IV. Wallowa County Profile

Introduction

The Nez Perce Tribe originally occupied a territory that encompassed virtually all of what is now north central Idaho as well as extensive portions of what is now southeastern Washington and northeastern Oregon, including Wallowa County. Wallowa County has a long history of Native American influence, with the Wallowa Band of the Nez Perce once making the Wallowa Valley their home for hunting, fishing, and gathering. They followed changing seasons from headwaters of rivers in spring, to high mountains of the Wallowas in summer and returned to deep canyons of the Snake River and its tributaries in winter (Nez Perce 2017).

Wallowa County, Oregon’s far northeastern county, shares state boundaries with both Washington and Idaho. The county is mostly mountainous and forms the headwaters of several important tributaries to the Columbia/Snake River System. About 3/5 of the land area in Wallowa County is publicly owned, including lands administered by a variety of federal, state, and local agencies (Table IV – 1). Most public land is part of the Wallowa-Whitman National Forest and is administered by the United States Forest Service (USFS).

Wallowa County is considered part of the northern portion of the Blue Mountain range characterized by a dissection of ridges and valleys typical of the Blue Mountains. The rugged landscape hosts the Blue’s most scenic mountains called the Wallowas. These snow-capped peaks, dramatic river canyons are classic glacial topography (WCChamber, 2017).

Wallowa County encompasses 3,152 square miles (2,017,280 acres). The majority of the County falls in the Lower Grande Ronde River Basin, an eastern portion lies within the Lower Snake River Basin.

The 359,991 acre Eagle Cap Wilderness lies in the heart of the beautiful Wallowa Mountains hosting approximately 535 miles of trails and extends beyond the County’s southern border. The Wenaha Wilderness lies to the northwest and is noted for its deer and elk hunting, as well as backpacking adventures. The newest wilderness area is the Hells Canyon Wilderness, along the eastern boundary of the county that takes in both sides of the Snake River canyon. The Snake River is the counties eastern border and the Oregon-Idaho boundary. This wilderness is buffered within the much larger Hells Canyon National Recreation Area.

The Wallowas beauty is gaining notoriety as one of Oregon’s 7 Wonders identified by the Statesmen Journal. As one of Oregon’s 7 Wonders it is now being identified in numerous ad campaigns through a number of popular web sites, magazines and a 7 Wonders of Oregon – YouTube video. It even managed to land in the Travel section of The New York Times.

Wallowa County is approximately 323 miles east of Portland, Oregon and 233 miles northwest of Boise, Idaho. Wallowa County is surrounded by three highly popular Wild and Scenic Rivers. The Grande Ronde River is north separating the county from Washington State; the Snake River runs the entire length of Wallowa County’s eastern border defining it from the state of Idaho; and the Minam River runs along its western edge. Baker County is on the southern border.
Wallowa Valley lies in the center of the county and supports the highest population base. The valley starts where the Minam Canyon opens near the town of Wallowa and runs 32 miles to the southeast to where McCully Creek enters the valley, just south of Kinney Lake. The valley is approximately 16 miles at the north (Trout Creek) to south point near (Ski Run).

Elevation spans in the county are significant with the lowest point located at 875 in the Hells Canyon National Recreation Area at the mouth of Cache Creek, to 9,845 feet at the top of Sacajawea Peak in the Eagle Cap Wilderness.

These elevation difference is telling to the abrupt changes from valley floor to ridgelines within the county. Wallowa County’s steep, dissected country provides a high degree of elevation changes, influencing a number of environmental conditions including wildfire behavior and suppression effectiveness.

The county offers a number of opportunities to residents and visitors alike, including recreational activities such as skiing (snow and water), snowmobiling, hunting, fishing, wildlife viewing, hiking, biking and rafting. Residents also rely on the local area for irrigation of farm lands and crops, livestock grazing, timber products, and gathering products such as morels, firewood, huckleberries, blackberries, various other items in the surrounding national forest. Fire impacts to rivers and landscape could have high detrimental effects to both the economy and ecology of the area.

**Communities**

Wallowa County supports multiple scattered communities located primarily along major highways or rivers. There are 4 incorporated communities all located in Wallowa Valley proper. Enterprise is the largest with 1,940 people followed by Joseph, Wallowa, and Lostine with populations of 1,095, 810, and 215 respectively (PSU 2016).

Additionally, 7 communities and multiple clusters of residential homes are unincorporated all located in the outlying areas of the county. Although unincorporated, these areas make up 43% of the county’s population. This does not take into account the summer tourism that increases some areas populations significantly. For instance, the Wallowa Lake community is host to a significant increase in population from Memorial Day through the end of September. The Wallowa State park attendance data provided by Oregon Parks and Recreation Department for the month of July 2016 alone totaled 103,544 (OPARD 2017). Recreational details can be found in this chapter under the section titled Recreational Economy. Figure IV-2 displays spatial distribution of communities around the county. Communities are predominantly located along main travel corridors and primary river access points. Except for
the communities located in the center of the valley, most are in close proximity or adjacent to public forested lands.

![Figure IV - 2. Distribution of populated communities throughout Wallowa County.](image)

Wallowa County has 5 fire districts/departments, providing structural fire protection primarily in and around the four incorporated towns including Wallowa Lake Community. Figure IV-3 shows the distribution of Wallowa County's five rural fire departments. Agencies primarily responsible for wildland fire protection include the U.S. Forest Service, Oregon Department of Forestry, the three city fire departments - Enterprise, Lostine, and Joseph - and 2 rural fire departments (Wallowa and Wallowa Lake). Fire Protection is discussed in further detail under Section XI – Emergency Management.

City fire protection agencies are responsible for structure protection within their protection areas. Rural departments provide not only structural protection but assist with wildland fire protections as well. For example, the Wallowa Rural fire department provides structural protection across a 62 square mile area but assist Oregon Department of Forestry (ODF) with wildland fire protections over an additional 150 square mile area.

The county area is a little over 2 million acres. The northern WUI Zone is 223,222 acres (11% of the county). The northern WUI Zone has no structural protection districts - it is serviced 100 percent through wildland protection by the Forest Service and ODF. The southern WUI Zone encompasses 273,53 acres (14% of the county). Thirty percent (142,742 acres) of the southern WUI Zone acres fall under city or rural structure protection (Figure IV – 3). In 2016 the decision was made to have 100% of Wallowa County under full wildland fire protection.
Two areas of the northern WUI Zone overlap into adjoining counties. A small portion of Union County (10,096 acres) falls in the southwest finger of the northern WUI Zone as it follows the Grande Ronde River on the east flank and Forest Service road 6200 on the west extending from Fry Meadows along the ridge to Long Meadow – Hoodoo Lookout area. The largest portion of the WUI Zone outside of Wallowa County is 31,348 acres lying just across the Washington State border in both Asotin and Garfield counties. This area encompasses a large portion of properties managed by Washington State Department of Natural Resources (DNR) with small fragments of Bureau of Land Management peppered across the area.

**Land Ownership and Stewardship**

Roughly 58% percent of Wallowa County is public lands managed by the U.S. Forest Service and 39% is privately owned. The remaining 3% of the acres is the Nature Conservancy, Bureau of Land Management, and State of Oregon.

Public land management and protection by the Forest Service occurs at higher elevations of mountainous areas and in deep canyons surrounding the private lands. Privately owned land totaling 777,607 acres, includes all of Wallowa Valley, Promise, Troy area and Imnaha River Corridor. These private lands are under ODF protection agreements, including the Nature Conservancy. The BLM lands speckle the landscape and are under a mutual aid agreement for fire protection with the Forest Service, Wallowa-Whitman National Forest.
Using land ownership data from the West Wide Risk Assessment, land ownership distribution is displayed for Oregon State and Wallowa County in Table IV-1, showing administered land in Wallowa County as compared with the state as a whole. Wallowa County is divided among federal, state and private ownership or stewardship. Federal land managers include the United States Forest Service and the Bureau of Land Management. The Oregon Department of Forestry provides technical forest stewardship assistance and fire protection patrol for state and many private forest lands throughout Wallowa County.

<table>
<thead>
<tr>
<th>Administered Lands</th>
<th>Private</th>
<th>BLM</th>
<th>TNC</th>
<th>State Lands</th>
<th>USFS</th>
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<tr>
<td>Wallowa County Lands 2,017,209 acres</td>
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<td>22,870</td>
<td>30,070</td>
<td>5,882</td>
<td>1,180,780</td>
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<tr>
<td>(39%)</td>
<td>(1%)</td>
<td>(1.5%)</td>
<td>(.5%)</td>
<td>(58%)</td>
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</tr>
<tr>
<td>State of Oregon Lands *</td>
<td>26,920,509</td>
<td>16,039,949</td>
<td>94,049</td>
<td>1,603,254</td>
<td>15,751,194</td>
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<tr>
<td>(44%)</td>
<td>(26%)</td>
<td>(1%)</td>
<td>(2%)</td>
<td>(25%)</td>
<td></td>
</tr>
</tbody>
</table>

Population and Demographics

According to the Portland State University Population Research Center, Wallowa County’s population consisted of 7,140 people in the year 2016.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Enterprise</td>
<td>1,985</td>
<td>1,895</td>
<td>90</td>
<td>4.5%</td>
</tr>
<tr>
<td>Joseph</td>
<td>1,100</td>
<td>1,054</td>
<td>46</td>
<td>4.2%</td>
</tr>
<tr>
<td>Lostine</td>
<td>215</td>
<td>263</td>
<td>-48</td>
<td>-22%</td>
</tr>
<tr>
<td>Wallowa</td>
<td>805</td>
<td>869</td>
<td>-64</td>
<td>-8%</td>
</tr>
<tr>
<td><strong>Wallowa County</strong></td>
<td><strong>7,140</strong></td>
<td><strong>7,226</strong></td>
<td><strong>-86</strong></td>
<td><strong>-1.2%</strong></td>
</tr>
<tr>
<td>Incorporated</td>
<td>4,105</td>
<td>4,081</td>
<td>20</td>
<td>.5%</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>3,035</td>
<td>3,145</td>
<td>-110</td>
<td>-3.6%</td>
</tr>
</tbody>
</table>

Table IV - 2. **Population Estimates for Wallowa County Incorporated Cities: April 1, 2000 - July 1, 2016 Prepared by Population Research Center, Portland State University, 4/18/2017:

Both Enterprise and Joseph have shown an increase in population since 2000, with Enterprise displaying a slightly higher growth rate of .3 percent compared to Joseph (Table IV – 2). Lostine and Wallowa have shown a decline in the number of residents. Some of the changes may be due to movement of local residence within the county itself, however the overall county population has seen a 1.2% decline between 2000 and 2016.

Looking toward future population trends Portland State University (PSU), Population Research Center provided insight on urban growth boundaries (incorporated cities) and areas outside the urban areas. The 2016 document titled, Coordinated Population Forecast 2016 through 2066, Wallowa County Urban Growth Boundaries (UGB) and Area Outside UGBs. Portland State University used recent and historical population changes to events that had an influence as a gauge in determining what could realistically occur in a given area in the future (PSU 2016).

Wallowa County’s two largest towns – Enterprise and Joseph – are expected to show a combined population growth of around 50 between 2016 and 2035 and approximately 110 from 2035 to 2066. Wallowa and Lostine are anticipated to show a decline in population through the entire projection period (PSU 2016). (See Table IV – 3)

Although the population of the county may decline the number of individuals that enter the county on an annual basis is anticipated to increase when taking into consideration the increasing popularity of the county as a prime vacation spot.
Table IV - 3. Projected Population of Incorporated Cities and Surrounding County Area. Information was taken from Figure 16 Wallowa County and Sub-Areas – Forecast population and AAGR (PSU 2016, Forecast by Population Research Center)

Although Enterprise and Joseph will show a slight growth rate through 2066, the remainder of the county will offset this with the entire county having a drop in population. Although the expected change in population is slight the shift in aging population is important. From 2016 to 2035 there is an expected increase in the county’s population 65 and older from near 29 percent to about 42 percent. If this projection holds true, this would have a significant impact on the availability of workforce aged personnel fire responder positions. More detailed information can be found in Chapter XI Emergency Management.

County growth has potential impacts on several aspects of fire protection. First, fire response capabilities can be limited when an additional 13% of the workforce is expected to enter retirement age over a 19 year time span. This could potentially compound an already existing lack of workforce recruitment.

Secondly, 18 percent of fire starts within the WUIZ are human-caused, indicating that almost half of all fire starts may be preventable. An increase in population is expected to bring an increase in recreation and land use. As a result, it can be anticipated that an increase of human-caused fires will occur with population growth. Third, an increase in population will likely result in additional development in the WUIZ, in effect increasing the number and types of values at risk and potential hazards. New residents bring new home constructions, outbuildings, and livestock, as well as increased infrastructure, causing new fire response assessments. In addition, heavy populations and large proportions of landscapes in the
wildland-urban interface (WUI) intermix can lead to even small wildfires threatening structures, increasing the risk and complexity for firefighters (CWS 2014).

According to the US Census Bureau, as of 2010 Wallowa County has a variety of household types, some of which are worth mentioning to bring attention to potential issues that may surface during potential evacuation situations. Out of the 10,501 households in Wallowa County, 8.5 percent have single male with children under 18 or single female with children under 18 (218 and 668 respectively). Households with single occupants over the age of 65 living alone account for 10.5 percent, of the total, with figures at 232 male and 777 female residents in this situation. Identification of residents within the WUI areas who may require additional assistance or longer than average time to evacuate may assist emergency services personnel in pre-fire assessments and planning.

**Employment and Industry**

Wallowa County hosts many diverse businesses and employment opportunities. The industries supporting the largest number of employees are in Agriculture, Forestry, Fishing and Hunting; followed by Healthcare and Social Assistance, Retail Trade, Construction, and Educational Services.

In 2015, the Service Sector accounted for 41% of the local labor earnings. Within this sector, Health Care, Retail Trade, Wholesale Trade and Food Services were the four largest industries accounting for 8.4%, 6.4%, 4.2% and 4.0% of the county’s total labor earnings, respectively. The Non-Service Sector accounted for 32% of earnings – with Farms (14.7%), Construction (7.8%), Forestry and Ag Services (5.1%), and Manufacturing (3.7%) providing the main sources of labor earnings. Government jobs (federal, state and county) provided 27% of total labor earnings.

From 1970 to 2015, employment grew from 2,871 to 4,578, a 59% increase driven largely by women and farm families entering the workforce. During that same period of time, the county’s population grew by 10%. Wage and salary employment (people who work for someone else) grew from 1,651 to 2,615 (a 58% increase), while proprietors (the self-employed) grew from 1,220 to 1,963, a 61% increase (reflecting a strong growth in cottage industries). Compared to other counties across the US, Wallowa
Wallowa County has an unusually high number of employees in specialized sectors, in particular Farming & Forestry; Health Practitioners; and Life, Physical, & Social Science.

The median wage in Wallowa County was $32,637 in 2015, and the median household income was $40,581. Wages in Northeast Oregon (Baker, Umatilla, Union and Wallowa counties) are distributed more evenly compared to the national average. The highest paid jobs in Wallowa County are in Business & Financial Operations; Management; Life, Physical and Social Sciences.

Median annual earnings in these sectors range from $52,000 to $65,000. These jobs are primarily located in Wallowa Valley (Census Tract 9603) where the median household income is $45,391. The median income in the eastern half of the county (outside the main valley corridor) is $39,514, and in the western half of the county it is $34,844, with 15.3% of Wallowa County residents falling below the poverty level.

From 1970 to 2015, labor earnings grew from $105.3 million to $136.0 million (in real terms), a 29% increase, while non-labor income grew from $43.8 million to $155.4 million (in real terms), a 255% increase. By 2015 non-labor income represented 53% of total personal income. Non-labor income was 39.5% of total personal income statewide in Oregon, and 36.1% for the USA as a whole. In Wallowa County, dividends, interest, and rent grew from $28 million to $72 million, an increase of 154 percent over the period 1970-2015. Over the same time period, transfer payments grew from $15 million to $83 million, an increase of 439 percent. Transfer payments includes government retirement and disability insurance benefits, medical payments such as mainly Medicare and Medicaid, income maintenance benefits, unemployment insurance benefits, etc. The median age for Wallowa County residents was 52.2 years in 2015, up from 44.4 in 2000, and 37.8 in 1990. Wallowa County’s median age is significantly higher than that for Oregon and the USA, which were 39.1 and 37.6, respectively, in 2015.
Natural Resource Industries

About one-quarter of Wallowa County’s land are in farm production – distributed across 522 individual farms. Approximately 55% of the farms are engaged in livestock production, predominantly beef cattle with some sheep and goat production, and a small amount of poultry production. This industry bears risk from wildfire including direct risk to livestock and pasture, as well as subsequent risks from restrictions in use of public land allotments following a fire.

The remaining farms are in crop production – primarily livestock forage (grass hay / alfalfa) with some grain production – or some other type of farming. Revenue from all types of farming increased from 2001 to 2015. Total farm revenue in 2015 was $63.8 million, of which $35.4 million was from livestock and related products, and $28.3 million was from crops. In 2015, average annual wages in crop production were $31,079 and average annual wages in animal production were $28,438.

Farm jobs accounted for 12.8% of Wallowa County’s employment, with Farm Proprietors employment accounting for 81% of total farm jobs. Most farms in Wallowa County are family businesses. Farming is a much more significant sector of employment in Wallowa County than for the USA.

Oregon Labor Market projections for Region 13, including Union, Baker, and Wallowa Counties from 2010 to 2022, show a gain of 11 percent for all occupations. Using the Oregon Employment Office standard occupational classification code listing, the regional employment projection for farming, fishing, and forestry is expected to show the largest positive change of employment categories, with a projected increase of 17.5 percent by the year 2022. Notable sub-groups of this category include Agricultural Workers, with the largest projected growth of 19 percent, while the Forest, Conservation, and Logging Workers sub-
category is predicted increase at 14.3 percent. Health Care is the second largest primary category with a projected 13.8 percent rise, followed by Construction and Extraction at 13.7 percent over the same period. Professional and related occupations are expected to increase 8 percent just above Management, Business, and Financial type employment increasing by 6.2 percent (Oregon Employment Department. 2014).

Although supervisors and managers of firefighting and prevention workers are expected to remain constant, the number of individual firefighting jobs is expected to increase by 11 percent. Changes in firefighters are expected to increase by nine positions from 82 to 91 with replacement openings occurring in 22 of the existing positions (Oregon Emply. Depart. 2014). These positions will play a key role in fire protection, particularly if changes in snow/rain precipitation and amounts continue to shift.

Local Climate

Wallowa County enjoys four distinct seasons with wide temperature fluctuations between day and night. Sitting at approximately 3,757 feet in elevation the town of Enterprise’s weather station was used as a reference.

Summer temperatures can reach a maximum more than 100 degrees, with maximum average temperatures peaking late July to early August where there is a gradual decline into January. Winters can be cold and harsh at times, with lows dropping well below zero for multiple days to weeks, with average temperatures typically range from 10 to 20 degrees in December and January.

Precipitation is measured in both rainfall and high-elevation snowpack. Annual precipitation data taken from the U.S. Department of Agriculture Natural Resource Conservation Service website shows annual precipitation in Wallowa County is as extreme as its temperatures. The lowest annual precipitation amounts are approximately 11 – 12 inches in locations such
as the confluence of the Imnaha and Snake River, while high mountain precipitations vary with location. The highest moisture locations in the county are across the mountain peaks of the Eagle Cap Wilderness, where Sacajawea and Anaroid Peaks can receive between 70 – 80 inches of moisture annually, see Figure IV - 12. Wallowa Valley, where the highest population exists, received an annual rainfall between 13 and 20 inches. Because of the high elevation pass locations the snow packs on the Wallowa Mountains Loop, road scenic byway to the town of Halfway in Baker County is closed for an average of 7 months a year, leaving only two access points into the county during the winter months. Seasonal distribution of moisture for the Wallowa County varies significantly as stated above.

Coastal influence west of the Cascade Mountain Range brings a mean rainfall of six inches per month for November, December, and January alone at the Salem airport weather station (Western Regional Climate Center WRCC, 2013). Data from 1971 – 2000 shows mean precipitations of 6.39, 6.46, and 5.84 inches respectively for Salem. Relative to the west side of the state of Oregon, northeast Oregon is a much drier climate with lower humidities and substantial less moisture in the form of rainfall.

Figure IV – 12. Geographic distribution of precipitation for Wallowa County Wallowa County.
Wallowa County data using Enterprise weather station, number 352672, shows averages for time span between years 1981 to 2010, with the highest average precipitation records occurring from April through June with the exception of October. Moisture in June often arrives near the beginning of the month with very little rain during the latter weeks. The driest months occur November through January when cold dry Arctic air arrives then again in July, August, and September with August as the 4th driest when dry high pressures build over the Pacific Northwest region. (Figure IV–13).

Precipitation that does occur during the summer months is often associated with thunderstorms, making moisture sporadic and accumulations gradual. For example during the month of July, August, and September the average daily moisture amounts equates to 0.02, 0.015, and 0.02 inches respectively. These intermittent moisture accumulations often have little to no effect on the overall fire conditions during fire season. Frequent thunderstorms that bring lightning into the mountainous regions of the Blue Mountains make eastern Oregon highly susceptible to lightning-caused fires with the capability to spread during typical dry summer conditions.

Annual moisture amounts and temperatures play an important role in wildfire behavior. When rainfall amounts and temperature changes occur over extended periods the available fuels – live and dead – react accordingly with the environment. Lower rainfall and warmer temperatures often lead to an increase in available burnable fuels, particularly with extended periods of persistent drought.

Temperature data was obtained through the National Centers for Environmental Information – National Oceanic and Atmospheric Administration (NOAA). Wallowa County data was analyzed for the years between 1955 through 2015. Mean temperature was assessed over the 60-year time period using the overall average from all years as the baseline for change. The average temperature for this time was divided into 15-year increments. Annual temperatures for Wallowa County are displayed in Figure IV – 15, showing each 15-year
period compared to the average from 1955 - 2014, with each plot point representing a 12-month period. Prior to the 1980s, average annual temperatures for the first three decades (1955 – 1969, 1970 – 1984) fell below the 60-year average, with 70 percent of the years below average and 30 percent of the years above average temperatures.

A shift in temperature averages began around 1986, showing close to a full degree average temperature increase by the year 1999. Since 1999, over roughly 19 years, temperatures have exhibited a .5 degree Fahrenheit or greater departure from the base period mean temperature, with 2016 being the most recent. Since 1999 this shift continued to increase for the next 15 year mean with another .4 degrees increase between 2000 and 2014. The annual average temperature for the 15 year span (2000 – 2014) in Wallowa County resulted in 11 of the 15 years above the base period temperature line, as shown in Figure IV - 15.

The annual temperature departures for years that fell into the warmest 10% ever recorded totaled 8 years since 1992 with departures ranging from 1.0 to 3.2 degrees. The year 2015 showed the most extreme departure of 3.2 degrees, matching a record set in 1934 for the warmest year.

This is consistent with findings in NOAA’s Regional Climate Trends and Scenarios for the U.S. National Climate Assessment, that found five of the nine warmest summers have occurred since 1998 (Kunkel et. al. 2013). Dalton et. al. also found that temperatures of the last 30 years in the Northwest have generally been above the 20th century average, and since 1998, all but two years are above the average for the century (Dalton et. al 2013). Temperature trends for 1895 – 2011 have risen annually and for all seasons except spring, with increases ranging from +0.10 to +0.20°F/decade (Kunkel et. al. 2013). Using temperature and precipitation stations for the Pacific Northwest located in the Historical Climate Network (USHCN) (Peterson and Vose 1997) it was found that most stations in the Northwest showed temperature trends as positive over the 1920 to 1997 period (Mote 2001).

The implications of rising temperatures are shown to have a correlation to both the length of fire seasons and accentuated conditions that favor large wildfires. Westerling et. al., found that the incidence of large wildfires in western forests showed an increase in the mid-1980s. This parallels the increase in temperatures since the 1980s. Comparisons of fire frequency and fire size from 1970 – mid-1980’s to fires after the mid-1980s show the latter time period had wildfire frequency that was nearly four times higher and the total burned area from the fires was over six and half times as large (Westerling et. al. 2006).

The length of the wildfire season also increased in the 1980s (Westerling et. al. 2006). This too, is consistent with the prolonged above average temperature found in NOAA’s graphs of Wallowa County. Westerling et. al. determined the average fire season length increased by 78 days (64 percent) when comparing timeframes of 1970 to 1986 with 1987 to 2003 overall, while the Northwest fire season increased five percent by 2003. Warm years accelerating earlier snowmelt, particularly since the mid-1980s, have shown a concentration of increased wildfire frequency at between 5500 and 8500 feet in elevation (Westerling et.al 2006).

Recent years have been no exception; from May 2012 through May 2015, both precipitation and temperatures have deviated from the most recent 30-year averages between 1981 – 2010. Warmer than normal winters, low snowpack, and lower than normal precipitation, at the
time of this document development, have impacted many areas of the West. Figure IV – 14 shows the last 36 months departure from the 30-year average based on the Western Regional Climate Center 2015. Until the winter of 2016 snowpack moisture levels were below average for Wallowa County.

![Figure IV-14. Precipitation Departure from Average for 2012–2015. NOAA Regional Climate Center.](image)

Year 2017 is currently showing moisture level ranges from slight departure to normal levels. However, since April 2017 the precipitation departures for Wallowa County are again showing a lower than average in precipitation. Although moisture levels are near normal, temperatures for 2017 remain above average continuing the warming trends for the region.

A single winter of high snow pack does not necessarily indicate a recovery from recent trends. For instance, the year 2010 was in the top 33% for wettest years with a +3.98” of moisture departure from average. This was followed by 2011, and 2012 showing +0.06” and +1.30” yet the long term drought index for precipitation remained below normal.

The National Interagency Coordination Center, National Predictive Services Unit shows Oregon – including Wallowa County – to have an expected normal fire season in terms of significant wildland fire potential outlook for July through September of 2017. Future climate trends, particularly where temperature is concerned, are expected to continue to show above average temperatures. This anticipated prolonged warming has management implications for wildfire response, mitigations, and costs. Further information can be found in Chapter VI, Wildfire Risk and Hazard Assessment.
36 Month Precipitation Departure

Precipitation Departure from Average (in.)
6/21/2014 - 6/20/2017

36 Month Temperature Departure

Av. Min. Temperature dep from Ave (deg. F)
6/21/2014 - 6/20/2017

Figure IV – 16. Generated 6/21/2017 Western Regional Climate Center, Reno Nevada. Partners with National centers for Environmental Information (NCEI); State Climate Offices; Regional Climate Centers; USDI climate Science Centers; and NOAA Regional Integrated Sciences and Assessments.
Fire History Overview

Wallowa County and the surrounding area have a significant history of lightning caused fires with around a fifth of the fires human caused. A combination of climate, fuels, and topography make Wallowa County an ideal receptor to wildfire. Figure IV - 17 shows Wallowa County and surrounding area fires over a 10-year period from 1999 to 2008, displaying both lightning and human ignitions and their geographic distribution. For (Oregon Department of Forestry - WWRA, 2013). Approximately 660 fire starts (human and natural) were reported during the years 1999 – 2008 according to the West Wide Risk Assessment data. During that time frame, human causes were responsible for approximately 117 (18 percent) of starts in Wallowa County, while lightning strikes totaled 543 (82 percent) of ignitions.

In analyzing just the fires within the identified WUIZ, which accounts for 43 percent of all county fires, human caused fires increase in proportion to lighting fires. Human-caused fires just within the WUIZ account for 23 percent of fire starts while lightning starts account for 77 percent in the WUIZ. This implies that approximately 23 percent of fires within the WUIZ may be preventable. In comparing the number of human caused fires inside and outside the WUIZ, there are roughly 55% and 45% respectively.

The WWRA provided results at a scale compatible with state and community use, much finer than the current national efforts (ODF-WWRA 2012). Fire points used needed to be from a data base period that was supported in all 17 western states during the West Wide Wildfire
Risk Assessment development. WWRA summary of statistics for Oregon indicates that key data used in the assessment varies with respect to accuracy and date of compilation. Federal and most state fire ignition data was utilized for the period of 1999 - 2008, however this range varied depending upon the availability of useable data. For most of the states, fire occurrence data ranging from 2004-2009 was used from the National Fire Incident Reporting System (NFIRS) to supplement the fire ignition data for private land (ODF -WWRA 2012). Key pieces of information needed to utilize fire start data were the latitude and longitude and fire size. One finding, in the fire reporting systems at the field office level, is key information needed was stated as optional or mandatory depending on the protection agency. Thus, resulting in the elimination of data, producing an inability to project some fire data. Implications of inconsistent reporting and missing fire details could result in fewer than actual Fire Occurrence Areas for Oregon State and its counties.

The West Wide Risk Assessment reviewed the number of fires ignited per 1000 acres per year to display areas of fire start concentrations over the 10-year period. Figure IV – 18 takes into account the fire start locations and proximity of the fire occurrence area for Wallowa County and adjacent counties the WUIZ includes. This provides fire managers with areas that have a higher probability of a fire ignition and middle ground areas that are high receptors for lighting.

Wallowa County had a total of 660 recorded fire starts, based on the West Wide Assessment, over the 10-year period. That is an average of 66 fires per year. As shown above, Wallowa County annually endures many fire starts from both lightning and human sources.
The number of fires reaching a 10-acre threshold was 57. An average of 5.7 fires per year exceeded 10 acres. Twenty-five fires were between 10 and 100 acres. A total of 33 fires were over 100 acres in size in the ten year period. Fourteen fires between 1999 – 2008 were sized at 100 to 1000 acres, averaging out to 1.4 fires per year. There were 19 fires over 1000 acres average 1.9 fires over 1000 acres per year, with the three largest fires recorded at 42,700 (Haas/Tyron Complex), 56,319 (Jim Creek Ranch), and 79,149 (Battle Creek). Human-caused fires accounted for five (20%) of the large fires over 100 acres, ranging from 120 to 1,745 acres.

<table>
<thead>
<tr>
<th>LARGE FIRE STATISTICS (acres)</th>
<th>1999 - 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 +</td>
<td>57</td>
</tr>
<tr>
<td>10 to 100</td>
<td>25</td>
</tr>
<tr>
<td>100 +</td>
<td>33</td>
</tr>
<tr>
<td>100 - 1000</td>
<td>14</td>
</tr>
<tr>
<td>1000 +</td>
<td>19</td>
</tr>
<tr>
<td>Average Number of Fires Per Year / Per Size</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Table IV – 4. Large fire count per size category. Displays the number of fires of each size over a 10 year period, from 1999 – 2008. Data made available by West Wide Risk Assessment.

Time of year also provides insight on when to expect the highest level of fire activity. In Wallowa County, July and August account for approximately 77 percent of all fires over the 10-year period. Including up until September 16th, close to 85 percent of all the fires occurred in a two and a half month period (Figure IV-19). This plays an important role in fire management preparedness and response.

Figure IV - 19. Distribution of fire starts per month for a 10 year period.
Human caused fires often occur as single ignitions where multiple suppression resources can act together to contain the fire. Large fires situations in Wallowa County can be contributed to two causes: First, seventy-five percent of large fires are lightning caused due to thunderstorms. The majority of storms rarely ignite a single fire and typically originate elsewhere and move into the county. By the time the storm reaches Wallowa County it has left a wake of small fires on the landscape behind it, often depleting suppression resource early on existing fires. Multiple fire starts often present challenges for fire managers since all agencies are prioritizing fires locally on the Wallowa-Whitman National Forest, regionally (Oregon and Washington), and nationally. For example, in 1989 Wallowa County experienced 180 total fires starts of which 132 occurred in a two week period from July 14 to July 31. Thirty-three fires started on July 26th, 33 fires on July 27th, and 15 on July 28th in Wallowa County. Local resource depletion is common when numerous storms occur over several days. However, the majority of the fires were contained with minimal acreage burned. Out of all 180 fire starts; 170 were less than 5 acres, 174 were less than 20 acres, only 3 (1.6%) were over 1000 acres. Unfortunately, the small percentages of large fires often require long term suppression efforts and a large number of suppression resources.

Secondly, terrain conditions in some areas of Wallowa County make it difficult to suppress fires with hand and engine crews. In steep terrain ground resources are typically assisted with aerial support at the height of fires season, providing resources are available. Steep slopes (topography) contribute to fire spread increasing the probability a fire growth. As the fire perimeter expands the number of resources needed to suppress also increases. The mountainous terrain also influences the flow patterns of the storms in a number of ways The storms build over the mountains and have enough thermal lifting to create cumulus; the storms build over the Cascade and central Oregon areas and slowly travel into Wallowa County from the south-southwest; and lastly the storms originate out of Nevada – south central Oregon and move into our area from the south following the Snake River.

Effective initial attack and coordinated local suppression efforts have kept large fire numbers lower; Historically, before effective suppression era these fires may have been significantly larger. This level of fire activity coupled with current landscape conditions creates potential for large damaging wildfires both in and near communities and their adjacent forested areas.

**Major Wallowa County Fires**

Just in the past 20 years since 1995, Wallowa County has had 25 large fires (1000 acres +) of which 11 had potential threats to communities. A few of the fires that had potential threat to local communities are mentioned below. Those mentioned here are Canal Fire 1989: Carrol Creek Fire 2000; Thorn Fire 2000; Grizzly Fire – 2015. These fires held significance for the local communities for various reasons.

Many of the these fires resulted in the issuance of The Emergency Conflagration Act—that authorizes the Oregon Office of the State Fire Marshal to mobilize structural firefighters and equipment to assist local resources battling fires and is invoked by the Governor of Oregon.
Canal Fire 1989 was the result of a thunderstorm that ignited a series of 33 fires in Wallowa County alone on July 26th, 1989. A total of 110 fire ignitions were detected one that one day between the Wallowa-Whitman, the Umatilla National Forests. July 27th and July 27th resulted in an additional 56 and 28 fire starts respectively.

The following information is an account given by retired Fire Management Officer and Incident Commander Type II qualified Nick Lunde:

“Due to the high volume of fire starts locally and in the surrounding area of northeast Oregon it created in a shortage of firefighters resulting in the need to set priorities for initial attack. Located on a high rocky ridge in sparse fuels the Canal Fire was determined to be low priority. Mr. Lunde was assigned as the incident commander who initial attacked the fire on July 28th with a 20 person crew but safety was immediately compromised due to a spot fire outside the perimeter of the main fire. Shortly afterward a second fire was detected on Mount Nebo that rapidly spread sending spot fires up to ¾ mile away. The two fires burned together making a significant run at which time suppression resources retreated to a safe area and others firefighters assisted in warning residents of Little Sheep Creek Valley to prepare to evacuate.” Additional information of Nick Lunde’s account can be found in Appendix B

The fire continued to burn toward the town of Joseph during the week of Chief Joseph Rodeo. The fire burned from the east making a run west into McCully Basin threatening local residence in the Prairie Creek / Divide areas and stopping just 2 miles short of the town of Joseph, Oregon.

Carrol Creek and Thorn Fire: Started by lightning on August 24, 2000 and a conflagration act was signed for increased assistance for this fire and the Thorn Fire burning at the same time. The Carrol Creek fire grew to an estimated 3197 acres threatening southeast Joseph while the Thorn fire threatened Thompson meadows area. A total of 20 structures were threatened with the loss of 1 barn and 1 outbuilding.

Horse Creek Fire started on August 14, 2001 from a lightning storm burning approximately 16, 459 acres. Steep terrain, strong winds, and low humidities increased fire behavior causing active spotting threatening the town of Imnaha. The conflagration act was enacted on August 17th due to structures threatened in town and along the Imnaha River.

Hurricane Creek Fire: The Hurricane Creek Fire was reported on July 14, 2014 after a thunderstorm passed through the local area. The fire started in steep terrain just inside the Eagle Cap Wilderness growing to an estimated 1,615 acres by August 8, 2014. The fire was located within a quarter mile of private land and 4 miles southwest of the town of Joseph resulting in an area closure and the closure of the Hurricane Creek Trail #1807 (InciWeb). Local residence in the Hurricane Creek canyon were put on a ready (an alert of potential threat) notice in the event the fire moved further toward their properties. Defensible space work was implemented along the Forest Service boundary near private residences increasing home defensibility should the fire spread north.
The 5 Mile Fire began on August 3, 2014 burning within a half mile south of the town of Imnaha. Road closures were put into effect from Freezeout Creek (community) north to Imnaha as well as the popular Hat Point road to the east (InciWeb). The fire burned approximately 4524 acres. (Figure IV - 21)

Grizzly Bear Complex: On August 13, 2015 a dry lightning storm resulted in 22 individual fire starts one of which 17 wilderness fires merged into the Butte Creek or Bear Ridge Fires. These fires later became the Grizzly Bear Complex with final acres totaling 76,475 acres as of September 2015 (USFS PNWR). On August 20th the fire grew 30,000 acres creating a plume visible for 100+ miles (USFS PNWR) promoting evacuations of local homeowners (Figure IV – 22). See Appendix B for full report. Threatened by the fire were the communities of Troy and residents of Eden and Bartlett Benches. The National Interagency Coordination Center, on August 25th, identified fire behavior as active with group torching, uphill fire runs, and short range spotting The fire started on the Umatilla National Forest in Washington State burning into Oregon toward communities along the Grande Ronde River. The Emergency Conflagration was invoked by the Governor on August
20th (OR 2017). The conflagration act was enacted for Wallowa County. Firefighting efforts saved many of the homes and outbuildings but lost 5 primary residence and 28 outbuildings (USFS PNWR) According to the State of Oregon conflagration history there were 405 residence and 98 other structures threatened with structures saved estimated at 400 residence and 78 other structures (OR 2017).

Communities and Wildfire

One of the Actions outlined in the Northern Blue Mountain Cohesive Strategy Pilot Project Action Plan in the Goal “Human populations and infrastructure can withstand a wildfire without loss of life and property”, is to Develop an Integrated Information, Education, and Awareness Program (Board of Forestry 2013).

Wildfire effects and values threatened are individual and subjective to residents. They occur in the form of buildings, homes, infrastructure, public and firefighter safety, health, and benefits the surrounding landscape provides to the communities and residents (CWS 2013).

Community education and preparedness is critical to lessening these impacts.

"The capacity of a community to prepare for, respond to, and recover from a wildfire event is also a critical concern. There is emerging literature on the concept of social vulnerability to catastrophic events." (CWS 2013)

Wildfires have an ecological as well as social impact to their geographic area and residents both during and after the incident. Communities directly threatened by wildfires can experience financial, physical, and psychological impacts (Cohn et al. 2006, Downing et al. 2008). Wildfires can impact community members in a number of ways and for many reasons even when there are limited losses. Evacuated residents reported substantial anxiety due to not knowing the status of their home and properties (Kent et al. 2003, Rodriguez-Mendez et
al. 2004) and having little control over the ongoing events (Hodgson 2007). Additionally, anxiety from evacuating can be affected by the type of evacuation order (voluntary or mandatory), the amount or lack of fire preparedness accomplished around their properties, presence of pets or livestock on the premises, current physical health of family members, and previous experience with wildfire evacuations (Cohn et al. 2006, Mozumber et al. 2008).

Post-fire is not without concern; it can result in psychological impacts to residents when they return home to a variety of issues stemming from loss of homes, physical possessions, family memorabilia, and documents (Downing et. al 2008) and/or apprehension over long term site conditions. There may also be emotional scars even if loss of homes does not occur and residual impacts from the wildfire are experienced such as: smoke damage, charred landscape and vegetation, and injury or death of pets/livestock (Taylor et al. 2007). The visual impacts, whether ecologically damaging or not, can leave residents with a variety of perceptions when viewing the results from their homes.

While the wildfire is actively burning, having current knowledge of the situation often allows residents to cope with the situation and understand the extent of combined efforts put into fighting the fire (Carroll et al. 2005). There are also times when community cohesiveness surfaces from impacted local residents through humanitarian efforts to assist one another in dealing with and rebuilding during and after a wildfire.

The residence of Wallowa County are not exempt from these psychological effects. The high visibility of the flaming fire fronts from local communities have left many residents with the memory of the Canal, 5 Mile, and Grizzly Bear fires, particularly with the burn area still visible from the valley. These fires made wildfire threat a much more tangible danger.

Public meetings, website posts of public safety concerns, and current fire information during the Grizzly Creek Fire helped local residents with fire situational awareness and understanding of decisions being made by the fire managers. Public opportunities to see and talk to local fire managers were conducted to provide a better understanding of the situation, the decision process occurring and to answer question.

Communication before, during, and post-fire has been found to be important to the success of future outreach efforts. Educating people about wildfire risk reduction measures in advance of wildfires and building awareness that local forests are prone to fire is crucial to a successful program. Time and place of the application of treatments and utilizing tools available will help both residents and land managers prepare for future wildfires.

**Economic Impact of Major Fires**

Northeast Oregon supports a dynamic landscape of ecosystems with constantly changing environments. Shifts in stand dynamics have occurred over the last century partially as a result of successful fire suppression in fire-adapted ecosystems. Historically, fire would have naturally performed stand cleansing by periodically removing accumulation levels of surface fuels, pruning of residual trees, and limiting stand undergrowth. The Carsey Institute issued a briefing paper in the spring of 2012 resulting from a survey conducted in the fall of 2011. The focus was the tri-county area of Northeast Oregon including Baker, Union, and Wallowa
Counties where landscapes and communities are changing in interconnected ways. One of the key findings in the survey is that large majorities of those surveyed perceive wildfires, insects, and the loss of forestry jobs and income as a serious threat to their communities (Hamilton et. al 2012).

In 2014 there were 63,612 wildfires reported at the national level, of which 666 were significant. Significant fires defined in the National Mobilization Guide are fires that are a minimum of 100 acres in timber, 300 acres in grass/brush fuel types, or are managed by a Type 1 or 2 Incident Management Team, a National Incident Management Organization or a Wildland Fire Management Team. Significant fires accounted for approximately 1.1 percent of all wildfires reported (NIFC 2015).

By comparison, the Northwest (NW) states of Oregon and Washington received a total of 3,087 and 1,480 reported fires, respectively. Significant fires for the NW totaled 113, accounting for 2.4 percent of all the wildfires reported in these two states (NIFC 2015).

Although large wildfires occur nationally every fire season, fire starts that are considered significant are a relatively small percentage in comparison to the total wildfires reported and suppressed. However, these fires account for most economic impact on state and federal funding in terms of suppression costs, natural resource loss, personal property loss, and local economies.

**Mean Fire Costs**

Fire costs for Forest Service records in Wallowa County were available from 1986 through 2014. Using the 28 years of data and 1986 as a starting point a seven year mean fire cost estimate was completed to showed mean fire costs in the hundreds of thousands. This rose to a mean large fire cost of more than a million dollars per fire over the next two decades, this mean fire cost has already carried into the current decade where six fire seasons, 2010 to 2016, have passed.

Using the same fire information from Figure VI – 24, and using fires 100 acres and larger, data shows the mean fire cost for Wallowa County’s large fires from 1986 to 1993 was $1,180,397 with the mean fire size for the same time period of 5608 acres. Although the next three 7 year increments progressively has fewer fires fire costs were increasing. The next three 7 year increments in order of dates showed mean fire sizes as 9621, 11,454, and 8170 acres respectively. The years from 2008 to 2014 had less fires over 100 acres (16 fires) compared to the previous three time frames the costs were higher on average.
This increase in fire acres and costs is important since the western United States supports large blocks of publicly owned land, encompassing more than half of the total land area. Fires that occur on public lands and spread onto private lands are a significant problem in the west. The problem is further compounded by steep slopes, insect and deceased trees, and limited resources as well as access (CWS 2014). Total individual fires reported, regardless of size or agency, in the western U.S. from 2008 through 2012 were on average, approximately 23,091 fires per year, resulting in an average annual burned acres of 4,666,030 (National Interagency Coordination Center 2013). Fires reported by all agencies in Oregon and Washington (northwest), for the 2014 fire season totaled 3092, involving 996,542 acres in Oregon and 1480 fires for 386,972 acres in Washington (NIFC 2014). In 2014, there were 2,155 human causes accounting for only 11 percent of the acres burned, while 2,417 lightning fires accounted for 89 percent of the fire acres (NWCC 2014). This closely matches Wallowa County fires where 18% were human caused and 82% lightning.

Suppression Costs

Fire suppression costs have continued to increase since the 1980s. The average cost of fire suppression expenditures for a 10-year period from 1990-2000 was around $350 million dollars. Fiscal years 2000, 2002, 2003, and 2006 had suppression expenditures totaling approximately $1 billion annually for USDA Forest Service alone (Gebert et. al. 2007 and Prestemon et al. 2010). Between Fiscal Year (FY) 2002 and FY 2012, the Forest Service found it necessary to transfer funds from discretionary, mandatory, and permanent accounts to cover fire suppression costs. In a statement before the Committee of Energy and Natural Resource of the U.S. Senate in 2013, the Chief of the Forest Service Thomas Tidwell stated,
“These transfers occur when the agency has exhausted all available funding resources from Suppression and FLAME accounts” (Tidwell 2013). In 2002 alone, the Forest Service transferred $999 million to cover suppression costs. Since FY 2000, the 10-year average has risen almost every year up to $1 billion in 2010 and beyond (Tidwell 2013).

These fires not only impact suppression cost but also affect natural resources and infrastructure. In 2012, more than 4,000 structures were destroyed, including 2,216 residences, exceeding the annual average loss of 1,416 between 1999 and 2012 (Tidwell 2013). In 2014, 1,953 structures were destroyed nationally including 1,038 residences, 874 minor structures, 20 commercial structures, and 14 mixed commercial/residential structures (NIFC 2015).

Economically, losses to natural resources and infrastructure can have significant impacts to businesses, water delivery systems, municipal watersheds, power supplies, and transportation systems, in addition to impacting the health and wellbeing of local communities. Home construction in the western states may increase future fire suppression costs since only 14 percent of available wildland interface areas are currently developed (Gude et. al 2008). Environmental conditions in combination with effects of expanding WUI areas underlie four broad areas of risk: risk to firefighters and civilian safety, ecological risks, social risks, and economic risks (CWS 2014).

Suppression costs are often associated with immediate costs of wildfires and WUIs, while some costs are associated with various other impacts that wildfires may have on the communities and ecosystems. These can occur during a wildfire incident or can extend well into the future, leaving long-lasting economic impacts. Costs related to wildfire reach beyond acres burned and the length of time of the actual fire event (WFLC 2009). Costs related to wildfires are explained here in the categories of direct and indirect costs.

Direct costs for the purpose of this document are expenses incurred during or immediately after a wildfire. When large fires occur, they are rarely an exclusive agency event. As a result, suppression costs are often associated with multi-agency expenditures that occur in categories such as: aviation, engines, firefighting crews, and personnel in supporting roles. Other direct costs include private property losses (insured and uninsured), infrastructure shutdown or damage, damage to recreation facilities, loss of timber resources, and evacuation/emergency aid (WFLC 2009).

Indirect costs often emerge post-fire when suppression resources are either down to bare bones or completely withdrawn from fire duties. Rehabilitation efforts are frequently associated with stabilizing and improving damaged fire areas. These can accumulate years post fire depending on the degree and amount of severely burned areas. Examples such as delayed fire effects to overstory trees (mortality may occur up to five years post burn), heavy rains a year or two later when vegetation is slow to re-establish causing soil or land movement, or potential for irrevocable impacts when loss of life is involved.

The Western Forestry Leadership Coalition examined six case studies of wildfires, all located in the western U.S., illustrating the range of costs from fire impacts. Table IV - 5 shows that actual wildfire costs exceed those often calculated, particularly when considering rehabilitation, direct and indirect costs; with differences vary from 2 to 30 times (WFLC 2009).
Recreation

Travel and tourism is one of the most important industries in Wallowa County offering a tremendous amount of variety when it comes to recreation opportunities, much of which is reliant on the county’s local forests and waterways.

Table IV - 5. Summary figures (last two columns) presented in Table are: 1) a ratio of total costs to suppression costs, and 2) suppression as a percentage of total costs. USFS, 2007 Large Fire Cost Review. Table was obtained in section Case Studies, Summary of Cost Information in The True Cost of Wildfires in the Western U.S. by Western Forestry Leadership Coalition. State and Federal government partnership including: 23 state and Pacific Island Foresters of the West; 7 western Regional Foresters, 3 western Research Station Directors, and Forest Products Lab Director of the USDA Forest Service (WFLC 2009).

![Table IV - 5. Summary figures](image)

Wallowa Lake is nestled between Chief Joseph Mountain and Mount Howard just south of the town of Joseph. This pristine glacier-formed lake draws in an annual average of 74,220 visitors for camping, lodging, fishing, boating, hiking and horseback riding in the Eagle Cap Wilderness each summer.
Each year thousands of visitors line Wallowa Lake and vicinity often for vacation purposes, particularly in the summer months. In 2016 alone June, July, August, and September received 51,138, 103,544, 53,592, and 89,256 respectively, in day use numbers. This equates to a daily use of 1,704 in June; July hosting 3,451 visitors; August 1,728; and September with 2,975 (OPRD 2017).

These daily averages occur during the peak of fire season months. This is significant in that there is only one access road to the south end of Wallowa Lake. Additionally, the highest State Park and recreation use is also the time of the highest number of fire starts for the county. The following two graphs display the annual attendance, from January to December, for the State Park from 2008 through 2016 for day use and for night use.
The Wallowa Lake Tram that transports sightseers to the top of Mount Howard is located at the south end of Wallowa Lake and is another high day use area. According to Tram Owners the 4 mile long cable transports an average of 32,000 people between mid-May and the end of September, averaging 235 people per day. The Tram not only creates summer jobs but attracts a high number of tourists that can get an amazing view of the Eagle Caps and Wallowa Valley from the top. It is important to note, there are 25 towers that rise 3700 feet from the base to the top over forested landscape with its highest use during the peak of fire season. The highest point of the tram cars above ground is 120 feet and the lowest is only 3 feet off the ground. There has been some fuels mitigation on the face of Mount Howard where areas average anywhere from 30 to 100 tons of down material per acre. At the time of the Mount Howard project plot data revealed 37% of all trees under 14 inch diameter breast height were dead. Untreated areas since the time of the fuels plot studies in 2005, are expected to have increased further with many of the standing dead trees contributing to the already heavy down woody debris

According to Dean Runyan Associates, May 2017 Oregon Travel Impacts prepared for the Oregon Tourism Commission in Salem, Oregon; the travel impacts into Wallowa County resulted in 28 million dollars in destination travel resulting in 12.7 million in earnings for the county while supporting 590 in employment. There was an estimated 444,000 overnight visitors in 2016 alone for the county.

Visitor spending for travelers on different overnight accommodations for Wallowa County has increased in all categories except for Vacation Home. All numbers reflect changes from 2013 – 2016 in ($Million): Hotel, Motel 10.3 – 12.7; Private Home 1.3 – 1.4; Campground 6.4 – 6.8; Vacation Home 1.3 – 1.3; Day Travel 5.7 – 6.3; Spending at Destination 25.0 – 28.5
Destinations spending includes accommodations, food service, food stores, local transportation and gas, arts/entertainment/recreation, and retail sales.

In the summer of 2012, an in-person survey was conducted by Oregon State University on questions regarding tourism in Wallowa county and their estimated expenditures. These were first hand interviews with visitors. The 2013 results showed that 60% of visitors traveled more than 175 miles with typical party size of 4 adults (80%). The average daily spending was estimated at $129.80 which is consistent with Dean Runyan Associates 2012 estimates of $133 per day per travel party.

The total direct travel spending occurring in Wallowa County annually could be significantly impacted if a wildfire were to significantly damage the landscape around the Wallowa Lake area. Large fires in Wallowa County and adjacent areas can impact the economy for several reasons. First, Wallowa County has a strong economy base in natural resources, agriculture, and tourism, with recreation a key component. Recreation can be further divided into hiking, bicycling, swimming, and rafting. For example, bicycle tourism alone contributes up to $15 million for the Eastern Region of Oregon. Travel expenditures to Wallowa County from 2000 to 2012 have increased by $5.4 million dollars, with earnings in 2012 of $9 million (NEOEDD 2013).

Although much of the expenditures in the county are a result of summer tourism spending typical family vacation visits, it also accounts for seasonal visits of non-locals for hunting fowl, bear, turkey and big game as well as steelhead fishing. The beauty and outdoor opportunities that Wallowa County offers could be significantly impacted if a fire of proportional size were to occur.

**Timber**

About half of Wallowa County is covered by forest but only a portion of this remains available for timber production – efforts to assess, plan and implement fire risk reduction actions are critical to sustaining this production potential. Of the nearly 1.1 million acres of forest, approximately 73% is in federal ownership, 14% in private industrial ownership and 12% in family forest ownership. The remaining 1% is in state ownership. As is true for the Blue Mountain National Forests (Malheur, Umatilla, and Wallowa-Whitman), a significant portion of Wallowa County's
federal forests are protected through management designation. Approximately 286,000 acres (36%) falls within active management designations that allow timber production, in addition to other benefits. Nearly 505,000 acres (64%) of the federal forests have management designations that limit or prevent timber production – 344,000 acres (43% of total federal forest land area) are highly protected through wilderness area, research natural area, wild and scenic, or inventoried roadless area designations. Commercial timber production is limited across another 160,000 acres (20%) by riparian buffers, old growth reserves, and a variety of wildlife habitat designations. Furthermore, the non-wilderness portion of the Hells Canyon National Recreation Area (HCNRA) accounts for 87,000 acres of the forest in management designation that allow timber production. However, conservation interests advocate against such use in the HCNRA. Therefore, the USFS focuses its active management on only 199,376 acres (25%) of its total forested land base. Challenges of these forest managements can be found in Chapter X Accomplishments and Challenges.

Three different wilderness areas fall within Wallowa County. The Eagle Cap Wilderness Area was established in 1940, and the other two (Wenaha-Tucannon, and Hells Canyon) were created in the 1970’s. Both the Eagle Cap and Hells Canyon Wilderness Areas were expanded over time – including under The Oregon Wilderness Act of 1984. Most of the other federal forest protections emerged in the 1990’s following broader federal policy shifts, new Endangered Species Act listings, and court decisions seeking to protect old growth.

Forest management, timber production and wood products manufacturing were historically the largest private payroll providers in Wallowa County – supporting over 30% of the total employment and labor earnings, and paying salaries significantly higher than the average wage. Following the USFS shift from a policy of sustained yield management to ecosystem management, and the listing of Chinook and Steelhead under the ESA, in the early 1990’s, timber harvest off of federal lands dropped by 95% resulting in significant job losses, mill closures, and structural changes to Wallowa County’s economy. Similar shocks were experienced across the Pacific Northwest. In 1987, 95 million board feet of timber was harvested from federal lands in Wallowa County. Over the 22 year period from 1994-2015, these federal lands produced an annual average of less than 5 million board feet. This equates to 6 board feet per acre per year across the total federal land ownership in Wallowa County, and 24 board feet per acre per year from the 199,379 acres readily available for management.

Most vertically integrated wood products companies in the Pacific Northwest broke-up during this same period of profound change in federal forest management. In Northeast Oregon, Boise Cascade sold all of its forest lands to a Timber Investment Management Organization (TIMO) in 2004. The new owner, Forest Capital Partners LLC of Boston, MA, managed the lands for 8 years before selling its timberland portfolio to Hancock Timber Resource Group and Molpus Woodlands Group. In 2016, these new owners sold off about 7% of its Northeast Oregon lands to Green Diamond. Other private industrial forestland sales are expected in the near future. This trajectory is increasing the likelihood of forest fragmentation and development.
Prior to the shift in federal forest management, timber production (and resulting job impacts) were evenly spread across all three types of forest ownership. In 1992, the federal forests accounted for 44% of total timber production, industrial forest lands 41%, and family forest lands 15%. Since 1994, the industrial forest lands have generated the lion’s share of timber production. In 2015, these lands accounted for 75% of the total saw log volume, family forests 19%, and federal forests 6%. After 20 years of increased harvest levels, industrial forest land production is trending downwards.

Impacts from timber harvest reduction have been felt through permanent mill closures and the loss of forest contracting businesses. From 1998 to 2014, timber proprietors in the Wallowa County shrank from 43 to 13, a 69.8% decrease. Despite the significant forest resource in the county, forest related employment accounted for only 4.7% of all jobs in 2015. Forest management and harvesting accounted for 2.8% of the county’s jobs, and wood products manufacturing accounted for 1.9%. This sector continues to support high wage jobs. Average wages are $47,950 – significantly higher than the non-timber private sector average wage of $27,265, and slightly higher than the average government wage of $42,915.

Wallowa County lost all of its traditional saw mills over the period 1994-2007, but it currently supports a unique small log processing plant (Integrated Biomass Resources LLC), a few mobile saw mills (the largest being JayZee Lumber LLC), and a few commercial firewood producers. This local infrastructure plays a small but important role in the forest restoration economy. Integrated Biomass Resources (IBR) was specifically designed to process the by-product of forest restoration and fuel reduction treatments, as well as non-saw log component of traditional timber sales. Coupled with the other small proprietorships, IBR improves the cost-effectiveness of restoration projects, generating more value non-saw log volume, and significantly reducing haul costs for this lower value material.

**Case Studies**

In the case studies examined by the Western Forestry Leadership Coalition, they concluded that two to three years following the Canyon Ferry Complex Fire, recreational visits to the national forest declined by 10 percent; no dollar figure was provided (WFLC 2009). In 1988, Yellowstone experienced multiple fires in and around the National Park, resulting in expenditures dropping approximately $13 million in 1989, and $26 million in 1990. The Rodeo-Chediski Fire is estimated to have had indirect costs in the tribal community of $8.1 million dollars through loss of sales tax revenue and job loss. The Hayman Fire also showed impact costs post-fire extinguishment of $2.7 million (approximate) through tax revenue and business losses, plus value reduction on surviving structures in the fire area (WFLC 2009).
Economic implications of a fire occurring in Wallowa County could be significant. A county of approximately 7,000 citizens has an estimated 440,000 visitors annually. The impacts to local economy from a large damaging wildfire could last several years post fire.

Many businesses rely on their relationship with the forests through tourism, recreation, commodities, and beauty. The multitude of impacts has not taken into account the additional ecological impacts that would be sustained affecting aquatics, wildlife habitat, and aesthetic values. On November 5, 2013, Colorado Senator Michael Bennet highlighted the need for wildfire mitigation resources at a Senate Hearing. Mitigation savings were pointed out by the Congressional Budget Office, stating that every $1 spent in wildfire mitigation saves $5 in future disaster losses (Bennet.senate.gov 2013).

The cost of suppression for land management agencies such as the Oregon Department of Forestry and United States Forest Service can mount quickly depending on fire season severity. When wildfire consumes physical property like structures, timber stands, or in areas with potential landslides, the associated costs rise dramatically, displacing people and businesses and contributing to higher overall economic losses. Wallowa County assets, both natural and created, should be protected to the extent possible against loss from wildfire.

Summary

Wallowa County supports a variety of geographic features that includes the numerous trails to high lakes in the northern Blue Mountains and Wallowa Mountains; the scenic byway from Joseph to Halfway that includes the Upper Imnaha River and Hells Canyon National Recreation Area; and local Wallowa Valley attractions such as Wallowa Lake, trail head access, Tramway, and a variety of numerous other town activities.

The diverseness of the county provides numerous economic opportunities from mercantile, agriculture, recreation, and natural resources. Non-Service Sector accounts for 32% of earnings while the Service Sector accounts for 41% of the local labor earnings and Government jobs (federal, state, and county), having a 27% labor earnings. The jobs are primarily located in Wallowa Valley where the four incorporated towns are located. Labor earnings have shown a 29% increase since 1970 and non-labor income grew 255%. Livestock and crops make up the agricultural commodity sales contributing 44% and 56% respectively.

Impacts on the timber industry have resulted in permanent mill closures and loss of forest contracting businesses with a decrease from 43 to 13 timber proprietors from 1998 to 2014 (69.8% reduction). The last traditional saw mill closed in 2007 but the county is currently supported by a small log processing plant and a few mobile saw mills.

The climate of Wallowa County varies greatly depending on elevation. The mountainous areas received from 32 to 52 inches of rain with the highest peaks reaching up to 80 inches often in the form of snow. Wallowa Valley is relatively dry with an average annual rainfall of 12 to 18 inches with as low as 11 inches down along the Snake River in Hells Canyon. Shifts in temperature based on local data are correlated with increasing length of wildfire season and an increase of fire frequency, occurring predominantly between 5500 and 8500 feet in elevation. The bulk of wildfires typically occur between July and mid-August accounting for 77
percent of all annual fires. Wildfire ignition causes are 82 percent lighting and 18 percent human, indicating there is some opportunity to reduce the number of human fires, lowering firefighter exposure and suppression costs.

Large fires over 1000 acres are common for the local county with an average occurrence of 1.9 fires per year of this size. Since the year 2000 there have been 24 fires over 1000 acres in Wallowa County with the smallest being 1,419 acres and the largest was the Grizzly Fire at 76,475 that originated outside the county in Washington and burned to the Grande Ronde River.

Fire suppression costs continue to rise with increases of homes lost and acres burned. Since fiscal year 2000, the 10-year average has risen, with costs reaching $1 billion dollars in 2010. Taking the initiative toward mitigation measures can help prevent some of the direct suppression costs. Every $1 spent on wildfire mitigation has the potential to save $5 in suppression costs. Promoting wildfire mitigation in Wallowa County will not only have potential cost savings in suppression, but will also reduce risks to firefighters and provide homeowners in treated areas opportunities to be involved in preparing their properties in advance.
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