

Economic Effects of Forest Restoration Activities on Colville National Forest Vision 2020 Projects

Report #4 in a Series Prepared for:
Colville National Forest Collaborative Working Group

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Economic Effects of Forest Restoration Activities on Colville National Forest Vision 2020 Projects: Report #4

How report #4 relates to previous publications

Our analytical objective has been to define an economic reference base for future socio-economic monitoring of Colville National Forest CFLRP² activities in furtherance of economic stimulus goals under their 2020 Vision program. There were three project phases each funded by different interest groups. Phase 1³ enabled FEI field teams to correct and augment severely error-prone published data that inaccurately described the economic structures of Ferry, Pend Oreille, and Stevens Counties in Northeastern Washington. Those findings were summarized in our initial CFLRP report #1.

In phase 2⁴, we collected detailed information on the regional forestry and wood products sector from industrial and agency key informants as well as defining the linkages between that sector's activities and individual sectors of those county economies. We used that corrected data to publish report #2 that described accurate economic profiles of each county economy.

Phase 3⁵ has three logical parts. Part A is the description of the NE Washington forests and of the regional wood products industry. This provides a relative context for understanding the role of the National Forest CFLRP activities within it. We took information collected under phase 2 and published report #3, a forest and wood products sector overview with estimations of the direct CFLRP job, income and expenditures connections to it. A revised report #3 was released on May 4, 2016.

Part B is purely analytical. FEI analysts built Input/Out models of the three county economies to quantify job and income linkages between CFLRP activities, primary sectors, and secondary sectors. Three separate models identified spatial disaggregations of effects that originate in one county but influence another. There is no published report on this part as the models are unique proprietary technology.

This 4th report (part C) is the culmination of all our previous work. Using the three I/O models we tested almost two dozen different types and locations of CFLRP activities could be linked to different spatial and sectoral economic effects patterns. We discuss the results, inferences and limitations of modeling CFLRP economic effects. It has four major sections:

1. Review of the Colville National Forest CFLRP economic setting,
2. Modeling results summaries and inferences describing the total economic effects of CFLRP activities across political jurisdictions and individual economic sectors,
3. Analyses of effects differences between different types of CFLRP activities, and
4. Experimental fiscal modeling estimate of some state and local tax revenues generated by CFLRP expenditures.

² CFLRP is Collaborative Forest Landscape Restoration Project

³ Funded by the NE Washington Forestry Coalition

⁴ Funded by the Washington State Department of Natural Resources

⁵ Funded by the Colville National Forest

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Executive Summary

FEI refined its three county level I/O models to respond to direct spending on CFLRP projects and activities. The average base period spending of \$ 5.4 million/year was separated between public (56%) and private (46%) sources. These patterns were spatially prorated to counties where they occurred. Within this pattern, expense detail was also sensitive to CFLRP practice types. McIver⁶ had found that most direct public contracting expenses (18% of total spending) leaked to out-of-region contractors (86%). Most of the balance (11%) accrued to Stevens County.

We presumed that most of the other direct expenditures categories occurred and accrued within the region. We further disaggregated this remaining CFLRP direct spending by categories of activities that funds were spent on. This helped us spatially disaggregate the rest of spending to counties. The CFLRP is in Ferry County and much of the total spending (~40%) does occur there. However, Stevens County gets the most direct spending (~60%) because the bulk of the operational resources are based there. Pend Oreille County gets almost no direct CFLRP spending.

Base period CFLRP spending generated 211 regional jobs and \$8.8 million of local income. In both indicators this is about 1% of the total regional economy. The spatial distribution of total effects is skewed away from the CFLRP's physical location because primary processing and trade sectors are concentrated further east. Ferry County only accrues 18% of jobs and 19% of income, most of this from direct effects. Total economic effects shift slightly to Pend Oreille County (9% of jobs, 15% of income) which had almost no CFLRP direct spending, and mostly to Stevens County (73% of jobs, 66% of income).

The dominant sector gain from a natural resource project is not surprising. Total CFLRP-linked jobs lodge in forestry services and primary wood processing sectors (60%) with an income pattern mirroring that (62%). There is almost no secondary processing sector to capture other potential wood gains. Other job gains from indirect and induced effects are felt mostly in other sectors (trade, entertainment and consumer services 13%, and government 19%).

FEI estimates of current economic reality generally agree with projections made in the original 20-20 Vision Project proposals. They are far short (29% of estimated jobs) of economic effects estimates found in 20-20 annual reports.

We used the models to estimate marginal effects of different spending types as a rough measure of investment social efficiency. Expenses on forest products produced by mechanical restoration generated the most total jobs (75%). The fact that most of these were in Stevens County shows that downstream processing of timber compensates for the lower labor/capital ratio of harvesting. In the Stevens County

⁶ McIver, Chelsea. 2015. Measuring the Benefits of CFLRP for Local Communities in NE Washington 2012-2015. University of Montana. Bureau of Business and Economic Development

case, the cost per job created was only \$5.2 thousand while each dollar spent generated \$7.10 in local income. Both labor intensive expenditures and National Forest own administrative and project expenditures generated 11% of jobs, split evenly between Ferry and Stevens Counties.

Economic effects include fiscal effects. An experimental FEI tax estimation model identified a local annual tax revenue gain of \$193 thousand from the only three tax types that we calculated (sales, B&O, and timber harvest). Of these harvest taxes dominate, so a significant portion of the total accrues to Ferry County (56%) where the CFLRP is located.

Input-Output modeling has technological and representational limits. Assumptions of data certainty and mathematical linearity create spurious precision. Our numerical results should be considered indicative rather than absolute. Economic effects also include non-commodity and qualitative effects, but I/O models are limited to pecuniary and quantitative ones. There are many types of CFLRP effects that cannot be quantified using this technology.

Economic Effects of Forest Restoration Activities on Colville National Forest Vision 2020 Projects

Part 1: The CFLRP Economic Context and Setting

Many forested areas of the Colville National Forest are overstocked and in an unhealthy condition. Declining national forest budgets as well as a legacy of policy shifts, litigation, and appeals have created an environment where national forest management has been marked by conflict, causing difficulties in addressing the problems of forest health. Risks of declining forest health include severe wildfire, insect epidemics, disease, and changes in ecosystem function. The Northeast Washington Forestry Coalition was organized in 2002 to bring various forestry interests together. Their goal was find common ground on solutions for the region's forestry problems.

Northeastern Washington includes Ferry, Pend Oreille, and Stevens Counties. The overall regional economy of Northeastern Washington includes some of the poorest local economies in the state with the highest unemployment rates. The Vision 2020 program was initiated by the Colville National Forest in 2009 and funded in 2011 to address socio-economic issues through forest restoration efforts on a CFLRP located in the Kettle Range and the region between the Kettle and Columbia Rivers.⁷

It was assumed that the Northeast Washington Region still has enough remaining private forest industry infrastructure capacity in place to assist in public forest and watershed restoration efforts. Our report #3 showed that the combined forest and wood products sectors remain dominant economic engines and that the CFLRP activities provide only a small proportion of those raw materials. Even so, parts of this region may have limited ability to benefit from increased federal spending on forest restoration. A recent study of CFLRP contracting⁸ shows that the majority of contract spending leaves the region (McIver, 2016). Local forestry labor and mechanical capacity resides primarily in one of three counties. Primary wood processing capacity is similarly concentrated and that infrastructure is now close to capacity. There is little local secondary wood products manufacturing. Finally, all three county economies display significant economic leakage to distant trade centers.

One objective of forest restoration is to make local forests more fire resilient. As fires become larger and more frequent, wildfire suppression expenditures will increase with costs being shared by the federal government and the Washington DNR. Due to the number of seasonal homes in the "wildland urban interface" (4618 seasonal homes) wildfires are expected to be more costly both in terms of suppression costs and damages. Insurance and uninsured losses from wildfires in the wildland-urban interface will also become more of a political issue. Large hot fires can also cause long term damage to other resources such as watersheds and recreational resources.

⁷ NE Washington Forestry Coalition. 2011. Northeast Washington Forest Vision 2020. 2nd funding proposal

⁸ McIver, Chelsea. 2015. *ibid*

Over time we see a positive linkage between increased forest restoration and wildfire suppression efficiency. FEI analysis of forest restoration economics in Eastern Oregon⁹ that suggested that public forest restoration investments could reduce wildfire suppression costs \$1.60 for each restoration dollar spent. Although we did not examine fire spending here in detail, we expect that this regional economy is more efficient at capturing restoration investment than wildfire suppression expenditures.

CFLRP Direct Spending

This report describes how direct spending associated with CFLRP activities links to the regional economy. We first estimate the local direct jobs and income associated with CFLRP spending. Spending varies from year to year so we used a two year average for Fiscal Years 2013-2014 to form a stable reference base. Almost two dozen variants of direct CFLRP spending were tested in economic input-output models (I/O) for each of the three counties. I/O models capture the re-spending or multiplier effects of CFLRP activities. Spatially separated models enable us to spatially assign effects to a county-level resolution.

We categorized CFLRP related spending into five financial categories so that we had the potential to track individual expenditure type contributions. These are summarized in table 4-1. Actual Forest Service expenditures are of two types. First are independent CFLRP contractors for stewardship activities discussed in great detail by Mclver.¹⁰ Second, there are annual USFS internal expenditures for two categories of CFLRP activities. General CFLRP administrative costs are for existing personnel and equipment resources allocated to CFLRP managerial tasks. These were allocated spatially to the Colville supervisor’s office, the Three Rivers Ranger District, and the Republic Ranger district based on two proportional capacities: the location of total resources available and the area of CFLRP administered. The 2020 reports also listed very specific project expenditures. These were aggregated into a USFS total average spending total.

Table 4-1: Categories of CFLRP Average Annual Expenditures
From Mclver 2016, & 2020 Vision annual reports

CFLRP Expense Type	2013-2014 Annual Ave
USFS direct Contracts	\$983,994
USFS CFLRP Allocated	\$2,053,943
Vaagen Logging Costs	\$1,980,000
Vaagen Stewardship Credits	\$407,004
Partners in Kind expenses	\$0
Total annual expenses	\$5,424,941

There are three non-Forest Service expenditures groups. The only CFLRP historical stewardship contract holder, Vaagen Brothers Lumber Co, was considered to have two types of annual expenditures. These

⁹ Mason, Bruce and Girrard. 2012. National Forest Health Restoration: An Economic Assessment of Forest Restoration on Eastern Oregon’s National Forests. A report to Oregon Governor Kitzhaber

¹⁰ Mclver, Chelsea. 2015 *ibid*

were estimated average costs of timber harvesting, and stewardship credits. The latter category is not a tangible expense, but a credit that compensates for performing non-harvest objectives within the CFLRP. These are actually paid for by discounting the stumpage payments due. That is an indicator of actual private expense magnitude, even though the ultimate costs accrue to the National Forest.

The 2020 accounting also considers in-kind expenses by other agencies. Although such activities were encouraged and may have occurred within the CFLRP boundaries, we did not utilize this expense category in modeling. After reviewing the types of projects and where they were based, we perceived that the effects of such activities would have occurred somewhere within the region under existing budget allocations. Counting these as unique local CFLRP expenses as well would have double-counted those agencies' background economic influences within the region.

The USFS direct contracts expenses are further separable by type of activity (table 4-2). The Mclver report further allocated these expenditures by location so that we were able to apportion them to individual counties. Most of the sub-contracts awarded by the USFS for CFLRP activities are to firms outside the region. The region's economy loses almost all effects of this spending. This primary economic leakage is extensive (86%). As a result, the spatial assignments of direct contract expenses to some counties were very small, so we expected the local secondary economic effects of these expenses to be equally small. The largest local effect is USFS administrative effort associated with administering contracts of out-of-area contractors. This does mostly stay in the region.

Table 4-2: CFLRP Average Annual Contracting Expenditures by Activity Type
Calculated from Mclver 2016

Expense Type	Ferry Co.	Pend Oreille Co.	Stevens County	Out-of Region	Total
Capital-intensive	\$0	\$0	\$102,327	\$248,494	\$350,821
Labor-Intensive	\$4,171	\$0	\$6,112	\$555,216	\$565,499
Stewardship	\$0	\$25,448	\$0	\$35,925	\$61,373
Technical Services	\$1,462	\$0	\$0	\$3,422	\$4,884
Products	\$0	\$1,418	\$0	\$0	\$1,418
Total	\$5,633	\$26,866	\$108,439	\$843,057	\$983,994

The Mclver findings suggest that the existing federal contracting protocol does not particularly enhance local economic development. During our phase 2 survey work we had identified contractors in the region that are capable of doing most of the reforestation, forest stewardship, and watershed restoration. For various reasons they are not bidding on CFLRP contracts.

Tribal forestry staffs of three tribes (Colville Confederated Tribe, Kalispell Tribe, and Spokane Tribe) were explicit in their interests about contracting for work on the Colville National Forest. They argued that tribal forestry operations all manage forests and have forestry and restoration practice capacity that could qualify for federal forest restoration projects. From an economic development perspective, tribal members have the highest seasonal unemployment rates and lowest income of any demographic group

in the region. Further they would be likely to re-spend money within the region, reducing economic leakage and supporting local businesses.

Direct Spending by CFLRP Activity Type

This section summarizes base period CFLRP spending by line item categories of spending. These were either identified in the direct contracting report, or created by apportionment to reflect how the different types of activities are spread across the landscape. The reason for creating such categories is that different types of forest restoration activities have different production functions. That is, the job and income linkages of capital-intensive timber harvesting feller-buncher machines are different than the labor-intensive practices of hand thinning.

These categories include: (1) contractor expenditure types: mechanical restoration, labor intensive restoration, technical and professional services; (2) different types of Vaagen activity spending under their stewardship contracts; including their mechanical restoration, mechanical restoration, other labor intensive restoration; (3) Products including timber and non-timber; and (4) National Forest own projects and administration expenses. These are described below:

- **Mechanical restoration** is similar to conventional logging in that it relies on tree clippers, skidders, loaders and other mechanized logging equipment. Because it is more selective and designed to achieve a particular species composition and spacing, it can be less efficient and more time consuming than when used for typical timber harvests. This difference is reflected in a reduced production function whether individually contracted or under stewardship contracts.
- **Labor Intensive restoration** includes activities such as thinning, girdling snags, slash treatment, fuels reduction and a variety of other hand labor associated with forest restoration. The same labor intensive restoration production function is used for both contracted and Vaagen stewardship activities.
- **Technical and professional work** includes contracts for engineering work, environmental monitoring, hydrology and a variety of other natural resource technical work.
- **Non-timber Stewardship and other stewardship** were treated as having a production function similar to labor intensive forest restoration described above.
- **Timber Products** is producing logs, chips and other miscellaneous products that are harvested from the Vision 2020 lands. We presume that these use efficient capital-intensive harvesting systems.
- **National Forest** is USFS expenses for office and field work associated with managing CFLRP projects plus any instances where agency crews and equipment are used directly to achieve CFLRP objectives.¹¹

¹¹ This category is overly inclusive as forest administrative activities have slightly different job/income linkages than active projects. Likewise the leakage patterns differ. However, we used this aggregation in part 4 so that marginal effects returns to federal restoration investments could be estimated.

For each county we calculated average base period (2013-2014) estimates by expenditure category. The amounts are generated either from the direct contracting reports or from annual 20-20 report amounts spatially apportioned using key informant estimates.

Ferry County CFLRP Direct Expenditure Patterns

The majority of the Vision 20:20 Lands are located in Ferry County (table 4-3). In terms of on-the-ground activity, Ferry County sees the most CFLRP activity (approximately 80%), but its economy is so weak and isolated, that it captures very little of the restoration-related spending. Examination of contractor spending by the University of Montana indicated that the majority of the contractors are out of region and that very few of the contractors are located in Ferry County.¹²

Table 4-3: CFLRP Expenditures by Type in Ferry County
2012-2014 Average Spending

Project Category	Direct Spending
Technical/Professional	\$ 1,462
National Forest	\$1,199,280
Vaagen Labor Intensive	\$ 396,000
Vaagen Mechanical	\$ 594,000
Total	\$2,194,913

The largest component of CFLRP spending in Ferry County is National Forest administrative and own projects spending of \$1.2 Million (2013-2014 average). The Colville National Forest, like many other Forests in the region has concentrated most of its technical staff in the Forest Supervisor offices (in Colville). This is particularly true for specialized technological and mechanical services. This limits the spatial budgetary influence of individual Ranger District offices, so the proportion of total spending linked to the Republic Ranger District Office is modest.

The second largest contributor to Ferry County economic impacts from CFLRP funds is Vaagen Brothers logging and restoration projects. Vaagen historically has purchased the stewardship contracts for forest restoration and timber harvest on the Vision 2020 lands. Vaagen Brothers main offices are located in Colville, but it hires crews from throughout the region, so a portion of its' labor intensive and equipment intensive restoration spending benefits the Ferry County economy. We estimate their combined harvest and stewardship activities contribute an average of a little over one million dollars in direct spending per year to the Ferry County economy.

Survey work indicated that there were not very many loggers or forest restoration workers left in that county. Most of these were located on the east side of the Kettle Range where it is easier to commute in to work in the Colville-Kettle Falls area. The east side of the Kettle Range and the lower Kettle River valley are functionally part of the Colville-Kettle Falls economy, not the Republic-Curlew economy. Our

¹² Mclver, Chelsea. 2016. *Opus cit*

data on Vaagen hiring and spending is not detailed enough to identify how much of this spending occurs on the west side of the Kettle Range (Republic area). From our observations, most of their economic effects are felt on the east side of the Kettle Range or in the Colville area.

Other labor intensive restoration contractors in Ferry County are small players in CFLRP spending and on average account for less than ten thousand dollars annually in direct spending. An average of one small technical service contract for about a thousand dollars is also shown as CFLRP funds captured by Ferry county. Typically this would be in surveying or engineering as these are the professional specialties most likely to fit Vision 2020 project activities.

Pend Oreille County CFLRP Direct Expenditure Patterns

None of the Vision 2020 lands are located in Pend Oreille County. As expected very little direct spending occurs there (table 4-4). All of the reported expenditures appear to be linked to supplemental contractors. Pend Oreille County direct spending is so small that it accounts for less than one full time job. The county’s secondary effects mostly come from wood processing of logs and residuals later trans- shipped to mills located there. That generates other indirect effects that are addressed later.

Table 4-4: CFLRP Expenditures by Type in Pend Oreille County

Project Category	Direct Spending
Stewardship	\$ 25,448
Products	\$ 1,418
Totals	\$ 26,866

Stevens County CFLRP Direct Expenditure Patterns

Stevens County is the locus of the majority of direct CFLRP expenditures (table 4-5). Most of the Forest Service administrative offices are in this county, along with supervisor’s office associated Forest Service technical project spending. The Vaagen Brothers Lumber headquarters and largest mill operations are also in Colville. Other mills are located in Kettle Falls. Most of the loggers and equipment reside in Stevens Co. So both the public sector and private sector concentrate direct CFLRP spending into Stevens County. We would expect both types of spending to create many well paid jobs. Direct CFLRP spending and other direct economic effects account for about \$3.4 million annually in direct base period spending in Stevens County.

Table 4-5: Stevens County Direct Spending

Project Category	Direct Spending
Equipment-intensive	102,327
Vaagen Equipment Intensive	594,000
Labor-Intensive	6,112
Vaagen Labor Intensive	396,000
National Forest	2,285,284
Totals	3,383,722

Direct Spending Key Points:

Looking at the direct expenditures patterns, we are able to draw some clear inferences.

1. Stevens County captures most of the direct economic impacts of CFLRP spending for several reasons:
 - a. Most of the loggers and Vaagen stewardship labor reside in Stevens County.
 - b. Mills that use almost all of the CFLRP products are located primarily in Stevens County.
 - c. The Colville National Forest Supervisors Office and Three Rivers Ranger District offices are located in Stevens County.
2. Forest Service own expenses and Vaagen reforestation activities are responsible for most of the direct economic effects in Ferry County.
3. Pend Oreille County is a minor player in CFLRP spending and effects. Effects are mostly associated with by-products that are delivered to the Pend Oreille Newsprint Mill and in most models would be considered secondary effects.
4. The region does not have a large pool of restoration contractors who bid on CFLRP work. Out-of-region contractors receive most of the non-Vaagen contract work. The State and TEDD have opportunities to foster more local area restoration contractor capacity.

Part 2: County Level CFLRP Total Economic Effects

FEI built I/O models with county-level resolution. This allows us to estimate how CFLRP activities and expenditure translate into economic effects with enhanced geographic precision over most regional analyses. Direct explicit job and expenditures data from a single CFLRP area located mostly in one county are then followed, and added, to the secondary jobs and income effects in that county.

Secondary effects estimations include both indirect effects and induced effects. Indirect effects are generated by the transactions associated with inter-industry purchases. As an indirect effect example consider a logging contractor who purchases fuel and repair services from a gas station and a mechanic. These are both inter-industry indirect expenditures. Induced effects are associated with the purchase of goods and services stimulated by increased income (payroll and proprietors income). In this example, a hired logger receives wage income and profit that is used to pay his rent (induced spending).

Both of types of spending (indirect and induced) generate subsequent rounds of transactions that have a ripple effect that often crosses political boundaries. However, we found that multipliers are not very high in any of these counties due to trade leakages, particularly to Spokane, to Idaho, and other regions. Ferry County has particularly small multipliers because it lacks some of the sectors that provide goods and services that businesses need to operate. It also has significant trade leakage of consumer spending.

We considered developing a three-county regional model to capture these inter-county purchases, but in our experience, this model would have over-estimated the linkages between the three counties.

Multipliers from a regional model would be considerably higher than the very low multipliers that are actually evident, particularly in the Ferry County model. This would imply that a lot of the indirect and induced spending stays in the region. However, our field work indicated that this is not the case. Most of the secondary effects from spending in Ferry County leak out of the region. In a similar sense most of the secondary effects of spending in Pend Oreille County leak out to Spokane and Idaho.

We separate and display the total economic effects results separately for each county. The summaries below show **total** effects. In other words, these estimates sum the direct, indirect and induced effects. In our tables we show economic effects for the most respondent individual sectors. The resultant spatial/sectoral patterns are revealing. First, it becomes clear that the CFLRP's physical location, mostly in Ferry County, has less influence on effects distribution than economic sector dominance, usually concentrated in Stevens County. Second, the within county distribution patterns between sectors are unusual. One good example is in combined trade, food and lodging, and consumer services sectors. When those effects occur they are located mostly well away from the CFLRP. Other patterns may be counter-intuitive. Although there is little direct local/state government CFLRP involvement, those sectors show visible gains. Each county discussion highlights these spatial connections. As these results are aggregated from multiple runs for each of the CFLRP expenditures categories, we have some ability to link individual effects to specific types of expenditures. This is discussed in part 3.

CFLRP Total Economic Effects in Ferry County

Ferry County is so economically isolated in the periphery of trade hierarchies that it does not capture many of the CFLRP economic effects. Total county effects are a net gain of 39 jobs, with an estimated annual income effect of about \$1.7 million dollars. Typical of lower order trade position (often referred to as hinterland communities), trade flows almost entirely in one direction; away from Ferry County and into regional trade centers. Ferry County has a “very open” economy, so a dollar spent there leaves the county rapidly.

Ferry County’s retail services are limited and not price competitive. Wholesale services are almost non-existent. Basic medical and professional services are available, but residents have to leave the county for specialized services. Like most hinterland communities, Ferry County has had a limited and specialized economic base (mining, wood products and agriculture) in extractive industries and little secondary processing of goods produced in the county. After a round of closures, remaining secondary metal processing, sawmills and plywood mills, and cattle feed lots and slaughter houses are mostly located elsewhere. Most of the value added to basic natural resources (minerals, timber and cattle) is associated with their secondary and tertiary processing, and that occurs elsewhere.

Tourism is a slowly growing part of the Ferry County economy. We were time and budget limited in surveying this sector, but it was apparent that more local businesses are trying to capture second home and tourist trade. Little of this shift can be related to CFLRP activities. While increasing tourism should bolster and diversify the existing economy, the tourism sector (actually reaggregated services of other economic sectors) offers lower paying seasonal jobs requiring new skill sets.

The CFLRP area is 80% within Ferry County, so as expected, most of the local total effects CFLRP are dominated by direct effects. They are felt most in its forestry sector, the wood products manufacturing sector, and in the federal government sector. The dominant contributors are: (1) from National Forest expenditures centered at the Republic ranger station; and (2) wood products sector gains from raw materials resold to the specialized Columbia Cedar mill near Kettle Falls. That mill’s production is specific to western red cedar products, but cedar is found only in small concentrations on the CFLRP so it imports logs from a wider timbershed. State and local government effects are concentrated primarily in public schools, although increased spending and employment does create demands for other local government services such as law enforcement, social services and roads maintenance.

The trade and services effect is insignificant and almost immeasurable. This is due primarily to the trade dominance of almost all relevant economic sectors by the Kettle Falls-Colville core economy. Stevens County contains the regional trade center and Ferry County transactions generate many secondary effects there. We expected more local effects in the transportation sector, but found that most truck drivers who haul products from CFLRP sales live outside of the county and effects are determined more by place-of-residence rather than place-of-work. This same pattern of out-of-county residence was evident in CFLRP contractors.¹³

¹³ Mclver, Chelsea. 2015. *ibid*

CFLRP Ferry County Employment Effects highlights (table 4-6) include:

- Logging and forest stewardship activities increase of about fifteen jobs
- Local government has three jobs added for additional services
- CFLRP harvesting activities support about four jobs in one species specialized sawmill
- There is no secondary wood processing sector
- As many as ten USFS jobs in Ferry County are generated by CFLRP oriented projects (this includes both full time and seasonal jobs)

Table 4-6: Ferry County CFLRP Impacts
Sectors with 0 job or < \$1000 income effects not shown

Affected Economic Sectors	Baseline Employment	Employment Change	Percentage Change %	Baseline Earnings -----(\$1,000)-----	Earnings Change	Percentage Change %
Agriculture and Forestry	300	15	5%	\$ 10,233	\$ 494	5%
Construction	80	1	1%	\$ 3,799	\$ 51	1%
Wood Products	219	4	2%	\$ 15,664	\$ 309	2%
Transportation	61	0	1%	\$ 1,124	\$ 8	1%
Trade	159	1	1%	\$ 3,252	\$ 21	1%
Finance	71	0	0%	\$ 2,066	\$ 14	1%
Food and Lodging	199	1	0%	\$ 2,998	\$ 12	0%
Consumer Services	43	0	1%	\$ 1,283	\$ 10	1%
Business Services	29	0	1%	\$ 1,078	\$ 8	1%
Med/Education/Social services	259	1	1%	\$ 10,729	\$ 67	1%
Federal Government	136	10	7%	\$ 7,499	\$ 546	7%
State & Local Government	375	3	1%	\$ 18,745	\$ 163	1%
Total	2,072	39	2%	\$ 90,212	\$ 1,704	2%

CFLRP Ferry County Income Effects highlights (Table 4-6) include:

- Almost one half million dollars in additional forestry income, but most of this is seasonal
- Over \$300 thousand dollars of additional income in wood products industry, but most of this impact stays on the east side of the Kettle Range
- Government spending increases about eight hundred thousand dollars. The majority of this spending is USFS project management activity at the Republic Ranger District.

CFLRP Total Economic Effects in Pend Oreille County

None of the Vision 2020 project area is located in Pend Oreille County, so with few direct effects, total effects in this county are minimal. They are mostly secondary impacts associated with the raw material supply linkages between mills in the region. The main linkage is to the Usk newsprint mill which utilizes

chips that are co-products of logs harvested within the Vision 2020 area and from other solid wood processing in Stevens County. Total local effects are about 19 jobs with an estimated income effect of about \$1.2 million dollars. The income increase is relatively large because jobs at the paper mill are well paid. Other effects are felt in the forestry sector, the wood products manufacturing sector, and in local government services. Secondary effects in all other sectors are so small that our rounded estimations in the table are imprecise.

Pend Oreille County Employment effects highlights (Table 4-7) include:

- Logging and forest stewardship activities increase about nine jobs linked to stewardship credits
- Wood produced from CFLRP activities supports about nine mill jobs
- Two jobs in local government provide services linked to the other effects
- There are only a few indirect and induced jobs spread across retail and service sectors that can be tied back to CFLRP activity.

Table 4-7: Pend Oreille County CFLRP Economic Effects by Sector
 Sectors with 0 job or < \$1000 income effects not shown

Economic Sector	Baseline	Employment	Percentage	Baseline	Earnings	Percentage
	Employment	Change	Change	Earnings	Change	Change
			%	-----(\$1,000)-----		%
Agriculture/Forestry	215	2	1%	\$6,163	\$94	2%
Wood Products	199	9	4%	\$18,583	\$925	5%
Transportation	79	1	0%	\$3,001	\$4	0%
Public Utilities	127	1	1%	\$5,600	\$35	1%
Communications	57	0	0%	\$1,762	\$2	0%
Trade	285	0	0%	\$6,933	\$4	0%
Tourist Services	221	1	0%	\$3,454	\$14	0%
Consumer Services	146	1	1%	\$4,054	\$24	1%
Business Services	113	1	1%	\$3,473	\$25	1%
Med/Educat/Soc Services	650	2	0%	\$26,330	\$58	0%
State & Local Govt	392	2	0%	\$16,711	\$79	0%
Totals	2,897	19	1%	\$115,454	\$ 1,265	1%

Pend Oreille County Income effects highlights (Table 4-7) include:

- Most of the income generated is in the paper mill and is year round income. Seasonal income is generated by stewardship credits from seasonal thinning and planting contracts.
- Government spending increases by about eighty thousand dollars. This increase is associated with local government services for additional workers employed in the forest and Mill-- probably supporting part of one school teacher, a small part of one deputy, and some road work.

CFLRP Total Economic Effects in Stevens County

Stevens County has both a strong wood products sector and a regional trade center. This more diversified economy enables it to capture most of the regional economic effects of the Vision 2020 Project. The largest CFLRP contractor is Vaagen Brothers Lumber. They have historically harvested, sorted and resold most of the CFLRP logs into mills primarily located within Stevens County. Their stewardship activities also use resources based there. The Colville National Forest Supervisors Office and the Three Rivers Ranger District in Kettle Falls both play a prominent role in other CFLRP projects and administration. As a result, much the significant National Forest expenditures for a Ferry County CFLRP generate their positive effects in Stevens County. Contracted CFLRP expenditures are an exception and accrue outside of the region.¹⁴

CFLRP activities support about 150 Stevens County jobs (Table 4-8); with an estimated income effect of about \$5.8 million dollars annually. The sectors showing the most response are forestry, wood products, and government.

Retail trade, tourist services (eating and drinking establishments in particular) show only modest gains. Sectors such as professional services, medical services, and fuel and repair services all show even smaller positive responses to the existence of CFLRP production and expenditures. Other secondary economic effects are spread throughout the economy and those estimates are less reliable because they are rounded-up portions of jobs. Even Stevens County is partially trade dominated by Spokane, so we expect that a significant portion of CFLRP effects could leak up the trade hierarchy to Spokane.

Table 4-8: Stevens County CFLRP Economic Effects by Sector
Sectors with 0 job or < \$1000 income effects not shown

Economic Sector	Baseline	Change in	Percent	Baseline	Change in	Percent
	Employment	Employment	Change	Earnings	Earnings	Change
				-----(\$1000's)-----		
Agriculture/Forestry	1,915	67	4%	\$ 47,876	\$ 1,768	4%
Wood Products	626	29	5%	\$ 34,691	\$ 1,827	5%
Transportation	352	1	1%	\$ 13,335	\$ 25	1%
Trade	1,586	12	1%	\$ 45,152	\$ 313	0%
Tourist Services	1,347	9	1%	\$ 21,407	\$ 138	0%
Consumer Services	401	3	1%	\$ 12,789	\$ 100	1%
Business Services	493	4	1%	\$ 15,395	\$ 158	1%
Med/Educ/Soc Services	709	4	1%	\$ 16,037	\$ 108	1%
Federal Govt	450	7	3%	\$ 31,442	\$ 549	1%
State & Local Govt	2,496	17	1%	\$ 122,521	\$ 757	3%
Other Sectors		3	>1%			1%
Total	12,184	154	1%	\$428,204	5,820	1%

¹⁴ Mclver, Chelsea. 2015. Opus cit.

In terms of income effects it is important to note that the USFS funded activities support some of the highest paying jobs in the local economy. Some of these jobs are seasonal, but even these are more stable from year to year than other jobs. Unlike other timberland owners, the Colville National Forest does not vary its overall budget or activity greatly from year to year. Although the CFLRP oriented expenditures themselves have demonstrated extreme variability, our analysis eliminated that by creating an average base reference year.

Stevens County Employment Effect highlights (table 4-8) include:

- Logging and forest stewardship activities generate about sixty jobs
- Seventeen local government jobs are CFLRP linked
- Extra federal government (primarily USFS) involvement is about seven jobs
- Wood produced by the CFLRP activities supports about thirty local mill jobs
- Linked retail trade, tourist, and consumer services generates about twenty-four jobs

Stevens County Income Effects Highlights (table 4-8) include:

- \$ 3.6 million increase in combined forestry & wood products sectors's incomes. These have the largest proportional gains of any sector (4% & 5% respectively).
- Lower than expected trade and services income gains due to leakages out to the Spokane economy
- \$550 thousand increase in federal income (mostly salaries)
- Almost \$760 thousand gain in state and local government (mostly teacher, law enforcement, social services and highway maintenance salaries)

Aggregating Regional CFLRP Total Economic Effects

As reported above, we did not build a 3-county model for technical reasons; basically there would have been a problem with over-estimated multiplier effects. To approximate a total regional CFLRP effect, we have simply aggregated the county specific findings in table 4-9. Recognize that of these total gains, most are concentrated in Stevens County. The expected gains are in the combined forestry and wood products manufacturing sectors (\$5.4 million). The collateral gain in government is a surprise unless one considers how much the additional CFLRP spending is concentrated in federal resources. Local government increases provide services to the gains in the private sector employment base.

Table 4-9: Aggregated Regional CFLRP Economic Effects
 Sectors with 0 job or < \$1000 income effects not shown

Economic Sector	Base Jobs	Jobs Change	Change %	Base Income	Income Change	Change %
Agriculture/ Forestry	2,430	84	3%	\$ 64,272	\$ 2,363	4%
Wood Products Mfg	1,044	42	4%	\$ 68,938	\$ 3,061	4%
Transportation	492	2	2%	\$ 17,460	\$ 33	2%
Trade	2,030	13	1%	\$ 55,337	\$ 334	1%
Motels/ Restaurants/ Recreation Services	1,767	11	1%	\$ 27,860	\$ 150	1%
Consumer Services	589	4	1%	\$ 18,126	\$ 110	1%
Business Services	635	5	1%	\$ 19,947	\$ 166	1%
Med/Educ/Social Serv.	1,618	7	0%	\$ 53,096	\$ 175	0%
Federal Government	730	17	3%	\$ 46,075	\$ 1,095	3%
State & Local Govt	3,263	22	1%	\$ 157,977	\$ 920	1%
Totals	17,532	211	1%	\$ 660,870	\$ 8,789	1%

Table 4-10 aggregates total regional economic effects from the previous county table totals. In this context, it is clearer how the effects are spatially skewed away from the predominant county of origin. It is also interesting how the county (Pend Oreille) with the region's single most valuable wood products facility (Ponderay Paper) has little CFLRP influence.

When comparing county CFLRP economic effects, we have suppressed the sector level findings because the county economic structures are so different. Table 4-7 shows how the largest percentage changes are in Ferry County. The largest absolute changes are concentrated in Stevens County's much larger and more diverse economy. Note that there is a small difference between the sum of county entries and the regional sum. This is due to the response of other sectors with less than 1 job or less than \$1000 income changes which were not reported.

Table 4-10: Comparison of CFLRP Economic Effects by County

County	Base Jobs	Jobs Change	Change %	Base Income	Income Change	Change %
Ferry	2,072	38	2%	\$90,213	\$1,763	2%
Pend Oreille	2,897	19	1%	\$115,454	\$1,265	1%
Stevens	12,184	154	1%	\$428,204	\$5,820	1%
Regional Σ	17,532	211	1%	\$660,870	\$8,789	1%

How Does this Compare With Expectations?

The second Vision 2020 proposal¹⁵ outlined economic expectations using a 2010 base. Using the “TREAT” tool, it projected that over a 10-year CFLRP operating horizon, the CFLRP restoration investments will annually contribute 258 part-time and full-time jobs, generating an estimated \$9,509,285.

This compares closely with our estimates of a 2013-2014 base year. We calculate CFLRP contributions as 227 jobs and \$9.7 million. The two sets of estimates are remarkably close. This is a surprise as out-of-region economic leakages turned out to be so high. The biggest difference is that our work shows that the spatial distribution of job and income effects is heavily concentrated into a single county of a three county economy. The TREAT approach uses a regional model and this generates significantly higher multipliers. That assumes greater local trade capture. Our survey work showed us that this was not the case, so the close alignment of the two estimates is hard to explain without a more detailed analysis of the TREAT tool.

Our estimates do differ significantly from later uses of the TREAT tool. Our total jobs estimate is much less than the second TREAT total jobs estimate, only 28.8%. Our income estimates are likewise much more conservative, only 31.1% of the TREAT estimates. We are also unable to explain the large incongruity between the two different TREAT estimates themselves. The latest TREAT estimates in the 2015 CFLRP annual report are seen in table 4-11.¹⁶ They are much larger than the original TREAT estimates.

Table 4-11: Jobs Created/ Maintained (FY 2015)

Type of projects	Direct part & full-time jobs	Total part & full-time jobs	Direct Labor Income	Total Labor Income
Commercial Product Activities	348	710	21,781,810	29,731,953
Other Project Activities	69	78	1,036,684	1,455,600
TOTALS:	418	788	22,818,494	31,187,554

¹⁵ NW Washington Forestry Coalition. 2011.opus cit

¹⁶ Copied directly from the Colville National Forest 2015 CFLRP annual report page 7

Part 3: Marginal Effects of Individual Types of CFLRP Expenditures

This section attempts to approximate the social efficiency of different types of forest restoration expenditures. By social efficiency we mean being able to identify CFLRP expenditures that generate the highest rates of total job and income contributions. We estimate each rate of job and income generation per unit of expenditure. The purpose of such an exercise is to help Vision 2020 decision makers to balance expense categories by contribution rate.

We use base period CFLRP spending categories previously defined in part 2. These were: (1) contractor expenditure types: **mechanical restoration, labor intensive restoration, technical and professional services**; (2) different types of **Vaagen activity spending** under their stewardship contracts; including their mechanical restoration, mechanical restoration, other labor intensive restoration; (3) **Products** including timber and non-timber; and (4) National Forest own projects and administration expenses. **National Forest** is USFS expenses for office and field work associated with managing CFLRF projects plus any instances where agency crews and equipment are used directly to achieve CFLRP objectives.

Using the expense-driven variants of the county models, we run each expense category in a spatially disaggregated form. Each can then be run separately to estimate marginal effects. These can be converted to contribution rate estimates. The results matrix from 15 runs across 49 sectors in each of three counties is too complex to publish, even as an appendix. This section summarizes the key indicators of estimated social efficiency.

For each expense type there is a County-specific table of results. There are two types: CFLRP associated job and income creation and the rates that this occurs relative to the rate that that this type of expense occurs. We highlight these marginal rates as being useful indicators of social efficiency by expense type. However, such indicators are **reliable only for small changes**. When each rate is calculated all other expense types are presumed to continue at previous background levels. One expense type cannot be totally replaced by another.

Mechanical Restoration Activities:

Mechanical restoration (similar to conventional logging) is performed on the Vision 2020 lands by Vaagen Brothers' logging contractors. It takes about \$45,000 in USFS investment in Ferry County to produce one job with mechanical restoration (see Table 4-12 below). This job impact includes the full multiplier effect so only part of the job is in mechanical restoration and other portions of the job are spread throughout the economy. Portions of this job effect may be also be seasonal (e.g. the logging season). In Stevens County it takes about \$40,000 to create one job through mechanical restoration. This reflects the greater multiplier effect in this county.

In Ferry County about \$.60 of income is generated by every USFS dollar of this type spent in the county, and in Stevens County \$.68 of income is generated by every USFS dollar spent in that county. This income is primarily in the forest industries, but some is spread throughout the economy.

Table4-12: Effect Rates of CFLRP Expenditures on Mechanical Restoration

Ferry County	Total Income(\$ thousands)	\$ 359,000
	Total Jobs	13
	Cost (\$K) per Job	\$44,662
	\$ Income/ \$ invested	\$.60
	USFS Investment(\$Thousands)	594,000
Stevens County	Total Income(\$ thousands)	\$402,000
	Total Jobs	15
	Cost (\$K) per Job	\$39,600
	\$ Income/ \$ invested	\$ 0.68
	USFS Investment(\$Thousands)	\$594,000

Labor Intensive Forest Restoration Activities:

Labor intensive forest restoration activities create more direct jobs per dollar invested (than mechanical restoration), but the jobs created are lower paying and more seasonal (table 4-13). Total jobs may be fewer. In Ferry County it takes about \$37 thousand of investment in forest restoration activities to create one job, while it only takes about \$30 thousand to create one in Stevens County. This job is spread throughout the economy in sectors related to forest restoration. Each dollar of investment in labor intensive restoration produces about \$.74 of income in Ferry County and \$.75 of income in Stevens County. Because they produce more income per dollar invested, labor intensive activities also produce more local tax revenue.

Table 4-13: Labor Intensive Forest Restoration Effects Rate Indicators

Ferry County	Total Income(\$ K)	\$292
	Total Jobs	11
	Cost (\$K) per Job	\$ 37.01
	\$ Income/ \$ invested	\$0.74
	USFS Investment (\$K)	\$ 396
Stevens County	Total Income(\$ K)	\$297
	Total Jobs	13
	\$ Income/ \$ invested	\$0.75
	Cost (\$K) per Job	\$30
	USFS Investment(\$ K)	\$396

Technical and Professional Work

Most of the contracts for technical and professional work related to Vision 2020 Project are awarded to contractors from outside the region. The remaining sample of in-region contracts was extremely small. These in-region technical and professional contracts appear to be good jobs and income producers. In

Ferry County it takes only about \$21 of CFLRP investment to produce one of these jobs. Technical and professional contracts that are awarded locally capture \$.92 in income for every dollar of CFLRP investment. There are no similar expenditures in the other counties. Spatially reorienting these types of contractors could generate significant local gains.

Table 4-14: Technical and Professional Contracts Effects Rate Indicators

Ferry County	Total Income (\$ K)	\$ 1
	Total Jobs	0.07
	Cost (\$K) per Job	\$ 20.89
	\$ Income/ \$ invested	\$.92
	USFS Investment (\$ K)	\$ 1

Non-Timber Stewardship Activities:

We found no significant differences between these activities and labor intensive forest restoration. They produce similar results per dollar of USFS investments.

National Forest Administrative and Own CFLRP Project Work

It takes more CFLRP investment to produce a job related to Forest Service administration of projects that for any other type of Vision 2020 expenditure. National Forest jobs are some of the best paying and most technically demanding local jobs so this is not surprising. However, they are not very efficient at producing other local income. This category of expenditure produces about \$ 0.58 of income in Ferry County and \$ 0.56 of income in Stevens County per CFLRP dollar invested. The multiplier effect for this spending is low because local economies are unable to capture enough of federal spending.

Table 4-15: National Forest Own Expenditures Effects Rate Indicators

Ferry County	Total Income(\$ K)	\$697
	Total Jobs	12
	Cost (\$K) per Job	\$100
	\$ Income/ \$ invested	\$0.58
	CFLRP Investment (\$K)	\$1,199
Stevens County	Total Income(\$ K)	668
	Total Jobs	12
	Cost (\$K) per Job	\$100
	\$ Income/ \$ invested	\$0.56
	CFLRP Investment (\$K)	\$ 1,199

Forest Products

Vision 2020 lands produce forest products as the result of mechanical restoration activities (by Vaagen Brothers or by other contractors). These activities generate the most total jobs because of integrated linkages through several layers of wood manufacturing. Such jobs are some of the highest paying ones in the region (although National Forest jobs may have higher annual salaries). Forest Products (logs, chips and poles) produce the majority of the jobs associated with CFLRP activities and the majority of the income (table 4-16).

Table 4-16: Forest Products Economic Effects

Indicator	Ferry Co.	Pend Oreille Co.	Stevens Co.
Total Income (\$ K)	\$533	\$1,276	\$4,467
Total Jobs	11	19	118

It is difficult to compare timber products in terms of jobs created per dollar of USFS investments because timber products are a by-product of CFLRP activities. By adding sums for CFLRP mechanical restoration (which produces most of the logs), with sums for downstream timber products, we can get a rough idea of the social efficiency proportion of public investment in forest restoration that is commodity based. Table 4-17 shows that CFLRP activities producing forest products are relatively efficient at producing local jobs at the rate of 1 job per \$24 thousand of National Forest expenditure in Ferry Co. Investment needed per additional local job is less in Stevens County (\$5 thousand/job) because so much primary log processing is concentrated there. This category also produces local income efficiently, generating \$1.50 to \$7.00 per National Forest dollar invested. Harvesting, hauling, then cutting logs into lumber is the most efficient CFLRP activity in terms of total local economic effects.

Table 4-17: Forest Products and Mechanical Restoration Combined Efficiency

	Ferry County	Stevens County
Total Jobs	24	134
Total Income \$thousands	\$892	\$4,921
USFS Investment \$K	\$594	\$696
Cost (\$K) per Job	\$24.4	\$5.2
\$ Income/ \$ invested	\$1.5	\$7.1

Part 4: CFLRP Linked State and Local Tax Generation

Effects of CFLRP Activities on State and Local Government Finances

CFLRP activities create jobs and income, but also generate a demand for costly state and local government services such as schools, social services, and roads. These costs are somewhat compensated by CFLRP activities that generate tax revenues. We built an experimental fiscal model that extended our I/O model findings. These are partial findings as we did not examine out-of-area contracting even though some of this contracting could have generated state revenue.

Our fiscal analysis estimated sales tax revenues, Business and Occupations Tax Revenues, and Washington Timber Harvest Tax revenues. Washington is unusual in having a severance tax on harvest activity. As of 1982 that was extended to harvests on public lands.¹⁷ Not shown are tax generation estimates for different categories of CFLRP expenditures that led to activity specific insights.

Our experimental formulation ignored several tax sources. Both state and federal income taxes are omitted for two reasons: (1) Washington has no income tax and (2) federal income taxes are too dependent on complex individual and corporate tax brackets and deductions patterns. We also left out state fuels taxes that would have been another source of local government revenue. Washington State has an effective fuels tax rate for gasoline and diesel fuels of \$0.455/gallon, but calculating fuels tax yield involves too many mileage generation and distribution assumptions for accurate estimation. All the omitted categories would have taken more in-depth analyses beyond the current budget.

Even with a limited state and local tax generation model, it is possible to show the pass-through rate for general CFLRP expenditures. The last two rows of table 4-18 use spatial allocation of CFLRP expenditures and tax estimates in attempt to estimate this rate. The pass-through rates are similar to an average of statute timber tax and sales tax rates.

Table 4-18: CFLRP Fiscal Effects by County

Tax Source	Ferry Co.	Pend Oreille Co.	Stevens Co.	TriCo Σ
Sales Tax Revenue (\$K)	\$16.3	0	\$33.7	\$50.0
B and O Tax Revenue (\$K)	\$10.3	0	\$14.3	\$24.6
Harvest Tax Revenue (\$K)	\$81.5	0	\$36.8	\$118.3
Total Tax Revenue (\$1000's)	\$108.1	0	\$84.8	\$192.9
CFLRP Expenditures	\$1,991.3	0	\$2,196.2	\$4,187.5
Taxes Return Per \$ spent	5.4%	N.A	3.9%	4.6%

¹⁷ Washington Department of Revenue. 2016. <http://wa.dor.gov> forest taxes

Fiscal Effects by Expenditure Type

We ran the fiscal model for each different type of CFLRP expenditures. This gives a rough idea of potential CFLRP-related local government revenue potential. The following tables focus only on the B&O tax (business and occupation) and the sales tax.

Mechanical restoration includes Vaagen Brothers timber harvesting expenditures (table 4-19). As a result, the downstream product processing and those linkages to other sectors

Table 4-19: Fiscal Effects of Mechanical Restoration Expenditures
All entries in \$1,000's

Ferry County	Sales Tax Revenue	\$4.23
	B and O Tax Revenue	\$ 2.93
	Total Tax Revenue	\$ 7.16
	Tax % Return	1%
Stevens County	Sales Tax Revenue	\$4.40
	B and O Tax Revenue	\$ 4.70
	Total Tax Revenue	\$9.10
	Tax % Return	2%

Labor intensive forest restoration does not produce much saleable wood so it did not generate much harvest tax in any county. It does produce mostly sales taxes in both Ferry and Stevens Counties (table 4-20).

Table 4-20: Fiscal Effects of Labor-Intensive Expenditures
All entries in \$1,000's

Ferry County	Sales Tax Revenue	\$4.04
	B and O Tax Revenue	\$2.15
	Total Tax Revenue	\$6.19
	Taxes % Return	2%
Stevens County	Sales Tax Revenue	\$4.04
	B and O Tax Revenue	\$ 2.20
	Total Tax Revenue	\$ 6.24
	Tax % Return	2%

In-region technical and professional contracts are small, but they generate slightly more tax revenue per dollar invested than other restoration expenditure categories. These are highly paid jobs and these contractors are subject to a number of taxes. Unfortunately, the proportional demand for services in the CFLRP is low and few are located nearby.

Table 4-21: Fiscal Effects of In-Region Technical/Professional Contracts
All entries in \$1,000's

Ferry County	Sales Tax Revenue	\$ 0.01
	B and O Tax Revenue	\$ 0.03
	Total Tax Revenue	\$ 0.04
	Taxes % Return	3%

As might be expected, National Forest administrative and own project expenditures produce very little in terms of local tax revenue (table 4-22). Federal direct spending is exempt from state taxation, so the only source of CFLRP-linked tax revenue is secondary payroll induced sales tax revenue.

Table 4-22: Fiscal Effects of National Forest Own Expenditures
All entries in \$1,000's

Ferry County	Sales Tax Revenue	\$4.96
	B and O Tax Revenue	\$1.56
	Total Tax Revenue	\$6.52
	Taxes % Return	0.5%
Stevens County	Sales Tax Revenue	6
	B and O Tax Revenue	2.05
	Total Tax Revenue	\$8.09
	Taxes % return	0.7%

The CFLRP expenditures associated with harvesting timber, mostly made by Vaagen Brothers Lumber (table 4-23). As logs go through so many downstream processes and all of these have linkages to other sectors, the role of this category is large. Note that the harvest taxes accrue where the resource is extracted, but the sales and B&O taxes occur where processing occurs and wages are spent.

Table 4-23: Fiscal Effects of Forest Products Expenditures
All entries in \$1,000's

Type of Tax	Ferry County	Pend Oreille County	Stevens County
Sales Tax Revenue (\$K)	\$7	\$47	\$89
B & O Tax Revenue (\$K)	\$8	\$14	\$46
Harvest Tax Revenue (\$K)	\$82	\$0	\$36

Fiscal Effects Insights

- Timber harvest taxes generate more tax revenues than all other analyzed taxes

- CFLRP-linked taxes may not compensate extra local government costs from the increased demands of forest workers and their families
- CFLRP-linked sales taxes do not generate much revenue in either Ferry or Pend Oreille County
- Capital intensive activities, such as mechanical restoration and logging that generate timber products and produce harvest taxes have slightly higher fiscal effects
- Most of the harvest tax revenue is generated in Ferry County's largest CFLRP area
- Stevens County's higher secondary spending in concentrated retail trade, accommodations and services generate more sales taxes
- CFLRP-linked taxes in Pend Oreille County were too small to register. Most CFLRP related tax revenues come from indirect and payroll spending and by B and O tax contributions.

Conclusions

The Colville National Forest CFLRP serves numerous managerial and ecological purposes. We have concentrated on the tangible financial aspects of its existence. We have looked primarily at the commodity products and tracked their multiplied effects through the three county economies. We have looked at the implication of CFLRP expenditures, whoever might make them. Finally, we have looked at new CFLRP-related direct jobs and income and the multiplied implications as secondary jobs and income are created from them.

What we find are measurable positive economic effects. Our spatial resolution indicates that resources concentrated into a Ferry County management area generate effects mostly outside of the intended 2020 Vision area for Ferry County. Effects get concentrated where resources are used, where people live, and where they trade. This benefits Stevens County out of proportion to the acreage of the CFLRP within it. As a result, it appears while the collaborative forest restoration model may be extremely effective at reducing political gridlock, it is an insufficient mechanism for spatially targeting desired economic redevelopment.

Caveats

Spatially sensitive Input-Output modeling typically provides realistic estimates of how actions affect a local economy. I/O technologies also have limitations; several of which are relevant to this project.

First, any mathematical model is only as good as the data utilized. Our phase 1 field calibration process markedly improved the quality, and phase 3 augmented the sector detail of northeastern Washington economic conditions. However, there are always errors of approximation and representation.

Second, an I/O model is a deterministic approximation of a stochastic system. We represented events that are variable as absolute linear equations, i.e. we presumed that central tendencies represent reality. That ignores the reality that when means are added, variance terms are multiplicative. So the variance of results is extremely high, but calculating the statistical confidence limits is problematic in complex matrices. Our seemingly absolute results misrepresent the real level of precision. Estimates of

tenths of jobs or explicit dollars of income are only suggestive of effects' relative magnitudes rather than precise measurements.

Finally, economic modeling quantifies some economic effects, but focuses on easily represented pecuniary effects. The results presented here are partial. There are other tangible effects of CFLRP spending in 2020 lands that we were not budgeted to analyze, and other intangible effects that must be considered qualitatively outside of this modeling process. In forest management, we consider this last short-coming important enough to enumerate these gaps.

What CFLRP EFFECTS Were Not Included?

CFLRP spending indirectly affects some of the following activities, but it would take a larger analytical effort to estimate, or even enumerate, less quantifiable effects associated with changes in long term CFLRP management. For example CFLRP projects and activities could affect:

1. Firewood cutting and use
2. Harvest of miscellaneous forest products such as huckleberries and mushrooms¹⁸
3. Values of improved ecosystem function
4. Habitat and access improvement affecting hunting, fishing, and subsistence activities
5. Water yield and quality
6. Intangible values such as aesthetics and spiritual
7. Camping and other forest-based recreation
8. Wildfire suppression spending patterns
9. Property values on adjacent private lands.
10. Private timber harvest and log markets
11. Local spending of out-of-area CFLRP contractors.¹⁹

¹⁸ These products are labor intensive and do create forest-based jobs. They are typically are seasonal and not reported

¹⁹ Out-of-area contractors may hire some local labor and make some local purchases for services such as lodging and eating and drinking. In our judgment these impacts are relatively minor and are not evident in the region's economy.