

policy

The Economic Contribution of Stewardship Contracting: Two Case Studies from the Mount Hood National Forest

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We conducted an economic analysis of two case study stewardship contracts on the Mount Hood National Forest in western Oregon. Stewardship contracting has been embraced by some federal managers to achieve restoration goals while providing economic benefits to local communities. Little is known about economic contributions from stewardship contracts, including how they compare against Secure Rural Schools funding or the century-old payments to counties revenue sharing system. Using expenditure data from sale purchasers, contractors, and fiscal agents, we developed methodology to track spending and used IMPLAN software to estimate economic contributions and multipliers. Results showed that (1) commercial thinning, service work, and retained receipts projects all contributed to local economic activity; (2) expenditures accounted for \$4 million in output and generated 36 jobs, with output and job multipliers of 1.42 and 1.82, respectively; and (3) benefits were distributed across a wider variety of economic sectors than timber harvesting alone.

Keywords: stewardship contracting, Mount Hood National Forest, collaborative forest management, federal forest policy, Secure Rural Schools

Stewardship contracting has been embraced by some national forests as a way to achieve ecological restoration goals while simultaneously providing economic benefits to local communities (Moseley and Charnley 2014). Stewardship contracts are an administrative mechanism to combine commercial sales of forest products and contracts for service work, such as pre-commercial thinning, trail maintenance, or hazard fuels reduction. Revenues or receipts from timber harvest in excess of service costs are called retained receipts and are held by the forest to fund restoration projects. In contrast, all

receipts generated from traditional timber sales are sent to the US Treasury. A century-old policy required the federal government to distribute 25% of federal timber receipts back to the counties where harvesting occurred to fund public schools, roads, and other county services (16 USC 500). After adoption of the Northwest Forest Plan in 1994, harvests from federal lands in the Pacific Northwest were curtailed sharply. Payments to counties fell in step with falling timber receipts, and growing concerns about the impact on county services led Congress to pass the Secure Rural Schools (SRS) and

Community Self-Determination Act of 2000 (P.L. 106–393). SRS funding was intended to decouple county payments from federal harvest and reduce reliance on timber receipts.

The current SRS authority expires in 2017, and the uncertain future of SRS funding has implications for federal timber policy. Under the Secure Rural Schools Act, an eligible county could elect to receive a Secure Rural Schools Act payment or a 25% payment, but not both (USDA Forest Service 2017). Counties receive no direct payments from stewardship contracting. If counties lose SRS funding permanently, they could again receive 25% of timber sale receipts. Although stewardship contracting has been around for nearly two decades, little is known about their economic contribution to local communities, and little data exist to compare them against benefits from traditional timber sales. An array of assessments have examined the use of stewardship contracting (Mattor and Cheng 2015); however, economic analyses are relatively sparse, especially in evaluating trade-offs forest managers face when choosing among contracting mechanisms (Hausbeck 2007).

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The objective of this paper is to formalize a discussion about the economic contribution of stewardship contracts. Using two case studies from the Mount Hood National Forest (MHNF) in northwestern Oregon, we performed an economic assessment of the commercial thinning and contracted service work performed by the timber purchaser, and subsequent restoration work funded using retained receipts. To date, the literature contains almost no information about how retained receipts are used, who gains, and how they are leveraged within the greater ecological restoration community. This type of socioeconomic monitoring could help inform comparisons between contracting methods to achieve management goals.

We begin with an overview of stewardship contracting and county payment policy, and then review the literature on economic monitoring of restoration and stewardship contracts. Then we introduce our two case studies, describe economic contribution methodology, and present analysis results. We end by discussing the economic contribution of stewardship contracting and some trade-offs faced by local forest managers and county officials.

Stewardship Contracts

Stewardship contracting was developed as a flexible approach to accelerate the pace and scope of ecological restoration activities on federal lands. These contracts were permanently authorized by Congress with passage of the 2014 Farm Bill and are used by the Forest Service and Bureau of Land Management (USDA Forest Service 2014). They combine elements of timber sales, because they allow the sale of commercial forest products, with contracts for service work, such as pre-commercial thinning, trail maintenance, and fuel reduction, that are funded with appropriated dollars.

Two specific authorities in stewardship contracting legislation are particularly relevant to our analysis. The first is the ability to trade forest products for service work, which offsets the cost to accomplish more work within existing appropriations. For example, the Forest Service could pay for culvert repairs and thinning operations using proceeds from any commercial timber sold as part of the project. This bartering approach has allowed the Forest Service to achieve resource management goals without depending on Congressional appropriations.

The other relevant authority is that the forest can keep receipts generated through selling forest products, providing additional funds for restoration work. If value of timber or other goods created from a stewardship contracting project exceeds the cost of contracted service work, the excess receipts are retained by the forest. Projects funded using retained receipts are selected by a local forest collaborative group. The ability to retain the excess receipts, rather than send them to the US Treasury, has enabled the Forest Service to complete forest restoration projects that may not have been possible otherwise (GAO 2008). Currently, all national forests in the Pacific Northwest Administrative Region of the Forest Service have used stewardship contracts as part of their land management activities (Daugherty 2017).

County Payments

With passage of the Payments to States law in 1908, Congress recognized the need to compensate local counties containing extensive tracts of federal forestland. Under the law, the United States Forest Service (USFS) made payments of 25% of gross timber sale receipts from each national forest to the counties where the forests are located. Payments were allocated based on the national forest acreage in each county to help pay for schools, roads, law enforcement, and other county services (16 USC 500). As federal harvest levels fell, counties dependent on the federal timber payments experienced an alarming decline in funding. In response, Congress passed the Secure Rural Schools and Community Self-Determination Act of 2000 (SRS). The law amended the county timber payments program to allow

72 counties in Oregon, Washington, and northern California to receive the average of their three highest timber harvest revenue payments from fiscal year 1986 to 1999 instead of traditional payments tied to harvesting. All affected counties in Oregon opted to receive SRS funding instead of federal receipts sharing payments.

SRS funding replaced timber receipt sharing with guaranteed levels of payments not tied to timber sales. The intent was to provide consistent and reliable support for counties to help them transition away from federal timber. SRS funding has been renewed several times since it expired in 2006, each time at reduced levels. Failure to reauthorize the Act in 2017 would result in county payments reverting back to 25% of timber receipts. Stewardship contracts represent an opportunity for the federal managers to achieve restoration and harvest goals while also contributing to local economies. However, payments from timber sales were made directly to county governments, while retained receipts from stewardship contracts are allocated by local collaborative groups to fund restoration work. As a result, some county governments remain averse to the use of stewardship contracts because of perceived negative impacts on local county budgets (Moseley and Charnley 2014).

Monitoring Stewardship Contracts

Although there are extensive discussions about biophysical metrics that define successful restoration, monitoring for social and economic impacts has lagged (Aronson

Management and Policy Implications

The Secure Rural Schools and Community Self-Determination Act (SRS) was originally enacted in 2000 to help counties dependent on receipts from federal timber sales adjust to declining harvest levels following the adoption of the Northwest Forest Plan. Counties opting for SRS funding replaced receiving 25% of federal timber revenues with guaranteed annual payments decoupled from harvest activity. The Act will expire in 2017, and unless it is reauthorized, county payments could revert back to dependence on timber sales. Stewardship contracting has been authorized since 2000 to streamline implementation of forest restoration goals on national forests. Little is known about the magnitude and distribution of economic benefits from them. We developed a methodology for project-level economic monitoring and estimated the economic contributions of two completed stewardship contracts on the Mount Hood National Forest in northwestern Oregon. In our case studies, county-level expenditures on commercial thinning, service work, and retained receipts projects greatly exceeded what could be expected from the payments to counties' revenue sharing regime. With the uncertain future of SRS funding, this study highlights the importance of project-level economic monitoring to inform comparisons between contracting mechanisms and discussions between federal land managers and stakeholders.

et al. 2010, Wortley et al. 2013). Wortley et al. (2013) found that only 3.5% of published peer review articles included social and economic attributes in monitoring. A Government Accountability Office report (GAO 2008) noted that stewardship contracts initially required project-level socioeconomic and ecological monitoring, but Congress changed the requirement to programmatic monitoring in 2003 (Kerkvliet 2010). The Pinchot Institute for Conservation (2012) conducted 15 case studies of Forest Service stewardship contracts, focusing on how agency personnel engaged with non-agency stakeholders with no mention of social or economic contributions.

Both stewardship contracts and traditional timber sales can generate timber revenue. They differ, however, because of the service work performed by the contract purchaser and the restoration work funded through retained receipts. The relationship between stewardship contracts and retained

receipts can be described by the following equation:

$$\begin{aligned} &\text{Timber revenue generated} \\ &\quad - \text{contracted services} = \text{retained} \\ &\quad \quad \quad \quad \quad \quad \quad \quad \text{receipts} \end{aligned}$$

The contract purchaser is responsible for elements on the left-hand side of the equation. Contracts are awarded based on quality of a proposal, expertise, and past contractor performance as well as bid price. Retained receipts remain with the forest and are allocated locally, usually through proposals submitted by a forest collaborative group.

There are a few examples of economic monitoring of stewardship contracts and forest restoration in the literature. Nielsen-Pincus and Moseley (2013) examined employment and economic impacts of public investments in forest and watershed restoration in Oregon. Using IMPLAN software

(IMPLAN Group 2015), they estimated that equipment intensive watershed restoration resulted in 15.7 jobs and an additional \$2,380,186 in total output per \$1 million of public investment, while fish passage projects led to 15.2 jobs and \$2,240,281 in total output effects per \$1 million public investment. Kerkvliet (2010) estimated economic impacts from stewardship contracting using a case study on the Lolo National Forest in Montana. The project's total economic impact included a \$23 million increase in final sales for 206 industry sectors in eight counties, 148 jobs, and a \$4.6 million increase in wages (2003 dollars). Impact multipliers for final demand and employment were 1.41 and 2.14, respectively. He concluded that the variety of project activities spread impacts across a wider variety of economic sectors than timber harvesting alone. Hjerpe and Kim (2008) examined economic impacts of a stewardship contract for fuels reduction in the southwest.

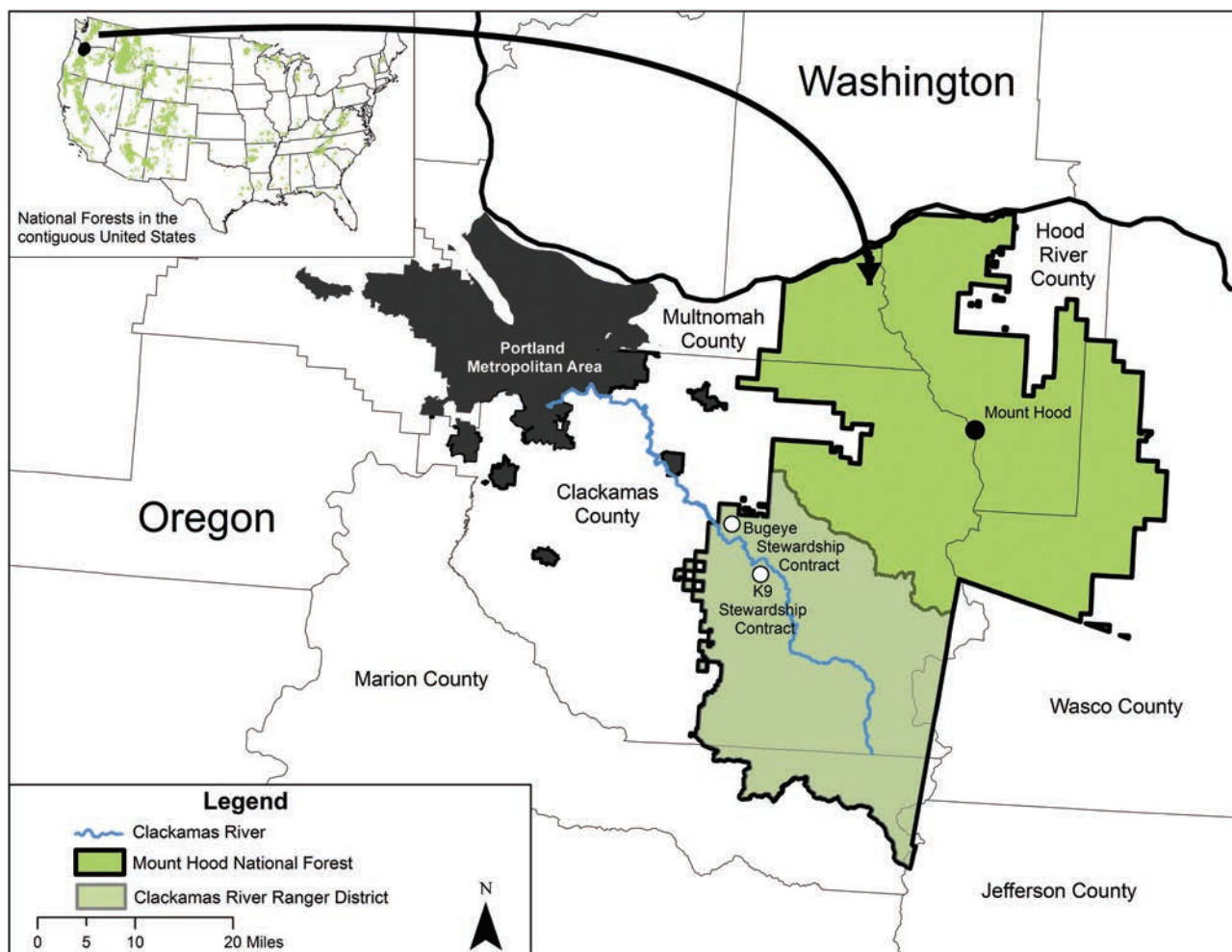


Figure 1. Mount Hood National Forest and the Clackamas River Ranger District and overlap with northern Oregon counties.

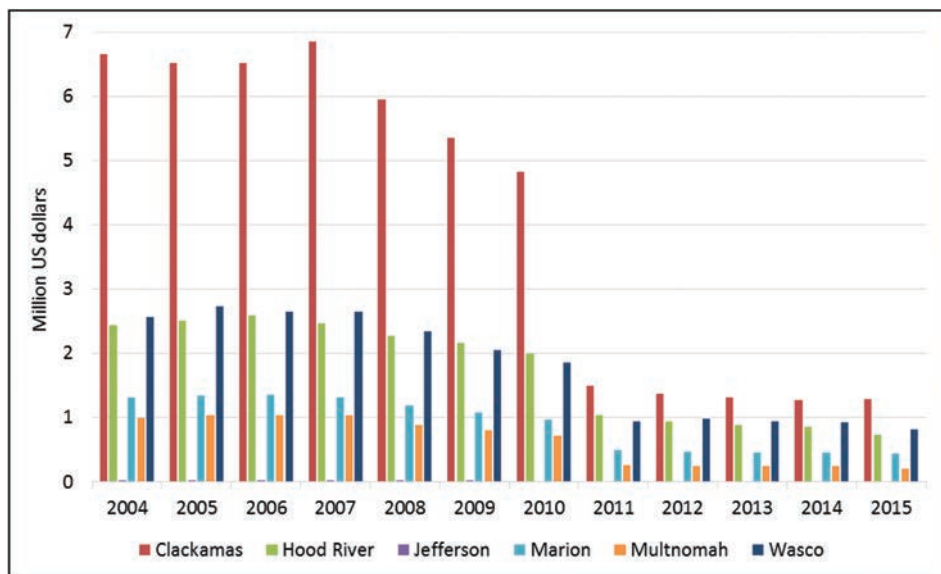


Figure 2. Secure Rural Schools funds for each county containing part of the Mount Hood National Forest, 2004–2015.

Impacts, multipliers, and wood utilization rates were calculated for fiscal year 2005 for five national forests and accounted for over \$40 million of output, generated nearly 500 jobs, and provided an economic stimulus to rural communities.

Collaboration is critical to the success of stewardship contracts. Restoration projects funded with retained receipts must be recommended formally by a collaborative group. [Mattor \(2013\)](#) assessed stewardship contract implementation by the Forest Service and showed that forests with active collaborative groups achieved more management objectives than those without. Collaborative groups contain a variety of local stakeholders with data that could facilitate economic monitoring, such as the contract purchaser and fiscal agents who administer retained receipts.

Study Area

Our two case studies were stewardship contracts located on the Clackamas River Ranger District of the Mount Hood National Forest ([Figure 1](#)). The MHNH comprises 1.1 million acres of forestland in north-central Oregon and straddles the Cascade mountain range. The forest includes moist western slopes of Mount Hood as well as drier east-side forests and rangelands and encompasses portions of six Oregon Counties: Clackamas, Multnomah, Hood River, Jefferson, Marion, and

Wasco ([Clackamas Stewardship Partners 2018](#)). Approximately 2 million people live in proximity to the west side of the forest, but counties on the east side are sparsely populated and rural in character. Almost half of the MHNH lies within Clackamas County, which [Figure 2](#) shows has received the majority of SRS funding for the six counties containing the MHNH (USDA Forest Service 2018). Overall, SRS funding dropped substantially in 2011; losses to Clackamas County were greater than other MHNH counties.

The MHNH is administratively unique for two reasons important to this paper. First, the MHNH was one of the first national forests in Oregon to adopt the Wyden Authority (Public Law 105–277, Section 323 as amended by Public Law 109–54, Section 434), which authorizes the USFS to enter into agreements for watershed restoration work on public or private lands for the protection, restoration, and enhancement of fish and wildlife habitat. The Authority allows the MHNH to use retained receipts for restoration projects located outside the forest boundaries, provided that the project benefits the forest ([USDA Forest Service 2005](#)). The second unique element of the MHNH is an internal accounting system designed to track spending associated with stewardship contracts and report project-level expenditures to a local collaborative group. Their system allows the forest to track receipts and expenditures,

including retained receipts projects, back to a specific stewardship contract. Without this system, retained receipts are difficult to track because they are distributed from pooled accounts not tied to an individual contract.

Case Study Stewardship Contracts

We analyzed the economic contributions of two stewardship contracts, K9 and Bugeye, completed on the Clackamas Ranger District. The K9 Stewardship Contract was awarded in 2007 and completed in 2011. It included commercial thinning of 359 acres along with service contracts for aquatic habitat improvement, precommercial thinning of overstocked young Douglas-fir (*Pseudotsuga menziesii*) stands, and road decommissioning. The Bugeye Stewardship Contract was awarded in 2009 and included commercial thinning of 301 acres and service work to place downed woody debris (DWD) and create habitat snags in the Clackamas River watershed. Work on the Bugeye Stewardship Contract was completed in 2011.

K9 and Bugeye were among the first stewardship contracts implemented by the MHNH. Both were purchased by the same firm and generated almost \$350,000 of retained receipts used in seven subsequent restoration projects. Three of the retained receipts projects were located on the MHNH and administered by USFS staff for fish passage improvement, off-highway vehicle damage repair, and road repairs. The other four were fish passage projects located off-forest and implemented by the Clackamas River Basin Council (CRBC), a local non-profit organization.

Data Collection and Organization

We worked with the Clackamas Stewardship Partners (CSP), one of three collaborative groups recommending projects for retained receipts on the MHNH. MHNH staff, the stewardship contract purchaser, and the CRBC all participate as members in the CSP. Beginning with the contract purchaser, we used a snowball sampling strategy ([Patton 2014](#)), asking each contractor to identify any subcontractors employed on the projects. The purchaser provided the volume of timber removed and the name, location, and

Table 1. Summary and timber harvest information for the K9 and Bugeye Stewardship Contracts.

Panel A: Summary information for each stewardship contract						
Stewardship contract	Award date	Close date	Purchaser bid (receipts)	Cost of services	Receipts retained	Purchaser county
K9	12/4/2007	2/14/2011	281,445	73,464	207,981	Skamania, WA
Bugeye	8/4/2009	1/10/2011	157,664	9,175	148,489	Skamania, WA

Panel B: Volume and destination of material harvested from thinning operations					
Stewardship contract	Destination mill type	Volume (mbf)	Fiscal mechanism	Firm county	Firm size (# of employees)
K9	Sawmill	1,540	Sale to mill	Hood River, OR	40
		360		Skamania, WA	225
		1,135			105
Bugeye	Sawmill	2,450	Sale to mill	Hood River, OR	40
		100		Skamania, WA	105
		578		Skamania, WA	35

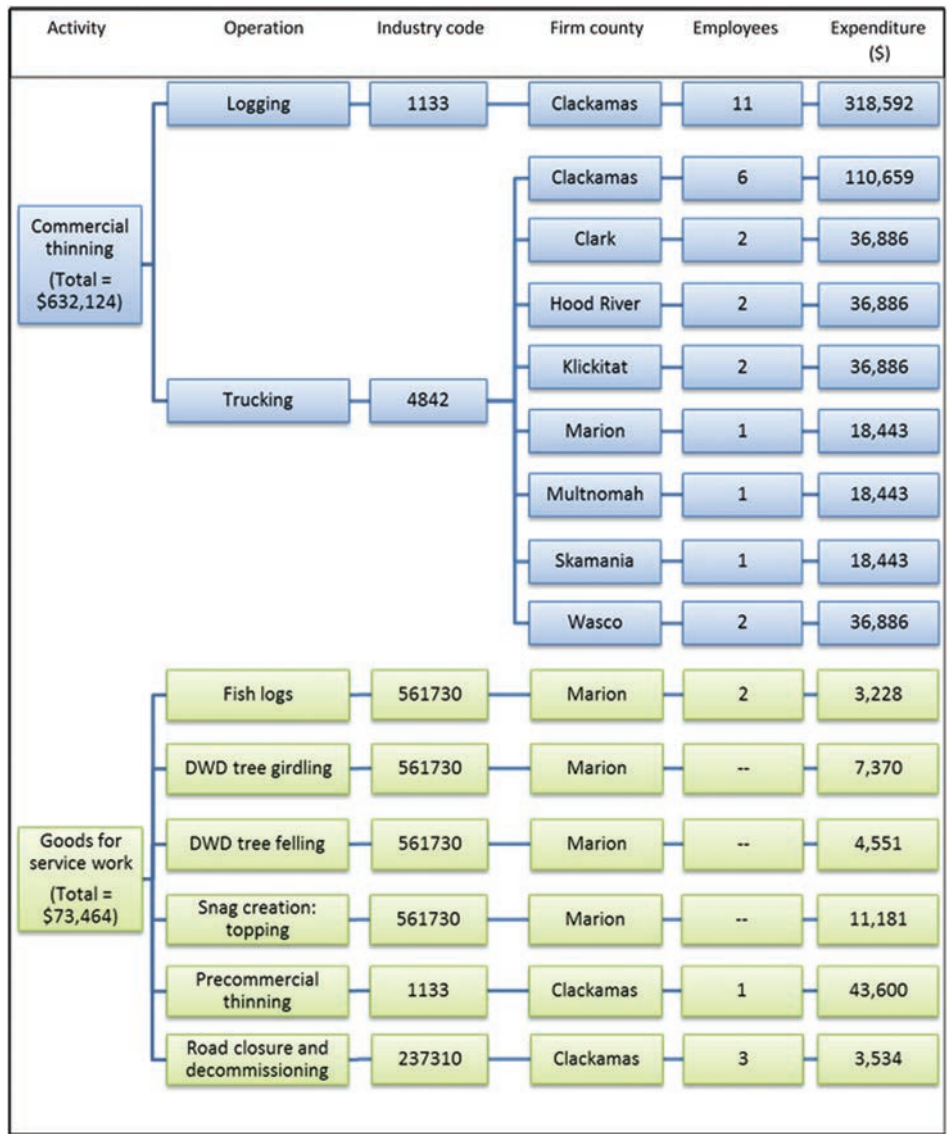


Figure 3. Commercial thinning (\$632,124) and goods for services (\$73,464) expenditures for the K9 stewardship contract. – indicates that the same firm completed more than one operation.

expenditures on all contractors involved in commercial thinning and service work. We made site visits to conduct interviews

with subcontractors between May and December 2014. Our interview objective was to track all expenditures for thinning

and service work. We have not included the identity of any contractors, to maintain confidentiality.

Financial data for retained receipts projects were obtained from two sources: (1) USFS staff from the Mount Hood Supervisor’s Office for on-forest expenditures; and (2) the CRBC, the fiscal agent for off-forest expenditures. We gathered details about retained receipt project contractors, expenditures, matching funds, and in-kind contributions. Economic contributions from the retained receipts projects accrued both from direct payments to contractors for the restoration work, and from management activities of partners who provided personnel, funding, and other support.

In total, we interviewed staff from the contract purchaser, MHNF, CRBC, and four contractors representing 67% of total contractor payments. Work was categorized as commercial thinning, service work, or retained receipts and combined with expenditure and employment data. Retained receipts were further subdivided into: (1) direct payments to contractors working on restoration projects, and (2) expenditures on project management activities of CRBC staff and funding partners. We then delineated an “economic contribution zone,” which contains all of the counties where contractors who worked on either stewardship contract were located. Mill operations were not included in the IMPLAN analysis to avoid double counting production inputs to wood-using mills, such as logging and trucking, which we obtained directly from contractor interviews. Including mill operations, as well as inputs to mill operations, would model production inputs twice.

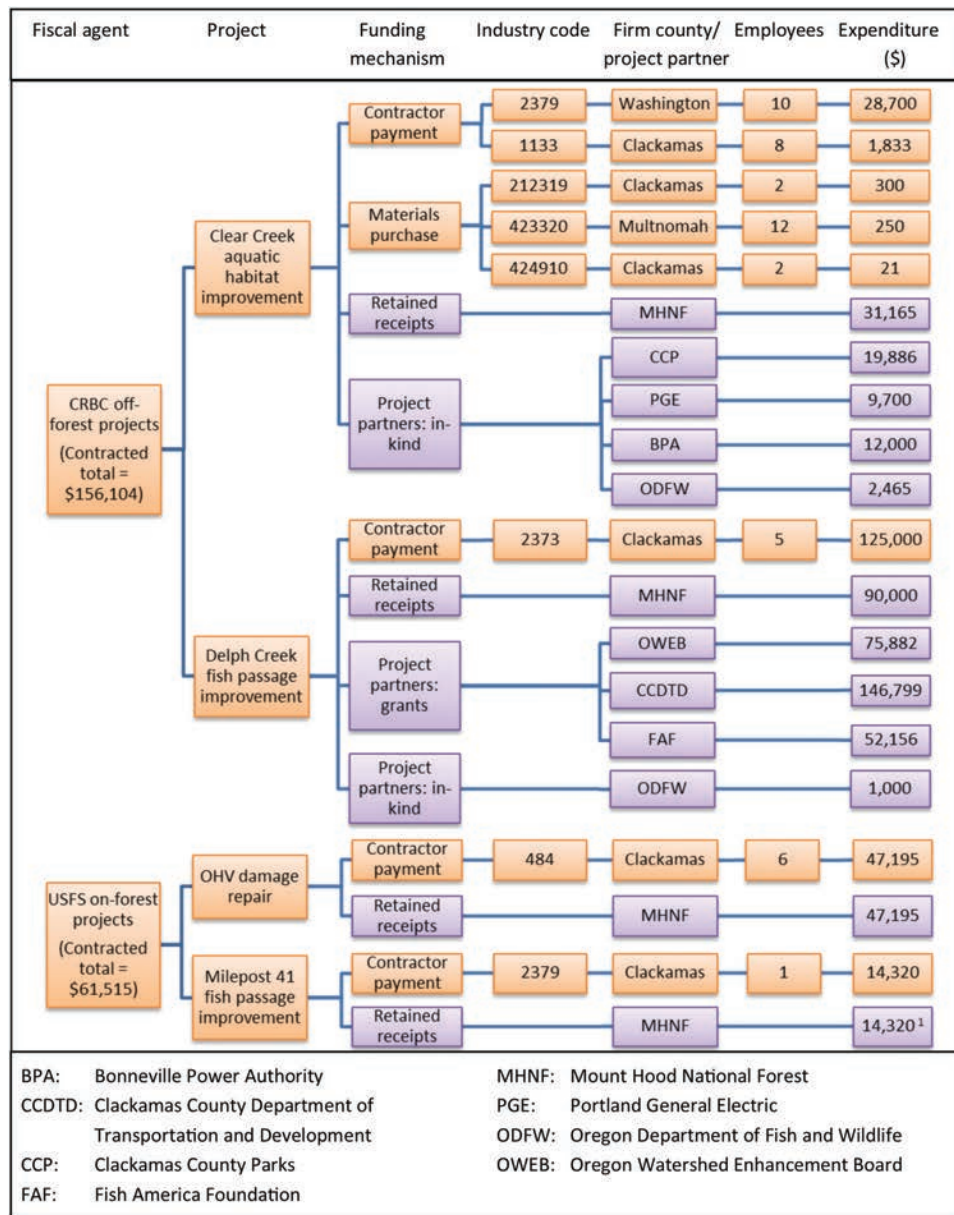


Figure 4. Disposition of retained receipts, leveraged funds, and in-kind contributions from the K9 stewardship contract (purple boxes indicate funds leveraged to pay for work referenced in orange boxes).¹ Transferred from receipts retained from a different stewardship contract.

IMPLAN Analysis and Sectoring Plan

We used IMPLAN data and software to develop an input/output (I–O) model to estimate economic effects. I–O models create a mathematical map that follows the path of expenditures as they cycle through a local economy. Note that we estimated effects as an economic contribution, rather than an economic impact (Watson et al. 2007). An economic impact is the effect of spending that would not have occurred otherwise, such as construction of a new sports

stadium on a vacant lot in a city that had no other plans for the lot (Watson et al. 2007). However, for stewardship contracting activities, the baseline for comparison is not no activity, because work could be accomplished through an alternative contracting mechanism. This was an assumption we made based on discussion with forest managers.

IMPLAN estimates three types of effects: direct, indirect, and induced (IMPLAN Group 2015). Direct effects are the change in economic activity resulting from direct project expenditures. In our case

studies, these are payments that contractors received directly from contract administrators. The indirect effect reflects increased economic activity to support those direct contributions, such as a logging firm purchasing fuel and equipment. Induced effects represent household consumption by people working at these firms, as they reinvest wages in goods and services provided by the local community. The greater the proportion of local purchases, the greater the direct, indirect, and induced effects, because resources remain in the community. Multipliers can then be calculated as the

Activity	Operation	Industry code	Firm county	Employees	Expenditure (\$)
Commercial thinning (Total value = \$530,000)	Logging	1133	Clackamas	11	261,000
	Trucking	4842	Clackamas	10	219,167
			Hood River	1	21,917
			Wasco	1	21,917
Road work	237310	Hood River	1	6,000	
Goods for service work (Total value = \$9,175)	DWD tree felling	561730	Marion	2	800
	DWD tree girdling	561730	Marion	--	1,760
	Snag creation: topping	561730	Marion	--	6,615

Figure 5. Commercial thinning (\$530,000) and goods for services (\$9,175) expenditures for the Bugeye stewardship contract. -- indicates that the same firm completed more than one operation.

ratio of total effects (direct, indirect, and induced) to direct effects for employment and output. Multipliers provide an estimate of how many times initial expenditures cycled through the contribution zone.

Because there is no “ecological restoration” sector in IMPLAN, we developed a sectoring plan based on expenditure data from contractor interviews. All contractor payments for harvest or service work were classified into an economic sector (e.g., logging) and assigned an industry code using the North American Industrial Classification System (NAICS). Economic effects from retained receipts projects were split into two parts: the direct expenditures to contractors performing restoration work; and the labor and administrative contributions of project managers at CRBC and funding partners. Because the majority of retained receipts administered by CRBC were used for fish passage projects, we used the spending pattern coefficients for fish passage project management reported in Nielsen-Pincus and Moseley (2013), which were estimated at the state level, rather than for specific counties.

IMPLAN results are summarized for direct, indirect, and induced effects of the

two stewardship contracts with respect to employment and overall output. IMPLAN jobs represent the annual number of full- and part-time jobs supported rather than full-time equivalents. Output is a gross measure of production that includes the value of all intermediate and final goods, a useful measure of the total flow of economic activity created by a specific activity.

Results and Discussion

The K9 and Bugeye Stewardship Contracts were purchased by the same firm located in Skamania County, WA. The purchaser paid \$439,109 for the two sales (Table 1A). Commercial thinning from K9 and Bugeye produced 3,035 MBF and 3,128 MBF of Douglas-fir, respectively (Table 1B). About 3,990 MBF was processed in Hood River County, Oregon. The remainder was sold to two sawmills and one veneer mill in Skamania County, WA. The contract purchaser paid harvest taxes to the State of Oregon amounting to \$10,623 for K9 and \$11,511 for Bugeye. Table 1A also shows that K9 and Bugeye generated retained receipts of \$207,981 and \$148,489, respectively.

We compiled the work activity with corresponding industry code, firm location,

employment, and expenditures into flowcharts that represent spending for each contract, including leveraged funding and match dollars from restoration partners (Figures 3–6). Commercial thinning and service work for K9 (Figure 3) drew contractors from eight counties with total expenditures worth \$705,588. K9 retained receipts contributed to three aquatic restoration projects and one off-highway vehicle damage repair project (Figure 4). Grants and in-kind contributions totaling \$319,888 were received from restoration partners for two off-forest projects. Firms contracted for the Bugeye thinning and service work received a total of \$539,175 and came from a five-county area (Figure 5). Retained receipts from Bugeye contributed to three projects focused on fish passage and forest road repair, and two projects were leveraged with \$484,018 in grants and in-kind contributions (Figure 6). The majority of contracted firms were local. Overall, 67.5% of all contractor payments from K9 and 86.7% of all contractor payments from Bugeye were received by firms in Clackamas County. Although we learned how many people worked on projects, we were unable to find out the duration of their work.

Fiscal agent	Project	Funding mechanism	Industry code	Firm county/ project partner	Employees	Expenditure (\$)
CRBC off-forest projects (Contracted total = \$233,900)	Clear Creek fish passage improvement	Contractor payment	2373	Clackamas	5	115,050
		Retained receipts		MHNF		60,000
		Project partners: grants		CCSWCD		20,000
				ODFW		53,900
				OWEB		140,537
	Project partners: in-kind		ODFW		4,200	
				WW		874
	Spring Creek fish passage improvement	Contractor payment	2373	Clackamas	5	118,850
		Retained receipts		MHNF		60,000
		Project partners: grants		OWEB		115,413
Project partners: in-kind			CCDTD		169,094	
USFS on-forest projects (Contracted total = \$11,250)	FS road repair	Contractor payment	237310	Cowlitz	3	8,250
		Materials purchase	4442	Cowlitz	5	2,000
			2123	Clackamas	20	1,000
	Retained receipts		MHNF		11,250 ¹	
CCSWCD:	Clackamas County Soil and Water Conservation District					
CCDTD:	Clackamas County Department of Transportation and Development					
MHNF:	Mount Hood National Forest					
ODFW:	Oregon Department of Fish and Wildlife					
OWEB:	Oregon Watershed Enhancement Board					
WW:	Wonser Woods Tree Farm					

Figure 6. Disposition of retained receipts, leveraged funds, and in-kind contributions from the Bugeye stewardship contract (purple boxes indicate funds leveraged to pay for work referenced in orange boxes).¹ Transferred from receipts retained from a different stewardship contract.

Economic Contribution

We combined county-level expenditures for commercial thinning, service work, and retained receipts projects to form a 10-county economic contribution zone (Figure 7). The zone contains six counties in Oregon and four in Washington, including all MHNF counties except Jefferson. The zone contains both urban and rural counties, so we developed Table 2 to show

their relative economic size, measured by number of establishments (USDC Census Bureau 2017).

Regional employment and output effects are shown in Table 3. Overall, 21.7 jobs were supported by the two stewardship contracts, with an additional 14.6 jobs spurred by indirect and induced activities. Project management activities generated 11.4 total jobs, but only 3.9 jobs were inside

the economic contribution zone. Gross economic output effects occurring within the zone amounted to \$2.38 million, about 60% of the total expenditures. By far, the majority of economic effects were experienced in Clackamas County, Oregon.

Multipliers were calculated for employment and output effects. The employment multiplier indicates that for every direct job supported by the stewardship

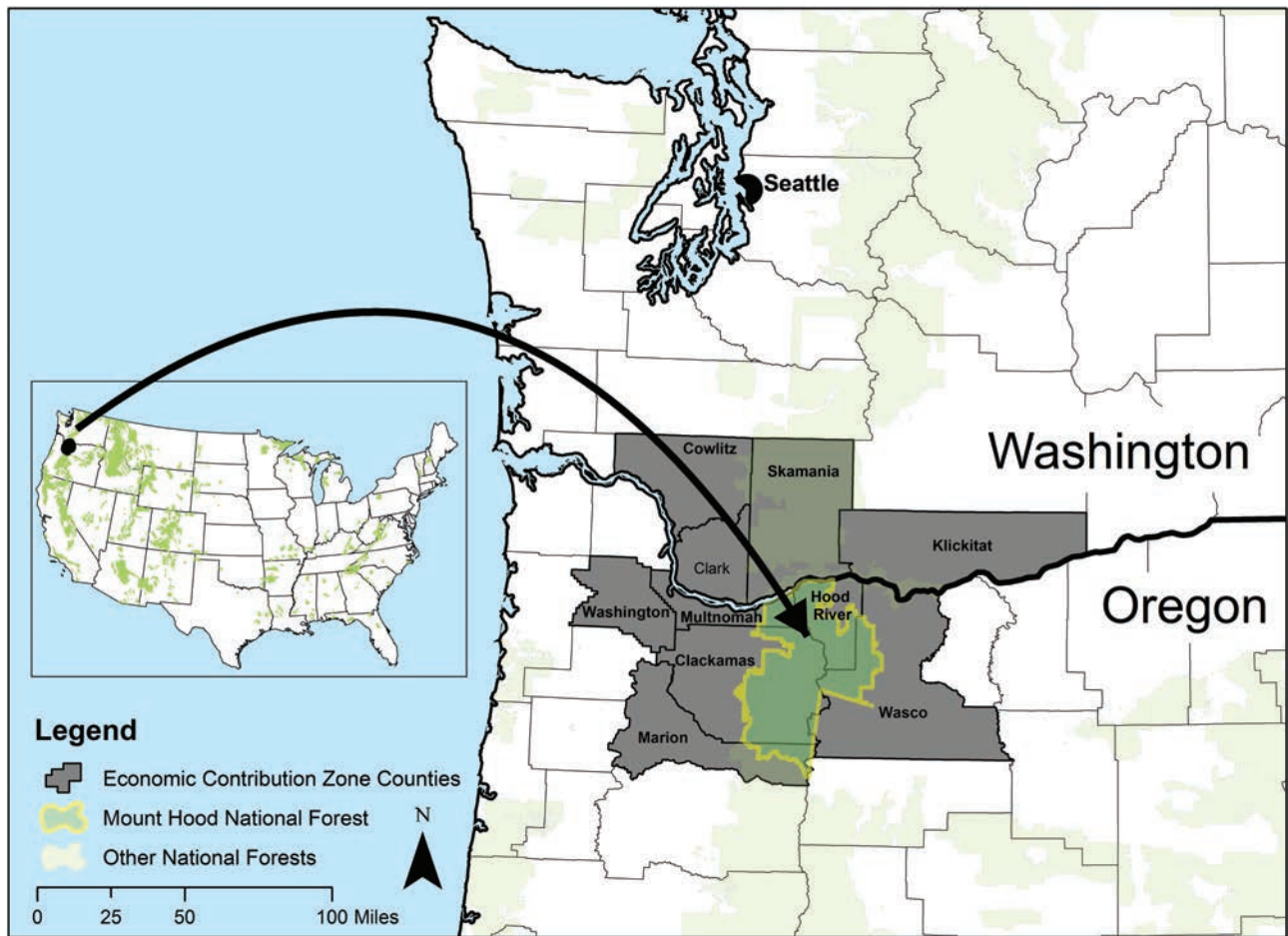


Figure 7. The economic contribution zone: Counties receiving economic activity from two case study stewardship contracts.

Table 2. Number of establishments by county in the case study economic contribution zone, 2012.¹

County	Logging and forestry services	Wood products manufacturing	Paper manufacturing	Total number of establishments
Clackamas	25	27	8	10,944
Clark	18	23	8	9,577
Cowlitz	40	11	8	2,170
Hood	5	4	0	958
Jefferson	4	1	0	355
Klickitat	21	5	0	534
Marion	16	22	2	7,600
Multnomah	8	27	20	25,087
Skamania	3	4	0	178
Wasco	5	2	0	713
Washington	14	37	9	14,234
Total	159	163	55	72,350

¹ NAICS codes 113, 321, and 322.

contracts, 1.82 jobs were supported in other areas of the economy. The economic output multiplier was 1.42; every dollar spent on the two stewardship contracts created another \$1.42 in supporting economic activity. We also separated the total effects into retained receipts project management and all other contracted work and found output multipliers of 2.9 and 1.4,

respectively, indicating a relatively large added value for retained receipts projects, especially for employment.

Economic contributions from the two case studies are within the range of published results for similar activities. Our employment multiplier of 1.82 was greater than Kerkvliet (2010) and Hjerpe and Kim (2008). However, most of the impacts in

Kerkvliet (2010) were from timber harvesting; the proportion of retained receipts in his study was much smaller than our two case studies. The Hjerpe and Kim (2008) analysis occurred in Arizona, where harvested materials were less valuable, potentially explaining why our employment multiplier was greater. We found an economic output contribution multiplier of 2.9 from the

Table 3. Direct, indirect, and induced effects of case study expenditures on regional employment and output.

Location	Direct effect	Indirect effect	Induced effect	Total effect
Employment				
Oregon statewide model	3.9	4.4	3.1	11.4
Clackamas	15.4	2.2	3.6	21.2
Hood River	0.6	0.1	0.1	0.8
Marion	0.3	0.1	0.2	0.6
Multnomah	0.1	0.1	0.1	0.2
Wasco	0.4	0.1	0.1	0.7
Washington	0.2	0.0	0.1	0.4
Clark	0.3	0.1	0.1	0.5
Cowlitz	0.0	0.0	0.0	0.1
Klickitat	0.3	0.1	0.0	0.4
Skamania	0.1	0.0	0.0	0.2
MHNF counties total	16.8	2.6	4.1	23.5
Employment total	21.7	7.2	7.5	36.4
Output (\$)				
Oregon statewide model	674,124	588,535	362,056	1,624,715
Clackamas	1,380,104	196,528	374,266	1,950,899
Hood River	64,803	10,109	12,571	87,483
Marion	53,948	7,454	22,943	84,346
Multnomah	18,490	6,166	6,588	31,244
Wasco	56,008	10,456	11,551	78,016
Washington	30,605	5,609	10,768	46,983
Clark	36,886	8,384	8,836	54,106
Cowlitz	8,942	1,910	2,458	13,310
Klickitat	36,886	11,957	3,987	52,830
Skamania	18,443	1,782	1,705	21,929
MHNF counties total	1,573,353	221,613	427,919	2,231,988
Output total	2,379,239	848,891	817,730	4,045,860

Table 4. Comparison of the two case study stewardship contracts against a hypothetical 25% of timber receipts distributed to MHNF counties. Our analysis shows greater economic activity generated by our two case study stewardship contracts than if commercial thinning operations were accomplished through timber sales. Note that the economic benefits of stewardship contracts primarily accrue to private sector enterprises, and a substantial amount leaked from the local area.

County	Direct contractor payments ²	Thinning operations	Service work and retained receipts activities				Service and retained receipts total	Proportion of service and retained receipts activities by county	County revenue share = Total timber revenue x 25% = \$439,109 x 0.25 = 109,777	
			Service work	Retained receipts		Receipts to county ¹			Proportion of MHNF in the county	
				On-forest	Off-forest					
			(\$)							
			(%)							
Clackamas	1,380,121	909,418	47,134	62,515	361,054	470,703	86.3	51,150	46.6	
Hood River	64,803	64,803	0	0	0	0	0.0	21,057	19.2	
Jefferson	0	0	0	0	0	0	0.0	485	0.4	
Marion	53,948	18,443	35,505	0	0	35,505	6.5	6,927	6.3	
Multnomah	18,693	18,443	0	0	250	250	<0.1	7,927	7.2	
Wasco	58,803	58,803	0	0	0	0	0.0	22,231	20.3	
Other	131,165	92,215	0	10,250	28,700	38,950	7.1	0	0.0	
Total	1,707,533	1,162,125	82,639	72,765	390,004	545,408	100.0	109,777	100.0	

¹ Receipts to county were calculated using an area-weighted proportion of a 25% share of commercial thinning revenue to counties containing parts of the Mount Hood National Forest, similar to what is specified under the 1908 Payments to States law.

² Only includes payments to contractors directly involved in restoration activities.

five fish passage restoration projects funded after leveraging retained receipts from the two contracts, which was comparable to the range of 2.3 to 3.3 reported by Nielsen-Pincus and Moseley (2013).

Payments to Counties

For illustrative purposes, we calculated what the payments to counties could look like using the century-old 25% policy, and compared them against our two case study

stewardship contracts. Specifically, we distributed 25% of the timber sale value to the MHNF counties and compared those to results from the two case studies (Table 4). We limited our comparison to service work

and retained receipts since receipts from commercial thinning could be generated regardless of contracting method. Harvest operations with a timber sale may have generated nearly \$110,000 from commercial thinning for local county governments, with almost half going to Clackamas County. In contrast, the stewardship contracts resulted in \$545,000 in retained receipts that were distributed in direct payments to contractors and project managers, which were leveraged by almost \$823,000 in contributions from restoration partners. The majority of work funded with retained receipts was conducted off-forest in Clackamas County by local contractors. We caution that the comparison between timber sales and stewardship contracts is not strictly “apples-to-apples.” Differences in bidding criteria create some uncertainty whether the awarded sale price on a stewardship contract would mirror the awarded price for a timber sale. Regardless, like Kerkvliet (2010), we found that stewardship contracts generate significant activity in more sectors of an economy than timber operations alone.

Clackamas County contains about half of the MHNF, and contractors located there received 58% of direct payments (Figure 8). Payments to contractors in the other MHNF counties (Multnomah, Hood River, Jefferson, Marion, and Wasco) combined were a modest 11.5% of the total. Hood River and Wasco Counties each contain about 20% of the

forest, but local contractors only received about 2% of direct payments; no Jefferson County contractors were involved. About one-third (34%) leaked outside the MHNF counties, the majority going to contractors in Washington state. The proportion of benefits accrued in Clackamas County was similar to the proportion of acreage, but the other five Mount Hood counties received substantially less than they might with a federal revenue sharing system. This finding suggests that attracting or training local contractors to perform ecological restoration work could retain more restoration dollars within the local community.

Although benefits to the local economy are considerable, county governments have only indirect incentives to support stewardship contracting. Opposition could be more likely in counties where federal receipts represent a large proportion of funding or where commercial timber value is limited and unlikely to generate retained receipts, which reduces local economic impact. Stakeholders from four national forests interviewed in Moseley and Charnley (2014) noted opposition from local officials concerned about county payments given the uncertainty of SRS funding and the low value of merchantable material from their projects. However, Clackamas County, the location of our case studies, enjoys a large and diverse economic base containing part of the Portland, Oregon,

metropolitan area. Unlike more rural counties, funding from federal land management comprises a small portion of Clackamas County’s budget. The county is located in the vicinity of functioning timber markets and contains local technical expertise for restoration work. Under these circumstances, county officials may look more favorably on stewardship contracts. In fact, Clackamas County participates in the Clackamas Stewardship Partners, and helps recommend retained receipts projects for the MHNF.

One challenge to greater adoption of stewardship contracting is the reality of declining federal payments to forest-dependent counties with limited economic bases (Moseley and Charnley 2014). These counties have had decades to reduce reliance on federal payments, with varying degrees of success. County officials, forest stakeholders, and policymakers need information about the economic benefits from stewardship contracts, especially with the uncertain fate of SRS funding. The two contracts we analyzed contributed over 36 jobs and \$4 million in economic output, nearly 60% of which occurred in Clackamas County. However, most of the benefits accrued to private sector entities. Private enterprises, in turn, pay taxes and make purchases that are reflected in indirect and induced economic effects, whereas revenue sharing from timber receipts are distributed directly to county governments.

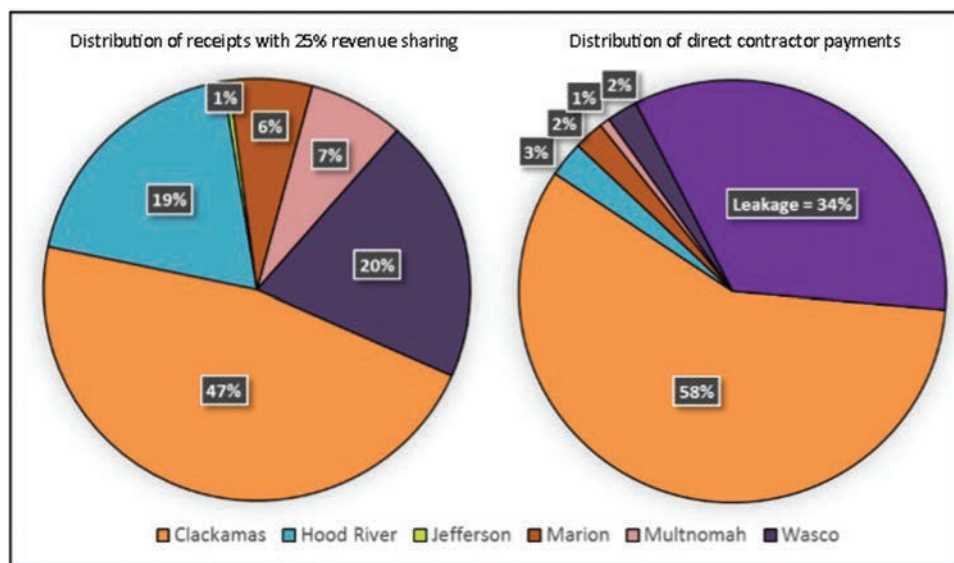


Figure 8. Distribution of direct economic effects from K9 and Bugeye stewardship contracts compared against a typical 25% revenue sharing distribution for Mount Hood National Forest counties.

Conclusion

We report results from contractor interviews and a custom input/output model that estimated economic contributions from two stewardship contracts on the Mount Hood National Forest in Oregon. The results show that economic activity was generated in a multitude of industrial sectors in a ten-county zone, as well as statewide. This is the first study we are aware of to quantify the economic contribution of retained receipts at the project level. Our analysis demonstrates how economic data could be gathered, analyzed, and monitored with a methodology that is generalizable to other western forests with retained receipts. We attribute our ability to perform the analysis to the custom accounting system devised by staff on the MHNF and the presence of a well-established collaborative group. Economic monitoring could be more broadly conducted if all national forests adopted an accounting system to link expenditures back to a particular contract. Finally, we want to emphasize that this work hinged on assistance from members of the Clackamas Stewardship Partners, which attests to the value of forest collaboratives.

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