

AN ABSTRACT OF THE THESIS OF

Byron P. Kreml for the degree of Master of Science in Sustainable Forest Management presented on June 12, 2019.

Title: Adapting to Revenue Changes Due to Declines in Timber Harvest: Case Studies in Oregon.

Abstract approved:

Tamara Cushing

Many counties in Oregon were historically dependent on federal timber harvests and associated revenue sharing programs. However, since federal policy changes in the late 1980s and early 1990s, federal timber harvests have decreased. These decreases in federal timber harvests translated to decreases in county revenue from the federal government, which in some counties had been a key source of revenue. As revenue from the federal government decreased, counties had to adapt in order to overcome these changes. Counties in Oregon exhibit large amounts of diversity, whether measured by demographics, ecosystem, or resources, resulting in many unique responses to these decreases in federal receipts. These county-level changes remain largely undocumented, with current research predominantly focusing on industry and socioeconomic responses to changes in federal timber harvests. This research aims to fill this gap, providing perspectives and information to county officials, state executives, and federal lawmakers, showing the unique stories of counties and how they responded to decreases in receipts from federal timber harvests.

To assess how counties in Oregon responded to decreases in federal receipts, a case study approach was used. Federal receipts over time were compared to each county's total budgets, as

well as breakouts of each county's revenue and expense budgets, thus providing perspectives on how county budgets were impacted by changes in federal receipts and how they responded to these changes. Utilizing a case study approach preserved the individuality and unique factors of each county. This approach acknowledged that there is no "right" response to changes in federal receipts, but rather highlights a series of different approaches that fit the unique nature of each county. These approaches, conveyed through case studies, can allow for other counties to learn from each other and provide clarity to lawmakers, adding depth and context to the implications of changing funding to counties in Oregon.

In each of the counties analyzed through these case studies, total budgets either remained constant or saw growth as federal receipts decreased. Some counties overcame decreases in federal receipts by shifting the allocation of their revenues and expenses, while other counties unlocked new growth by capitalizing on assets such as natural amenities. These findings show that counties may be resilient to decreases in federal receipts, with some counties thriving in the face of these decreasing receipts and others effectively maintaining the status quo.

Understanding the similarities and differences between these counties and how they respond is essential for local, state, and federal stakeholders and officials, and will be a key topic of discussion as counties face continued financial uncertainty.

©Copyright by Byron P. Kreml
June 12, 2019
All Rights Reserved

Adapting to Revenue Changes Due to Declines in Timber Harvest: Case Studies in Oregon.

by
Byron P. Krempf

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Presented June 12, 2019
Commencement June 2019

Master of Science thesis of Byron P. Kreml presented on June 12, 2019.

APPROVED:

Major Professor, representing Sustainable Forest Management

Head of the Department of Forest Engineering, Resources, and Management

Dean of the Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Byron P. Kreml, Author

ACKNOWLEDGEMENTS

I wish to thank my advisor, Dr. Tammy Cushing, as well as my committee members, John Becker-Blease, Greg Frey, and Jon Kalodimos, for their help, support, and guidance. Through each step of my thesis they provided guidance, support, and encouragement, inspiring me to strive for excellence and to be the best I can be. Their patience, wisdom, and encouragement made this thesis possible and defined my graduate experience.

I would also like to thank OSU faculty and staff, including (but not limited to) Madison Dudley, Geoff Huntington, Lisa Ganio, Ariel Muldoon, and John Sessions for their guidance and council as I strove to finish this thesis and prepare for the next steps of my life. Without these members of the OSU community, I would not have succeeded.

Most importantly, I would like to thank my friends and family for building me up, supporting me, and encouraging me as I pursued higher education. These people made graduate school the best of times. Whether it was discussions over a late-night campfire, spending endless hours perfecting a presentation, exploring the distant corners of the earth, or getting lost in Excel sheets trying to fix a #REF error, I will never forget these times. Family became friends, friends became family, and these memories will serve as "... a light in dark places, when all other lights go out" (Tolkien, J.R.R., 1954).

Isaiah 40:31: "But those who wait upon the Lord shall renew their strength; they shall mount up on wings like eagles, they shall run and not be weary, they shall walk and not faint."

TABLE OF CONTENTS

	<u>Page</u>
Chapter 1 – Introduction	1
The Relationship between Federal Lands and Counties	1
Federal Receipts and their Significance in Counties	2
An Overview of Payments in Lieu of Taxes.....	3
An Overview of the O&C Lands and SRS	10
Research Question	13
Chapter 2 – Literature Review.....	14
Declines in Timber Harvests from Oregon’s National Forests.....	14
Previous Research	15
Highlighted Findings from Previous Cases Studies.....	17
Responding to Economic Uncertainty in Rural Communities.....	19
Filling in the Gaps.....	24
Chapter 3 – Methodology	25
Why a Case Study Approach	25
County Selection	26
Data Collection	28
Data Analysis	30
Chapter 4 – County Profiles.....	32
County Profiles: Coos County	32
County Profiles: Crook County	37
County Profiles: Deschutes County	42

TABLE OF CONTENTS (CONTINUED)

	<u>Page</u>
County Profiles: Douglas County	47
County Profiles: Josephine County	52
County Profiles: Wallowa County	57
County Profiles: Summary	62
Chapter 5 – Results	64
Coos County Analytical Results	64
Crook County Analytical Results	67
Deschutes County Analytical Results	71
Douglas County Analytical Results	74
Josephine County Analytical Results	77
Wallowa County Analytical Results	80
County Themes	81
Chapter 6 – Discussion	83
County Grouping	83
Coos, Crook, and Deschutes County	84
Douglas and Josephine County	87
Wallowa County	91
Chapter 7 – Conclusions and Limitations	93
Bibliography	95

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Steps in Calculating PILT on Eligible Federal Lands.	5
2. PILT Payments over Time.	9
3. O&C Lands in Oregon.	11
4. Counties Selected for Case Study Analysis.	28
5. USFS and BLM Land in Coos County, Oregon.	32
6. Coos County Population Compared to Oregon and National Population.	33
7. Coos County Unemployment Compared to Oregon and National Unemployment.	34
8. Coos County Employment Compared to Oregon and National Employment.	34
9. Coos County Personal Income Compared to Oregon and National Personal Income.	34
10. Coos County Private and Public Timber Harvests over Time.	35
11. Federal Receipts from the USFS and BLM to Coos County.	36
12. USFS and BLM Land in Crook County.	37
13. Crook County Population Compared to Oregon and National Population.	38
14. Crook County Unemployment Compared to Oregon and National Unemployment.	39
15. Crook County Employment Compared to Oregon and National Employment	39
16. Crook County Personal Income Compared to Oregon and National Personal Income.	39
17. Crook County Private and Public Timber Harvests over Time.	40
18. Federal Receipts from the USFS and BLM to Crook County.	41
19. USFS and BLM land in Deschutes County, Oregon.	42
20. Deschutes County Population Compared to Oregon and National Population.	43
21. Deschutes County Unemployment Compared to Oregon and National Unemployment.	44

LIST OF FIGURES (CONTINUED)

<u>Figure</u>	<u>Page</u>
22. Deschutes County Employment Compared to National Employment.	44
23. Deschutes County Personal Income Compared to Oregon and National Personal Income. ...	44
24. Deschutes County Private and Public Timber Harvests over Time.....	45
25. Federal Receipts from the USFS and BLM to Deschutes County.....	46
26. USFS and BLM Land in Douglas County, Oregon	48
27. Douglas County Population compared to Oregon and National Population.	49
28. Douglas County Unemployment compared to Oregon and National Unemployment.	49
29. Douglas County Employment Compared to Oregon and National Employment.....	50
30. Douglas County Personal Income compared to Oregon and National Personal Income.	50
31. Douglas County Private and Public Timber Harvests over Time.....	51
32. Federal Receipts from the USFS and BLM to Douglas County.....	51
33. USFS and BLM Land in Josephine County, Oregon.....	52
34. Josephine County Population Compared to Oregon and National Population.....	53
35. Josephine County Unemployment Compared to Oregon and National Unemployment.....	54
36. Josephine County Employment Compared to Oregon and National Employment.	54
37. Josephine County Personal Income Compared to Oregon and National Personal Income.	54
38. Josephine County Private and Public Timber Harvests over Time	55
39. Federal Receipts from the USFS and BLM to Josephine County.	56
40. USFS and BLM Land in Wallowa County, Oregon.	57
41. Wallowa County Population Compared to Oregon and National Population.	58
42. Wallowa County Unemployment Compared to Oregon and National Unemployment.	59
43. Wallowa County Employment Compared to Oregon and National Employment.....	59

LIST OF FIGURES (CONTINUED)

<u>Figure</u>	<u>Page</u>
44. Wallowa County Personal Income Compared to Oregon and National Personal Income.	59
45. Wallowa County Private and Public Timber Harvests Over Time.....	60
46. Federal Receipts from the USFS and BLM to Wallowa County.....	61
47. Public Timber Harvest Volumes in Highlighted Counties.	62
48. Percent of 1970 Timber Harvest Volumes in Highlighted Counties.	62
49. Coos County’s Revenue and Expense Budgets.	65
50. Crook County’s Revenue and Expense Budgets.	70
51. Deschutes County’s Revenue and Expense Budgets.	72
52. Douglas County’s Revenue and Expense Budgets.	75
53. Josephine County’s Revenue and Expense Budgets.....	78
54. Wallowa County’s Revenue Budgets.	81

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. PILT Equivalency in 1997.....	7
2. Highlighted County Budget Categories.....	29
3. SLR for Coos County.....	64
4. SLR for Crook County.....	68
5. SLR for Deschutes County.	71
6. SLR of Douglas County.....	74
7. SLR for Josephine County.....	77
8. SLR for Wallowa County.	80
9. Thematic Observations within Counties.....	82
10. Coos, Crook, and Deschutes County Budget Changes.....	85
11. Douglas and Josephine County Budget Changes.....	88

Adapting to Revenue Changes Due to Declines in Timber Harvest: Case Studies in Oregon

CHAPTER 1 – INTRODUCTION

The Relationship between Federal Lands and Counties

The United States has a significant land base, and in the 1800s had to determine how to best distribute or retain this land. To do so, the Property Clause was written into the U.S. Constitution, saying that “The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory of other Property belonging to the United States...”, giving Congress the authority to acquire, dispose of, and manage federal lands (Hoover, 2018; U.S.C. Art. VI, §3 cl.2, 1788). Congress has allocated this land to four federal land management agencies (FLMA): the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), the U.S. Fish & Wildlife Service, and the National Park Service (NPS) (Hoover, 2018). These federal agencies manage the resources bestowed to them, and it is agency policy to consider forest-dependent communities in close proximity to them (Roth, 1991; Maleki, 2008).

Historically, residents of counties thought to be timber dependent were employed in timber-related jobs: forestry, logging, industrial facilities to process forest products, etc. The U.S. Forest Service states that timber dependent communities are “isolated from major urban areas” and “highly dependent on the lumber industry” (Roth, 1991). A non-partisan research group called Headwaters Economics has taken this definition a step further by defining historically timber dependent counties as having a population of less than 200,000 people and had timber-related jobs contribute to 20 percent or more of workers earnings from 1970-1989 (Rasker, 2017). However, this relationship between forests and communities has significantly changed

over time (Roth, 1991). Whether comparing employment, earnings, population change, or any other factor, the relationship between timber and counties has proven to be dynamic rather than static (Maleki, 2008).

Under Article VI, Clause 2 of the U.S. Constitution (commonly known as the Supremacy Clause), states cannot tax the federal government (U.S.C. Art. VI, Cl.2, 1788; Hoover, 2018). In the eastern United States, federal land ownership is proportionally small, and this void in a state's taxable land area (taxable base) was relatively inconsequential. In the western United States, federal land ownership is proportionally larger, creating demand for services such as roads, law enforcement, and fire protection on public land without compensating counties via taxes (Hoover, 2017, 2018; Schuster, Beckley, Bushur, Gebert, & Niccolucci, 1999). To compensate for this misalignment between a county's taxable base and services provided, Congress created a series of funding structures to ameliorate this loss in revenue. The Payments In lieu of Taxes (PILT) Act, passed in 1976 was designed at the recommendation of a federal commission to fill the void in a county's taxable base and is one of the largest revenue sharing programs used to compensate counties (U.S.C. §§6901-6907, 1976; Hoover, 2017). Other revenue sharing programs such as the Oregon and California Railroad Lands (O&C Lands) have also been created to equitably compensate counties for the services they provide to federal lands (U.S.C §§1181a-1181j, 1937; Congressional Research Service, 2015).

Federal Receipts and their Significance in Counties

As federal lands cannot be taxed, the federal government has come up with an array of programs to compensate counties for the federal lands within county borders and the services (such as fire protection) provided by counties (Hoover, 2017; Schuster et al., 1999). While there

are multiple programs to compensate counties for their decreased taxable base, the scope of this project is limited to PILT, Revenue Sharing (RS), and the Secure Rural Schools (SRS) Act, how these structures have changed over time, and how these changes have affected county revenue structures. PILT is the most prevalent of these programs (both spatially and monetarily), but the SRS Act is particularly relevant to the 18 counties in Oregon containing the Oregon and California (O&C) federal lands (Congressional Research Service, 2015; Hoover, 2017). The O&C Lands are publicly owned, but had at one point been granted to the O&C Railroad Company, thus providing tax revenue to counties. Upon reverting back to federal ownership, these 18 counties suffered a sudden decrease in their taxable revenue. Revenue Sharing systems dependent on timber sales were historically common, but federal timber sales have declined by more than 90% in some areas, which decreased federal receipts to counties (Congressional Research Service, 2015, 2017).

An Overview of Payments in Lieu of Taxes

The Payments in Lieu of Taxes Act of 1976 was designed to compensate governments (specifically counties) for a decrease in their taxable base, as well as to compensate them for services provided, caused by the federal government allocating land to FLMA for retention and management. These payments were designed to equitably compensate counties for this loss of revenue which was perceived to be unevenly distributed across the United States (Hoover, 2017).

The Department of the Interior (DOI) manages the PILT payment program for the FLMA, as specified by the PILT Act. Section 6902 of the PILT Act states that National Forest System, National Park System, Bureau of Land Management, lands in federal water resource projects, dredge areas maintained by the U.S. Army Corps of Engineers, inactive and semi-active

army installations, and specific lands donated to the Federal Government are entitled lands under the PILT Act, and are therefore entitled to revenue sharing (U.S.C. §§6901-6907, 1976). In addition, Section 6904 of the PILT Act states that Federal Lands acquired after December 30th, 1970, as well as additions to the NPS or National Forest Wilderness Areas are entitled to PILT payments. Section 6905 of the PILT Act states that Federal lands in the Redwood National Park or lands acquired in the Tahoe Basin near Lake Tahoe are also subject to PILT payments (U.S.C. §§6901-6907, 1976; Department of the Interior, 2015).

PILT payments are calculated based on five factors: 1) acres of land in a county eligible for PILT Payments 2) population 3) previous year's payments for all eligible lands under other payment programs from FLMA 4) presence of state pass-through laws, causing the payments to go directly to local government entities (including school districts) and 5) changes in the Consumer Price Index (CPI). These five factors are used to calculate the authorized payment level for a county. There are two methods to calculate specific payment values based on these factors (Figure 1). The first method compares a county's eligible acreage multiplied by a factor of \$2.66/ac (an annually adjusted rate) against the county's payment ceiling as defined by the county's population (Department of the Interior, 2017). The lesser of these two values is used, and then the previous year's total payments for these eligible lands (either revenue sharing or specific payments due to other programs) is subtracted. This option is called the standard rate. The second method compares a county's eligible acreage multiplied by a factor of \$0.37/ac (an annually adjusted rate) against the county's ceiling payment as defined by the county's population (Department of the Interior, 2017). This option, called the minimum provision, is used for counties which received large amounts of payments from FLMA programs in the

previous year. The county is then authorized to receive Option 1 or Option 2 payments-- whichever is greater. If Congress chooses to, counties may receive a pro-rated portion of this authorized level (Hoover, 2017). In 2017, the PILT appropriation was 99.7% of the authorized funding (Hoover, 2017), while in 2018, the PILT appropriation was 100% (Department of the Interior, 2015).

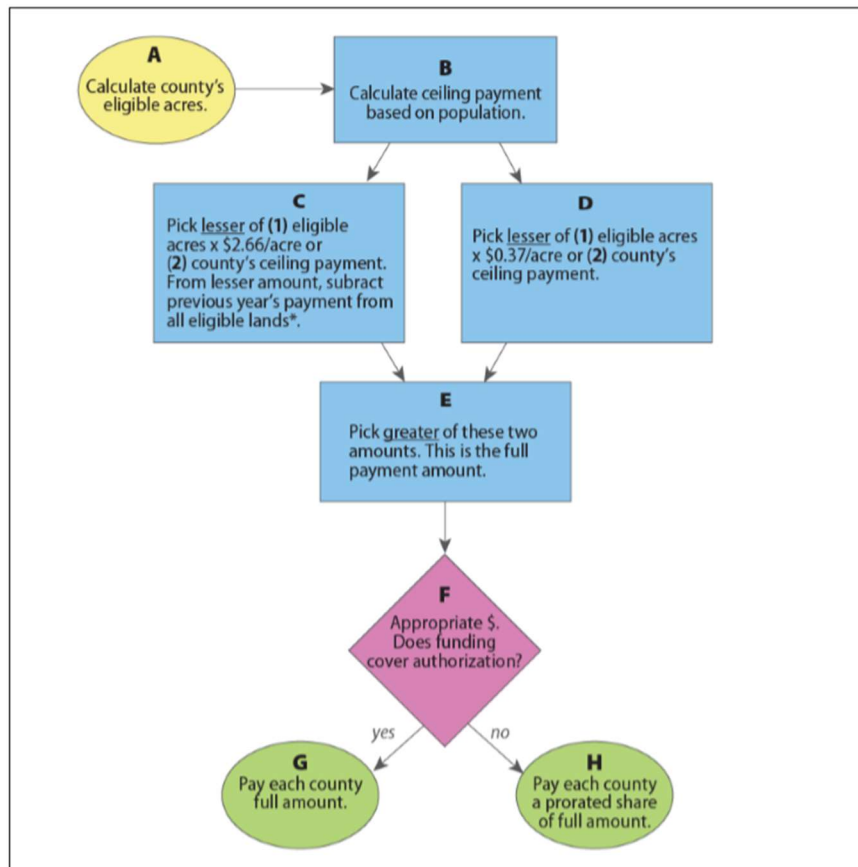


Figure 1. Steps in Calculating PILT on Eligible Federal Lands. (Hoover, 2017)

The Congressional Research Service (CRS) cited six idiosyncrasies of the PILT program, which could be perceived to add complexity or reduce efficiency of the program:

- A few counties that receive very large payments from other federal revenue sharing programs (because of valuable timber, mining, recreation, and other land uses) also are authorized to receive a minimum payment (\$0.37 per acre) from PILT.

- Although there is no distinction between acquired and public domain lands for other categories of eligible lands, acquired lands of the Fish and Wildlife Service (FWS) are not eligible for PILT. This provision works to the detriment of many counties in the East and Midwest, where nearly all FWS lands are acquired lands.
- Payments under the Secure Rural Schools (SRS) program require an offset in the following year's PILT payment for certain lands under the jurisdiction of the Forest Service (FS). However, if the eligible lands are under the jurisdiction of the BLM, there is no reduction in the next year's PILT payment.
- Certain BLM lands (called the Oregon and California Grant Lands) receive payments that do not require an offset in the following year's PILT payment.
- Some of the "units of general local government" (counties) that receive large payments have other substantial sources of revenue, and some of the counties that receive small payments are relatively poor.
- In some counties the PILT payment greatly exceeds the amount the county would receive if the land were taxed at fair market value, whereas in others it is much less. (Hoover, 2017).

These idiosyncrasies are commonly cited by critics, either of the PILT program as a whole, or to highlight inefficiencies and inequities within parts of the program.

In 1996, the United States Congress directed the BLM to analyze the PILT program by assessing the following topics:

- The extent to which PILT receipts exceeded the revenue a county would receive if its taxable base had not been decreased;
- The services provided by counties to visitors of these public lands, and the economic benefits that counties received from these visitors;
- Other economic benefits counties receive from having public lands within their borders; and
- Recommendations to amend the PILT Act and other payment structures.

In 1997, the BLM entered into an agreement with the USFS Rocky Mountain Research Station to research the tax equivalency and benefits-to-costs of the PILT program. This research analyzed the equivalency of PILT payments and PILT plus Revenue Sharing (RS) payments to property taxes on a per-acre basis by addressing three topics: 1) Tax equivalency between PILT, PILT plus RS, and the taxable income that would be generated if federal lands were taxed like other lands; 2) the nature and extent of the costs that local governments bear due to FLMA lands; and 3) the nature and extent of the economic benefits counties receive due to the presence of FLMA lands and associated activities. This study did not attempt to quantify the noneconomic or nonmarket benefits provided by federal lands such as increased water quality or recreational opportunities due to the difficulty in quantifying these benefits (Schuster et al., 1999).

This research found that federal revenue sharing was not an equivalent substitute for property taxes, and that region-specific factors played a large role in the equity of this. Table 1 shows that in the East for instance, taxable revenue was equal to \$6.61/ac, whereas under a fully funded PILT and RS program, revenue would only equal \$1.69/ac. This pattern was observed in all regions, with the foregone tax revenue outweighing the receipts that local governments would receive.

Table 1. PILT Equivalency in 1997 (Schuster et al., 1999).

Estimated FY 1997 Total Tax and Federal Payments Per Acre, by Region								
Region	Total Tax	Federal Payments						
		PILT	PILT+RS	PILT*	PILT*+RS			
			\$ per acre					
East	\$ 6.61	\$ 0.56	\$ 1.20	\$ 1.04	\$ 1.69			
Interior West	\$ 0.78	\$ 0.21	\$ 0.37	\$ 0.40	\$ 0.55			
Pacific West	\$ 3.49	\$ 0.17	\$ 1.87	\$ 0.31	\$ 2.02			
Alaska	\$ 0.72	\$ 0.06	\$ 0.12	\$ 0.11	\$ 0.17			
United States	\$ 1.48	\$ 0.17	\$ 0.54	\$ 0.32	\$ 0.68			

*Values if the 1997 PILT had been fully funded

The findings of the USFS Rocky Mountain Research Station were that PILT payments were not equivalent to foregone property taxes in any region of the U.S. On a county-by-county basis, it was estimated that 62% of counties received equivalency when both PILT and RS were factored in, with most of these counties being found in the Pacific West (California, Oregon, Washington, and Hawaii), due its high value natural resources. It was also found that uniformly increasing the PILT funds would not be an equitable approach to address this lack of equivalency; doubling PILT funding would increase county equivalency from 62% to 69%, with the counties that had already achieved equivalency receiving a disproportionate amount of these benefits. Eighty-seven percent of these inequalities could be predicted by a county's tax system, the "importance" of federal lands within the county, and the size of the county. When surveyed, counties containing federal land, on average, identified federal lands as being responsible for 10% to 50% of their Search and Rescue, Law Enforcement, and Road Maintenance costs, while other surveyed factors had 0% to 10% impact on county costs.

The study also found that the only perceived benefit (or cost-saving item) of having federal land within county borders was "Use of Federal Land", with roughly 10% of surveyed counties stating that this factor was in fact cost-saving (or decreased county expenses). All other potential benefits (environmental education, water improvement, etc.) were not identified as providing benefit or reducing costs to counties. However, counties perceived the benefits to their citizens to be significantly higher than the cost-saving items to county budgets. Counties identified that "Places to hunt and fish", "Places to recreate", and "Recreational facilities" were of greatest value, providing "moderate" (10% to 50%) benefit to their constituents. Only "Work force diversity", "Support industrial base", and "Electric power" were perceived to provide no

benefit to counties. These results varied by region, with counties in the Pacific West being less likely to perceive “Places to hunt” and “Places to fish” as beneficial (Schuster et al., 1999).

The PILT program is facing a series of challenges and has some underlying issues which Congress is working to rectify. While H.R. 3257, passed by the 114th Congress extended PILT for four fiscal years, 2019 is the last year in which receipts are currently authorized (Meadows, 2015). Congressional debate continues on topics such as whether to fund the PILT program entirely or partially every year, whether to reduce the program, and even to consider the eradication of the program in order to help reduce federal deficits (Hoover, 2017). In 2018, the PILT program was fully funded, with payments totaling \$552.8 million that were disbursed to more than 1,900 local governments (Figure 2) (Department of the Interior, 2015). In addition to ongoing congressional debate over PILT funding, debate also continues to exist over topics such as tax equivalency, funding for FWS lands, and inclusion of Indian and other lands (Hoover, 2017). While these debates continue, the fact remains that there is little understanding of county dependency on PILT receipts.

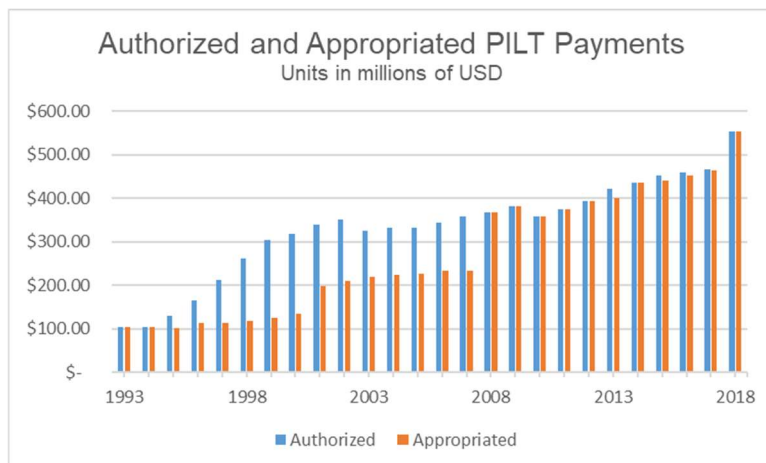


Figure 2. PILT Payments over Time (Department of the Interior, 2018; Hoover, 2017).

An Overview of the O&C Lands and SRS

In 1866, Congress granted 2.6 million acres of land to the Oregon and California Railroad Company (O&C) to construct a 300-mile section of railroad spanning from Sacramento, CA to Portland, OR. These lands were located in western Oregon, and span 18 counties (Figure 3). In 1915, the U.S. Supreme Court ruled that the O&C Railroad Company violated the terms of the grant, which led to the 1937 O&C Act which returned the lands to federal ownership. The BLM was granted management of these lands, with the mandate to produce timber, protect watersheds, enhance economic stability of local communities and counties, and increase recreational opportunities (Congressional Research Service, 2015; Stanford University, n.d.).

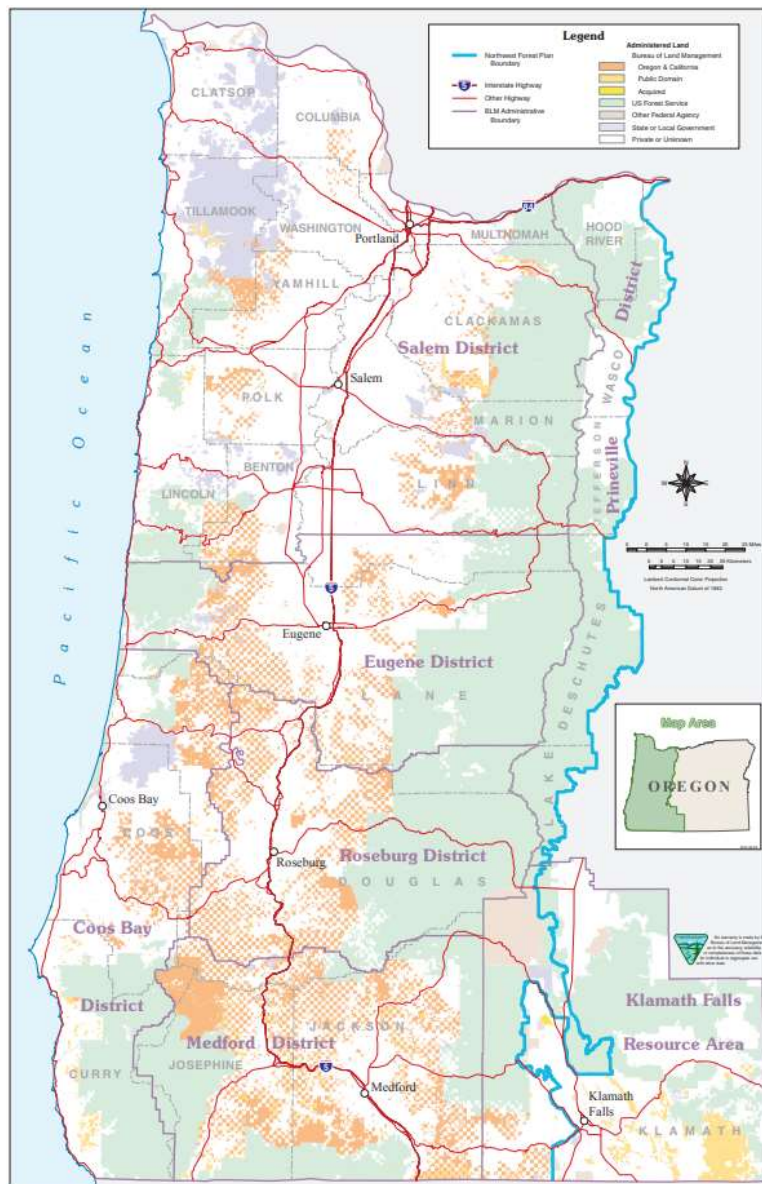


Figure 3. O&C Lands in Oregon (Bureau of Land Management, 2012).

Counties had historically received revenue in the form of taxes from the O&C Railroad Company, but these payments evaporated upon the O&C Railroad Company realizing their claim to the lands would be nullified. Upon transfer of these lands to the federal government, there was no way for counties to receive property tax or be compensated for this loss in revenue. This was addressed in the 1937 O&C Act, which established a revenue sharing system to mitigate this loss

of revenue to counties. This RS system relied heavily on timber sales, of which counties received a portion of the total revenue generated from the O&C Lands. However, when timber revenues and sales began to decline in the 1990s, these RS receipts began to decline.

To mitigate these declining payments, Congress established an alternative payment structure to compensate counties under the Secure Rural Schools and Community Self-Determination Act of 2000 (SRS). The SRS Act had three purposes: 1) to stabilize and transition payments to counties to provide funding for schools and roads that would supplement other available funds; 2) to make additional investments in, and create additional employment opportunities through projects; and 3) to improve cooperative relationships among the people that use and care for the federal land and the agencies that manage the federal land (U.S.C. §7101, 2018).

The SRS program provided O&C counties with the ability to choose to accept payments based on historic receipts rather than their allocation of current receipts (Congressional Research Service, 2015). Depending on changes in population and non-forested public lands, some counties choose to accept current receipts instead of payments based on historic receipts. The SRS program was initially scheduled to expire in 2006, which would return counties to the historic RS system, but in FY 2006, it was extended for one year. In FY 2008, the Emergency Economic Stabilization Act was passed, extending the SRS program through FY 2011. Since then, the SRS Act has been extended five more times (with a few temporary expirations), culminating in the most recent extension in PL 151-141 (U.S.C. §7101, 2018). While these reiterative single or multi-year extensions have benefitted counties, this process is not reliable nor predictable for counties, increasing risk in county revenue flows. Three key concerns about

RS programs that the SRS Act is supplementing exist: 1) the decline in timber receipts due to a decrease in timber sales; 2) the annual payout uncertainty that surrounds these payments, and 3) how timber revenue and county payments are linked, and how counties may undertake revenue generating activities to maintain solvency in the short-term without consideration for long-term repercussions (Congressional Research Service, 2017).

Research Question

This study is designed to analyze how counties responded to changes in federal receipts. The studied counties will be grouped by changes in budget- if total revenue and expense budgets have a direct covariance with federal receipts, this may show that the county was significantly negatively impacted by decreases in federal receipts. If total revenue and expense budgets do not have a direct covariance with federal receipts, this will either indicate that counties were not and are not dependent on federal receipts, or that they adjusted the proportional revenue and expense budgets without the total revenue and expense budgets responding to federal receipts. If total revenue and expense budgets are found to have an inverse covariance to federal receipts, this means that the counties have realized growth in covariance to decreases in federal receipts.

Within each county's budgets, revenue and expense items will be examined to determine whether there is any covariance to federal receipts, and the direction (increase/decrease) of that change. For example, if property taxes were increased as federal receipts decreased, or if general services expenditures were decreased, this analysis will highlight these patterns. If county budgets show no overall change as federal receipts changed and no itemized change as federal receipts changed, this will indicate that the county is not dependent on federal receipts.

CHAPTER 2 – LITERATURE REVIEW

Declines in Timber Harvests from Oregon's National Forests

While private timber harvests in Oregon have proven to be relatively stable over time, timber harvests on federal lands have been negatively impacted by regulation (Freudenburg, Wilson, & O'Leary, 1998; OFRI, 2017). While there is contention about which policies caused the decrease in federal timber harvests, it is unequivocally accepted that the decrease in federal timber harvests can be attributed to federal policies (Carroll, McKetta, Blatner, & Schallau, 1999; Freudenburg et al., 1998).

In Freudenburg, Wilson, and O'Leary's publication, "Forty Years of Spotted Owls? A Longitudinal Analysis of Logging Industry Job Losses", both an ordinary least squares regressions approach and a time series regression approach was used to determine how many jobs had been lost due to habitat protection of species such as the spotted owl. It should be noted that the spotted owl is an endangered species protected under the Endangered Species Act, and effectively serves as the mascot for the Northwest Forest Plan, which protects old-growth habitat for endangered late-successional species (Oregon Fish and Wildlife Office, n.d.). Their research concluded that "Despite the widespread and apparently heartfelt conviction that the jobs of rural loggers and primary wood processors in the Pacific Northwest are being endangered by the federal protection of the spotted owl... there is simply no credible evidence of a statistically believable job-loss effect" (Freudenburg et al., 1998). However, they were able to attribute the loss of jobs to a delayed response from the passing of the Wilderness Act in 1964, which prohibited the installation of structures and roads, commercial enterprises, and mechanized and motorized transport in specific holdings of federal lands (Meyer, 1999).

Carrol, McKetta, Blatner, and Schallauet authored a response to Freudenburg et al.'s paper which identified several shortcomings or oversights that impacted Freudenburg et al.'s results. By overlooking the fact that many public lands were already excluded from harvest, and employing a national analysis when the Wilderness Act was region-specific, Freudenburg et al.'s research muted the significance of the Endangered Species Act's role in the 1990s. Carrol et al. found that the classification of the spotted owl as an endangered species in 1989 did have a negative "spotted owl effect" on timber harvests from federal lands, which was distinguishable from the delayed response of the 1964 Wilderness Act (Carroll et al., 1999).

These findings show that, whether attributed to the 1964 Wilderness Act or the 1989 listing of the spotted owl, there was a recognizable decrease in federal timber harvests due to policy changes in the late 1980s and 1990s.

Previous Research

Previous research has begun to document the relationship between timber and counties. Research on population change, impoverished families, education levels, and average earnings have been conducted to capture how historically timber dependent communities have been affected by decreases in earnings from timber-related jobs (Rasker, 2017). Researchers have also analyzed why the timber industry has declined in the Pacific Northwest. The Oregon Department of Economic Analysis found that factors such as automation and increased efficiency, as well as increased supply of harvests in the southeastern United States have been largely responsible for decreases in timber-related employment (Freudenburg et al., 1998; Rasker, 2017).

In the 2016 Secretary of State Audit Report of financial conditions in Oregon, dependency on timber revenues was explicitly considered (Wenger, 2016). Curry, Douglas,

Josephine, and Polk counties were designated as “Counties to Monitor”, and all but Polk County were historically timber dependent and still rely heavily on receipts from federal lands. The Congressional Research Service has also written an array of reports to provide background for Congress to review, though this is largely explanatory rather than analytical (Hoover, 2017, 2018). These reports are designed to explain existing structures and processes but may not fully capture the interactions and dependencies that may exist due to federal revenue sharing.

Research conducted by the BLM and the USFS has looked into whether PILT and other receipts were equitable, or provided funding that was less than what would be received if the taxable base had been left intact (Hoover, 2017; Schuster et al., 1999). A 1997 joint BLM-USFS tax equivalency study found that while PILT payments were on average lower than that taxable base, 51 percent of the counties examined were tax equivalent. These discrepancies varied by region and may be different under current conditions and structures (Schuster et al., 1999). This publication also made the important distinction that FLMA provide many benefits and add non-market values to counties, such as watersheds and recreational opportunities, which are not quantified (Hoover, 2017; Schuster et al., 1999).

The same joint research by the BLM and the USFS also undertook a benefit-cost study, which surveyed county officials. Their findings showed “...little indication that the presence of federal lands in a county had any direct fiscal benefits...”. This report found that county officials perceive that the citizens of the county enjoy a greater benefit than the counties themselves do, with citizens benefitting from factors such as recreational opportunities, but counties receiving little to no economic benefit (Schuster et al., 1999).

This is highlighted by current research by the USFS, which states that “Communities are culturally, socially, and economically linked to nearby forest lands in complex ways” (Maleki, 2008), but that these communities are not defined by timber dependence due to their ability to adapt (McKee, 2004). All of this research begins to outline how counties and citizens thereof may or may not be dependent on revenue sharing from federal lands and associated timber harvests.

Highlighted Findings from Previous Cases Studies

Headwater Economics conducted paired tests of 25 counties that were historically timber dependent against 25 counties that were not historically timber dependent in Idaho, Oregon, and Washington. Overall, no statistically significant trends were found, which Headwaters Economics attributed to a high range of results in counties that were not historically timber dependent. However, Headwaters noted that three historically timber dependent counties had outperformed other timber dependent counties in recent years, and conducted a trio of qualitative case studies to begin to understand this trend (Rasker, 2017).

Bonner County, Idaho was a historically timber dependent county. Headwaters Economics found that there were three driving factors driving Bonner County’s transition from a timber dependent economy: 1) natural amenities and a high quality of life, 2) flexibility and adaptability to diversify and welcome new economic opportunities, and 3) engaged, collaborative planning. While Bonner County’s natural amenities aren’t replicable by other counties, quality of life can be improved. Headwaters Economics gave credit to the local leaders of Bonner County for fostering an environment that was attractive for new businesses and

industries, and enhancing collaborative planning to increase civic engagement, thus creating a grass-roots movement to decrease dependence on the timber sector (Rasker, 2017).

Headwaters Economics identified three primary factors that helped Mason County, Washington transition from a timber dependent economy: 1) connectivity to metropolitan areas; 2) natural amenities; and 3) flexibility and adaptability to diversify and welcome new economic opportunities. Natural amenities and connectivity to metropolitan markets are both inherent factors within counties that cannot be replicated but can provide increased opportunity for county diversification from timber-related jobs. Mason County benefitted from economic expansion such as construction of a state prison and a tribal casino. Mason County continues to focus on improvement and growth, updating its Comprehensive Plan to continue to foster new economic development opportunities.

Skamania County, Washington also had three key factors that Headwaters Economics found that helped to diversify from a timber dependent economy: 1) natural amenities; 2) flexibility and adaptability to diversify and welcome new economic opportunities; and 3) connectivity to major metropolitan markets. Natural amenities and connectivity to urban markets are both inherent and are not factors that counties can replicate. The Skamania Lodge was constructed to capitalize on these connectivity factors as well as the inherent beauty of Skamania County, and also served to foster expansion opportunities for niche businesses and industries. The adaptability and flexibility of the county leaders to facilitate the construction of the Lodge, as well as their continued ability to create a favorable environment for new businesses is a significant factor contributing to Skamania County's successful diversification from the timber economy (Rasker, 2017).

These case studies found that factors such as natural amenities and proximity to urban hubs are beneficial to counties that choose to capitalize on them, but also identified that flexibility and adaptability from county leaders to create favorable environments for businesses was key to diversifying from a timber dependent economy. Headwaters Economics also identified the importance of collaborative planning, ensuring stakeholder support and involvement, and creating a healthy community between businesses, government, and citizens. These actions were found to facilitate growth within counties, continuing to ensure a vibrant and thriving community independent of the timber sector (Rasker, 2017).

Responding to Economic Uncertainty in Rural Communities

In 2005, the North Carolina Rural Economic Development Center partnered with the University of North Carolina's School of Government to launch an initiative to help struggling small towns realize new growth and economic health. This initiative, called "Small Towns, Big Ideas: Case Studies in Small Town Community Economic Development", used a case study approach to analyze 45 small towns across the U.S. that were surviving and thriving regardless of potentially dismal economic outlooks. Their findings were not quantitative; instead their results were qualitative and anecdotal, describing strategies that were unique to each small town or that were shared between many small towns (Lambe, 2013).

Seven themes emerged from their case studies. These themes, or "Lessons Learned", are not hard and fast rules that dictate success, but may have features that are useful to other rural communities facing economic challenges. These seven themes are as follows:

1. In small towns, community development is economic development.

The NC Rural Economic Development Center found that focusing on community

development focused on broader activities than economic development and provided many lasting benefits to communities. It was also found that these community development approaches were typically comprehensive in nature and focused on long-term outcomes that may not be realized in a single political election cycle. These long-term community development approaches often provided more benefit than an incremental approach, and were likely to facilitate lasting changes.

2. Small towns with the most dramatic outcomes tend to be proactive and future-oriented; they embrace change and assume risk.

Small towns that preemptively began to address problems were found to be more likely to thrive. By proactively adapting to future changes, small towns are able to embrace new opportunities. Even if new opportunities were not present, small towns that prepared for change were able to adapt quickly when an opportunity arose. This required civic engagement and strong county leaders, as adapting includes large amounts of risk and uncertainty, but can facilitate county growth in the long term.

3. Successful community economic development strategies are guided by a broadly held local vision.

Many small towns stressed the importance of having a broad and widely shared vision for the future of the town. This shared vision allowed for goal planning, and was flexible and adaptable. By having a shared vision, small towns are able to capitalize on their most valuable resource - people. When this vision is shared, social buy-in is increased, fostering healthy communities. It was also found that migration into these small towns was constructive, and that these newcomers should be included in this local vision. By welcoming

newcomers into this shared vision, new perspectives and opportunities can arise, further increasing opportunities in a small town.

4. Defining assets and opportunities broadly can yield innovative strategies that capitalize on a community's competitive advantage.

Small towns that take a comprehensive approach to defining assets and opportunities tend to find more opportunities for growth. By capitalizing on factors such as the natural amenities, unique historical features, or even individual people, opportunities can arise. It is even possible to capitalize on the "small town" brand, creating a unique tourism destination focusing on the niche factors of an individual town or community. By capitalizing on these assets, innovation can be incited, encouraging a vibrant community.

5. Innovative local governance, partnerships and organization significantly enhance the capacity for community economic development.

Even if a small town has all of the requisite factors to unlock new growth, without innovative leaders to capitalize on it, growth will not occur. These leaders are not limited to county officials; community members, business leaders, and other cross-jurisdictional partnerships can help share resources and ideas, thus priming a community for growth.

6. Effective communities identify, measure and celebrate short-term successes to sustain support for long-term community economic development.

By celebrating short-term successes, social buy-in can be rewarded and enhanced. These short-term goals can be focused on, highlighting the success of communities, and providing opportunity to keep the shared vision of the community fresh in everyone's mind. By

focusing on short-term goals as well as long-term visions, monitoring can be enacted, increasing accountability within a community.

7. Viable community economic development involves the use of a comprehensive package of strategies and tools, rather than a piecemeal approach.

While there is no “right” approach to increasing a community’s economic viability, comprehensive approaches tend to outshine other approaches. By comprehensively addressing issues, growth can be found in many unexpected places. Instead of tackling one issue at a time, a comprehensive strategy allows for long-term vision, and can also prevent future issues from arising.

While these seven findings were written for rural towns, their findings are highly relevant to rural counties. Each of these factors can be scaled up to a county-level, or can be addressed in each town within a county. By recognizing common success traits found in small towns across the U.S., rural counties can learn and adapt, increasing their economic footing in an uncertain landscape (Lambe, 2013).

Morgan, Lambe, and Freyer capitalized on the NC Rural Economic Development Center’s research in their article, “Homegrown Responses to Economic Uncertainty in Rural America”. Their findings were that, “...(communities) that have approached economic development by looking inward to community strengths and existing resources are often far better than those that attempt to lure companies to relocate by promising low wages and tax incentives” (Morgan, Lambe, & Freyer, 2009). Their findings, based on the 45 case studies conducted in “Small Towns Big Ideas”, highlight three strategies for economic development:

place-based development, economic gardening, and creativity and talent cultivation (Morgan et al., 2009).

Place-based development capitalizes on the unique factors within a community. Whether it be natural amenities, historic factors, or infrastructure, focusing on these characteristics to increase the quality of life within a community is key to bolstering growth. Quality of life factors should be focused on and enhanced, but not recklessly. By enhancing these place-based characteristics, increases in tourism can occur. While this can be good, if it is unchecked or happens too rapidly, it can negatively impact a community in the short term (Morgan et al., 2009).

Economic gardening focuses on an entrepreneurship-based approach, focusing on information, infrastructure, and social capital. By developing the economic opportunities already present within a community, or ‘economic gardening’, opportunities for growth can be created without relying on external support. The International City/County Management Association (ICMA) defines economic gardening by saying, “Economic gardening is an entrepreneurial approach to economic development that seeks to grow the local economy from within”, and is based on an entrepreneurial economy that was formed in Littleton, Colorado after a large employer withdrew from the region (Hamilton-Pennel, 2010; Farmer, 2014). This approach ensures incremental and long-term success, rather than waiting for an opportunity to come to you. Economic gardening is highly dependent on the local community, and often goes hand-in-hand with place-based development, creating opportunity for a comprehensive approach to success.

Talent cultivation is very similar to economic gardening, except for the fact that this approach is more educational in nature. By cultivating talents (and appreciation for talents) within a county, growth can be further stimulated. Talent cultivation isn't limited to the arts; instead creating opportunities for learning such as trade schools can help increase growth opportunities. By continuing to invest in the individual citizens of a community, a healthy culture is created, encouraging growth and economic viability (Morgan et al., 2009).

Filling in the Gaps

While the history of federal revenue sharing is well documented, and the equitability of existing structures to facilitate revenue sharing has been researched, significant gaps remain. A review of published articles, white papers, and journals revealed that county budget changes as federal receipts change has not been analyzed. In addition, current research has focused on the correlation between socioeconomic factors and timber harvests as a whole, without stratifying differences between public and private lands. This research, while essential, is not comprehensive. The following research is designed to explain to researchers, policy makers, and counties the relationship between federal receipts and county budgets and socioeconomic factors. This will provide a deeper understanding about what timber dependency is and is not, and will provide further evidence to understand what “resiliency” is in historically timber dependent counties.

CHAPTER 3 – METHODOLOGY

Why a Case Study Approach

A case study is, “An empirical inquiry about a contemporary phenomenon (e.g., a “case”), set within its real-world context- especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2011). Given that this research is explanatory in nature, a case-based approach is appropriate (Yin, 2011). It is important to emphasize the real-world context of these studies, spatially and temporally, and given that it is not possible to run tests on counties and the receipts they receive from FLMA, a case study approach is appropriate.

A multiple-case study approach, with embedded subcases was used. The case studies, by definition, are qualitative (albeit data driven), with subcases containing quantitative analysis. These case studies capture how federal receipts have changed over time, and the associated effects that occurred to and within six counties in Oregon. By using multiple counties, a level of direct and theoretical replications is achieved.

Data for the case studies comes from reported sources- census data, reported socioeconomic factors, etc. Using reported data can lead to biases. For example, reported crime rates are not necessarily reflective of true crime rates, as a decrease in law enforcement budgets may mask an increase in true crime (Yin, 2011). Similarly, there is opportunity for reported sources to provide information in a more favorable light than may actually be reflective of the scenario, or to downplay events to better suit a particular narrative. Reported data can also come from biased sources, such as politically charged reporters or politicians, requiring additional scrutiny. To compensate for this, audited data was used whenever possible in this research.

While there is still opportunity for different reported methods (such as those found in county budgets), audited data is held to a higher rigor and may address biases.

County Selection

This research serves to examine how county budgets have changed over time as federal receipts changed. As such, counties that were more likely to be sensitive to changes in federal receipts were examined. To determine which counties would be appropriate to study, a two-pronged approach was used. Headwaters Economics defines county timber dependency as counties with a population of less than 200,000, in which timber-related jobs contributed 20 percent or more of workers earnings from 1970-1989 (Rasker, 2017). By this metric, Columbia, Coos, Crook, Curry, Douglas, Grant, and Klamath counties are historically timber dependent. Functioning under a different objective, Oregon's 2016 Financial Condition Review identified four counties (Curry, Douglas, Josephine, and Polk Counties) as "Counties to Monitor", or counties facing solvency challenges (Wenger, 2016). The 2016 financial condition review analyzed 10 indicators to determine the financial condition of counties, with timber revenue dependence being the second indicator on the list.

To facilitate this research, counties that were historically timber dependent, were adjacent to historically timber dependent counties, or had intriguing qualitative factors surrounding their relationship with timber were chosen. In total, six counties were chosen to serve as case studies in Oregon: Coos, Crook, Deschutes, Douglas, Josephine, and Wallowa County. Coos, Crook County, Douglas, and Josephine County were chosen as representative historically timber dependent counties in Oregon, with Douglas County and Josephine County also being listed as "Counties to Monitor" under Oregon's 2016 financial condition review (Figure 4).

Deschutes County, while not classified as historically timber dependent, was chosen for qualitative factors, including the relative significance of public lands within the county for recreation and proximity to Crook County, which was defined as historically timber dependent. Deschutes County saw contribution to total earnings from timber related jobs decrease from 15% to 3% between 1970 and 1989, preventing Headwaters Economics from defining it as historically timber dependent (Rasker, 2017). Likewise, Wallowa County was chosen for qualitative factors including geographic separation and unique county characteristics such as its small population and natural amenities rather than for historic timber dependence. Similar to Deschutes County, Wallowa County saw timber-related job earnings decrease from a 16% contribution to total earnings to 3% between 1970 and 1989, preventing it from being defined as a historically timber dependent county. These counties may serve as control counties in future studies, but currently facilitate comparison and contrast between historically timber dependent counties in Oregon and counties not defined in the literature to be historically dependent on timber.

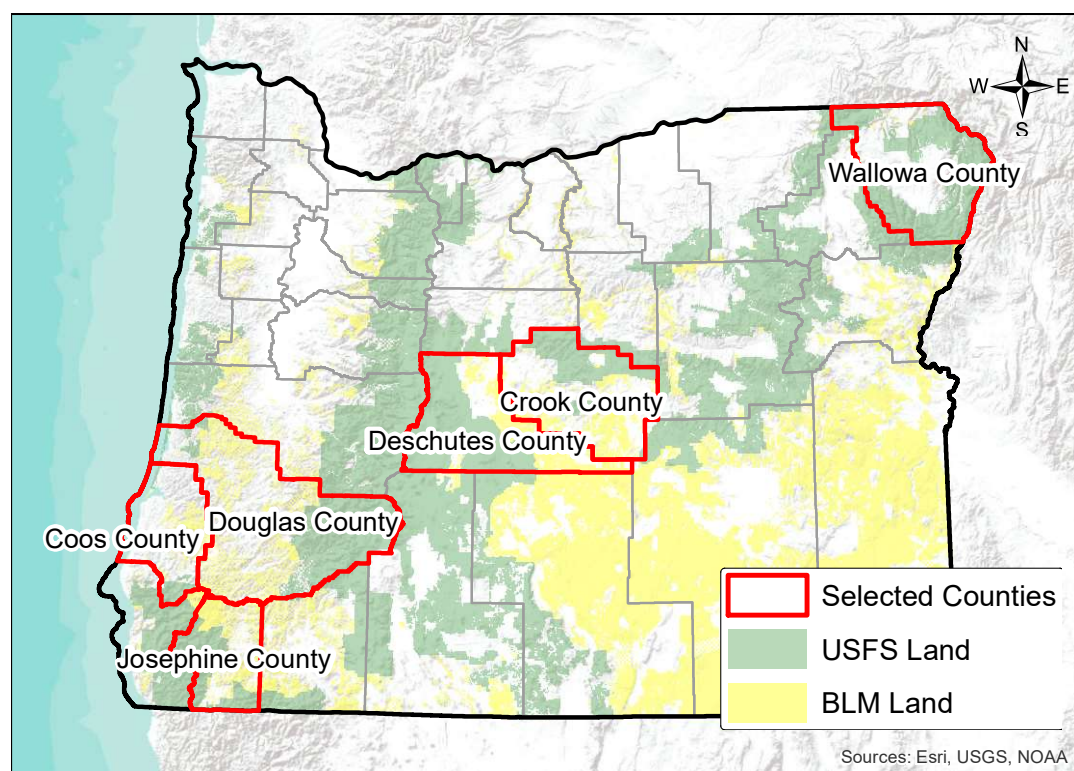


Figure 4. Counties Selected for Case Study Analysis (Bureau of Land Management, n.d.; USDA Forest Service, n.d.).

Data Collection

The USFS Human Dimensions Toolkit (also known as the Economic Profile System), created by Headwaters Economics, allows for reports to be generated on a variety of topics including socioeconomic measures, timber harvest, demographics, and federal land payments (Headwaters Economics, 2018). These reports were retrieved at a county-by-county level. Digital county audit reports dating back to 2004 are available through the Oregon Secretary of State's Local Government Audit Report Search Engine ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.). Physical copies of county audit reports from 1989-2003 are stored in the Salem Archives. Due to policies surrounding audits, all audits dating further back than 1989 have been purged from local and state records. All existing reports were retrieved and manually

entered into spreadsheets for analysis. Due to a lack of standardization, each county had unique budgets, preventing a uniform database from being created (Table 2). While county budgets contain similar information, each county has the ability to group revenue and expense items as they see fit. For example, Josephine County has a catch-all revenue line for ‘taxes’, while Coos County has unique lines for ‘property taxes’ and ‘taxes-other’. These differences between counties resulted in each county’s budget data being analyzed separately rather than a comprehensive look at each budget over time across counties.

Table 2. Highlighted County Budget Categories.

County	Coos	Crook	Deschutes	Douglas	Josephine	Wallowa
Revenue	Property taxes	Property taxes	Taxes	Charges for services	Taxes	Taxes
	Taxes- other	Taxes- other	Taxes- other	Permits, licenses, and fines	Fees and charges for services	Intergovernmental
	Intergovernmental	Interest	Licenses and permits	Property taxes	Interfund charges for services	Licenses and permits
	Licenses, fees, and permits	Licenses, permits, and fees	Fines, forfeitures, and penalties	Assessments	Intergovernmental revenues	Charges for services and supplies
	Charges for services	Charges for services	Special assessments	Interest	Other revenues	Interest earnings
	Timber sales	Other	Interest and rents	Other		Other
	Fines and forfeitures	Local	Intergovernmental			
	Interest on investments	State	Charges for services			
	Other revenue	Federal	Other			
Expense	General government	General government	General government	General government	General government	Administrative services
	Public safety	General services	General services	Public safety	Public safety	Community development
	Public works	Public safety	Public protection	Highways and streets	Public works	Human services
	Health and welfare	Highways and roads	County roads	Sanitation	Culture and recreation	Public safety
	Conservation	Health and welfare	Health and welfare	Health and welfare	Community development	Public works
	Community development	Culture and education	Education	Culture and recreation	Human services	Capital outlay
	Culture and recreation	Principal	Principal payments	Conservation	Debt service- principal	Principal
	Intergovernmental	Interest	Interest	Education	Debt service- interest	Interest
	Debt service	Capital outlay	Trustee fees	Capital outlay	Debt service- bond issuance costs	Personal services
	Capital Outlay	Personnel services	Debt issuance costs	Principal	Physical & mental health	Materials and services
	Principal	Turnover to the state of Oregon	Capital outlay	Interest	Physical environment	Other requirements
	Interest on investments	Turnover to other districts	General services		Capital projects	Trust/agency expenditures
	Conservation	Other				Forest revenue
	Education	Education				Trust/agency receipts
		Sanitation				Bond sale receipts

While county audit reports do not have a definitions section, a qualitative look at the audits can provide insight to what each revenue and expense item represents. For example, intergovernmental revenue within Douglas County was comprised predominantly of state motor vehicle fees, and Crook County explicitly states that, “...Intergovernmental agreements with the Countywide Law Enforcement District and Rural Law Enforcement District, are accounted for...for countywide law enforcement services”, while federal revenue was categorized as a separate revenue item than these intergovernmental revenues. The lack of uniformity does

present a barrier to fully understanding and comparing these revenue and expense items, as can be seen by Crook County’s expense item “culture and education”, which is not directly comparable to Douglas County’s “culture and recreation” expense item. This lack of uniformity is one limitation of reported data, which can limit explicit understanding of each item and prevent direct comparison between revenue and expense items across counties.

The Oregon Department of Forestry (ODF) provides a comprehensive dataset of private and public timber harvests on a county-by-county level, and publishes this data through Oregon State’s Open Data Portal. To create this comprehensive dataset, the ODF collects data from a variety of agencies. The Oregon Department of Revenue collects data on Forest Industry, Other Private, and Other Public entities. Native American harvests were compiled from the five Confederated Indian Tribes by the ODF. The BLM reports all timber harvests occurring on BLM land, and the USFS compiled the reports of all timber harvest occurring on USFS lands. All units (unless otherwise specified) are in thousand board feet (MBF), and are measured using the Scribner Log Scale. The ODF used conversion factors to normalize the scaling of data depending on region and policy over time, ensuring all units were equivalent and eliminating the need for any post-processing or transformation of the dataset (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

Data Analysis

Due to the fact that each county in Oregon has unique budget structures, each county served as an independent population for this study. To account for population effects, county budgets and total federal receipts were converted to dollars per capita. By converting all budgets to a per capita basis, county revenues and expenses can be directly compared against each other,

regardless of population size or growth over time. Normality and autocorrelation were qualitatively evaluated using quantile-quantile plots and autocorrelation plots in RStudio. If the data was right-skewed and log-transforming improved the normality of the dataset, these transformations were made. Then simple linear regression (SLR) was used to quantify the relationship between annual total revenue and county-level federal receipts, and annual total expenses against county-level federal receipts.

All budget data and federal receipt data was reported and analyzed in nominal values rather than being inflation-adjusted. While future research may consider analysis based on real values instead of nominal, it is important to note the approach used in this research.

Individual budget items totaling at least 5% of a county's revenue or expense over time were similarly analyzed. Each budget item was normalized and assessed for autocorrelation in RStudio. SLR was used to quantify the relationship between each dependent variable (budget item) and the predictor variable (federal timber harvests). The resulting outputs identified whether any correlation between the predictor and dependent variables were present.

The following section highlights each county's profile and provides relevant quantitative and qualitative facts about the county. These county profiles set the stage for the results, providing depth and context to facilitate the understanding of each county's nuances and individuality. Upon providing this county background, the results will be provided on a county-by-county basis, further deepening the understanding of each unique county. In the discussion, counties will be grouped based on how they responded, allowing for comparison of counties within Oregon. This structure is designed to enhance county-specific knowledge and simultaneously allow for comparison and contrasts between counties.

CHAPTER 4 – COUNTY PROFILES

County Profiles: Coos County

“Located on the southern Oregon Coast (Figure 5), Coos County stretches from the Lakes of Tenmile to the Cranberry Bogs of Bandon encompassing nearly 1,600 square miles. Most of its population of 63,043 can reach the Pacific beaches in minutes, From Sunset to Horsfall to Whiskey Run [sic]. Coos County has 7 cities, with the County Seat in Coquille.

Currently, forest products, tourism, fishing and agriculture dominate the Coos County economy. The service industry is replacing the former lumber-driven economy.

Bandon Dunes Golf Resort, north of Bandon and south of Coos Bay, attracts tourists and golfers from around the world. Boating, dairy farming, myrtlewood manufacturing, shipbuilding and repair and agriculture specialty products, including cranberries, also play an important role.”(Coos County, 2018).

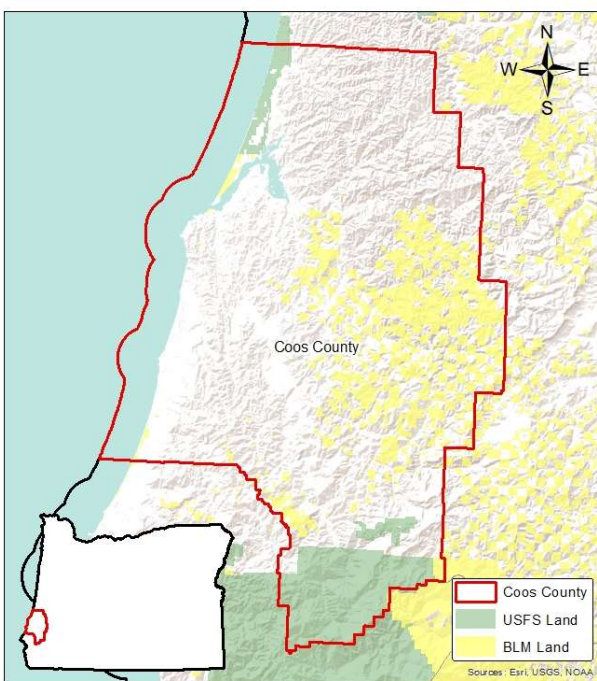


Figure 5. USFS and BLM land in Coos County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.).

When using the state of Oregon and the United States as benchmarks, Coos County has underperformed socioeconomically. Between 1970 and 2016, Coos County saw its population

grow by 12%, while Oregon saw its population grow by 95%, and the U.S. saw its population grow by 59% (Figure 6). In 2016, unemployment rates were at 30-year lows within Coos County and the state of Oregon, and were similarly low at national levels, but responded dramatically to recessions (Figure 7). In the same timeframe, Coos County saw a 37% increase in employment, compared to the statewide 165% increase in employment and the national 112% increase in employment (Figure 8). Coos County also saw personal income (in real terms) increase by 98%, compared to the 255% statewide increase in personal income and the 201% increase in personal income that the nation saw (Figure 9) (Headwaters Economics, 2018).

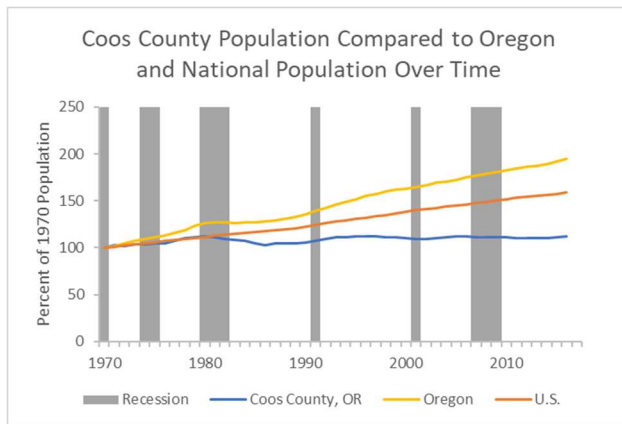


Figure 6. Coos County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

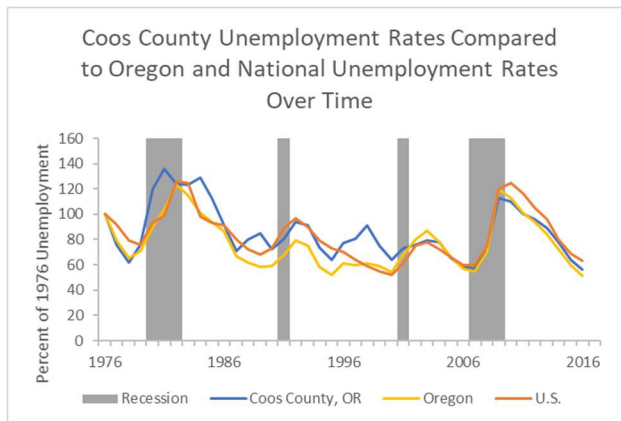


Figure 7. Coos County Percent Unemployment Rates Compared to Oregon and National Percent Unemployment Rate Change between 1976 and 2017 (Headwaters Economics, 2018).

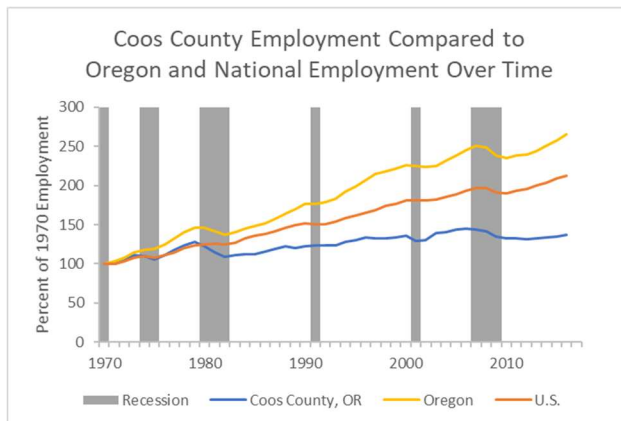


Figure 8. Coos County Percent Employment Change Compared to Oregon and National Percent Employment Change between 1970 and 2017 (Headwaters Economics, 2018).

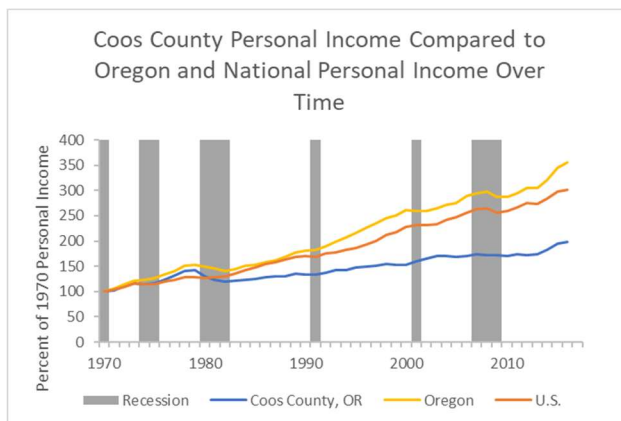


Figure 9. Coos County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change between 1970 and 2017 (Headwaters Economics, 2018).

Timber harvests have fluctuated in Coos County over time, ranging from 741,551 MBF (thousand board feet) in 1964 to a low of 195,669 MBF in 2009 (Figure 10). While timber harvests from privately owned lands have fluctuated over time, harvests from publicly owned lands have recognized far greater fluctuations, with a dramatic decrease in harvests due to “the spotted owl effect” in the late 1980’s. Policy changes which impacted these timber harvests on public lands may have also had significant ramifications on socioeconomic factors within Coos County.

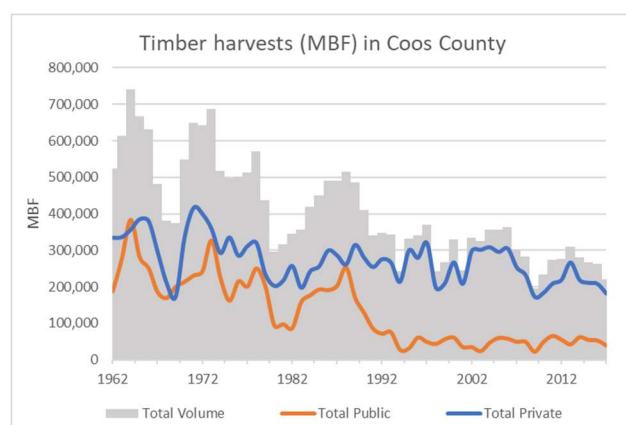


Figure 10. Coos County Private and Public Timber Harvests between 1962 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

As federal timber harvest volumes decreased over time, federal receipts from the USFS and the BLM also decreased. While federal receipts from the BLM were proportionally small, the receipts from the USFS were substantial, annually totaling more than \$10,000,000 between 1986 and 1993. While congressional policies cushioned the decreases in federal revenue sharing to Coos County, total receipts dropped from \$11,000,000 in 1986 to just over \$2,000,000 in 2017 (Figure 11).

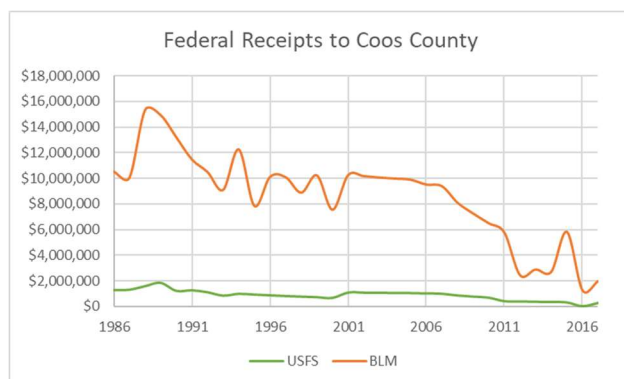


Figure 11. Federal Receipts from the USFS and BLM to Coos County between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Crook County

“Crook County is located in the center of the state (Figure 12), approximately three hours from Portland, Salem, Corvallis and Eugene. Bend, the largest city in central Oregon, is approximately 40 minutes away.

Geographically Crook County, with a population of approximately 26,845, is Oregon's most centrally located county. Founded in 1882, the county seat, Prineville, has a population of 10,370. It is the only incorporated population center within Crook County. Powell Butte, Post and Paulina are the other communities found within the County.

Livestock, forest products, recreation, agriculture, manufacturing and wholesale trade comprise the major industries found within the county. Covering approximately 2,991 square miles, Crook County is rich in forests, rangelands and irrigated agricultural fields. The elevation of Prineville is 2,868 feet and receives an average of 10.5 inches of moisture per year. Nights are cool and daytime temperatures are moderate. Average temperature in January is 31.8 degrees; in July it is 64.5 degrees.”(Crook County, 2018)

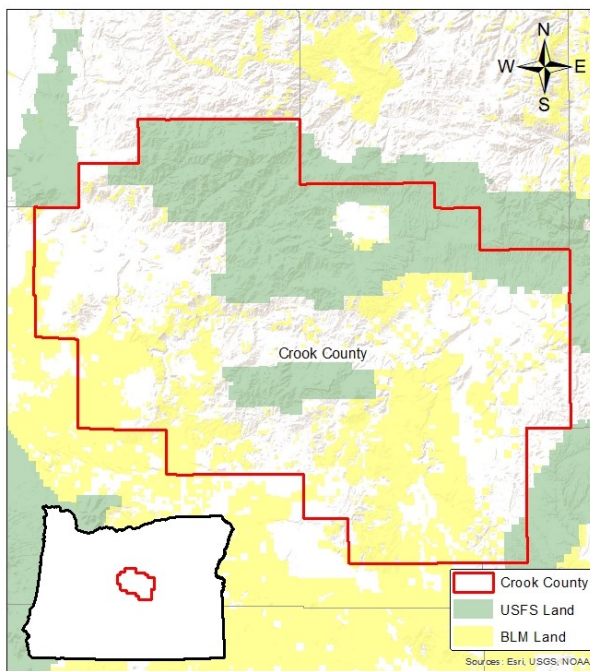


Figure 12. USFS and BLM land in Crook County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.).

Crook County’s population increased 124% between 1970 and 2016, compared to a 95% increase in Oregon and a 59% population increase nationwide (Figure 13). In the secular press,

Prineville (the county seat of Crook County) City Manager explicitly attributes some of this growth to major companies building data centers within the region and directly points out this new industry replacing the timber industry (Spurr, 2017). Between 1976 and 2016, unemployment in Crook County tended to be lower than in Oregon or nationwide, a trend that has continued since the Great Recession (Figure 14). County employment levels have increased by 104% in the same time period, compared to the 165% increase in employment that Oregon saw and the 112% increase in employment that occurred in the U.S (Figure 15). Personal income in Crook County increased by 254%, nearly matching the 255% increase that Oregon saw, and exceeding the 201% increase that occurred nationwide (Figure 16) (Headwaters Economics, 2018).

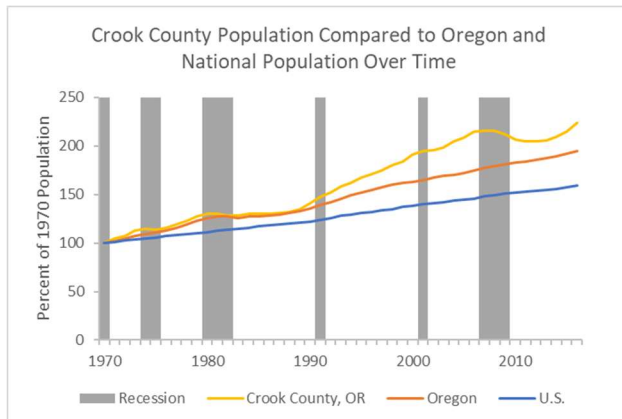


Figure 13. Crook County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

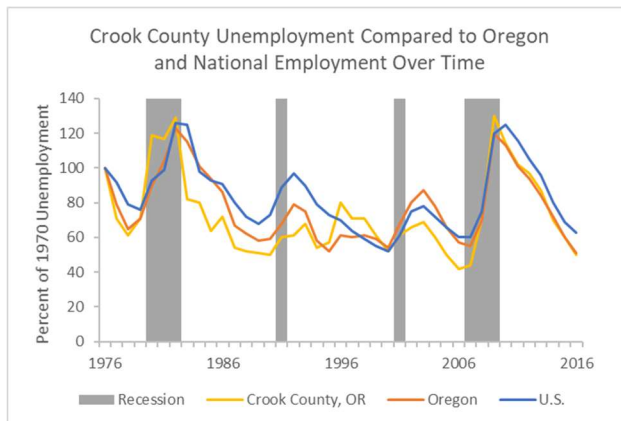


Figure 14. Crook County Unemployment Rates Compared to Oregon and National Unemployment Rates between 1976 and 2017.

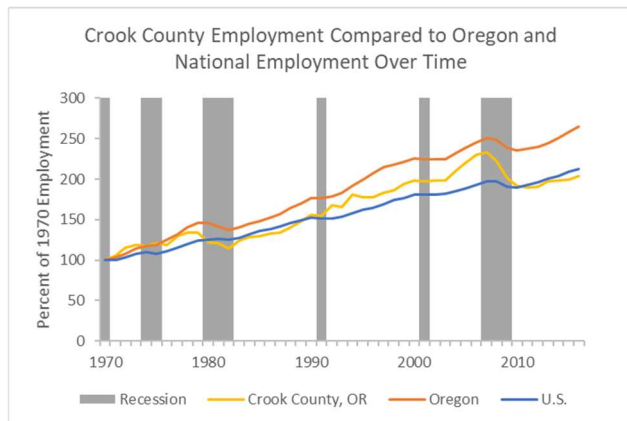


Figure 15. Crook County Percent Employment Change Compared to Oregon and National Percent Employment Change between 1970 and 2017 (Headwaters Economics, 2018).

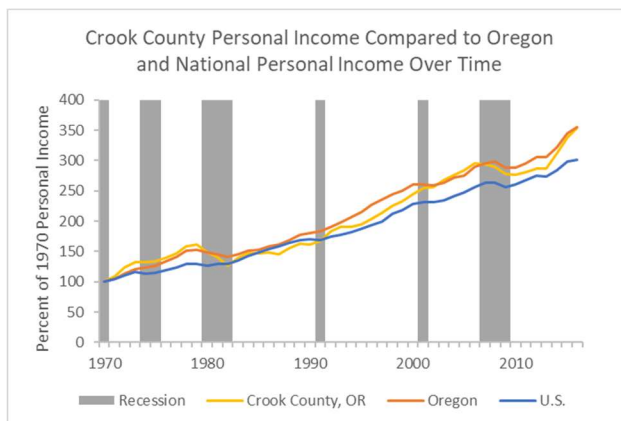


Figure 16. Crook County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change between 1970 and 2017.

Timber harvests have decreased dramatically in Crook County, falling from an all-time high of 114,881 MBF in 1962 to 10,460 MBF harvested in 2017 (Figure 17). Historically, federal timber harvests comprised a vast majority of timber harvested, but this pattern began to change in 1991. From 1991 to 1994, public timber harvests nearly matched private timber harvests. From 1995 until 2000, private timber harvests greatly outpaced public timber harvests, when both private and public timber harvests fell to near-zero levels.

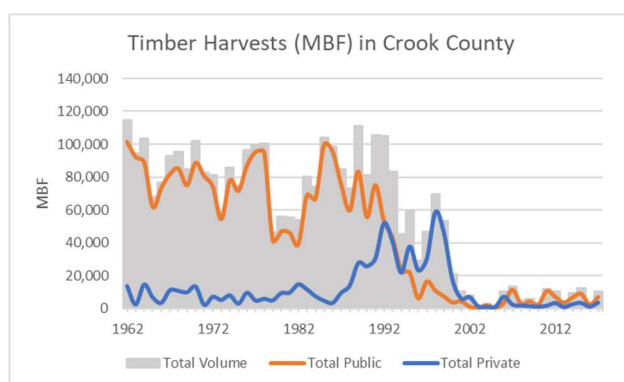


Figure 17. Crook County Private and Public Timber Harvests between 1962 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

As federal timber harvest volumes decreased over time in Crook County, federal receipts from the USFS also decreased. Federal receipts from the BLM technically increased over time, increasing from \$0 in 2003 to \$53,362 in 2017, but these values remain fairly insubstantial in comparison to receipts from the USFS, which fell from over \$9,000,000 in 1986 to just over \$1,500,000 in 2017 (Figure 18).

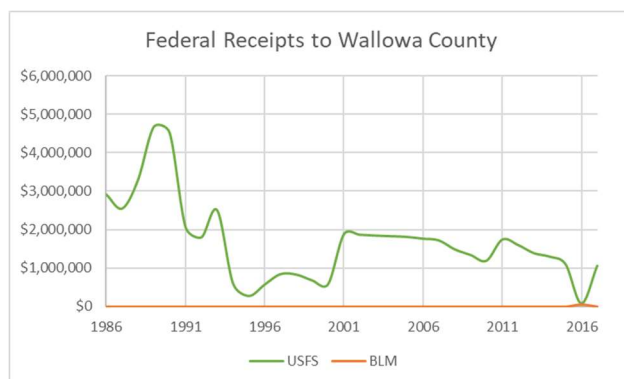


Figure 18. Federal Receipts from the USFS and BLM to Crook County between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Deschutes County

“Located in the heart of Central Oregon (Figure 19), between the towering Cascade Mountain Range to the west and the high desert plateau to the east, Deschutes County is the outdoor recreation capital of Oregon. The county encompasses 3,055 square miles of scenic beauty, mild climate, diverse recreational opportunities and a growing economy. From humble beginnings, Deschutes County now experiences the most rapid population growth of any county in Oregon. It has developed into a bustling, exciting destination where progress, growth and unique beauty intertwine.

Among Deschutes County’s residents, 93.3% are white, 0.6% are American Indian, 1.2% are Asian, 2.2% are of another race with the remaining 2.7% of two or more races. Hispanic or Latino of any race, represent 7.7% of the population. The median age of Deschutes County residents is 41.9 years old, which is slightly older than the U.S. median age of 37.6 years old. The County median age includes 17.4% of residents who are 65 years old or older and 21.9% under the age of 18.

Among current Deschutes County residents, 58% were born outside of Oregon, including 5.5% who were born outside the United States. 39% of all residents moved into their current home between 2000 and 2009 and 41% moved in 2010 or later.”(Deschutes County, 2019).

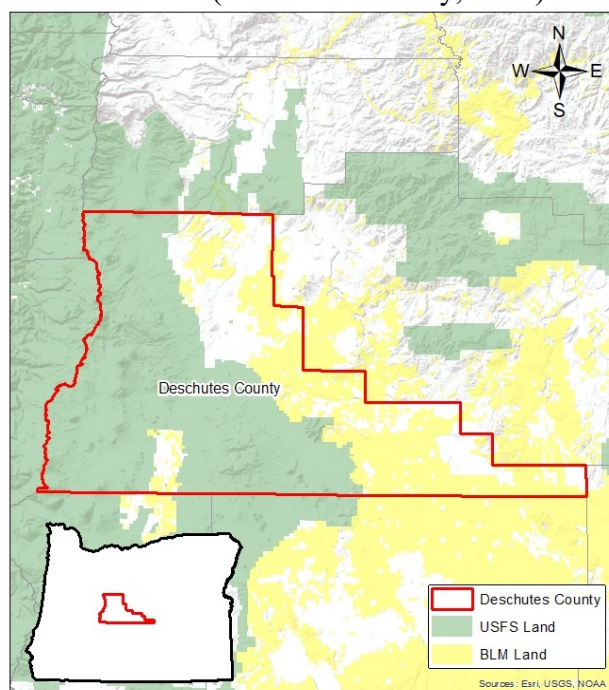


Figure 19. USFS and BLM land in Deschutes County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.).

To suggest that Deschutes County is growing rapidly would be an understatement.

Deschutes County has seen a 487% population increase between 1970 and 2016, compared to the 95% population increase that occurred in Oregon or the 59% population increase that occurred nationwide (Figure 20). Unemployment rates are currently similar between Deschutes County, Oregon, and the U.S., but recessions have had a proportionally larger impact on Deschutes County than other benchmarks (Figure 21). Secular articles report that, to some extent, the replacement of a commodities sector (i.e. timber) with a tourism and recreation based economy contributed to Deschutes County's exaggerated response (The Oregon Editorial Board, 2013). During the same period of time, Deschutes County has seen a 775% increase in employment, compared to a 165% increase statewide or a 112% increase across the U.S. (Figure 22). Personal income has also increased by 1035% within the county during this period, compared to a 255% increase in Oregon and a 201% increase nationwide (Figure 23) (Headwaters Economics, 2018).

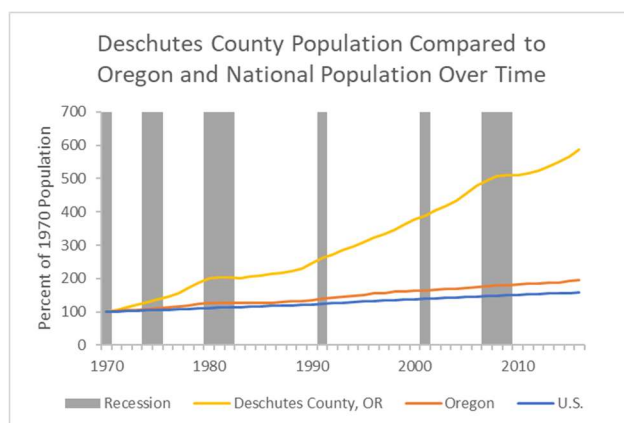


Figure 20. Deschutes County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

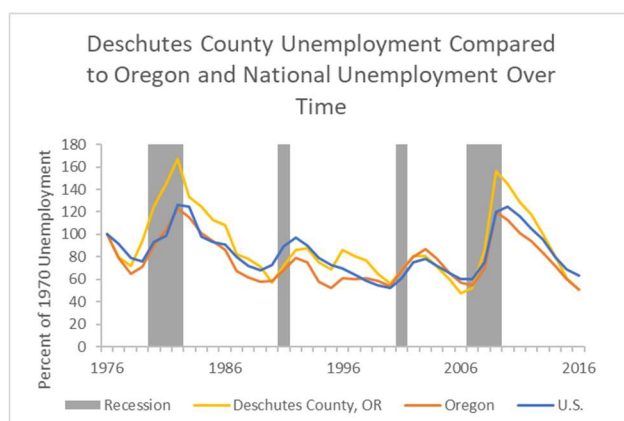


Figure 21. Deschutes Percent Unemployment Rate Change Compared to Oregon and National Percent Unemployment Rate Change between 1976 and 2017 (Headwaters Economics, 2018).

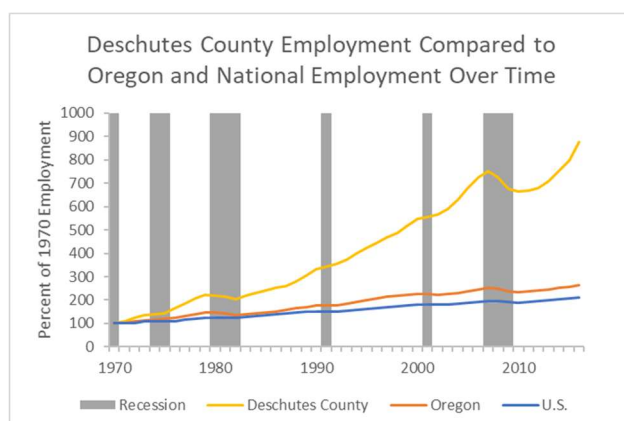


Figure 22. Deschutes County Percent Employment Change Compared to National Percent Employment Change between 1970 and 2017 (Headwaters Economics, 2018).

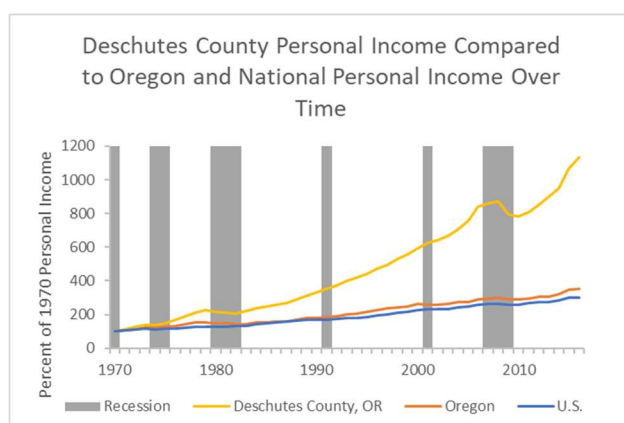


Figure 23. Deschutes County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change between 1976 and 2017 (Headwaters Economics, 2018).

Until 1991, federal timber harvests in Deschutes County fluctuated around an average volume of ~80,000 MBF over time, with total harvests of approximately 100,000 MBF (Figure 24). Federal timber harvests comprised the majority of the total timber harvested, but federal timber harvests began to decrease rapidly in 1991. Private timber harvests have remained fairly constant over time. Total timber harvests were 29,603 MBF in 2017, which is representative of timber harvests since 2000 in Deschutes County.

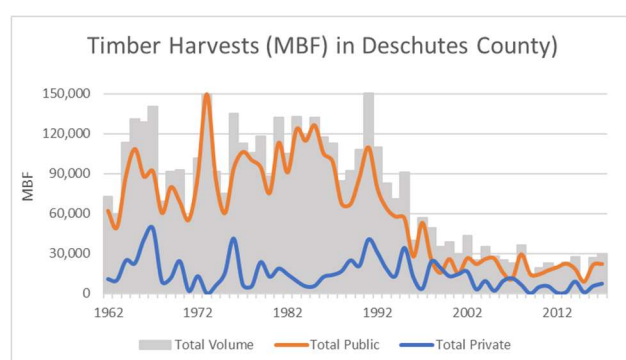


Figure 24. Deschutes County Private and Public Timber Harvests between 1962 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

Deschutes County exhibited similar trends to its neighboring county, Crook County. As federal timber harvest volumes decreased over time, federal receipts from the USFS also decreased. Receipts from the BLM increased from \$0 in 2003 to \$53,846 in 2017, but this increase did not compensate for the decrease in USFS receipts, which fell from roughly \$11,000,000 in 1986 to \$1,41,000 in 2017 (Figure 25).

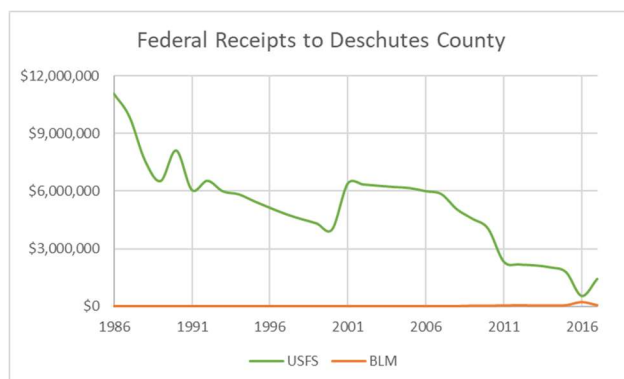


Figure 25. Federal Receipts from the USFS and BLM to Deschutes County between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Douglas County

“Douglas County was named for U.S. Senator Steven A. Douglas (1813-1861). Senator Douglas was a Democratic candidate for the Presidency against Abraham Lincoln in 1860, and he was an enthusiastic Oregon supporter in the Congress. When first created on January 24, 1851, the County was part of Umpqua County. On January 7, 1852, the Territorial Legislature created new boundaries and renamed it Douglas County.

The County extends from sea level at the Pacific Ocean to 9,182 foot Mt. Thielsen in the Cascade Mountains. It has the entire Umpqua River watershed within its boundaries, and it contains nearly 2.8 million acres of commercial forest lands (Figure 26).

Approximately 25% of Douglas County's labor force is employed in the forest products industry which includes numerous sawmills and veneer plants, as well as one pulp and one particle board plant, and numerous shingle, shake, pole and other wood products plants. Agriculture is an important factor in the economy with field crops, orchards, and livestock as major products. The County Parks Department, the first in Oregon, has over 50 parks in the system. They range from large facilities with overnight camping to small boat launching access points. Over 50% of the land area of the County is owned by the Federal Government. These lands are managed by the U.S. Forest Service and the Bureau of Land management. The 2010 census counted 107,667 people in Douglas County. There are 12 incorporated cities in the County: Canyonville, Drain, Elkton, Glendale, Myrtle Creek, Oakland, Reedsport, Riddle, Roseburg, Sutherlin, Winston, and Yoncalla.

The wood products industry has always been Douglas County's mainstay, as some of the nation's largest timber stands continue to grow here. With 19 percent of the total workforce directly employed in forest harvesting and production, it is estimated that another 30 percent owe their jobs to the necessary support services. Diversification of Douglas County's industrial and economic base is being aggressively pursued, and new enterprises provide additional employment for the highly skilled and motivated labor force. Specialty electronics, research and development, business forms, and unique law enforcement rain gear are just some of the items manufactured in the Roseburg area. New firms with manufacturing facilities in Douglas County include a major pleasure boat company, an electrical cable manufacturer, and various secondary wood products firms.” (Douglas County, 2018)

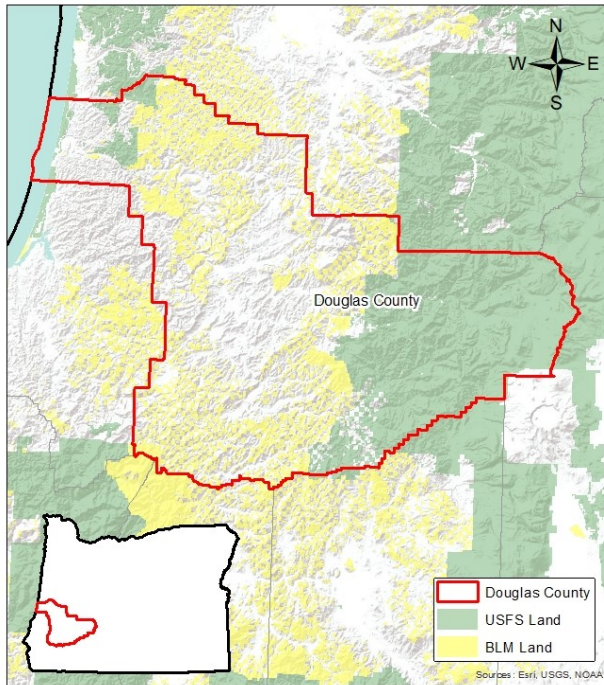


Figure 26. USFS and BLM Land in Douglas County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.)

When compared to statewide and national benchmarks, Douglas County is slightly underperforming. Between 1970 and 2017, Douglas County’s population has increased by 50% compared to a 95% increase statewide and a 59% national increase (Figure 27). Douglas County’s unemployment rates are currently equal to federal unemployment rates, but historically and in times of recessions, Douglas County has seen significantly higher unemployment levels than the state or nation (Figure 38). Secular media attributes this directly to decreases in employment in the timber sector, stating “In Douglas County, local officials estimate that one in four jobs is directly tied to wood: cutting it, transporting it, making it into building material. State statistics show that the county lost a quarter of its wood products jobs since the start of 2008...” (Associated Press, 2009).

Douglas County has seen a 79% increase in employment, compared to a 165% increase in employment within the state and a 112% increase nationwide (Figure 29). Personal income has increased 151% within the county, compared to 255% statewide, and 201% nationally (Figure 30) (Headwaters Economics, 2018).

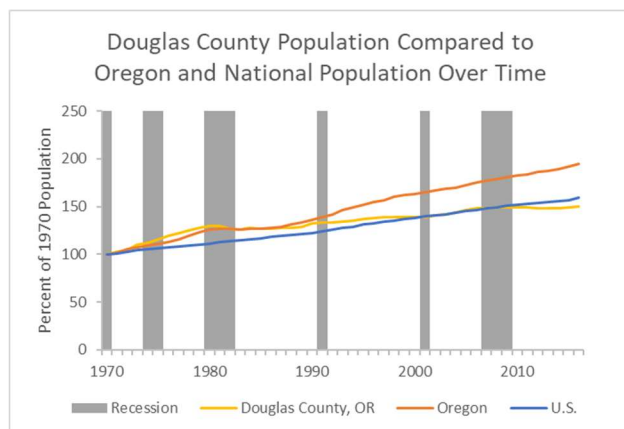


Figure 27. Douglas County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

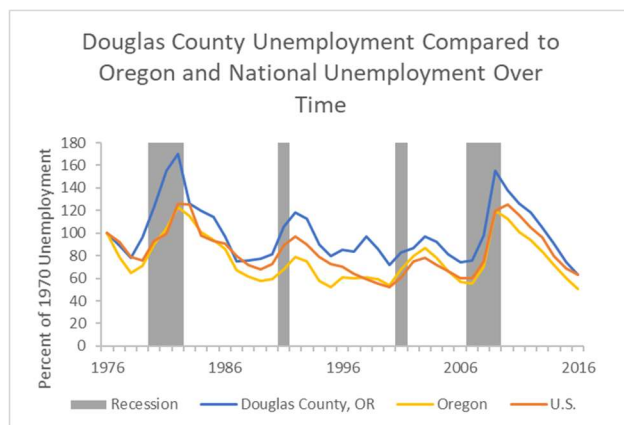


Figure 28. Douglas County Percent Unemployment Change Compared to Oregon and National Percent Unemployment Change between 1976 and 2017 (Headwaters Economics, 2018).

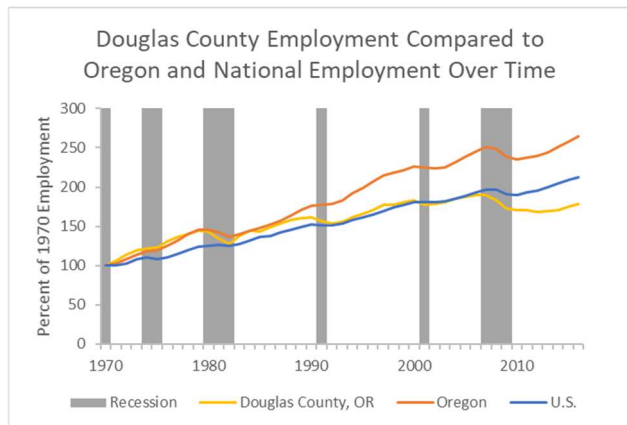


Figure 29. Douglas County Percent Employment Change Compared to Oregon and National Percent Employment Change Between 1970 and 2017 (Headwaters Economics, 2018).

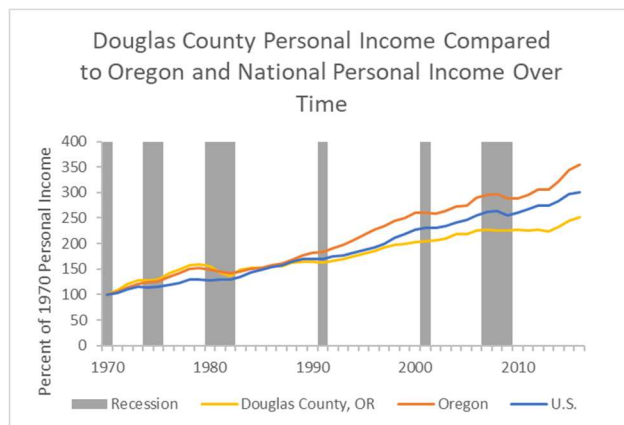


Figure 30. Douglas County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change Between 1970 and 2017.

Timber harvests in Douglas County averaged approximately 1,300,000 MBF until the late 1980s, and was roughly equally split between private and public timber harvests (Figure 31). In the late 1980s, federal timber harvests dropped to roughly 60,000 MBF harvested per year, where they have plateaued. Private timber harvests have remained constant since the 1980s, with roughly 400,000 MBF being harvested annually. In 2017, a total of 588,767 MBF were harvested in Douglas County.

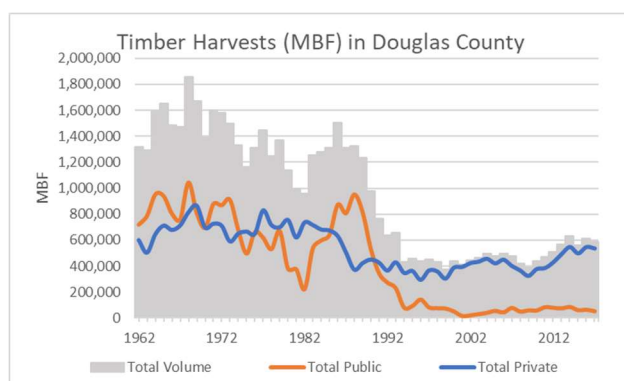


Figure 31. Douglas County Private and Public Timber Harvests between 1962 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018)..

Douglas County, with somewhat similar holdings of USFS and BLM land, saw similar decreases in federal receipts over time. As federal timber harvests decreased in Douglas County, total federal receipts decreased from \$68,000,000 in 1986 to \$17,000,000 in 2017. While congressional policies slowed this loss of revenue, as shown in the 2001 spike in both USFS receipts, total receipts in Douglas County still fell by roughly 75% over this time period (Figure 32).

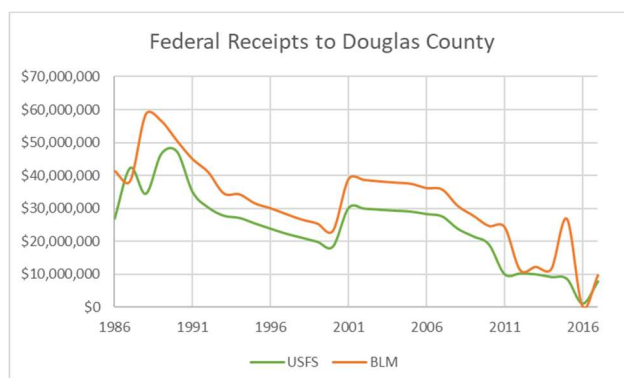


Figure 32. Federal Receipts from the USFS and BLM to Douglas County Between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Josephine County

“Josephine County is a county in the U.S. state of Oregon (Figure 33). As of the 2010 census, the population was 82,713. The county seat is Grants Pass.

Most of the commercial activity during the territorial period centered on gold mining and the supply of provisions to miners. Miners had been active in the Rogue and Illinois valleys since 1851. By the late 1850s, however, gold mining was beginning to decline, and population dwindled as well. In 1859, gold was discovered along the Fraser River in British Columbia and numerous people left Josephine County to search for valuable claims there.

Josephine County shares the Rogue Valley and Applegate Valley wine appellations with Jackson County. The U.S. government owns the majority of the land within the county boundaries, with the Bureau of Land Management owning 28% of the lands within the county boundaries, most of which are Oregon and California Railroad lands, and the Forest Service owning 39%.

Grants Pass is now the departure point for most Rogue River scenic waterway guided fishing and boat trips, one of the destinations being Hellgate canyon. The Illinois River, one of the Rogue's tributaries, has also been designated a scenic waterway” (“Josephine County, Oregon,” 2018).

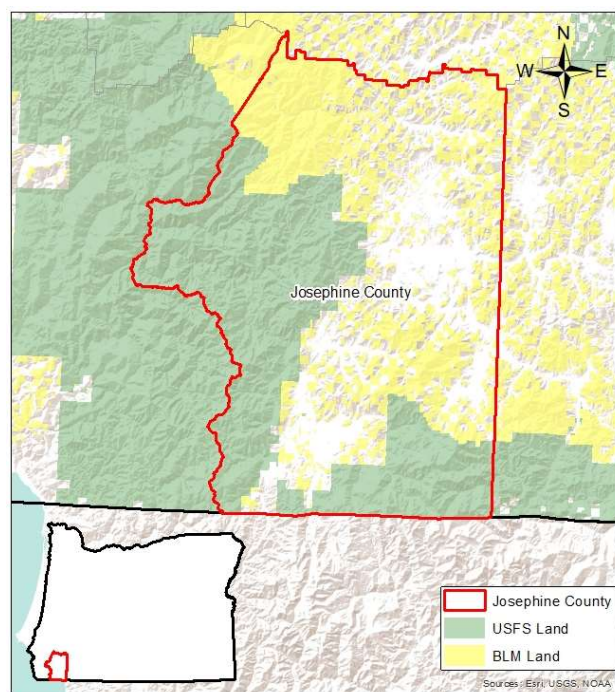


Figure 33. USFS and BLM Land in Josephine County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.)

Between 1970 and 2017, Josephine County has successfully outperformed statewide and national benchmarks. Josephine County has seen a 137% population increase, compared to a 95% population increase statewide and a 59% population increase nationally (Figure 34). Between 1976 and 2016, unemployment rates have, on average, been lower than state and national rates, but have been subject to the same recession-induced fluctuations (Figure 35). Likewise, countywide employment has increased 200%, compared to 165% within Oregon and 112% nationwide (Figure 36) in the same time period. Josephine County has also seen a 308% increase in personal income, compared to a 255% increase in personal income within the state and a 201% increase in personal income within the U.S. (Figure 37). Oregon’s Office of Economic Analysis attributes this to the “Rogue Valley Economy”, driven by tourism and recreation (Lehner, 2016) (Headwaters Economics, 2018).

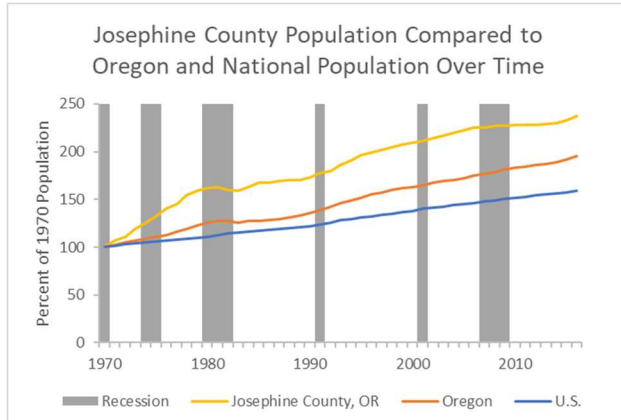


Figure 34. Josephine County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

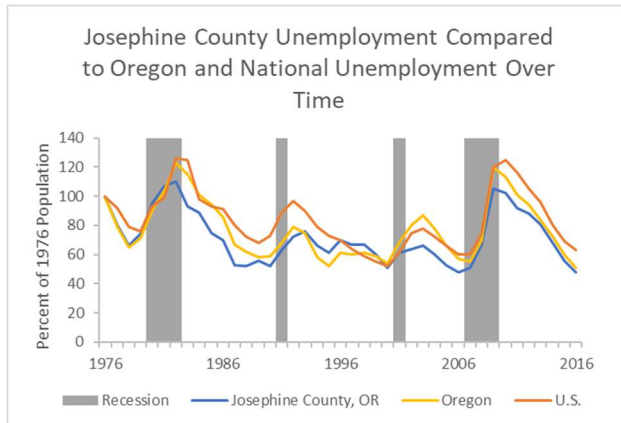


Figure 35. Josephine County Percent Unemployment Rate Change Compared to Oregon and National Percent Unemployment Rate Change between 1976 and 2017 (Headwaters Economics, 2018).

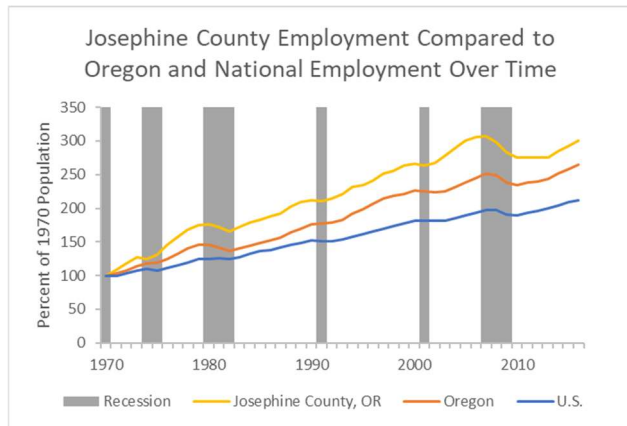


Figure 36. Josephine County Percent Employment Change Compared to Oregon and National Percent Employment Change between 1970 and 2017 (Headwaters Economics, 2018).

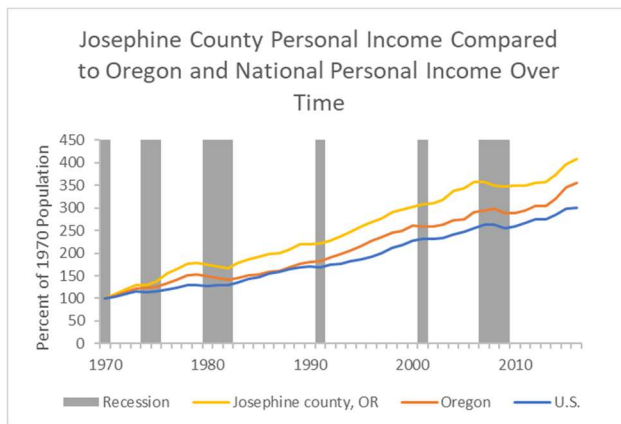


Figure 37. Josephine County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change between 1970 and 2017 (Headwaters Economics, 2018).

Timber harvests in Josephine County decreased slowly from 1962 to 1989 with a severe, albeit short lived drop in timber harvests from 1981-1983 (Figure 38). Between 1989 and 1990, federal timber harvests fell from 156,222 MBF to 58,411, and continued a downward trend until 2017, when 5,465 MBF of timber was harvested. Private timber harvests picked up in the late 1980s, roughly doubling in volume from 10,000 MBF to 20,000 MBF harvested annually. Since 1990, private timber harvests have accounted for the majority of timber harvested, making up 26,382 MBF of the 31,847 MBF of timber harvested in Josephine County in 2017.

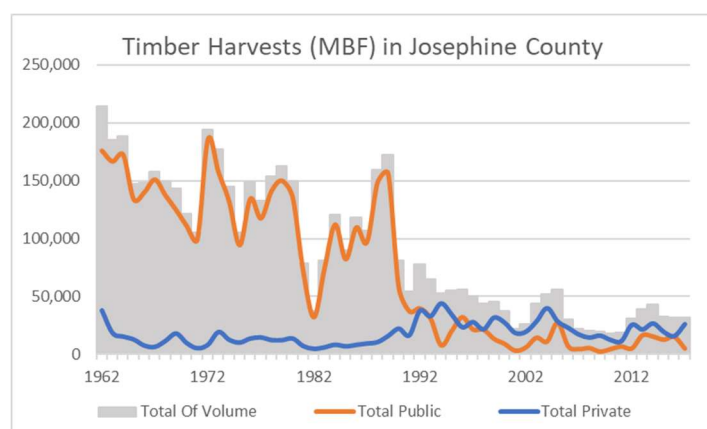


Figure 38. Josephine County Private and Public Timber Harvests between 1962 and 2017
 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018)

As federal timber harvests decreased over time in Josephine County, federal receipts from the USFS and the BLM also decreased. Between 1986 and 2017, receipts from the BLM decreased from roughly \$20,000,000 to \$4,500,000, while receipts from the USFS decreased from roughly \$4,500,000 to just over \$1,000,000 in 2017. Congressional policies boosted federal receipts in the late 1990s, but even so, federal receipts fell by roughly 75% across this time period (Figure 39).

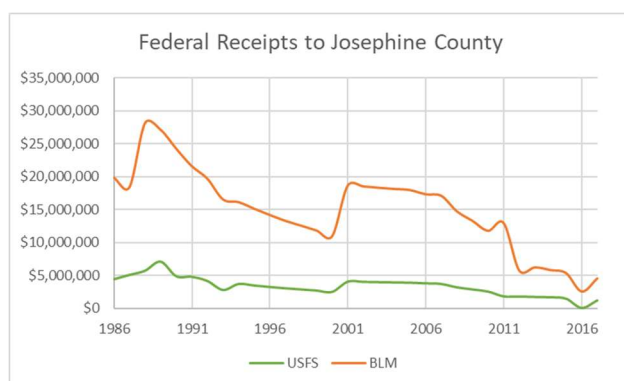


Figure 39. Federal Receipts from the USFS and BLM to Josephine County Between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Wallowa County

“Wallowa County is a county in the U.S. state of Oregon (Figure 40). As of the 2010 census, the population was 7,008, making it Oregon's fourth-least populous county. Its county seat is Enterprise. According to Oregon Geographic Names, the origins of the county's name are uncertain, with the most likely explanation being it is derived from the Nez Perce term for a structure of stakes (a weir) used in fishing. An alternative explanation is that Wallowa is derived from a Nez Perce word for "winding water". The journals of Lewis and Clark Expedition record the name of the Wallowa River as Wil-le-wah.

Wallowa County is part of the eight-county definition of Eastern Oregon.

Wallowa is the northeasternmost county of Oregon. According to the U.S. Census Bureau, the county has a total area of 3,152 square miles (8,160 km²), of which 3,146 square miles (8,150 km²) is land and 5.5 square miles (14 km²) (0.2%) is water.

The principal industries in Wallowa County are agriculture, ranching, lumber, and tourism. Since 1985, three bronze foundries and a number of related businesses specializing in statue-making have opened in Joseph and Enterprise, helping to stabilize the local economy. The Forest Service is the largest landlord in the county, owning 56% of the land.”(“Wallowa County, Oregon,” 2018)

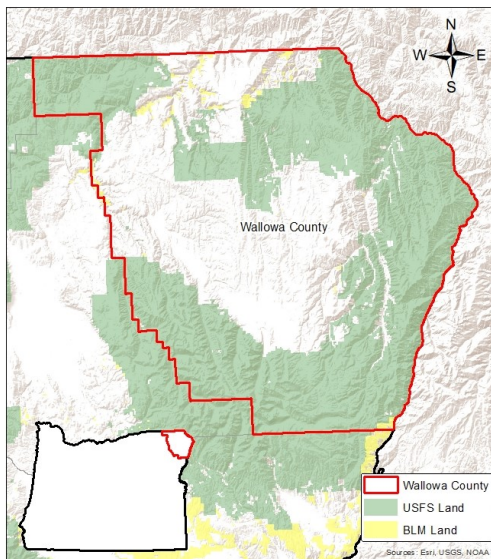


Figure 40. USFS and BLM Land in Wallowa County, Oregon (Bureau of Land Management, n.d.; USDA Forest Service, n.d.)

Wallowa County has underperformed socioeconomically against both the benchmark of Oregon and the United States. Wallowa County has seen an 11% population growth between 1970 and 2017, compared to a 95% population growth statewide, and a 59% population growth nationally (Figure 41). Wallowa County is currently enjoying low unemployment levels, and has historically had unemployment rates that matched or exceeded statewide and national unemployment rates (Figure 42). During the same time span, employment rates have increased by 66% in Wallowa County, compared to a 165% increase in employment statewide and a 112% increase in employment across the nation (Figure 43). Personal income (in real terms) has increased by 103% nationally, compared to a 255% statewide increase in personal income, and a nationwide increase of 201% (Figure 44) (Headwaters Economics, 2018).

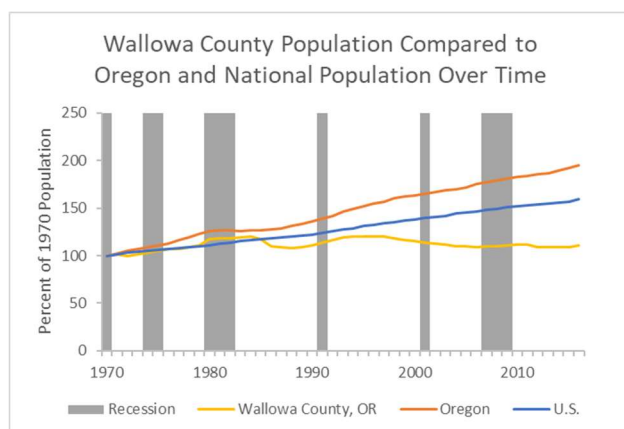


Figure 41. Wallowa County Percent Population Change Compared to Oregon and National Percent Population Change between 1970 and 2017 (Headwaters Economics, 2018).

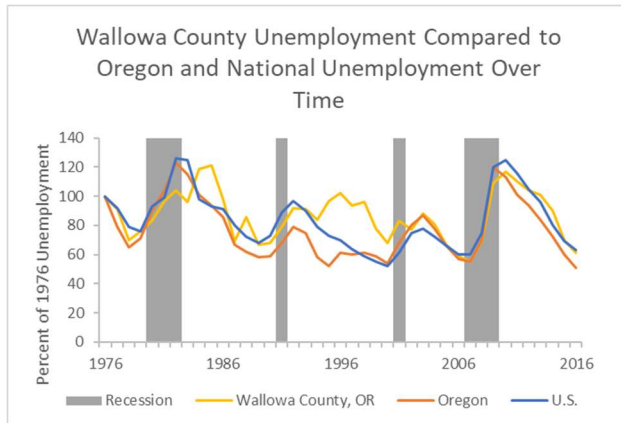


Figure 42. Wallowa County Percent Unemployment Change Compared to Oregon and National Unemployment Change between 1976 and 2017 (Headwaters Economics, 2018).

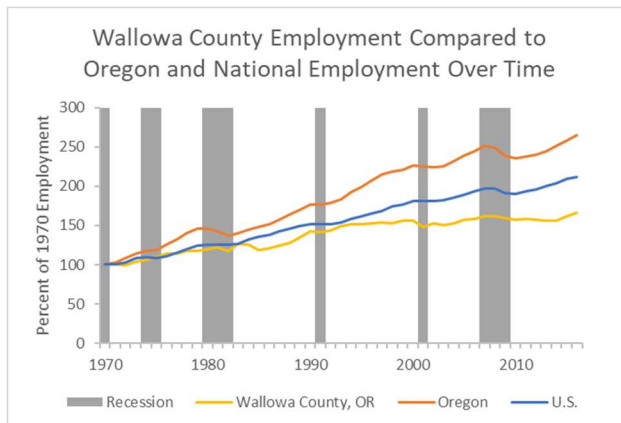


Figure 43. Wallowa County Percent Employment Change Compared to Oregon and National Percent Employment Change between 1970 and 2017 (Headwaters Economics, 2018).

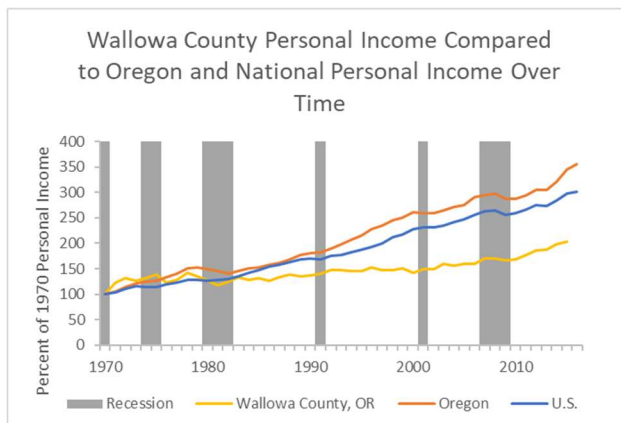


Figure 44. Wallowa County Percent Personal Income Change Compared to Oregon and National Percent Personal Income Change between 1970 and 2017.

Timber harvests have decreased in Wallowa County over time, with a maximum of 164,694 MBF of timber harvested in 1969, and a current low of 42,680 MBF harvested in 2017 (Figure 45). Federal timber harvests had historically been a dominant portion of the timber harvests, but in 1991 was overtaken by private timber harvests. This trend has continued since 1991, with private harvests comprising almost all of the total timber harvests in Wallowa County.

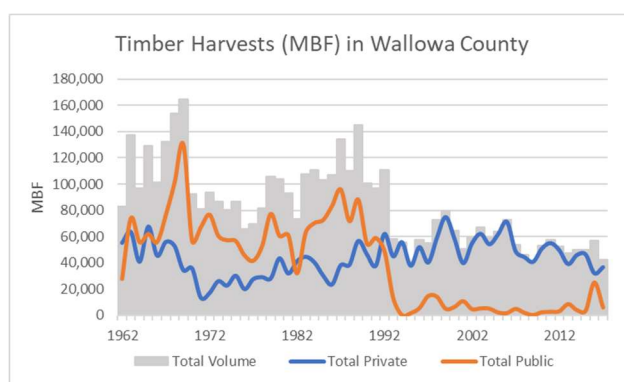


Figure 45. Wallowa County Private and Public Timber Harvests between 1962 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

As federal timber harvest volumes decreased over time in Wallowa County, federal receipts from the USFS also decreased. Federal receipts from the BLM technically increased from \$0 in 2003 to \$1,517 in 2017, but this marginal increase did not offset the decrease in USFS receipts, which fell from \$2,900,000 in 1986 to \$1,000,000 in 2017 (Figure 46). Congressional policies caused a spike in USFS receipts in the late 1990s, but even so, federal receipts fell by roughly 66% during this time.

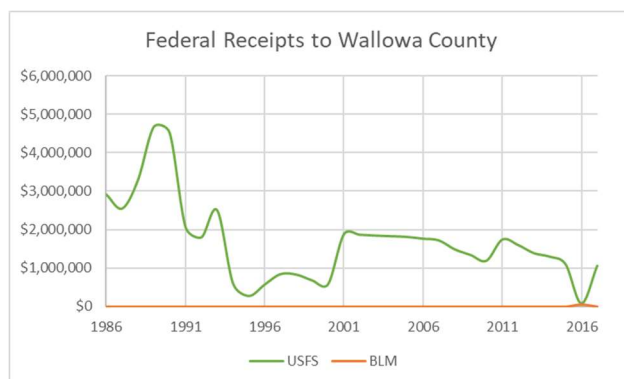


Figure 46. Federal Receipts from the USFS and BLM to Wallowa County between 1986 and 2017 (Headwaters Economics, 2018).

County Profiles: Summary

While each of the counties highlighted in these case studies are subject to unique factors such as forest type, landscape, proximity to markets, and economy, several patterns remain constant. Figure 47 shows total federal volumes harvested over time, from which federal receipts are derived. This highlights the fact that some counties had forest conditions or access to markets that allowed for historically higher federal timber harvest volumes, and shows that federal timber harvests decreased in every analyzed county. Figure 48 shows the percent change in timber harvest over time within these counties, further highlighting the impact of federal policy on public timber harvests and subsequent receipts to counties.

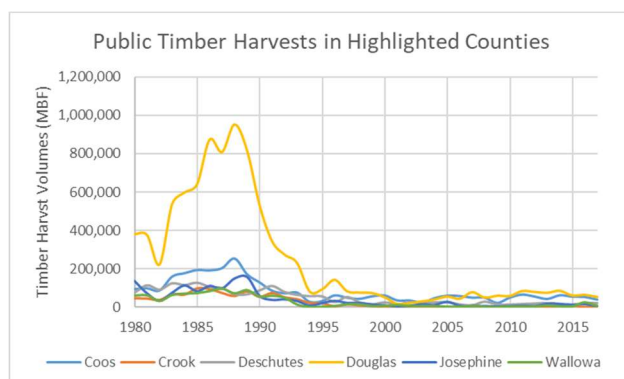


Figure 47. Public Timber Harvest Volumes in Highlighted Counties between 1980 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

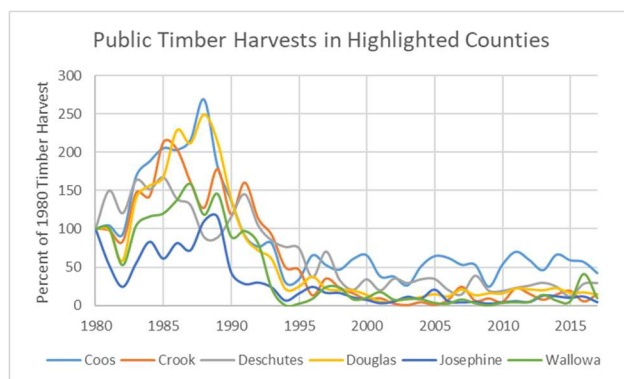


Figure 48. Percent of 1980 Timber Harvest Volumes in Highlighted Counties Between 1980 and 2017 (“Timber Harvest Data 1962-2017 | Oregon transparency,” 2018).

Federal policies passed in the late 1990s did help to mitigate the revenue impacts of decreased federal timber harvests, but even with these emergency policies, counties still continued to receive fewer dollars from federal receipts over time. This pattern was seen in every county in these case studies, raising the question of whether or not these decreases in federal receipts significantly affected county budgets over time. This question is addressed in the subsequent sections, providing quantitative and qualitative perspectives on impacts to counties and their associated budget changes.

CHAPTER 5 – RESULTS

Coos County Analytical Results

Using simple linear regression (SLR), it was found that both total revenue and total expenses had an inverse covariance with federal receipts in Coos County (Table 3). As federal receipts decreased, total revenue and expense budgets increased.

Table 3. SLR of Coos County's Revenue and Expense Budgets against Federal Receipts between 1989 and 2017.

Coos County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-Val	Relationship
Total Revenue	1	326,511.0	326,511.0	22.8	<0.001	Inverse
Residuals	27	387,491.0	14,352.0			
Total Expenses	1	358,405.0	358,405.0	29.2	<0.001	Inverse
Residuals	27	330,912.0	12,256.0			
Revenue						
Property Taxes	1	27,779.0	27,779.2	70.9	<0.001	Inverse
Residuals	27	10,574.0	391.6			
Log Intergovernmental	1	0.7	0.7	12.9	0.001	Inverse
Residuals	27	1.6	0.1			
Licenses, Fees, and Permits	1	3,513.6	3,513.6	25.1	<0.001	Inverse
Residuals	27	3,778.3	139.9			
Expense						
General Government	1	482.1	482.1	0.7	0.406	None
Residuals	27	18,229.7	675.2			
Public Safety	1	17,550.0	17,550.1	18.7	<0.001	Inverse
Residuals	27	25,333.0	938.3			
Log Public Works	1	0.1	0.1	2.7	0.1146	None
Residuals	27	0.8	0.0			
Health and Welfare	1	73,199.0	73,199.0	76.5	<0.001	Inverse
Residuals	27	25,840.0	957.0			
Culture and Recreation	1	4,495.9	4,495.9	26.5	<0.001	Inverse
Residuals	27	169.6				

Of Coos County's nine revenue items, only three comprised 5% or more of the total revenue budgets. Intergovernmental revenue comprised 59.3% of total revenue, while property taxes comprised 18.8% of total revenue and licenses, fees, and permits comprised 6.2% of total

revenue. Of Coos County's 19 expense items, five comprised 5% or more of the total expense budget. Public safety comprised 25.3% of total expenses, health and welfare comprised 22.2% of total expenses, general government comprised 16.6% of total expenses, public works comprised 13.7% of total expenses, and culture and recreation comprised 8.8% of total expenses (Figure 49).

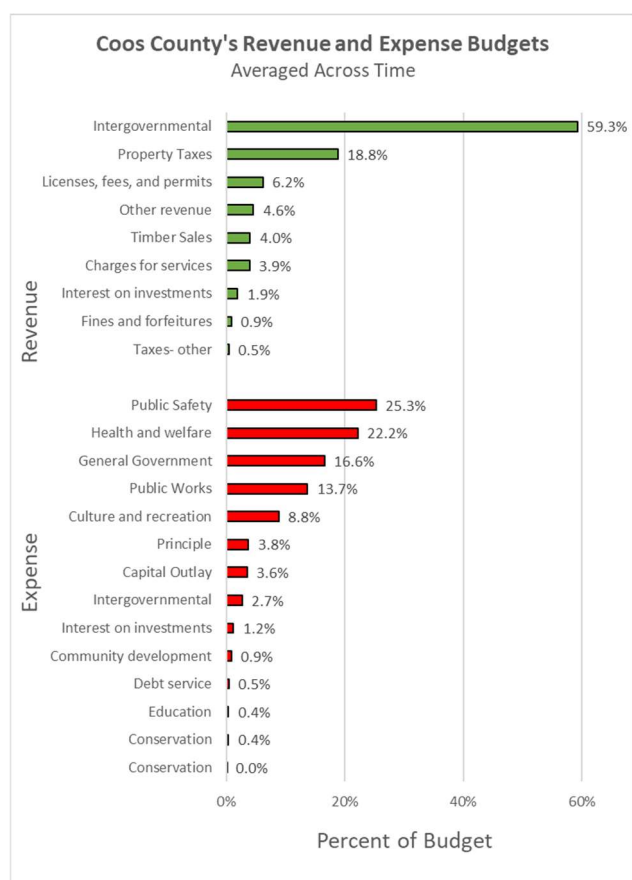


Figure 49. Coos County's Revenue and Expense Budgets Averaged Across 1989-2017 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.).

Table 3 shows SLR output for each variable. At a 95% level of confidence, all analyzed revenue sources show strong inverse correlations to changes in federal receipts. This indicates that Coos County's revenue has significantly increased as federal receipts decreased, showing that Coos County has successfully decreased their revenue dependence on federal receipts. At a

95% level of confidence, public safety, health and welfare, and culture and recreation show strong inverse covariance to changes in federal receipts, while general government and public works do not show a covariance. This finding shows that Coos County has not decreased their expenses in proportion to decreases in federal receipts, and instead shows that expenses have either stayed constant or grown as decreases in federal receipts occurred.

Crook County Analytical Results

Using SLR, it was found that at a 95% level of confidence, total revenue had an inverse covariance with federal receipts, while total expenses did not have any covariance with federal receipts in Crook County. At a 95% level of confidence, there is no covariance between total expenses and federal receipts in Cook County, but it should be noted that at other levels of confidence (i.e. 90%), total expenses would be found to be significant. While a 95% level of confidence was used in this research, other research with the same data may find weak or moderate presence of covariance between total expenses and federal receipts in Crook County. Changes in total revenue budgets had an inverse covariance with federal receipts, whereas changes in expense budgets may have weak covariance with changes in federal receipts.

Table 4. SLR of Crook County's Revenue and Expense Budgets against Federal Receipts between 1989 and 2017.

Crook County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-Val	Relationship
Total Revenue	1	213,053.0	213,053.0	5.9	0.023	Inverse
Residuals	27	1,358,461.0	50,313.0			
Total Expenses	1	191,261.0	191,261.0	3.2	0.085	None
Residuals	27	1,617,745.0	59,916.0			
Revenue						
Property Taxes	1	26,329.0	26,328.9	42.1	0.050	Inverse
Residuals	27	168,824.0	6,252.7			
Interest	1	24.4	24.4	6.5	0.017	Inverse
Residuals	27	101.5	3.8			
Licenses, Permits, and Fees	1	11,732.0	11,731.8	5.3	0.029	Inverse
Residuals	27	59,234.0	2,193.9			
Charges for Services	1	415.9	415.9	0.6	0.460	Inverse
Residuals	27	19,976.9	739.9			
State	1	35,919.0	35,919.0	9.8	0.004	Inverse
Residuals	27	99,108.0	3,671.0			
Expense						
General Government	1	71,722.0	71,722.0	8.6	0.007	Inverse
Residuals	27	224,661.0	8,321.0			
General Services	1	13,543.0	13,542.8	1.7	0.209	None
Residuals	27	220,808.0	8,178.1			
Public Safety	1	148,718.0	148,718.0	30.3	<0.001	Inverse
Residuals	27	132,373.0	4,903.0			
Highways and Roads	1	48,500.0	48,500.0	8.1	0.008	Inverse
Residuals	27	161,460.0	5,980.0			
Health and Welfare	1	29,772.0	29,771.8	18.4	<0.001	Inverse
Residuals	27	43,805.0	1,622.4			
Culture and Education	1	23,886.0	23,885.7	13.9	<0.001	Inverse
Residuals	27	46,309.0	1,715.2			

Of Crook County's eight revenue items, five comprised 5% or more of the total revenue budget. Property taxes comprised 34.5% of total revenue, state receipts comprised 30.3% of total revenue, charges for services comprised 11.8% of total revenue, licenses, permits, and fees comprised 8.8% of total revenue, and interest comprised 7.5% of total revenue. Federal receipts

was removed from the dataset as it was a confounding variable. As Crook County reported federal receipts in its revenue budgets, simple linear regression of federal receipts against federal receipts did not yield any valuable information on an itemized level, and masked changes on a total revenue level. Of Crook County's 16 expense items, seven comprised more than 5% of total expenses. Public Safety comprised 20.7% of total expense, highways and roads comprised 20.6% of total expense, general government comprised 13.0% of total roads, general services comprised 10.0% of total expenses, health and welfare comprised 8.6% of total expenses, capital outlay comprised 8.6% of total expenses, and culture and education comprised 8.4% of total expenses (Figure 50).

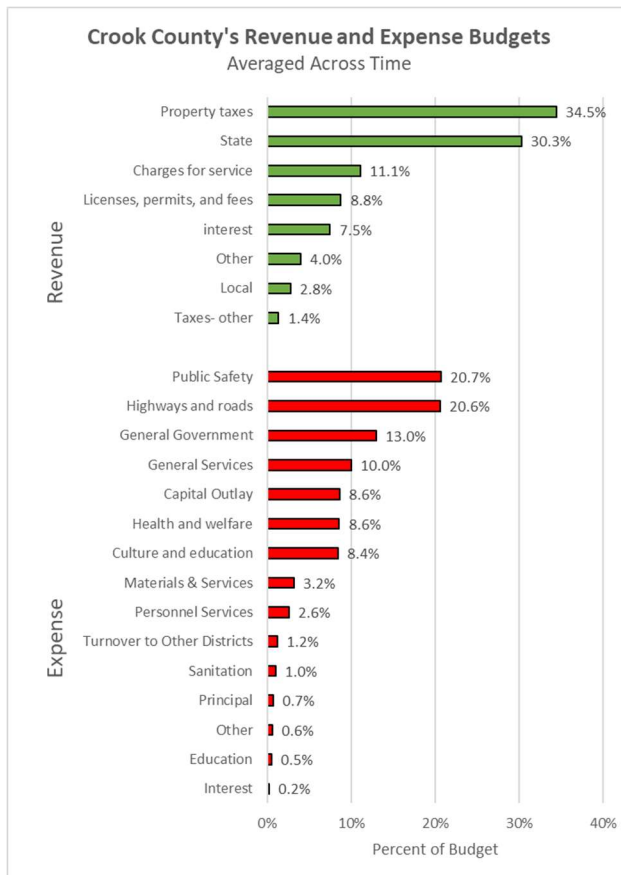


Figure 50. Crook County's Revenue and Expense Budgets Averaged Across 1989-2017
 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.)

Table 4 shows SLR output for each variable. At a 95% level of confidence, all revenue items increased as federal receipts decreased, indicating that Crook County has experienced overall growth even as they received fewer receipts from the federal government. At a 95% level of confidence, general government, public safety, highways and roads, health and welfare, and culture and education show strong inverse covariance to federal receipts, while general government did not have any covariance with federal receipts. This means that Crook County has not decreased their expenses in proportion to decreases in federal receipts, and instead shows that expenses have either stayed constant or grown as decreases in federal receipts occurred.

Deschutes County Analytical Results

Using SLR, it was found that both total revenue and total expenses had inverse covariance with federal receipts (Table 5). As federal receipts decreased, county budgets (both revenue and expense) increased.

Table 5. SLR of Deschutes County's Revenue and Expense Budgets against Federal Receipts between 1989 and 2017.

Deschutes County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-Val	Relationship
Total Revenue	1	1,732,328.0	1,732,328.0	121.7	<0.001	Inverse
Residuals	27	384,228.0	14,231.0			
Total Expenses	1	1,488,208.0	1,488,208.0	144.8	<0.001	Inverse
Residuals	27	277,436.0	10,275.0			
Revenue						
Taxes	1	253,015.0	253,015.0	120.5	<0.001	Inverse
Residuals	27	56,700.0	2,100.0			
Intergovernmental	1	468,639.0	468,639.0	74.0	<0.001	Inverse
Residuals	27	171,054.0	6,335.0			
Log Charges for Services	1	5.9	5.9	24.2	<0.001	Inverse
Residuals	27	6.6	0.2			
Expense						
General Government	1	37,716.0	37,716.0	14.9	<0.001	Inverse
Residuals	27	68,163.0	2,525.0			
Public Protection	1	591,604.0	591,604.0	63.7	<0.001	Inverse
Residuals	27	250,590.0	9,281.0			
County Roads	1	5,440.4	5,440.4	77.4	<0.001	Inverse
Residuals	27	1,897.1	70.3			
Health and Welfare	1	84,384.0	84,384.0	46.2	<0.001	Inverse
Residuals	27	49,352.0	1,828.0			
Capital Outlay	1	80.0	80.1	0.0	0.8878	None
Residuals	27	106,574.0	3,947.2			
General Services	1	1,819.0	1,819.1	0.5	0.4738	None
Residuals	27	93,056.0	3,446.5			

Of Deschutes County's nine revenue items, only three comprised more than 5% of total revenue budgets. Intergovernmental revenue comprised 45.1% of total revenue, taxes comprised 32.8% of total revenue, and charges for services comprised 11.0% of total revenue. Of Deschutes County's 12 expense items, six comprised more than 5% of total expense budgets. Public protection comprised 34.5% of total expenses, health and welfare comprised 19.4% of total expenses, county roads comprised 10.2% of total expenses, capital outlay comprised 9.8% of total expense, general services comprised 8.9% of total expenses, and general government comprised 7.2% of total expenses (Figure 51).

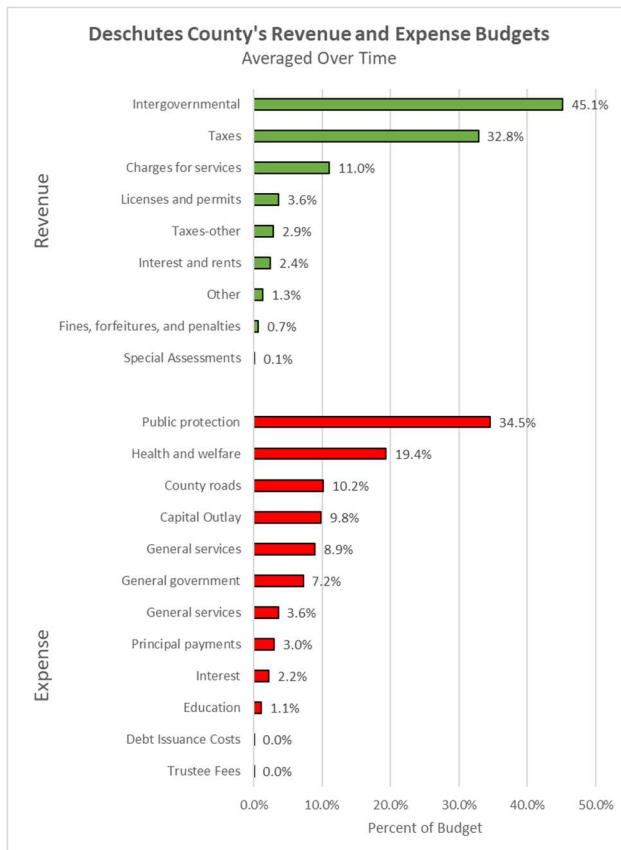


Figure 51. Deschutes County's Revenue and Expense Budgets Averaged Across 1989-2017 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.).

Table 5 shows the SLR output for each variable. At a 95% level of confidence, all revenues sources show strong inverse covariance to federal receipts. This finding shows that Deschutes County's revenue has significantly increased as federal receipts decreased, showing that Deschutes County has successfully decreased any undocumented revenue dependence on federal receipts. At a 95% level of confidence, all expense items except capital outlay and general services showed strong inverse covariance to federal receipts. This indicates that Deschutes County has not decreased their expenses in proportion to decreases in federal receipts, and instead shows that expenses have either stayed constant or grown as decreases in federal receipts occurred.

Douglas County Analytical Results

Using SLR, it was found that neither total revenue nor total expenses had any covariance with federal receipts in Douglas County (Table 6).

Table 6. SLR of Douglas County's Revenue and Expense Budgets against Federal Receipts between 1989 and 2017.

Douglas County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-val	Relationship
Total Revenue	1	25,999.0	25,999.0	0.9	0.339	None
Residuals	27	740,632.0	27,432.0			
Total Expenses	1	39,939.0	39,939.0	1.6	0.2122	None
Residuals	27	660,386.0	24,459.0			
Revenue						
Charges for Services	1	11,228.7	11,228.7	71.2	<0.001	Inverse
Residual	27	4,259.3	157.8			
Intergovernmental	1	95,989.0	95,989.0	4.0	0.054	None
Residual	27	640,697.0	23,730.0			
Property Taxes	1	8,532.7	8,532.7	72.3	<0.001	Inverse
Residuals	27	3,187.5	118.1			
Interest	1	4,847.3	4,847.3	9.3	0.005	Direct
Residuals	27	14,026.1	519.5			
Expense						
General Government	1	4,779.0	4,779.2	4.0	0.057	None
Residuals	27	32,528.0	1,204.7			
Public Safety	1	44,963.0	44,963.0	47.2	<0.001	Inverse
Residuals	27	25,722.0	953.0			
Log Highways and Streets	1	0.0	0.0	1.4	0.249	None
Residuals	27	0.7	0.0			
Log Health and Welfare	1	0.1	0.1	0.4	0.5402	None
Residuals	27	5.7	0.2			
Culture and Recreation	1	37.5	37.5	0.3	0.578	None
Residuals	27	3,193.3	118.3			
Education	1	8,102.0	8,102.0	177.4	<0.001	Direct
Residuals	27	1,233.0	45.7			
Capital Outlay	1	4,319.8	4,319.8	3.8	0.063	None
Residuals	27	31,019.0	1,148.9			

Of Douglas County's seven revenue items, four comprised 5% or more of the total revenue budget. Intergovernmental revenue comprised 75.0% of Douglas County's total revenue, while charges for services comprised 7.9% of total revenue, property taxes comprised 6.9% of total revenue, and interest comprised 5.4% of total revenue. Of Douglas County's 11 expense items, five comprised 5% or more of the total expense budget. Public safety comprised 20.7% of total expenses, general government comprised 20.2% of total expenses, health and welfare comprised 19.2% of total expenses, highways and streets comprised 14.0% of total expenses, and capital outlay comprised 10.6% of total expenses (Figure 52).

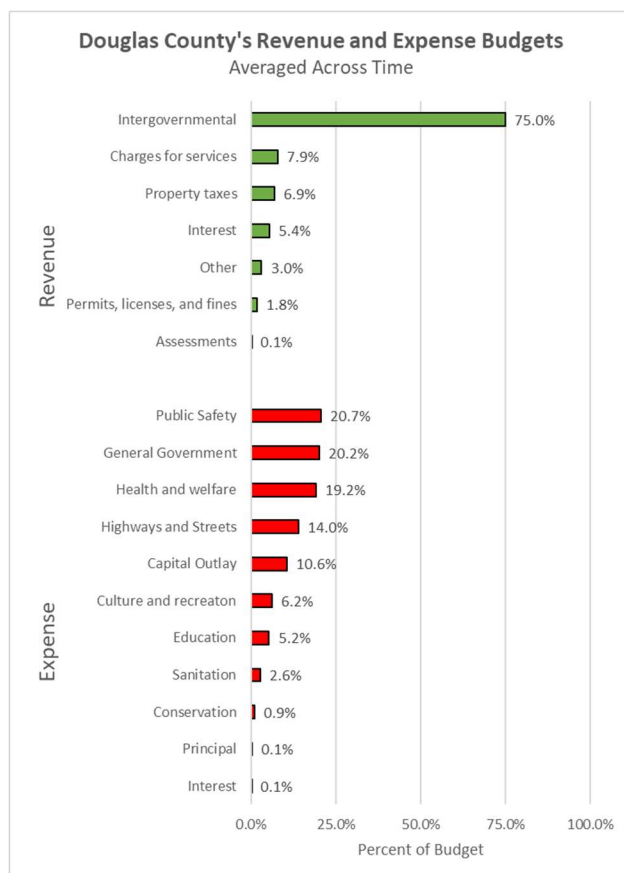


Figure 52. Douglas County's Revenue and Expense Budgets Averaged Across 1989-2017 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.).

Table 6 shows SLR output for each variable. At a 95% level of confidence, charges for services and property taxes show strong inverse covariance to federal receipts, while interest had a direct covariance with federal receipts. Because total revenue did not have any covariance with federal receipts, this finding indicates that Douglas County has responded by adjusting revenue generation methods without their total revenue budget changing, thus successfully offsetting the decreases in federal receipts. Intergovernmental revenue does not show any covariance to federal receipts. At a 95% level of confidence, public safety is the only expense item which is inversely related to federal receipts, and education is the only expense item which is directly related to federal receipts. This indicates that overall, Douglas County's expense budget has not significantly changed as federal revenue decreased, but that certain expense items may be affected (either positively or negatively).

Josephine County Analytical Results

Audit reports for Josephine County were unobtainable from the county or state (misplaced/purged/destroyed). As such, analysis for Josephine County occurs from 1990-2017.

Using SLR, it was found that neither total revenue nor total expenses shared any covariance with federal receipts (Table 7).

Table 7. SLR of Josephine County's Revenue and Expense Budgets against Federal Receipts between 1990 and 2017.

Josephine County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-Val	Relationship
Total Revenue	1.0	199.0	199.1	0.0	0.928	None
Residuals	26.0	620,973.0	23,883.6			
Total Expenses	1.0	2,677.0	2,676.6	0.1	0.748	None
Residuals	26.0	659,818.0	25,377.6			
Revenue						
Taxes	1.0	15.6	15.6	0.0	0.889	None
Residuals	26.0	20,260.7	779.3			
Fees and Charges for Services	1.0	3,944.2	3,944.2	13.8	<0.001	Inverse
Residuals	26.0	7,456.2	286.8			
Interfund Charges for Services	1.0	261,941.0	261,941.0	8.0	0.001	Inverse
Residuals	26.0	848,605.0	32,639.0			
Log Intergovernmental Revenue	1.0	25.6	25.6	18.4	<0.001	Direct
Residuals	26.0	36.0	1.4			
Expense						
General Government	1.0	3,894.0	3,893.9	3.0	0.093	None
Residuals	26.0	33,378.0	1,283.8			
Public Safety	1.0	3,275.0	3,274.6	2.0	0.167	None
Residuals	26.0	42,146.0	1,621.0			
Public Works	1.0	643.2	643.2	2.9	0.102	None
Residuals	26.0	5,805.0	223.3			
Log Human Services	1.0	63.8	63.8	14.0	<0.001	Inverse
Residuals	26.0	118.6	4.6			
Physical and Mental Health	1.0	29,724.0	29,724.0	2.5	0.129	None
Residuals	26.0	314,346.0	12,090.0			

Four out of five revenue lines comprised 5% or more of Josephine County's total revenue budgets. Intergovernmental revenues comprised 36.0% of total revenue, interfund charges for

services comprised 33.4% of total revenue, fees and charges for services comprised 13.3% of total revenue, and taxes comprised 12.8% of total revenue. Of Josephine County's 12 expense items, six comprised 5% or more of total expense budgets. Public safety comprised 29.4% of total expenses, physical and mental health comprised 14.8% of total expenses, human services comprised 14.8% of total expenses, public works comprised 14.2% of total expenses, general government comprised 10.0% of total expenses, and culture and recreation comprised 6.6% of total expenses (Figure 53).

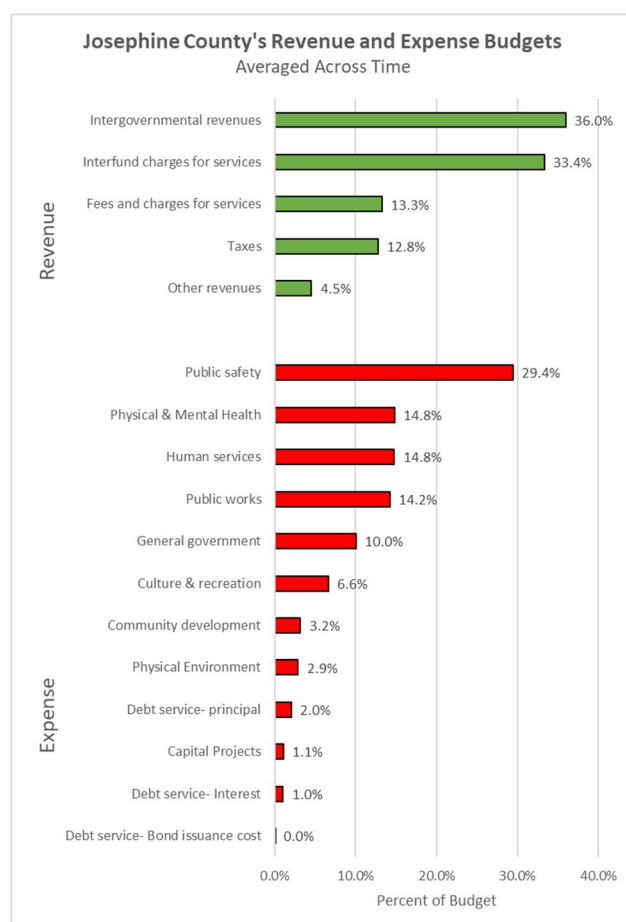


Figure 53. Josephine County's Revenue and Expense Budgets Averaged Across 1990-2017 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.).

Table 7 shows the SLR output for each variable. At a 95% level of confidence, taxes did not share any covariance with federal receipts, while fees and charges for services and interfund charges for services had an inverse covariance to federal receipts and intergovernmental revenue had a direct covariance with federal receipts. This means that, while total revenue budgets have not changed in covariance to federal receipts, there has been an itemized change in revenue at the same time as changes in federal receipts, offsetting this loss of revenue. At a 95% level of confidence, human services is the only expense item having covariance with federal receipts, and had an inverse covariance. This means that while human services budgets increased as federal receipts decreased, overall, Josephine County's expense budgets did not change as federal receipts changed.

Wallowa County Analytical Results

Using SLR, it was found that neither total revenue nor total expenses shared any covariance with federal receipts in Wallowa County. All changes in total revenue and expense budgets occurred independent of changes in federal receipts (Table 8).

Table 8. SLR for Wallowa County's Revenue and Expense Budgets against Federal Receipts between 1989 and 2017.

Wallowa County						
Regression of Response Variables against Total Federal Receipts						
95% Level of Confidence						
	DF	Sum of Squares	Mean Squared	F Value	P-Val	Relationship
Total Revenue	1	104391	104391	0.6	0.446	None
Residuals	27	470373	174192			
Total Expense	1	168205	168205	1.7	0.207	None
Residuals	27	2719521	100723			
Revenue						
Tax	1	15618	15618	1.6	0.217	None
Residuals	27	263917	9774.7			
Intergovernmental	1	29124	29124	0.3	0.582	None
Residuals	27	2532367	93791			
Charges for Services and Supplies	1	31	30.64	0.0	0.894	None
Residuals	27	45441	1682.98			
Log Other	1	1.713	1.71302	1.8	0.196	None
Residuals	27	26.306	0.97442			

Of Wallowa county's six revenue items, four comprised 5% or more of the total revenue budgets. Intergovernmental revenue comprised 53.1% of total revenue budgets, taxes comprised 26.0% of total revenue budgets, charges for services and supplies comprised 9.7% of total revenue budgets, and other comprised 6.0% of total revenue budgets (Figure 54).

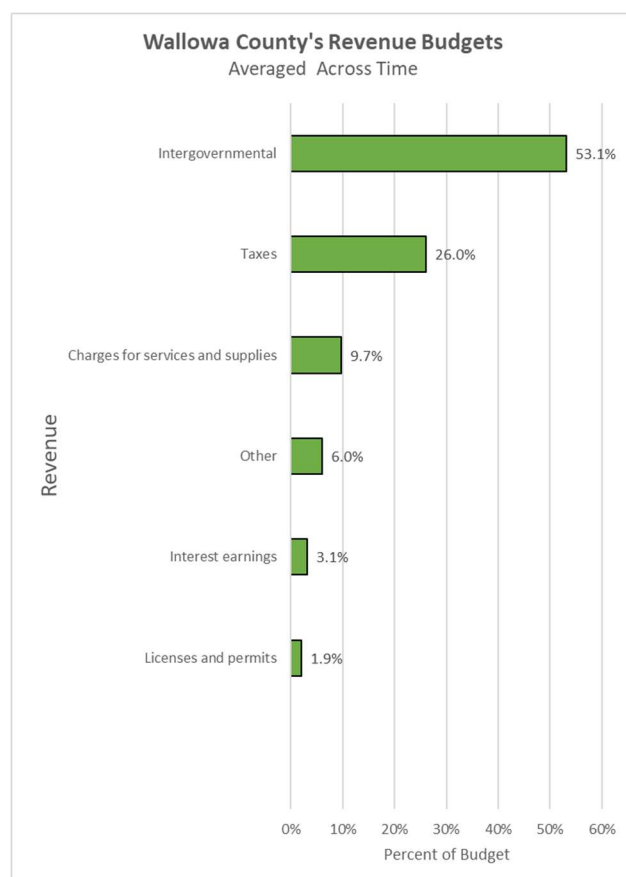


Figure 54. Wallowa County's Revenue Budgets Averaged Across 1989-2017 ("Oregon Secretary of State Audits Division: Audit Report Search," n.d.).

Wallowa County changed how they reported their expenses in 2003, preventing comparison of individual expense items against total federal receipts over time. To account for this, total expenses over time were compared against federal receipts, mitigating reporting issues of the data. Table 8 shows the SLR output for each variable. At a 95% level of confidence, no revenue items shared any covariance with federal receipts over time.

County Themes

When evaluating these quantitative and analytical results, it is important to remember the qualitative aspects of these counties. Table 9 shows the total revenue and expense changes over

time as federal receipts changed, and thematic trends observed within the county descriptions or easily accessible via a web search.

Table 9. Thematic Observations within Counties.

County Budgets and Thematic Observations						
Response Variable	Coos County	Crook County	Deschutes County	Douglas County	Josephine County	Wallowa County
Total Revenue	Increase	Increase	Increase	None	None	None
Total Expense	Increase	None	Increase	None	None	None
Thematic Observations						
Strategic Plan?	Yes	Yes	Yes	No	No	Yes
Strong Natural Amenities?	Yes	No	Yes	Yes	Yes	No
Timber-based Economy?	Yes	Yes	No	Yes	No	Yes
Urban Proximity?	No	Yes	Yes	No	No	No
Population Trends	Underperform	Outperform	Outperform	Underperform	Overperform	Underperform

The presence of a strategic plan was assessed via a web search, and natural amenities were assessed solely based on whether they were mentioned in the county profile. The presence of a timber based economy was also assessed based on whether or not it was mentioned in the county profile, as was urban proximity. Population trends were evaluated using based on the county profiles to determine whether or not population growth had outpaced state and national benchmarks.

While not a quantitative approach nor a focus of this research, it is interesting to note that Coos, Crook, and Deschutes counties all saw total revenue increase over time and had strategic plans that were easily accessible. Wallowa County also had an easily accessible strategic plan but did not observe total revenue increases in covariance to decreases in federal receipts.

CHAPTER 6 – DISCUSSION

County Grouping

Counties were grouped based on the analysis of their total revenue and total expense budgets against federal receipts. Coos County, Crook County, and Deschutes County were grouped together because all three counties exhibit inverse covariance between total revenue and federal receipts at a 95% level of confidence. Coos County and Deschutes County also experienced inverse covariance between total expenses and federal receipts at a 95% level of confidence, while Crook County was not significant (p-val: 0.02, Table 4). Josephine County, and Douglas County did not have covariance between total revenue and expense budgets and federal receipts, but did have covariance between individual budget items and federal receipts, and were grouped accordingly. Wallowa County was the only county that did not exhibit any covariance between federal receipts and budgets, and is therefore analyzed separately.

Alternative groups of counties are possible; in example, counties could be grouped based on whether or not it was found that there was a covariance between property taxes and federal receipts. While these alternative groupings are valid and may provide additional insight to counties and their changes during periods of decrease in federal receipts, grouping by total revenue and expense budgets was used to capture the overall trends that occurred across and within counties. Additional research could benefit from this fine-scale analysis, but for this exploratory research, grouping by total revenue or expense budgets was deemed to be most appropriate.

It should be noted that the results of this analysis are limited to covariance between federal receipts and county budgets. While there may be no direct covariance between decreasing

county budgets and federal receipts, county budgets could have decreased in response to other factors. Oregon's 2016 financial condition review, which highlighted Douglas and Josephine County as being in financial peril, analyzed 10 indicators to assess fiscal health: Local Support; Timber Revenue Dependence (federal receipts); Debt Burden; Liquidity; Fund Balance; Retirement Benefit Obligation; Public Safety; Personal Income; Population Trends; and Unemployment (Wenger, 2016). It is entirely possible, and in some cases likely, that even if decreases in federal receipts showed no statistical covariance to decreased revenues in a county, any combination of these nine other factors could have contributed to decreasing county budgets.

Coos, Crook, and Deschutes County

Coos County, Crook County, and Deschutes County saw inverse covariance between total revenue and federal receipts. As federal receipts decreased, county revenues and expenses continued to increase (Table 10). This covariance does not imply that the lower the dollar value of federal receipts the higher the county budgets; instead it indicates that these two counties may be resilient against decreases in federal receipts and have growth opportunities that may have been realized in tandem with decreases in federal receipts. In example, both Coos County and Deschutes County have recognized the growing importance of tourism in their counties. These recreational and tourism opportunities may not have been fully realized until decreases in federal timber harvests and subsequent revenue occurred. If revenue and expense generation factors related to tourism increased at a faster rate than federal receipts decreased in these counties, it would explain this inverse covariance between total revenue and expense and federal receipts.

Table 10. Coos, Crook, Deschutes County Budget Changes during a Time of Decreases in Federal Receipts.

County Budget Changes as Federal Receipts Decreased			
Response Variable	Coos County	Crook County	Deschutes County
Total Revenue	Increase	None	Increase
Total Expense	Increase	None	Increase
Revenue			
Property taxes	Increase	Increase	Increase
Intergovernmental	Increase	NA	Increase
Interest	NA	Increase	NA
Interfund charges for services	NA	NA	NA
Licenses, fees, and permits	Increase	Increase	NA
Charges for services	NA	Increase	Increase
State	NA	Increase	NA
Expenses			
General government	None	Increase	Increase
General services	NA	None	None
Public works	None	NA	NA
Public safety	Increase	Increase	Increase
Highways and roads	NA	Increase	Increase
Culture and education	NA	Increase	NA
Culture and recreation	Increase	NA	NA
Capital outlay	NA	NA	None
Health and welfare	Increase	NA	Increase

Within Coos, Crook, and Deschutes County's revenue budgets, a theme that emerged was that (property) taxes and intergovernmental revenue had significant inversely covariance with federal receipts (Table 10). Within Coos and Crook County, licenses, fees and permits also had strong and inverse covariance with federal receipts, but within Crook and Deschutes County, licenses and permits was not a large enough revenue source to be analyzed. Likewise, within Deschutes County, charges for services had a significant inverse covariance to federal receipts, but charges for services was not a large enough revenue source to be analyzed within Coos County.

Similarly, within Coos, Crook, and Deschutes County's expense budgets, a theme that emerged was that public safety had an inverse covariance to federal receipts (Table 10). Within Coos and Deschutes County, health and welfare had an inverse covariance to federal receipts, but was not a large enough expense to be considered in Crook County (Table 10). Within Crook and

Deschutes County, general governmental expenses had a significant inverse covariance to federal receipts but this trend was not found within Coos County. Public works did not exhibit any covariance with federal receipts within Coos County, and Crook and Deschutes County did not have an expense item directly comparable to public works. Within Crook and Deschutes County, county road expenses had a strong inverse covariance to federal receipts, but Coos County did not have a line item for county roads. An inverse covariance was expressed between culture and recreation in Coos and Crook County, but Deschutes County did not have an equivalent expense item. Capital outlay did not have any covariance against federal receipts in Deschutes County, and was not a large enough expense item to be considered in Coos or Crook County. General services was not found to have any covariance to federal receipts in Crook or Deschutes County, and Coos County did not have an expense item that was comparable.

These findings may be explained by Headwaters Economics' findings that natural amenities can facilitate a county's transition from timber dependency (Rasker, 2017). Both Coos County and Deschutes County have focused on increasing tourism and recreation, capitalizing on their natural amenities. Crook County's proximity to Deschutes County may also allow the Crook County to receive the benefits of these natural amenities. Headwaters Economics' findings also show that proximity to urban hubs can be highly beneficial for counties. Crook County explicitly talks about how proximity to Bend, Portland and Salem are beneficial to Crook County's Economies. These counties have shown that they can benefit from flexibility and adaptability to diversify and welcome new economic opportunities. While proximity to metropolitan areas was not considered in this research, Deschutes County's rapidly growing

population and its flourishing county seat (Bend, OR) may help to continue to facilitate a transition from any undefined timber-dependency.

Many of the similarities between Crook County and Deschutes County may be a factor of geographic location. Because these counties are adjacent, many socioeconomic, environmental, and political factors may be similar between these counties. However, these counties are still unique in many ways, ranging from the ‘urbanite’ metropolis of Bend to the agrarian society within Crook County.

Douglas and Josephine County

Douglas County and Josephine County have unique budgets, but share the theme that their total revenue and expense budgets did not change in covariance to changes in federal receipts (Table 11). While subsequent SLR found that individual line items changed in covariance to changes in federal receipts, all changes in total county budgets occurred independently of federal receipts. The fact that Douglas and Josephine County’s total revenue and expense budgets did not change in covariance to changes in federal receipts does not indicate that these counties were unaffected by changes in federal receipts. Rather, this finding shows that these counties were able to compensate for the changes in federal receipts by shifting the mechanisms of revenue generation and adjusting expenditures to offset the changes in federal receipts.

Table 11. Douglas and Josephine County Budget Changes during a Time of Decrease in Federal Receipts.

County Budget Changes as Federal Receipts Decreased		
Response Variable	Douglas County	Josephine County
Total revenue	None	None
Total expenses	None	None
Revenue		
Property taxes	Inverse	None
Intergovernmental	None	Direct
Interest	Direct	NA
Interfund Charges for services	NA	Inverse
Charges for services	Inverse	Inverse
Expenses		
General government	None	None
Public works	NA	None
Public safety	Inverse	None
Culture and recreation	None	NA
Education	Direct	NA
Capital outlay	None	NA
Health and welfare	None	None
Human services	NA	Inverse
Physical and mental health	NA	None

In Douglas County's revenue budgets, property taxes and charges for services had inverse relationships with federal receipts (Table 6). Interest revenue had a direct covariance to federal receipts, while intergovernmental revenue did not have any covariance with federal receipts. Douglas County's general government expenses showed no covariance to federal receipts, as did culture and recreation, capital outlay, and health and welfare. Public safety expenses have increased in during the same period that federal receipts decreased, and education expenses have decreased in during the same period as federal receipts decreased. These results suggest that Douglas County increased its property taxes and charges for services to offset decreases in federal receipts. The majority of Douglas County's services remained unaffected by decreases in federal receipts. The decrease in the education item of Douglas County's budget may have covariance with decreases in SRS funds. However, Douglas County could have streamlined its educational systems, decreasing the total costs of this expense item without

decreasing the quality of service provided. This finding does not indicate that decreases in federal receipts negatively impacted educational systems within Douglas County, only that educational expenses within Douglas County decreased.

Douglas County's county profile talks not only of the recreational opportunities within the county, but also highlights an aggressive pursuit to transition from timber-dependency, which was a historic mainstay of its economy. By actively working to create an environment that is favorable to new industries and organizations, Douglas County is able to continue to decrease its timber dependency, allowing for continued growth within the county.

It should be noted that even though Douglas County is capitalizing on recreation and diversification from timber dependency, Douglas County is still defined as a "County to Monitor" in Oregon's 2016 Financial Condition Review, which defined timber dependency as a contributing factor (Wenger, 2016). This analysis does not contradict the Secretary of State's report, and acknowledges that Douglas County has seen a decrease in federal receipts over time. The findings of this research do show that individual revenue and expense items have changes in covariance to decreases in federal receipts, but total revenue and expense budgets showed no statistical covariance at a 95% level of confidence (p-values of 0.339 and 0.2122 respectively) (Table 6). Douglas County is facing fiscal challenges, and additional federal receipts would be beneficial to the county, but given the data in this analysis, there is no covariance between total revenue and expense budgets and federal receipts.

Josephine County exhibited a unique trend in that it was the only timber dependent county that did not exhibit a covariance between property tax revenue and federal receipts (Table 11). Josephine County also exhibited a direct covariance between intergovernmental revenue and

federal receipts, and inverse covariance between charges for services and interfund charges for services. Human services was the only expense budget item to exhibit an inverse covariance against federal receipts, with all other expense items showing no covariance. As federal receipts decreased in Josephine County, interfund charges for services and charges for services increased, thus offsetting the loss of federal receipts. Human services expenses increased over time as federal receipts decreased, but this covariance does not yield any apparent explanations.

One possible explanation of the lack of a covariance between federal receipts and taxes in Josephine County can be found in Oregon's tax codes. In 1990, Measure 5 was introduced, creating tax rate limits. Measure 5 transitioned Oregon's property tax system from a levy-based property tax system to a system with permanent tax rates. In 1997, Measure 5 was replaced by Measure 50, which was designed to reduce property taxes and control their future growth. Measure 50 prevented the assessed value of a property from increasing more than three percent annually, simplifying the tax code and increasing the efficiency of predicting future taxes. While Measure 5 and Measure 50 applied to every county in Oregon, it is possible that these Measures prevented Josephine County from increasing their property taxes to compensate for decreases in federal receipts (Oregon Department of Revenue, 2009).

Grants Pass, located in Josephine County, is identified as the primary access point for fishing on the Rogue River, providing the county with some natural amenities that may be capable of being monetized to substitute for decreased federal receipts. In all, Josephine County appeared to be less affected by decreases in federal receipts than Crook or Douglas County, with fewer revenue and expense items showing covariance to federal receipts. This may indicate that, regardless of the federal land holdings within Josephine County, the county is less reliant on

federal receipts than other counties in this study. This may be due to inherent factors, but it is also possible that county leaders began to diversify revenue structures to compensate for potential decreases in federal timber harvests, which could mask covariance effects.

Like Douglas County, Josephine County is defined as a “County to Monitor” in Oregon’s 2016 Financial Condition Review (Wenger, 2016). While Josephine County is defined as historically timber dependent, and has experienced decreases in federal receipts, at a 95% level of confidence, no covariance is present between federal receipts and total revenue or expense budgets (p-values of 0.928 and 0.748, respectively) (Table 7). There was a covariance between changes in federal receipts and revenue and expense items, which would be expected due to the county’s timber dependency, but these trends were not seen in total budgets. Given Josephine County’s timber dependency and current financial condition, these results are not easily explicable. It is possible that there are confounding factors such as local, state, and federal policies that were not captured in this study, muting the covariance between federal receipts and county budgets. However, given the data and analysis of this study, no covariance between federal receipts and total revenue and expense budgets were found in Josephine County.

Wallowa County

Wallowa County was the only county in this study which exhibited no covariance to federal receipts, either in total revenue and expense or in individual budget items. This is not unexpected due to a reduced timber sector in Wallowa County, even though the USFS is the largest landowner in the county. Wallowa County was not classified as historically timber dependent, and it is unlikely that it would have been affected by decreases in federal receipts. Wallowa County’s revenue and expense items proved to be resilient to changes in federal

receipts, though this may be attributed to a lack of federal receipts available to the county over time.

CHAPTER 7 – CONCLUSIONS AND LIMITATIONS

The findings of this research indicate that budgets of counties which were not classified as historically timber dependent (i.e. Deschutes County) may still be correlated to changes in federal receipts. Another important theme that emerged from this research was that none of the counties in this research saw decreases in total revenue and expense budgets in covariance to federal receipts, though further research is needed to determine whether confounding factors are present. If county budgets did change in covariance to federal receipts, this change was inverse, showing that some counties are able to grow (both revenue and expense budgets), regardless (or potentially because of) changes in federal management, driving changes in federal receipts.

This research also found that some county budget items such as property taxes and public safety are commonly found to change in covariance to changes in federal receipts, while other budget items such as public works are less likely to change in covariance to changes in federal receipts. While each county functioned as a unique population in this research, and these explanatory results are not capable of being extrapolated to other counties, these themes do provide insight into county responses to changes in federal receipts.

Future research should continue to explore this vein of research by pursuing local, state, and federal policies and laws that caused or prevented changes in county budgets, further deepening the understanding of how changes in federal receipts affect county budgets. Debt latency of counties could also be assessed, providing further insight into county solvency. Further research could also employ multivariate statistics to analyze trends across counties in Oregon, potentially paving the way for causal inferences to be obtained instead of covariance.

This research could also be synthesized with previous research exploring the relationship between socioeconomic factors and federal receipts in Oregon, thus providing a more comprehensive perspective on inter-county and intra-county responses to changes in federal receipts.

It should be noted that this research has limitations that should be recognized. All county budget data and federal receipt data was analyzed using nominal values, and the same analysis using real budget data and receipts may yield different results. The authors assume that using real values instead of nominal values will not change the themes and stories that emerged from this research, but this assumption should be tested. County debt latency was not considered in this study due to a lack of readily accessible data, but this is something that should be considered in future research. Another important limitation of this research is the fact that county budget records before 1989 were not obtainable. This prevents analysis on whether counties took any actions to prepare for decreases in federal receipts. This truncated time horizon prevents any piecewise defined analysis of pre-and-post changes in federal policies and how county budgets may have changed. Urban density and connectivity was not analyzed in this research, but Headwaters Economics has noted the significance of this when counties are transitioning from timber dependent economies (Rasker, 2017). Finally, the limitations of reported data were acknowledged throughout this research, which at times inhibited direct comparison of revenue and expense items between counties.

These limitations, while unavoidable in this research, do not compromise the findings of this research. Rather, it is important to recognize the true scope and limitations of this project to understand how to interpret it and expand upon it in future research.

BIBLIOGRAPHY

- Associated Press. (2009, July 20). Oregon's recession is "poverty with a view" - oregonlive.com [Ne]. Retrieved May 16, 2019, from Oregonlive.com website:
https://www.oregonlive.com/news/2009/07/oregons_recession_is_poverty_w.html
- Bureau of Land Management. (2012). Northwest Forest Plan. Retrieved April 22, 2019, from
https://www.blm.gov/or/resources/forests/files/NW_ForestPlanMap.pdf
- Bureau of Land Management. (n.d.). BLM Navigator. Retrieved May 15, 2019, from Discover Your Public Lands website: <https://navigator.blm.gov/home>
- Carroll, M. S., McKetta, C. W., Blatner, K. A., & Schallau, C. (1999). A Response to "Forty Years of Spotted Owls? A Longitudinal Analysis of Logging Industry Job Losses." *Sociological Perspectives*, 42(2), 325–333. <https://doi.org/10.2307/1389632>
- Congressional Research Service. (2015). The Oregon and California Railroad Lands (O&C Lands): Issues for Congress. *Congressional Research Service*, 20.
- Congressional Research Service. (2017). *Reauthorizing the Secure Rural Schools and Community Self-Determination Act of 2000*. 30.
- Coos County. (2018). Coos County > Home [Governmental]. Retrieved December 23, 2018, from The Official Website of Coos County, Oregon website: <http://www.co.coos.or.us/>
- Crook County. (2018). About Crook County [Governmental]. Retrieved January 2, 2019, from The Official Website of Crook County, Oregon website:
<https://co.crook.or.us/AboutTheCounty2/AbouttheCounty/tabid/56/Default.aspx>
- Department of the Interior. (2015, June 18). Frequently Asked Questions. Retrieved December 11, 2018, from <https://www.doi.gov/pilt/resources/faqs>

- Department of the Interior. (2017). Fiscal Year 2017 Payments in Lieu of Taxes National Summary. Retrieved April 22, 2019, from https://www.doi.gov/sites/doi.gov/files/uploads/2017_pilt_annualreport.pdf website: https://www.doi.gov/sites/doi.gov/files/uploads/2017_pilt_annualreport.pdf
- Department of the Interior. (2018). Fiscal Year 2018 Payments in Lieu of Taxes National summary. Retrieved April 22, 2019, from https://www.doi.gov/sites/doi.gov/files/uploads/2018_national_summary.pdf
- Deschutes County. (2019). About Deschutes County | Deschutes County Oregon [Governmental]. Retrieved January 2, 2019, from The Official Website of Deschutes County, Oregon website: <https://www.deschutes.org/administration/page/about-deschutes-county>
- Douglas County. (2018). Douglas County Oregon e-Government - County Overview [Governmental]. Retrieved January 2, 2019, from The Official Website of Douglas County, Oregon website: <http://www.co.douglas.or.us/overview.asp>
- Farmer, L. (2014, June 27). Economic Gardening Is Growing, But What Is It? Retrieved May 28, 2019, from Governing.com website: <https://www.governing.com/topics/finance/gov-how-to-grow-businesses-that-grow-the-economy.html>
- Freudenburg, W. R., Wilson, L. J., & O'Leary, D. J. (1998). Forty Years of Spotted Owls? A Longitudinal Analysis of Logging Industry Job Losses. *Sociological Perspectives*, 41(1), 1–26. <https://doi.org/10.2307/1389351>
- Hamilton-Pennel, C. (2010). Seven Steps to Developing an Economic Gardening Implementation Strategy. Retrieved May 28, 2019, from ICMA.org website:

<https://icma.org/articles/article/seven-steps-developing-economic-gardening-implementation-strategy>

Headwaters Economics. (2018). Economic Profile System (EPS). Retrieved December 26, 2018, from Headwaters Economics website: <https://headwaterseconomics.org/tools/economic-profile-system/>

Hoover, K. (2017). *PILT (Payments in Lieu of Taxes): Somewhat Simplified*. Retrieved from <https://www.everycrsreport.com/reports/RL31392.html>

Hoover, K. (2018). *Federal Lands and Related Resources: Overview and Selected Issues for the 115th Congress*. 36.

Josephine County, Oregon. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/w/index.php?title=Josephine_County,_Oregon&oldid=865578323

Lambe, W. (2013, October 2). Small Towns Big Ideas: Case Studies in Small Town Community Economic Development. Retrieved April 30, 2019, from Community-Wealth.org website: <https://community-wealth.org/content/small-towns-big-ideas-case-studies-small-town-community-economic-development>

Lehner, J. (2016, November 3). Poverty and Progress, Josephine County Edition | Oregon Office of Economic Analysis [Governmental]. Retrieved May 16, 2019, from Oregon Office of Economic Analysis website: <https://oregoneconomicanalysis.com/2016/11/03/poverty-and-progress-josephine-county-edition/>

Maleki, S. (2008). *Understanding the Social and Economic Transitions of Forest Communities* (p. 12). Retrieved from <https://www.fs.fed.us/pnw/pubs/science-update-18.pdf>

- McKee, M. (2004). Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. *BMJ*, 328(7432), 153–153.
<https://doi.org/10.1136/bmj.328.7432.153>
- Meadows, M. (2015, August 31). H.R.3257 - 114th Congress (2015-2016): PILT and SRS Certainty Act [Webpage]. Retrieved April 22, 2019, from
<https://www.congress.gov/bill/114th-congress/house-bill/3257>
- Meyer, S. (1999). *Wilderness science in a time of change conference—Volume 5: Wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT.* 5, 5.
- Morgan, J. Q., Lambe, W., & Freyer, A. (2009). Homegrown Responses to Economic Uncertainty in Rural America. *Rural Realities*, 3(2), 15.
- OFRI. (2017). OFRI Facts 2017-18. Retrieved December 1, 2018, from
https://oregonforests.org/sites/default/files/2017-05/OFRI_FactsFacts_1718_WEB.pdf
- Oregon & California Railroad Lands Act.* , (1937).
- Oregon Department of Revenue. (2009). A Brief History of Oregon Property Taxation [Governmental]. Retrieved May 1, 2019, from
<https://www.oregon.gov/DOR/programs/gov-research/Documents/303-405-1.pdf>
website: <https://www.oregon.gov/DOR/programs/gov-research/Documents/303-405-1.pdf>
- Oregon Fish and Wildlife Office. (n.d.). OFWO - Northern Spotted Owl. Retrieved April 25, 2019, from <https://www.fws.gov/oregonfwo/articles.cfm?id=149489595>
- Oregon Secretary of State Audits Division: Audit Report Search. (n.d.). Retrieved May 20, 2019, from <https://secure.sos.state.or.us/muni/public.do>

Rasker, R. (2017). *The Transition from Western Timber Dependence: Lessons for Counties*.

Retrieved from https://headwaterseconomics.org/wp-content/uploads/Lessons_Timber_Transition.pdf

Roth, D. (1991). Community Stability, Rural Development, and the Forest Service. *Rural Development Perspectives*, 5.

Schuster, E. G., Beckley, P. R., Bushur, J. M., Gebert, K. M., & Niccolucci, M. J. (1999). *An Analysis of PILT-Related Payments and Likely Property Tax Liability of Federal Resource Management Lands* (General Technical Report No. RMRS-GTR-36).

<https://doi.org/10.2737/RMRS-GTR-36>

Secure Rural Schools And Community Self-determination Act Of 2000. , Pub. L. No. 106–393 (2018).

Spurr, K. (2017, March 23). Census: Deschutes, Crook county growth among nation's fastest.

Retrieved May 15, 2019, from The Bulletin website:

<http://www.bendbulletin.com/localstate/5170792-151/census-deschutes-crook-county-growth-among-nations-fastest>

Stanford University. (n.d.). Follow The Money: O&C. Retrieved April 9, 2019, from Stanford

University website: http://followthemoney.stanford.edu/pages/O_C.html

The Oregon Editorial Board. (2013, November 9). Bend and Medford as economic growth engines: Editorial - oregonlive.com [News]. Retrieved May 16, 2019, from

Oregonlive.com website:

https://www.oregonlive.com/opinion/2013/11/bend_and_medford_as_economic_g.html

The Payments in Lieu of Taxes Act. , (1976).

Timber Harvest Data 1962-2017 | Oregon transparency. (2018, October 29). Retrieved April 7, 2019, from <https://data.oregon.gov/Natural-Resources/Timber-Harvest-Data-1962-2017/7ie7-wbyr>

Tolkien, J.R.R. (1954). *The Fellowship of the Ring*. Houghton Mifflin Harcourt.

U.S. Constitution, Article IV, §3, Clause 2. , (1788).

U.S. Constitution Article VI, §1, Clause 2. , (1788).

USDA Forest Service. (n.d.). USDA Forest Service Geodata Clearinghouse. Retrieved May 15, 2019, from FSGeodata Clearinghouse website:

<https://data.fs.usda.gov/geodata/edw/datasets.php>

Wallowa County, Oregon. (2018). In *Wikipedia*. Retrieved from

https://en.wikipedia.org/w/index.php?title=Wallowa_County,_Oregon&oldid=86983778

5

Wenger, M. (2016). *Oregon's Counties: 2016 Financial Condition Review*. (2016), 45.

Yin, R. K. (2011). *Applications of Case Study Research* (3rd ed., Vol. 34). Thousand Oaks, California: SAGE.