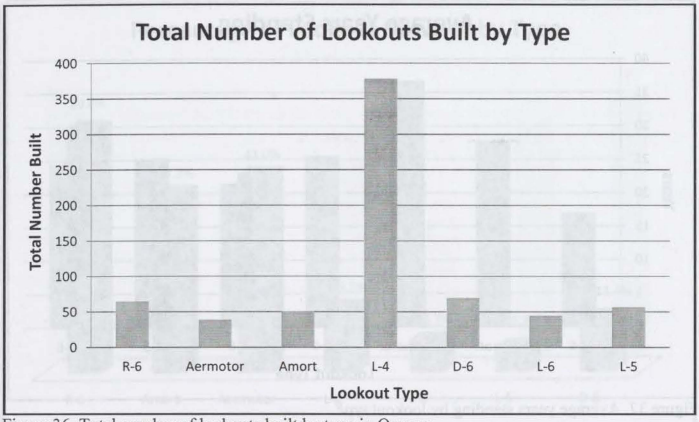

Figure 36. Total number of lookouts built by type in Oregon.

Conversely, the least common lookout type built in Oregon is the L-6 type lookout with only 45 examples constructed in the state. The average building period for these uniform and standardized lookout types in Oregon ranges from 1924 to 1963 (a span of 39 years). The average year that the D-6 type lookout was constructed was 1924, where 1963 represents the average year that the R-6 type lookout was constructed. (Table 2). The average removal period of standardized lookout types ranges from 1947 to 1981, (a span of 34 years). The first standardized lookout type to be removed was the D-6 lookout with 1947 the average year of removal. Aermotor type lookouts remained extant longer when compared to other lookout types with an average years standing of 36.75. The R-6 type lookout has the shortest average years standing at 17 years. The other lookout types experienced very similar average years standing dates, ranging from 21 to 27 years. Among all lookout types, the average years standing is 25.45 years. (Figure 37).

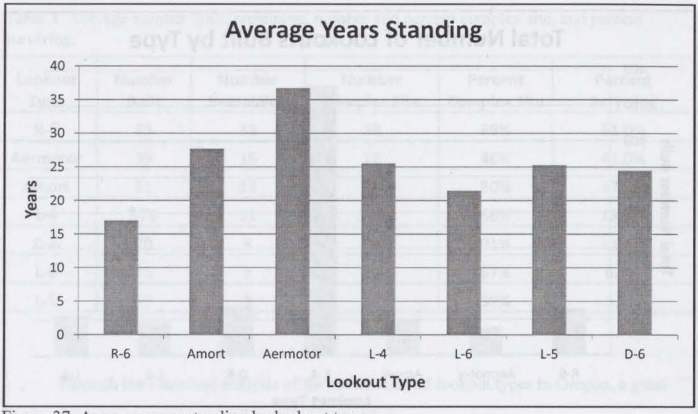

Figure 37. Average years standing by lookout type.

The R-6 type lookout has the best survivability percentage of all lookout types in Oregon, at a rate just over 50 percent (Figure 38 and Table 3).

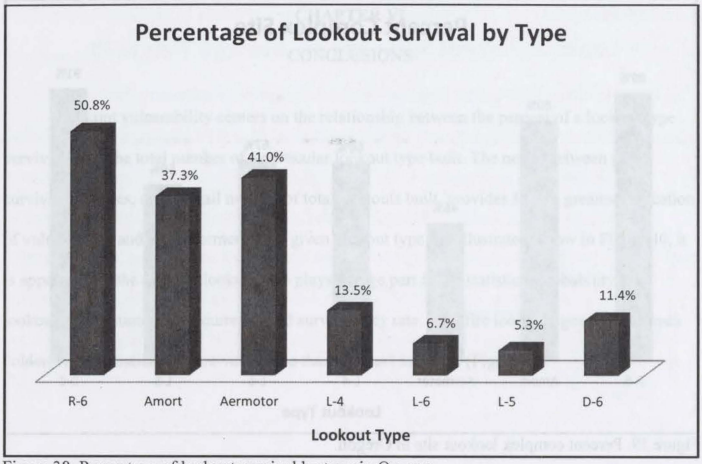

Figure 38. Percentage of lookout survival by type in Oregon.

The L-5 lookout type has the poorest overall survivability percentage; only 3 L-5s (5.3 percent of the original 57 L-5's) built in Oregon remain extant. Though few examples of the Aermotor type lookout were constructed in Oregon, (the type was more popular in Regions 5 [California] and 3 [Arizona and New Mexico]), the Aermotor type lookout has a interestingly high survival rate at 41 percent. Though the L-4 lookout type was the most constructed lookout type in Oregon, only 13.5 percent of the 378 L-4s stand today. The L-4 remains the most popular extant lookout type in Oregon, but it does not adequately reflect the total number of L-4 lookouts that were constructed as it has a relatively meager survivability rate. The D-6 lookout most commonly occurs at complex lookout sites at a rate of 91 percent. Aermotor type lookouts were the least likely to occur at complex sites. 46 percent of Aermotor type lookouts reflect the complex lookout site component (Figure 39).

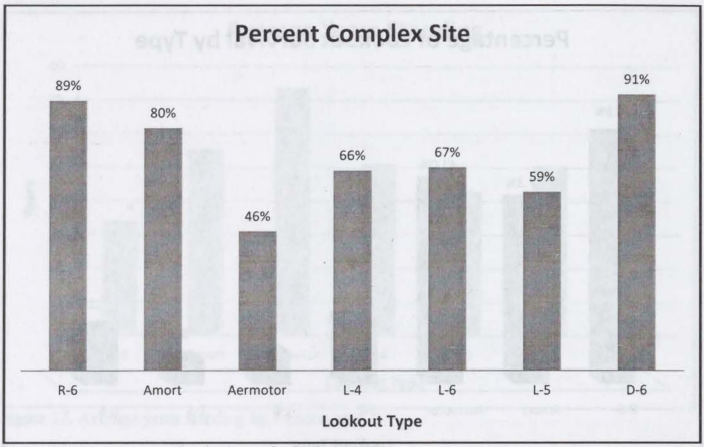

Figure 39. Percent complex lookout site in Oregon.

CHAPTER VI

CONCLUSIONS

Lookout vulnerability centers on the relationship between the percent of a lookout type surviving, and the total number of a particular lookout type built. The nexus between poor survivability rates, and a small number of total lookouts built, provides for the greatest indication of vulnerability and endangerment for a given lookout type. As illustrated below in Figure 40, it is apparent that the age of a lookout also plays a large part in the statistical probability of a lookout type's numerical occurrence and survivability rate. As a fire lookout ages and becomes "older," it is statistically more vulnerable than "newer" lookouts (Figure 40).

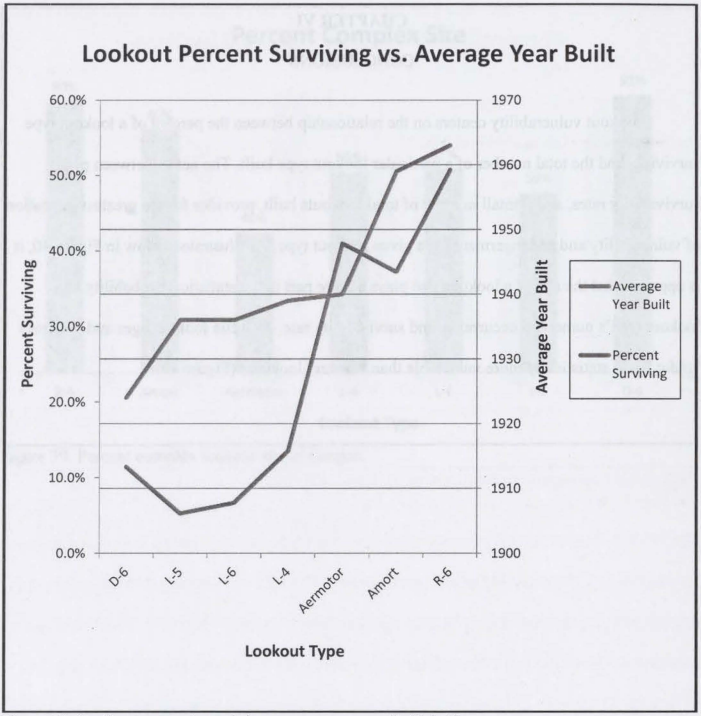

Figure 40. Lookout percent surviving vs. average year built in Oregon.

There is a direct correlation between age and survivability rates for all lookout types. As expected with historic resources, older lookout structures generally express lower survivability rates. Conversely, later lookouts often see much higher survivability rates. Older lookout structures have poor survivability rates as the increased duration on the site increases the chance

of adverse effects from the elements, vandalism, lack of maintenance, and planned demolition by forest managers.

Through the statistical analysis, a clear outlier emerged throughout the various charts and tables presented in chapter V. The Aermotor type lookout consistently broke "the rule" in relation to the correlation between survivability and age. Aermotor type lookouts have a disproportionately successful survivability rate compared to other lookouts of the same era (Figure 40). This lookout type has a 41 percent survival rate in Oregon, although a relatively few number of these structures were constructed. As Aermotor lookouts are exclusively made of steel, one can argue that this form of lookout construction accounts for the exceptional survival rate of Aermotor type lookouts. As witnessed in the Frissell Point Lookout case study, many lookouts were taken by fire. This low cost and effective means of lookout removal was simply impossible in regards to a steel lookout structure. Aeromotor lookouts exhibit an average of 36.75 years on a site, well above the average years other lookout types remain on a site (Figure 37). The new statistical evidence verifies the outstanding performance Aermotor lookouts exhibit over time. This survivability phenomenon can be used by resource managers when identifying lookout types to prioritize for preservation efforts.

As found through the statistical analysis, L-5 and L-6 lookouts have the poorest survivability rates (Figure 38). As these were generally much smaller lookouts, both their usefulness and practicality became limited as new and larger lookout forms became popular. Interestingly, Kresek argues that the L-5 was commonly placed on auxiliary sites, however through the analysis of the complex lookout component, the Aermotor lookout type had the lowest occurrence of a complex lookout site at only 46 percent.[132] The L-5 had a higher probability of occurring as a component in a complex lookout site with 59 percent of L-5

[132] Kresek, Ray. *Fire Lookouts of Oregon & Washington*. Page 11.

lookouts having previous and/or future lookout types on the site. These data indicate that it was more common for the Aermotor lookout type to occupy a site with no other previous and or future lookouts built. It was hoped that a direct correlation between complex lookout sites and survivability rates could be identified, but identifying a trend proved unsuccessful. (Figure 41).

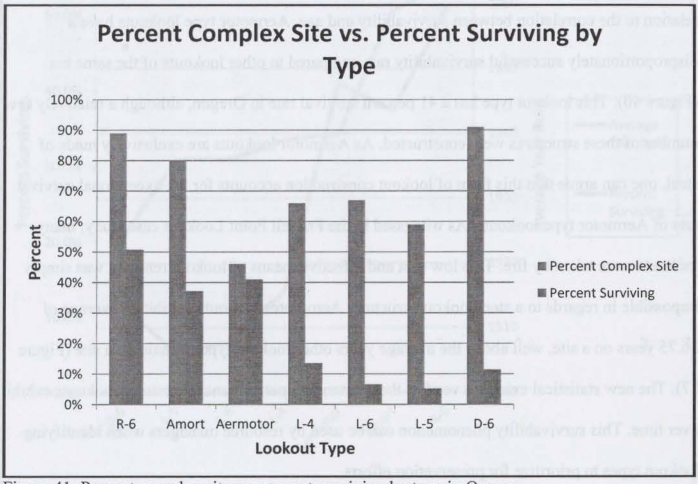

Figure 41. Percent complex site vs. percent surviving by type in Oregon.

In Oregon, the most vulnerable and endangered lookout types are the L-5 and L-6 patterned structures. Though all lookout types face a high degree of endangerment, L-5 and L-6 lookout types are particularly vulnerable as few representative examples remain. Essentially, the L-5 and L-6 lookout types are nearly extinct in Oregon. Historic preservation efforts should focus on these remaining lookout types in Oregon, especially if these lookout types are in wilderness areas. As the ongoing Green Mountain Lookout legal case (outlined in chapter IV)

can set a precedent for future lookout preservation, it is recommended that lookouts in wilderness areas be prioritized for preservation as they are likely targets in the ongoing battle between cultural resource management and the interpretation of the Wilderness Act. Lookouts such as Olallie Mountain Lookout remain especially vulnerable as they are located in wilderness areas, and are in need of extensive restoration and rehabilitation work, which may be impeded by the lookouts location in a wilderness area.

WILDFIRELOOKOUTS.COM

Currently, there are a variety of private fire lookout web pages and online organizations which offer a range of lookout resources and information. Through the process of conducting this project, it was observed that a central "lookout hub" could benefit lookout researchers. The domain name "WildfireLookouts.com" was acquired by the author in the Fall of 2012, and was quickly launched. The webpage was designed by the author and is intended to be highly user friendly and simple. The goal of this webpage is to have a visually appealing and user-friendly interface, while also providing a useful resource for people interested in lookout preservation, history, and culture. The webpage features a lookout photo gallery, a blog, other web-based lookout resources, as well as contact information to the web host.

Two Wildfirelookouts.com associated social media profiles have been created (Twitter and Facebook) and linked to this webpage in order to increase the amount of public attention that Wildfirelookouts.com and historic fire lookouts receive. Within a day of the launch of WildfireLookouts.com, the webpage received over 150 webpage visitors, as well as over 50 webpage "likes" on Facebook. This data demonstrates the effectiveness online media and tools such as Facebook have on drumming up support for preservation causes. At the time of this

publication over 400 unique web visitors have viewed Wildfirelookouts.com. This indicates that the webpage is successfully reaching a public audience. Coupled with site maintenance and future updates, it is expected that the webpage will grow in popularity among web based lookout resources.

In order to distribute the work created from this study, Wildfirelookouts.com will be utilized as a vehicle to distribute this project's content. *All Along the Watchtower: Identifying Trends in Historic Fire Lookout Preservation Through Selected Case Studies and a Statistical Analysis*, as well as the lookout condition assessment, will be posted as free and available documents on the webpage. It is hoped that this strategy will provide lookout researchers with more data, sources, and information in order to facilitate future lookout research and preservation efforts.

RECOMMENDATIONS

Although this study used data specific to Oregon, both the methodology and implications of the research are highly applicable to other geographic regions of the United States. It is expected that many of the trends identified in this project are representative of lookout trends and relationships across the nation. It is hoped that a similar model will be used by future researchers on a larger scale in order to identify vulnerable fire lookouts. It is conceivable that at some point every lookout in the United States could be analyzed in the same manner as this project, delivering statistics that encompass every lookout in the nation. As statistical data can substantiate and initiate action in Historic Preservation efforts, it is hoped that this work will continue beyond Oregon in order to preserve historic fire lookouts on a national and global level.

Though lookout preservation should be approached on a case by case basis, it is often necessary to prioritize preservation efforts due to limited resources and funding. In a perfect world, all lookout resources would be well preserved and funded, but as current federal fiscal shortfalls plague government agencies, it is necessary that resource managers team up with private interest groups to facilitate lookout preservation and restoration projects. As illustrated by the Carpenter Mountain Lookout case study, a nexus between resource managers and private groups provides the best conditions for successful lookout preservation.

The lack of consistent lookout documentation and condition assessments makes lookout research and preservation efforts difficult. How can a private group and or agency identify the need for lookout preservation if a condition assessment has not been completed in decades? It is suggested that resource management agencies promote the implementation of privately conducted lookout condition assessments. Though this could potentially present some problems between the governmental and private interface, it would enable resource managers to follow the status of lookouts as limited funding does not always promote close resource supervision by federal agencies. Condition assessments are the first step in the preservation process as it is hard to identify the need for preservation work if the condition of a resource is unknown.

Documenting currently extant lookout structures will also benefit future lookout research. By using relatively recent developments in 3-D imaging software, lookout enthusiasts can create and distribute accurate renderings of lookouts and their sub types (Figure 42). The use of electronic media, such as rendering programs, will allow for a greater degree of lookout related data and information distribution. Rendering destroyed lookouts and placing them on their respective sites via software such as Google Earth may be a helpful tool in recording non extant lookouts in a way that is more technical than photographs.

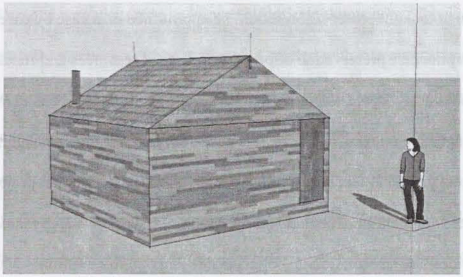

Figure 42. Rendering of L-4 Grange Hall lookout type at Olallie Mountain Lookout

Use of lookouts as rental spaces has also proven to be successful in preserving the lookout structures themselves. The fire lookout rental process draws a respectful sort of cliental. The advantages of allowing such individuals to occupy these spaces are much greater than the relatively small risk of damage to the lookout. Tapping into sky watchers, backpackers, writers and day hikers in order to promote lookout preservation is desirable as interpretive opportunities radiate from historic lookouts. Interpretive literature and information can only help the lookout preservation cause, as lookouts are resources that go largely unseen by the general population of America. Education is a pivotal aspect for any preservation effort, and historic fire lookout preservation is no different in this regard.

Future exploration in the use of historic aerial photographs could also be greatly useful for illustrating the changing nature of the landscape, and could better support historical narratives of particular lookouts. Sites that are missing particular dates, photographs, narratives, and other specific information, should be targeted for study in order to fill in gaps in the Oregon lookout knowledge base. Obtaining this lookout information will only become more difficult and challenging as time goes on.

It is apparent that thousands of historic fire lookouts are in need of both immediate and sometimes expansive preservation efforts. Little by little, historic lookout numbers are in decline, and with the subsequent loss of a cultural resource, a rich and important historical narrative also fades away. By identifying past and present lookout preservation trends, the challenges and direction of future fire lookout preservation can better be recognized. A committed and unique group of preservationists work to save the thousands of lookouts in America, and it will be through their passion and dedication that these structures will survive through the 21st century. As the philanthropist John Ruskin once said, "...it is again no question of expediency or feeling whether we shall preserve the buildings of past times or not. We have no right whatever to touch them. They are not ours. They belong partly to those who built them, and partly to all the generations of mankind who are to follow us."

APPENDIX A

LOOKOUT CONDITION ASSESSMENT FORM

Prior to this project, a condition assessment form specific to lookouts did not exist. As the field of Historic Preservation uses standardized forms for recording resources, it was considered important to create a lookout condition assessment form. It is desired that this condition assessment form will be used by historic preservationists and resource managers, as well as by other groups interested in these American treasures. The assessment form was designed to be straight forward and accessible to anyone. As lookouts often suffer from lack of documentation, it is hoped that these condition assessment forms will facilitate a more consistent record of historic lookouts. By openly circulating these forms on Wildfirelookouts.com, it is expected that completed forms will make their way to resource managers who manage historic lookout structures and sites. If these condition assessment forms provide a means of updating resource managers on the status of particular lookouts, then the intention of the form has been fulfilled.

Fire Lookout Condition Assessment Form

Lookout Information

Lookout Name: **State/County:**

Lookout Location Description:

National Forest: Y/N **Forest Name:** **Wilderness: Y/N**

Construction Materials: Wood ☐ Steel ☐ Stone/Masonry ☐ Other ☐

Lookout Type: L-4 ☐ L-5 ☐ L-6 ☐ R-6 ☐ D-6 ☐ Aermotor ☐ Amort ☐ Other ☐ Ukn. ☐

Lookout Description

Foundation type and description:

Exterior condition description (walls, windows, door and roof):

Did you enter the lookout? Y/N

Description and condition of interior:

Synopsis

Overall physical condition of lookout? Terrible ☐ Poor ☐ Fair ☐ Good ☐ Excellent ☐

Have you visited this lookout before? Y/N

Any recent signs of damage and or vandalism? Y/N
Notes:

Created By John Hill Name of Assessor: Date Visited:

Oregon Lookouts At A Glance

D-6 Cupola
Average Year Built: 1924
Number Built: 70
Number Surviving: 8
Percent Surviving: 11.4%

L-5
Average Year Built: 1936
Number Built: 57
Number Surviving: 3
Percent Surviving: 5.3%

L-6
Average Year Built: 1936
Number Built: 45
Number Surviving: 3
Percent Surviving: 6.7%

L-4
Average Year Built: 1939
Number Built: 378
Number Surviving: 51
Percent Surviving: 13.5%

Aermotor
Average Year Built: 1940
Number Built: 39
Number Surviving: 16
Percent Surviving: 41%

Amort (ODF)
Average Year Built: 1959
Number Built: 51
Number Surviving: 19
Percent Surviving: 37.3%

R-6 Flat
Average Year Built: 1963
Number Built: 65
Number Surviving: 33
Percent Surviving: 51%

Did you know that lookouts were once used to spot enemy aircraft during World War II?

Interested? Visit Wildfirelookouts.com for more information!

Did you know that you can rent many lookouts overnight? Find out more at http://ffla.org/lookout-rentals.html.

Created By John Hill 2013

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University of Oregon Historic Preservation Program

Terminal Project Approval Page

Student: John Peregrine Hill

Title: All Along The Watchtower: Identifying Trends In Historic Fire Lookout Preservation Through Case Studies And A Statistical Analysis

This Terminal Project has been accepted and approved in partial fulfillment of the requirements for the Master of Science degree in the Historic Preservation Program by:

Committee Chairperson: Rick Minor Date: 5-23-2013

Committee Member: Christopher Pain Date: 6/23/2013

Committee Member: Rick Rempel Date: 5/27/2013

Degree awarded: M.S. Historic Preservation, June 2013