

# Regional Economic Contributions of the Four Forests Restoration Initiative (4FRI) in Northern Arizona in 2023



Report prepared by *Conservation Economics Institute*

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For The Nature Conservancy



Photo credit: Anne Mottek Lucas

## EXECUTIVE SUMMARY

A regional economic contribution analysis of the Four Forest Restoration Initiative (4FRI) was conducted for Calendar Year 2023, illustrating regional employment and output from 4FRI in five northern Arizona counties. Forest restoration in communities with high wildfire risk is done primarily through thinning and prescribed burning. The US Forest Service (USFS) works with regional contractors to conduct forest restoration thinning for the 4FRI and implements most of the prescribed

burns. These activities, along with subsequent wood utilization of thinned material, provide well paid employment opportunities in rural forested communities and indirectly generate additional output in the form of goods and services needed to log and produce wood products.

A survey of primary thinning contractors and interviews with wood converters were used to collect data. Additionally, regional USFS 4FRI managers were contacted and provided data on prescribed burning jobs and contracted amounts for engineering and site preparation at restoration areas. Employment data were collected as full-time equivalents (FTEs) and entered into

IMPLAN economic impact analysis software. Using IMPLAN, indirect and induced effects were estimated for annual 4FRI regional economic contributions.

Approximately **17,400 acres** across the 4FRI footprint were mechanically thinned in 2023 (i.e., commercial thinning), resulting in **76 direct logging jobs** (FTEs) in the region. During this period, primary contractors reported that approximately **693,000 green tons of sawlogs** and pulpwood (>6" diameter at breast height—(dbh)) were removed and utilized from 4FRI treatments. Additionally, some **212,500 green tons of biomass** and slash (<6" dbh) were removed and utilized. A range of wood products were produced from 4FRI thinning treatments including: dimensional lumber, pallets, moulding, animal bedding, playground cover, mulch, biopower, heating pellets, and firewood.

An additional **138 direct wood converter jobs** (FTEs) were generated in the region by 4FRI wood utilization.

When other restoration treatments and activities are included, such as extensive hand thinning and prescribed burning, along with indirect and induced effects, over **1,000 full and part-time jobs** were sustained by 4FRI activities in northern Arizona in 2023. 4FRI activities in 2023 generated over **\$215 million in regional output** when including total effects. Multiplier effects, or the amount of additional employment, income, or output that is generated for every direct job or dollar ranged from **1.46 to 1.78**. Thus, 4FRI activities have a substantial economic impact on the regional communities and residents that live adjacent to these national forests.

*Table ES1: Total 2023 4FRI Regional Economic Contributions (\$2023)*

| Impact Type              | Employment*    | Labor Income        | Value Added**        | Output               |
|--------------------------|----------------|---------------------|----------------------|----------------------|
| Direct Effect            | 564.0          | \$36,730,236        | \$68,879,325         | \$148,514,383        |
| Indirect Effect          | 298.6          | \$11,538,978        | \$23,289,877         | \$44,479,098         |
| Induced Effect           | 141.5          | \$6,543,597         | \$13,826,822         | \$23,821,145         |
| <b>Total Effect</b>      | <b>1,004.1</b> | <b>\$54,812,810</b> | <b>\$105,996,024</b> | <b>\$216,814,627</b> |
| <b>Multiplier Effect</b> | <b>1.78</b>    | <b>1.49</b>         | <b>1.54</b>          | <b>1.46</b>          |

Source: IMPLAN, Northern Arizona Region 2022, Type SAM Multipliers

\*Includes full- and part-time jobs.

\*\* Value added is the difference between an industry's total output and its intermediate inputs. It includes employee compensation, taxes, and surplus.

## INTRODUCTION

Understanding the economic opportunities that come from forest restoration is a critical social aspect of large-scale ecological restoration. While forest restoration provides numerous economic benefits related to decreased wildfire risk and improved native species habitat, it also can spur substantial economic impacts such as regional employment and industry output. Restoration employment is especially important for forested, rural communities that used to have vibrant resource-dependent regional economies. This is the case for communities in northern Arizona that are part of the Four Forest Restoration Initiative (4FRI), the largest of all projects conducted under the Collabora-

tive Forest Landscape Restoration Program (CFLRP). Economic impacts and contributions of forest restoration are rarely investigated or documented, leaving regional forest stakeholders and managers without the full information necessary to evaluate and compare various forest management options. Given the importance of knowing how forest restoration affords and provides regional economic opportunities, economic research is needed to collect primary data through surveys and analyze total economic impacts. To provide this information, we conducted a regional economic contribution analysis of 4FRI forest restoration for the Calendar Year (CY) 2023.

## METHODS

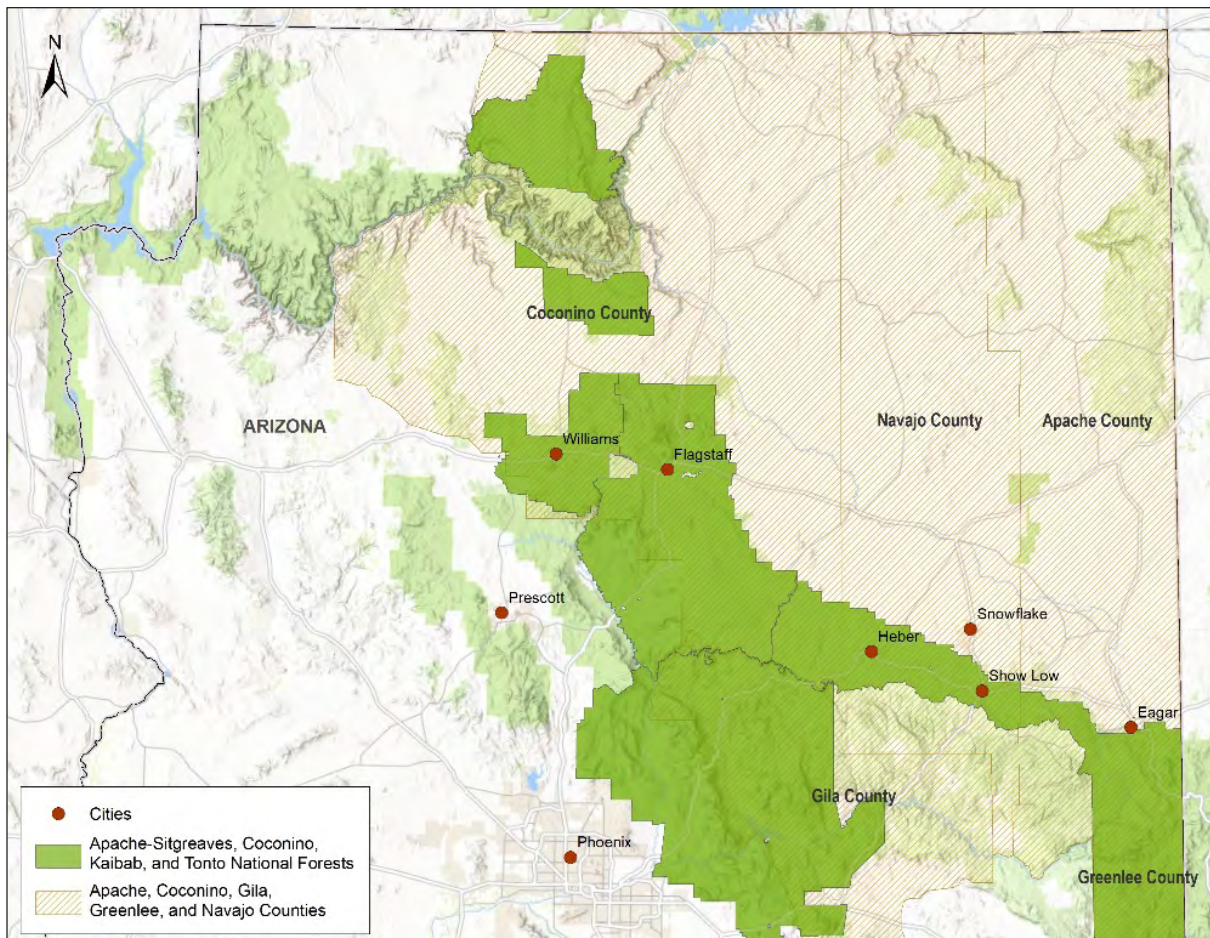
Regional economic contribution analysis is predicated on the Input-Output (I-O) methodology, where the final demand associated with the activity being measured is entered into a large input-output matrix of the regional economy. We use the I-O model, IMPLAN, that includes 546 industry sectors, to see how the initial final demand is circulated through the various industry sectors. In IMPLAN, the I-O matrix can be shocked using either output or employment. Once the economic final demand (as either output or employment) is entered into the appropriate industry sectors, the IMPLAN model is used to estimate initial leakage from the regional economy (services and goods that need to be imported in the regional economy) and reveals the direct effects of the change in final demand. Then, the IMPLAN model is used to conduct contribution analysis showing all the backward linkages (indirect effects) of forest restoration,

or the goods and services necessary to provide tree thinning services (e.g., fuel needed to operate logging equipment). Additionally, induced effects, or the re-circulation of wages and income on local services and purchases, are also estimated. Combined, the direct, indirect, and induced effects of forest restoration can be aggregated to show total effects and corresponding multiplier effects.

### Study Site

4FRI restoration treatments are being conducted on four Arizona national forests: the Apache-Sitgreaves, the Coconino, the Kaibab, and the Tonto. These national forests are primarily located in Apache, Coconino, Gila, Greenlee, and Navajo Counties. Figure 1 shows the four national forests and the five northern Arizona counties that compose the regional economic contribution zone, along with some of the most affected communities (e.g., Flagstaff, Williams, Heber, Show Low, Eagar, and Snowflake).

**Figure 1: 4FRI Regional Economic Contribution Zone (Apache, Coconino, Gila, Greenlee, and Navajo Counties)**



A very small portion of wood utilization from 4FRI thinning occurs in Chino Valley, which is located in adjacent Yavapai County. We include these minor contributions in our regional analysis. Jobs from 4FRI wood utilization that occur in Phoenix and Maricopa County (primarily pallet production) are also a small portion of overall related employment. Because we are focused on *regional* economic contributions of 4FRI, we do not include processing jobs in the much larger metropolitan area of Phoenix.

### *Data Collection*

Employment and output data were collected for CY 2023 in three primary categories of 4FRI economic activity: **mechanical thinning**, **wood processing**, and **other restoration** such as prescribed fire, hand thinning, and site prep. All employment data were collected as Full-Time Equivalents (FTEs). USFS operates on a federal fiscal year (Oct. 1st – Sept. 30th) but adjusted reported data to CY 2023.

### *Mechanical Thinning Employment and Wood Removal Data Collection*

We worked with the 4FRI Stakeholder Group, the US Forest Service (USFS), and The Nature Conservancy to identify primary contractors who conducted mechanical/commercial thinning under 4FRI contracts in CY 2023. Once contractors were identified, we administered a survey (Appendix A) that allowed us to ascertain economic employment and wood removed for processing associated with 4FRI activities in 2023.

The primary contractors were initially contacted by telephone to explain the study and ask for their participation. During this time, we conducted a brief interview to better understand their business model, and participants were verbally asked for their consent. We then sent an email with a letter explaining the research project and the survey. Once the survey was completed by the primary contractors, we interviewed the respondents on the telephone to assure we understood their answers and to validate their responses. In order to increase survey participation and to account for the time needed to complete the survey,

we provided incentive payments of \$400 to all respondents that answered all of the survey questions.

For the mechanical thinning contractor surveys, 12 primary thinning contractors were identified and contacted about participating in the survey. Of the 12, nine primary thinning contractors successfully completed the survey. Of those contractors who did not complete the survey, one contractor declined to participate, and two contractors were going through a bankruptcy process, which ultimately reduced the total number of survey responses. Given that the contractors who were unable to participate in the survey had regional economic contributions in 2023, we estimated employment for the three missing contractors by determining their overall acres treated in 2023 (as reported by the USFS) and using the per-acre averages for employment from the responses of the nine completed surveys.

### *Wood Converters Employment Data Collection*

The primary contractor surveys asked respondents to list wood processors, or converters, that purchased the wood. Some of the primary thinning contractors were vertically integrated ( $n = 4$ ), having their own sawmill and wood processing capabilities, while others only conducted logging and then sold thinned wood to converters. Subsequently, we were able to capture some processing employment through the surveys and the remaining employment was captured by interviewing wood converters. These wood converters were asked to provide their overall annual FTE employment in CY 2023 and the portion of employment attributable to wood removed from 4FRI thinning treatments during that same year.

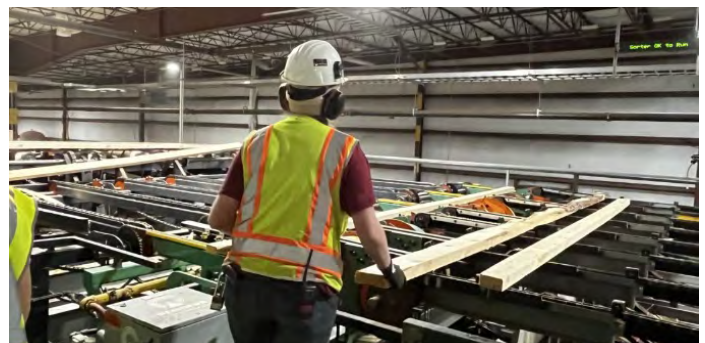


Photo credit: Anne Mottek Lucas

## Other Restoration Employment/Output Data Collection

We worked with the USFS to determine employment for other restoration activities such as prescribed fire, hand thinning, mastication, and site prep. These “other restoration” activities can also generate substantial regional economic contributions. USFS managers with knowledge of 4FRI activities were contacted and asked for information in three areas not covered by surveys and interviews of primary thinning contractors and wood processors. Specifically, we asked for information on:

- USFS employment for conducting prescribed burns inside the 4FRI footprint;
- USFS contracting amounts spent on chainsaw (hand thinning) and mastication projects inside the 4FRI footprint; and
- USFS contracting amounts spent on engineering services that were related to restoration site preparation, site closures, and raw materials needed such as gravel and sand.

Forest Service employment for prescribed burning operations was entered under one industry sector---federal government, non-military. Contracting amounts for hand thinning, mastication, and engineering were converted to full- and part-time employment using IMPLAN output per job in each relevant sector, allowing for all final demand to be entered as employment.

## RESULTS

Regional economic contribution analysis was conducted by entering estimated final demand changes from 4FRI activities into IMPLAN software. Contribution analysis traces the associated industries (backward linkages) necessary for loggers and wood converters to provide these services and illustrates how 4FRI wages are partially recirculated through the northern Arizona regional economy.



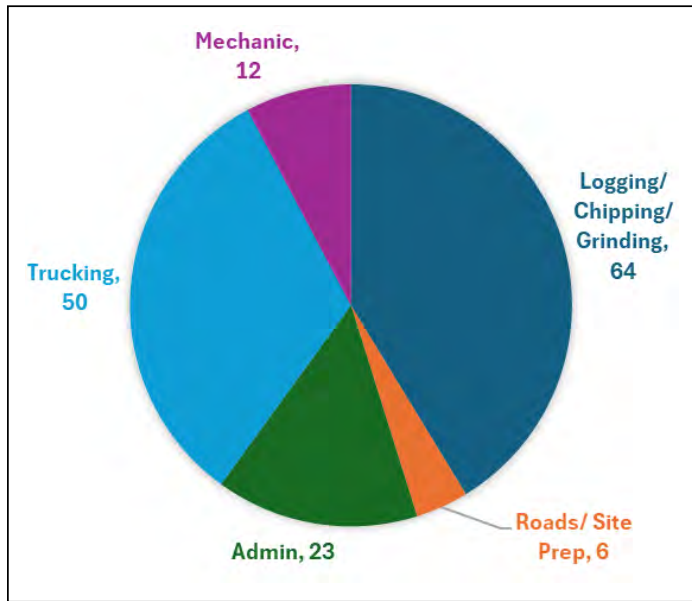
Photo credit: Anne Mottek Lucas

## Mechanical Thinning Employment and Wood Removal

Thinning contractors reported a total of 17,400 acres that were mechanically thinned and included wood removal from 4FRI treatments in 2023. An additional 3,800 acres were reported in 2023 that were thinned but did not include sawlog removal. For thinning treatments that included sawlog/pulpwood removal, almost 33 green tons of sawlogs/pulpwood (> 6” diameter at breast height (dbh)) were removed per acre treated. For biomass and slash that included removal (< 6” dbh), about 10 green tons were removed per acre treated.

- Based on our survey data, **4FRI mechanical thinning projects generated approximately 155 jobs in 2023**, primarily in commercial logging, truck transportation, and support activities for forestry (administration and management). Figure 2 illustrates the detailed breakdown of mechanical thinning jobs.

Figure 2: Detailed 4FRI Mechanical Thinning Employment for 2023



### Wood Converter Employment and Wood Utilized

Overall, we found that primary contractors removed approximately 693,000 green tons of sawlogs and pulpwood (>6" dbh) from 4FRI treatments in 2023. Additionally, some 212,500 green tons of biomass and slash (<6" dbh) were removed and utilized. A number of wood products are produced from 4FRI thinning treatments including: dimensional lumber, pallets, moulding, animal bedding, playground cover, mulch, biopower, heating pellets, and firewood. Additionally, rounds or cants, are sometimes processed in northern Arizona and then shipped out of region for further processing. Most of the wood products are produced in northern Arizona, with a primary exception of pallets produced in the Phoenix area.

- Based on reported processing jobs attributable to 4FRI thinned wood, **4FRI wood processing resulted in approximately 138 annual jobs**, primarily in the sawmill, electric power generation, and miscellaneous wood product manufacturing industry sectors. A small amount of additional wood processing jobs occurred in the Phoenix area; these jobs are not included in our regional economic contribution analysis.

### Other Restoration Employment

Forest restoration in overly dense stands of ponderosa pine can involve multiple treatments for each acre including mechanical thinning of merchantable trees, hand thinning, mastication of dog hair thickets and small trees, and prescribed burns conducted as larger broadcast burns or concentrated jackpot pile burns. Additionally, much of the restoration site prep and decommissioning, such as logging road access, culvert placements, provision of raw materials (e.g., gravel, sand), and road decommissioning are contracted out to engineering and construction companies.

Based on USFS reporting, approximately \$19 million was contracted out in CY 2023 for chainsaw and mastication work on 4FRI projects that were not part of primary mechanical thinning contracts. Likewise, approximately \$16 million was spent on engineering and site preparation contracts. These contracts accounted for nine miles of paving, three new bridges, development of two crush and stockpile pits, and the resurfacing of 14 miles of forest system roads. We used IMPLAN ratios of output to employment for the correlating industry sectors to convert contract amounts to employment estimates.



Photo credit: Anne Mottek Lucas

Finally, the USFS determined that \$11.6 million was spent in 2023 on compensation for internal jobs throughout Region 3 focused on prescribed burning projects. Using IMPLAN ratios of output to employment, approximately 76 USFS prescribed fire jobs were sustained. While some additional prescribed

burning employment is generated in collaborating state, county, and municipal fire departments, we did not receive data on these additional jobs.

- Based on USFS reporting, **an additional 64 jobs were sustained through 4FRI engineering and site preparation, and an additional 92 jobs were sustained from hand thinning and mas-**

**tication projects.** Furthermore, **76 USFS prescribed fire jobs were reported.** Site prep jobs were allocated to industrial sectors focused on the maintenance and construction of roads and infrastructure. Hand thinning and mastication jobs were allocated to commercial logging, and USFS prescribed fire jobs were allocated to the federal government, non-military sector.

*Table 1: Final Demand Changes for 4FRI Restoration Treatments 2023*

| Event Name                       | IMPLAN Sector | IMPLAN Sector Description  | Employment (FTEs) | IMPLAN Full and Part-time Jobs |
|----------------------------------|---------------|--|-------------------|--------------------------------|
| Thinning and logging             | 16            | Logging  | 168*              | 194                            |
| Road prep and culverts           | 62            | Maintenance and repair construction of highways, streets, bridges... | 38**              | 39                             |
| Admin and management             | 19            | Support activities for agriculture and forestry                      | 23                | 27                             |
| Truck transportation             | 417           | Truck transportation   | 50                | 53                             |
| Sawmills                         | 132           | Sawmills   | 86                | 88                             |
| Biomass power generation         | 45            | Electric power generation - Biomass                                  | 24                | 24                             |
| Other wood product manufacturing | 143           | All other miscellaneous wood product manufacturing                   | 28                | 29                             |
| USFS prescribed fire             | 546           | Employment and payroll of federal govt, non-military                 | 76                | 77                             |
| Road engineering                 | 54            | Construction of new highways and streets                             | 32                | 33                             |
| <b>Total Employment</b>          |               |  | <b>525</b>        | <b>564</b>                     |

\* For logging, 76 jobs from primary thinning contractors; 92 from USFS hand thinning and mastication contracts.

\*\*For site prep, 6 jobs from primary thinning contractors; 32 jobs from USFS contracts for engineering/prep.

## REGIONAL ECONOMIC CONTRIBUTION RESULTS

To initiate the regional contribution analysis, we allocated the employment results from all three categories detailed above to the appropriate IMPLAN industrial sectors. Because IMPLAN utilizes full- and part-time jobs for employment, and our data were collected as FTEs, we converted all employment data to IMPLAN full- and part-time jobs to estimate total re-

gional contributions.<sup>1</sup> Table 1 shows the final demand changes entered into IMPLAN’s impact analysis.

The calculated full- and part-time jobs were entered as final demand into each of the industry sectors (Table 1) and were entered into our five-county regional economic zone. Table 2 illustrates the direct, indirect, and induced effects of 4FRI resto-

<sup>1</sup> IMPLAN conversions from FTEs to full- and part-time jobs can be found here: <https://support.implan.com/hc/en-us/articles/115009668268-Full-Time-Equivalent-FTE-Employment>.

ration activities in 2023. Multiplier effects were calculated for four economic indicators by dividing total effects by direct effects.

**Table 2: Total 2023 4FRI Regional Economic Contributions (\$2023)**

| Impact Type              | Employment*    | Labor Income        | Value Added**        | Output               |
|--------------------------|----------------|---------------------|----------------------|----------------------|
| Direct Effect            | 564.0          | \$36,730,236        | \$68,879,325         | \$148,514,383        |
| Indirect Effect          | 298.6          | \$11,538,978        | \$23,289,877         | \$44,479,098         |
| Induced Effect           | 141.5          | \$6,543,597         | \$13,826,822         | \$23,821,145         |
| <b>Total Effect</b>      | <b>1,004.1</b> | <b>\$54,812,810</b> | <b>\$105,996,024</b> | <b>\$216,814,627</b> |
| <b>Multiplier Effect</b> | <b>1.78</b>    | <b>1.49</b>         | <b>1.54</b>          | <b>1.46</b>          |

Source: IMPLAN, Northern Arizona Region 2022, Type SAM Multipliers

\*Includes full- and part-time jobs.

\*\* Value added is the difference between an industry's total output and its intermediate inputs. It includes employee compensation, taxes, and surplus.

We provide greater detail in Table 3, showing the top ten industries affected by total employment (including indirect and induced employment) and the correlating total value added and output.

**Table 3: Top Ten Regional Employment for 4FRI in 2023 (\$2023)**

| Industry Description   | Total Employment* | Total Value Added** | Total Output |
|--|-------------------|---------------------|--------------|
| Commercial logging   | 230.00            | \$30,469,758        | \$39,608,697 |
| Support activities for agriculture and forestry                                | 98.01             | \$2,344,751         | \$2,842,250  |
| Sawmills   | 90.23             | \$4,920,017         | \$37,434,907 |
| Employment and payroll of federal govt, non-military                           | 77.00             | \$11,627,424        | \$11,627,424 |
| Truck transportation   | 60.04             | \$6,464,205         | \$13,659,149 |
| All other crop farming   | 44.77             | \$50,143            | \$92,609     |
| Maintenance and repair construction of highways, streets, bridges, and tunnels | 39.00             | \$3,230,073         | \$9,025,946  |
| Construction of new highways and streets                                       | 33.00             | \$2,326,405         | \$4,874,441  |
| All other miscellaneous wood product manufacturing                             | 29.34             | \$2,066,586         | \$7,845,318  |
| Electric power generation - Biomass  | 24.74             | \$13,197,126        | \$33,477,418 |

Source: IMPLAN, Northern Arizona Region 2022, Type SAM Multipliers, Total Effects include Indirect and Induced Effects.

\*Includes full and part-time jobs.

\*\* Value added is the difference between an industry's total output and its intermediate inputs. It includes employee compensation, taxes, and surplus.

## DISCUSSION

For 2023, approximately 17,400 acres received mechanical thinning with sawlog removal within the 4FRI footprint. Numerous other acres received hand thinning, mastication, and prescribed burn treatments. 4FRI forest restoration activities generated substantial regional economic contributions in 2023. When including indirect and induced effects, 4FRI sustained over 1,000 full- and part-time jobs, almost \$55 million in labor income, and \$217 million in output across the five-county northern Arizona region.



Wildfire risk reduction treatments continue to expand as 4FRI has ramped up the implementation phase. Compared to the last time that regional economic contributions were measured for 4FRI in 2017, annual acres receiving mechanical thinning has increased by 33% (from 13,100 acres to 17,400 acres) with primary thinning jobs and wood processing jobs increasing by approximately 23% and 15% respectively.<sup>2</sup> Likewise, wood removed and utilized per thinned 4FRI acre has increased roughly 34% from 2017.<sup>3</sup>

For regional economic contribution analysis, caution is needed when interpreting results. For example, while we focused on in-region employment and expenditures, we were unable to track residency for some 4FRI workers. Specifically, the 92 FTE logging jobs associated with hand thinning and mastication, contracted out by the USFS, are likely a slight overestimate of actual regional eco-

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<sup>2</sup> Hjerpe, E., Mottek Lucas, A., & Eichman, H. (2021). Modeling regional economic contributions of forest restoration: A case study of the Four Forest Restoration Initiative. *Journal of Forestry*, 119 (5), 439-453. Available at: <https://academic.oup.com/jof/article/119/5/439/6271431>.

<sup>3</sup> Precise comparisons to the 2017 4FRI contribution analysis cannot be made due to different data collected and methods.

nomie contributions, as we presume a number of these workers (and companies) may live outside the five-county region and outside the state of Arizona. Out-of-region 4FRI workers have less regional economic contributions than 4FRI workers that reside within the region. Manual and chainsaw felling is often conducted by transient workers and companies that travel across multiple states on a project basis. However, the surveyed thinning and wood processing companies that account for the majority of 4FRI employment are almost all regional companies with in-region resident workers.

## ACKNOWLEDGEMENTS

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We are very appreciative of the logging and wood conversion companies and owners that participated in our surveys and interviews. We would like to thank the US Forest Service for their assistance, particularly 4FRI Operations Coordinator Brett Crary. We also thank Tabi Bolton with Campbell Global and the Arizona Department of Forestry and Fire Management.



Conservation  
Economics Institute

## Appendix A: Survey Instrument

### Regional Economic Contributions of 4FRI Forest Restoration in Arizona

Conservation Economics Institute has been commissioned by The Nature Conservancy to conduct economic monitoring of forest restoration in the Apache-Sitgreaves (A-S), Coconino, Kaibab, and Tonto National Forests. Your company has been identified as having conducted thinning projects in Calendar Year 2023 for the U.S. Forest Service (USFS) as part of the Four Forests Restoration Initiative (4FRI), and we are asking you to complete the short questionnaire below. ***You will be mailed a check for \$400, upon full completion of the questionnaire, to cover your time to report annual thinning and wood utilization accomplishments.***

As there are only a few contractors who worked on 4FRI USFS restoration activities in northern AZ in 2023, your participation in completing this survey will improve the results of the study and is greatly appreciated. All information collected will be retained in a confidential and anonymous manner. The answers you provide will not be directly associated with you or your business and responses will be grouped and unidentifiable in the final report.

The findings will be used to highlight the economic importance of forest restoration in Arizona's rural communities and will be widely shared with the 4FRI Stakeholder Group, decision makers, legislatures, and the public. ***Your participation will illustrate and support forest product industry's efforts and accomplishments across the state.*** For any questions related to this survey, please call Anne Mottek, CEI Research Associate, at 928-213-0413, or you can e-mail Anne at [mottekconsulting@gmail.com](mailto:mottekconsulting@gmail.com).

### Economic Survey

Name of person completing the questionnaire: \_\_\_\_\_

Company name: \_\_\_\_\_

Best phone #: \_\_\_\_\_ Best e-mail address: \_\_\_\_\_

Communication preference: \_\_\_\_\_ Email \_\_\_\_\_ Phone

Best mailing address (for mailing the monetary incentive) (Street or PO Box, City, State, Zip Code):

\_\_\_\_\_

**General Instructions:**

- Please answer to the best of your ability and provide the best estimates if you are not exactly sure.
- All questions are concerned only with activities associated with **USFS 4FRI thinning projects, and/or GNA(s) that occurred in the 4FRI footprint, during Calendar Year (CY) 2023. Do not include work that was conducted on state land.**
- Please describe work and utilization that was actually conducted in CY 2023; do not include planned projects that may be under contract.
- Please only list activities and employment that occurred in and near these four national forests: A-S, Coconino, Kaibab, and Tonto (**this includes only work conducted in Apache, Coconino, Graham, Greenlee, and Navajo counties**)

**Part A (Thinning in CY 2023)**

1) How many acres did your company thin for USFS 4FRI restoration contracts in CY 2023?

\_\_\_\_\_ Acres

2) In implementing the acres in Q1 above, how many people in Full-time Equivalents\* (FTEs) in CY 2023 were employed in the following **thinning** activities:

- For **employment**, please estimate each position as a full-time equivalent (FTE). For example, if a logger only worked for three months out of the year, the logger would count as .25 jobs (3/12=.25).
- Each job should only be allocated to **one** activity (job) and should not be double counted. For example, if an employee worked as a logger and a mechanic, account for their employment separately (in FTEs) for each job they perform.
- Please include all relevant employment within **your company** and **subcontracted by your company**. Do not include employment that occurs outside of northern Arizona (e.g., in Maricopa County or out-of-state).
- Please note that employment questions (FTEs) for the production of wood products are to be completed in Part C.

|  |            |
|--|------------|
| Logging and In-Woods Chipping/Grinding | _____ FTEs |
| Road Construction and Site Prep        | _____ FTEs |
| Technical Consulting                   | _____ FTEs |
| Admin and Management                   | _____ FTEs |
| Trucking                               | _____ FTEs |
| Mechanic                               | _____ FTEs |

Other Job Type not listed above (specify job type description and FTEs)

|                       |            |
|-----------------------|------------|
| Job Description _____ | _____ FTEs |
| Job Description _____ | _____ FTEs |
| Job Description _____ | _____ FTE  |

3) In thinking about your CY 2023 USFS 4FRI restoration contracts, how much of your total annual business (%) do these USFS/GNA 4FRI restoration contracts represent? \_\_\_\_\_%

**Part B (Wood Removal and Utilization in CY 2023):**

1) For your USFS 4FRI thinning project acres that you identified in Part A Q1, how much wood, in total, was removed and utilized as either sawlogs/pulpwood or biomass/slash in CY 2023?

Sawlogs/Pulpwood (6"+ dbh) \_\_\_\_\_ Green Tons or \_\_\_\_\_ ccf

Biomass and Slash (< 6" dbh) \_\_\_\_\_ Green Tons

2) Did YOUR company conduct any off-site (**not** on the thinning site) milling or conversion of 4FRI thinned material into finished wood products?

\_\_\_\_\_ Yes \_\_\_\_\_ No

**IF YES** → Please list the percentage of sawlogs/pulpwood and biomass/slash milled or converted by YOUR company below.

Sawlogs/Pulpwood \_\_\_\_\_ % Biomass and Slash \_\_\_\_\_%

**IF NO** → Continue to next question - Question 3

3) Please list any other primary companies who purchased wood from the acres thinned by your company and processed it into finished wood products.

- For each company that you list below, please state the amount of sawlogs and biomass/slash purchased as a percentage of all wood removed from 4FRI contracts in CY 2023--the percentage of answer #1 directly above.
- Total % of sawlogs listed in #2 and #3, when added together, should equal 100%.
- Total % of biomass/slash listed in #2 and #3, when added together, should equal 100%.

Company Name: \_\_\_\_\_

% of total Sawlogs/Pulpwood \_\_\_\_\_ % of total Biomass/Slash \_\_\_\_\_

Company Name: \_\_\_\_\_

% of total Sawlogs/Pulpwood \_\_\_\_\_ % of total Biomass/Slash \_\_\_\_\_

Company Name: \_\_\_\_\_

% of total Sawlogs/Pulpwood \_\_\_\_\_ % of total Biomass/Slash \_\_\_\_\_

Company Name: \_\_\_\_\_

% of total Sawlogs/Pulpwood \_\_\_\_\_ % of total Biomass/Slash \_\_\_\_\_

**Part C (Wood Product Utilization from 4FRI Acres in CY 2023):**

The remaining questions pertain to the thinned wood (from answer in Part B, Question 1) that was produced into wood products. Please estimate final wood product quantities and employment (FTEs) for all utilized wood that was thinned from 4FRI acres by YOUR company in CY 2023.

1) For the following types of wood products, specify the amounts that were produced from **sawlogs/pulpwood** (please identify the quantity and unit/metric used for each product type).

Dimension Lumber: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Rounds or Cants: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Pallets: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Moulding: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Firewood: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Animal Bedding/Wood Shavings: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Chips for Biomass Energy (from pulpwood here, and enter biomass energy, from slash, separately in Q2 below): quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Other (specify type): \_\_\_\_\_ quantity \_\_\_\_\_ unit/metric \_\_\_\_\_

2) For the following types of wood products, specify the amounts that were produced from **biomass and slash** (please identify the quantity and unit/metric used for each product type).

Biomass Energy (from biomass/slash): quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Pellets: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Fertilizer/Mulch: quantity \_\_\_\_\_ unit/metric \_\_\_\_\_  
Other (specify type): \_\_\_\_\_ quantity \_\_\_\_\_ unit/metric \_\_\_\_\_

3) How many people (in FTEs) were employed for off-site production (**not** on the thinning site) of wood products from wood harvested in 4FRI contracts in CY 2023?

*If you don't know employment related to off-site milling or trucking of 4FRI wood products, please leave blank. Please estimate each position as a full-time equivalent (FTE). For example, if a mill operator only worked for three months out of the year, the mill operator would count as .25 jobs (3/12=.25).*

Off-site (**not** on thinning site) production of finished wood products and milling of wood \_\_\_\_ FTEs

Additional trucking for off-site (**not** on the thinning site) wood products \_\_\_\_\_ FTEs

*Include FTEs for any additional trucking employment that was **not** reported in Part A.*

**The Survey is Complete. Thank You for Your Participation.**