

Ecosystem Workforce Program

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Economic Impacts of Restoration Calculator for Oregon Counties v1.0 *User Guide*



INSTITUTE FOR A SUSTAINABLE ENVIRONMENT



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Contents

Restoration Economics and Economic Modeling	1
Oregon's Restoration Economy	1
Regional Economic Impact Analysis	2
Calculator Methodology	2
Using the Calculator	3
Downloading the Calculator	3
Entering Project Details	3
Economic Impact Outputs	5
Summary	7



Globally, ecological restoration activities are increasing in response to environmental, economic, and cultural trends that value healthy functioning ecosystems. This is especially evident in Oregon where federal, state, and local governments and other community-based organizations and collaborative groups have made substantial investments in forest, rangeland, and watershed restoration projects over the past twenty years or so. In order to ensure continued investment in ecological restoration, practitioners and researchers need to identify and publicize the benefits accrued to society from restoration practice and policy.

Recent research conducted by the Ecosystem Workforce Program at the University of Oregon has shown that in addition to improving ecological conditions and restoring habitats and species, watershed and forest restoration projects can provide significant economic benefits. This research suggests that the Oregon Watershed Enhancement Board's restoration investment of approximately \$168.5 million since 1997 has resulted in nearly 2,700 jobs and \$400 million in total economic activity.¹ This sustained investment in restoration has created both new local organizational capacity in watershed councils and other community-based partners and business opportunities across urban and, especially, rural Oregon.

In order for restoration practitioners to better monitor and predict economic impacts of restoration in Oregon, the Ecosystem Workforce Program has developed a calculator to quantify estimated county-level economic and employment impacts from investments in ecological restoration throughout the state of Oregon. The calculator is based on data collected through a review of about 100 Oregon Watershed Enhancement Board (OWEB) grants including thousands of invoices from hundreds of vendors, and financial interviews with nearly 200 restoration contractors.

This data was analyzed using IMPLAN software that projects the economic impacts of projected expenditures for a particular region. The results of this analysis have been incorporated into statistical models that are embedded in the calculator. Using a Microsoft Excel spreadsheet, the calculator allows project managers to translate project expenditures into predicted county-level employment, earnings, the overall economic activity generated from their proposed restoration activities. Specific information required by the calculator includes estimated project spending by work type, the project location, amount of funds spent in the local county, and the timeframe for planning and implementation.

This user guide was created to provide users with a review of typical restoration economics and a basic understanding of economic impact modeling, step-by-step instructions about the information needed to use the calculator, and guidance for interpreting the outputs from the calculator.

Restoration Economics and Economic Modeling

Oregon's Restoration Economy

In order to understand potential economic impacts of restoration in Oregon it is essential to understand how Oregon's restoration economy typically functions. Most funding for restoration projects on both private and public land comes from state, federal, and tribal land management agency budgets as well as philanthropic and other private entities. In some cases private landowners will fund their own restoration projects. The potential economic benefits created by these funds depend on who is allocated these funds and where the recipients are located.

Restoration projects are typically implemented on public lands by government land management agencies or on private lands by local collaborative organizations, such as watershed councils and soil and water conservation districts, as well as by landowners themselves. On public lands, agency managers often use appropriated funding to issue contracts to private firms to implement the work.

¹ Nielsen-Pincus and Moseley 2010. Economic Impacts of Forest and Watershed Restoration in Oregon. Ecosystem Workforce Program Working Paper 24. Ecosystem Workforce Program, University of Oregon. Available online at ewp.uoregon.edu/sites/ewp.uoregon.edu/files/downloads/WP24.pdf.

On private lands, local organizations often receive grants to hire staff members and contractors to undertake outreach and planning, develop restoration priorities, and implement projects. At the local level, government and tribal agencies also hire contractors to do the same. Contractors hired to implement projects as well as local organizations employ people to perform restoration work. Contractors also hire subcontractors and make purchases for supplies and materials.

Regional Economic Impact Analysis

Regional economic input-output models are based on the movement of economic activity between economic sectors in a given region. Economic impacts are typically reported as direct and secondary effects and are typically measured by employment, income, and total economic output. Employment is a measure of the jobs required to produce an amount of goods and services and is usually expressed in number of full and part-time jobs created. Income is a measurement of the total wages and salaries paid in the production of goods and services. Total economic output is the total value of all goods and services resulting from the production of goods and services.

Direct effects are measures of the economic activity resulting from the actual production of goods and services. For restoration, we define the direct effects as those created from the on-the-ground implementation of a project, including the effects of local restoration organizations employing project management and coordination staff members and hiring restoration contractors to plan and implement projects.

Secondary effects include indirect effects and induced effects. Indirect effects are the economic changes resulting from the purchase of goods and services needed to support the direct effects. For restoration, indirect effects are the jobs, wages, and values created through local purchasing of materials, supplies, and the supporting services needed to implement restoration activities. Induced effects are the economic changes resulting when workers spend their earnings on housing, utilities, food, and other consumer goods and services. Total induced economic output is the total value of all goods and services produced by this household spending.

Calculator Methodology

To develop the county-level economic impact models used by the calculator, the thirty-six Oregon counties were divided into three categories based on population and local economic conditions: metro counties, natural resource counties, and agricultural counties. Data collected from OWEB grants were organized by sector and county-type. Using IMPLAN software, input-output models were developed using this data for each of the counties.

The results of this IMPLAN analysis were then used to develop statistical models that predict total employment, total wages, and total economic output for each county. These models use the percentage of project funding that a user plans to spend in three categories: equipment-intensive restoration work, labor-intensive restoration work (including project management and technical work), and materials and supplies. Each model includes individual county corrections based on county-specific results to ensure that calculator outputs reflect local economic conditions.

Using the Calculator

Although the calculator includes several worksheets, most of these are hidden because they contain the background calculations needed to predict economic impacts. In order to use the calculator the user needs only to understand the “Economic Impacts Calculator” worksheet. This worksheet is where the user inputs restoration project data that will be used to estimate economic impacts. Estimated economic impacts are also reported on this worksheet.

Downloading the Calculator

Use this link to download the calculator spreadsheet from ewp.uoregon.edu/economy. This version of the calculator requires **Microsoft Windows**. When you open the file there will a security warning, “**Macros have been disabled.**” In order for the calculator to work properly, click on the “**Options**” button and select “**Enable this content**” and click “**OK.**”

A brief introduction to the calculator is provided in the Excel spreadsheet tab labeled “**ReadMe.**” In order to begin using the calculator, click on the “**Go To Calculator**” button at the bottom of this sheet.

Entering Project Details

Although using the calculator requires little or no previous experience with economic impacts modeling it is essential that the user enters correct project details in order for the calculator to produce quality economic impact estimates.

In order to use the calculator the following information and steps are required:

1. “**Project Name.**” Enter the name of the project.
2. “**Project Location (County).**” Select from the drop down menu the name of the county where the project will be implemented. This information ensures that the correct calculations are used to estimate your local economic impacts.
3. “**Project Timeline.**” Select the number of the years (one-five) for project implementation and select the project start year. Entering the right start year of the project ensures that project spending is adjusted for inflation in order to accurately estimate economic impacts throughout the life of the project.

The screenshot shows the Excel spreadsheet interface for the "Economic Impacts of Restoration Calculator for Oregon Counties v. 1.0". The ribbon at the top includes Home, Insert, Page Layout, Formulas, Data, Review, View, and Developer. The main content area contains the following input fields:

Project Name	Project Location (County)
Big Creek Culvert Replacement	Lane
Project Timeline	
Enter Number of Years for Project Implementation	1
Project Start Year	2011

4. **“Annual and Total Project Spending Distributions.”** Enter the total amount of money that will be spent on each of the following spending categories for each year of the project:
 - a. **Contracted Work: Equipment Intensive.** Contracted work that relies on heavy equipment to conduct various construction and logging operations. Examples include in-stream construction, hauling logs and rocks, culvert replacement, commercial thinning, tree felling and yarding, and so forth. This includes heavy equipment rental and associated operator costs.
 - b. **Contracted Work: Labor Intensive.** Contracted work requiring labor instead of heavy equipment including tree planting, riparian projects, fencing, hand thinning, and similar tasks.
 - c. **Contracted Work: Technical Services.** Contracted technical work including project design, engineering, surveying, and such.
 - d. **In-House Labor Costs.** Include any projected expenses for employees (full-time, part-time, or temporary) that will be directly involved in the project implementation.
 - e. **Materials and Supplies and Administration.** All spending planned for purchases related to the project as well as overhead administrative costs.

5. **“Percent In County.”** For each annual expenditure, enter the approximate percent of project spending that will be spent within the county where the project is located. The calculator will calculate the total overall local project spending.

Annual and Total Project Spending Distributions

Spending Type	Year 1		Project Totals	
	Amount	% In County	Amount	% In County
Contracted Work: Equipment Intensive	\$ 250,000	50.00%	\$ 250,000	50.00%
Contracted Work: Labor Intensive	\$ 50,000	75.00%	\$ 50,000	75.00%
Contracted Work: Technical Services	\$ 50,000	50.00%	\$ 50,000	50.00%
In-house Labor Costs	\$ 25,000	100.00%	\$ 25,000	100.00%
Materials, Supplies, and Administration	\$ 100,000	25.00%	\$ 100,000	25.00%
Total must be less than or equal to 100%	\$ 475,000.00	50.00%	\$ 475,000	50.00%

Percent of Project Budget Spent in County

50%

CLEAR INPUTS

6. **“Calculate,” “Clear Results,” and “Clear Inputs”** buttons. Click on the “calculate” button to calculate estimated economic impacts, the “clear results” button to clear the results, and the “clear inputs” to clear the inputs.

Total County Spending Adjusted for Inflation

\$ 237,500.00

CALCULATE

CLEAR RESULTS

Economic Impact Outputs

The following describes the different calculator outputs:

Jobs	2.8
Wages	\$132,891
Ave. Wage	\$47,799
Output	\$360,412

1. **“Total Project Summary.”** This is a summary of the total economic inputs (includes direct, indirect, and induced impacts explained in further detail below) as well as the average wage for each job.
2. **“Economic Impact Estimates.”** The following economic impacts are estimated for each year of the project as well as the total estimate for the entire life of the project. Each indicator (jobs, wages, output) is broken into total, direct, and indirect and induced impacts:
 - a. **Total Jobs (full and part-time)**—This is the total predicted number of county-level jobs supported by the project spending entered into the calculator. It includes:
 - **Direct Jobs**—county-level jobs of those directly involved in restoration planning and project implementation
 - **Indirect and Induced Jobs**—county-level jobs supported by the purchase of goods and services needed to support project implementation and those jobs supported by the household spending of income earned during project implementation
 - b. **Total Wages**—This is the total predicted county-level labor income resulting from project spending entered into the calculator. It includes:
 - **Direct Wages**—county-level earnings of those directly involved in restoration planning and project implementation
 - **Indirect and Induced Wages**—county-level wages supported by the purchase of goods and services needed to support project implementation and those wages supported by household spending of income earned during project implementation
 - c. **Total Economic Output**—This is the total predicted county-level economic activity resulting from the spending entered into the calculator. It includes:
 - **Direct Output**—total value of all goods and services produced at the county level as a direct result of project implementation

	2011	2015	Project Totals
Total Jobs (full and part-time)	2.8		2.8
Direct Jobs	1.7		1.7
Indirect and Induced Jobs	1.1		1.1
Total Wages	\$132,891		\$132,891
Direct Wages	\$74,930		\$74,930
Indirect and Induced Wages	\$57,961		\$57,961
Total Economic Output	\$360,412		\$360,412
Direct Output	\$212,500		\$212,500
Indirect and Induced Output	\$147,912		\$147,912

UNHIDE CALCULATION SHEETS HIDE CALCULATION SHEETS

- **Indirect and Induced Output**—total value of all goods and services produced at the county level through the purchase of goods and services needed to support project implementation and the value of goods and services supported by household spending of income earned during project implementation

3. “**County Economic Benchmarks.**” This basic county economic information is provided so the estimated impacts of projects can be put into perspective in terms of their effect on the county economy.

Population	Households	Employment	Average Household Income	Gross Regional Product	
346,560	141,889	194,279	\$ 82,132	\$ 11,634,786,009	
Government Employment			Wood Products Employment	Natural Resources and Agriculture Employment	
16.8%			3.7%	1.5%	

Reporting and Using Your Results

Once you have entered your project information and calculated your estimated economic impacts you will probably want to share your results with community members, funders, and other important decision-makers, as well as the business owners and workers involved in your restoration program.

It is important to note that this calculator is meant only to estimate economic impacts based on models developed using county-level data from previous restoration investments. It does not monitor actual economic impacts of restoration project spending. For more information about monitoring actual economic impacts of restoration spending, a handbook titled “**A Quick Guide to Monitoring Economic Benefits of Ecosystem Restoration and Stewardship**” is available for download on the EWP website using this link: <http://ewp.uoregon.edu/economy>.

When deciding how to share the estimated economic impacts of your restoration program, it is important that you think about the following:

- Who you are trying to reach (i.e. community members, funders, government officials, landowners, contractors, workers), and the kind of information they might be most interested in seeing.
- Some easy ways to report your findings that include newsletters, annual reports, websites, or presentations and discussions at meetings.

The following hypothetical example is provided as a guide for how you could describe the estimated economic impacts of a restoration project. It is based on the example featured in the screenshots throughout this user guide:

Economic Impact Estimates Example: Big Creek Culvert Replacement

The Big Creek Culvert Replacement is a project proposed for implementation in the summer of 2011. This project will replace multiple culverts in the Big Creek subwatershed and will take place entirely in Lane County. Total project spending will be \$475,000, of which \$237,500 (50 percent) will be spent locally by hiring contractors and purchasing materials from businesses based in Lane County as well as supporting other watershed council staff members based in the county.

Using the “Economic Impacts of Restoration Calculator for Oregon Counties” developed by the Ecosystem Workforce Program at the University of Oregon, it is estimated that this project will support 2.8 Lane County jobs with an average wage of \$47,799 and \$360,412 in total local economic activity. Total economic activity is the value of all of the goods and services produced as a direct result of these culvert replacements as well as through the purchase of goods and services needed to support project implementation and the value of goods and services supported by household spending of income earned during project implementation.

Total predicted wages for the 2.8 total jobs will be \$132,891. Of that total, \$74,930 in wages will support 1.7 jobs directly involved in replacing the culverts and \$57,961 will support 1.1 jobs through the purchase of goods and services needed to support project implementation as well as household spending of income earned by those working directly on the on the project. Of the total economic output (\$360,412), \$212,500 is the total predicted value of the goods and services produced directly as a result of implementing the culvert replacements and \$57,961 is the total value of goods and services needed to support the project implementation as well as household spending of income earned as the project was being completed.

Notes

The information that went into the creation of this calculator was based on economic data for the state of Oregon. Applications to other locations outside of Oregon are as valid as the local economic structure is similar to that of an Oregon county.

We consider this version of the calculator to be v1.0, reflecting our desire to make improvements to the calculator based on feedback from users. Please do not hesitate to contact us if you have questions about the calculator or its results. Any questions or inquiries about the calculator or user guide should be directed to the Ecosystem Workforce Program at the University of Oregon via e-mail to ewp@uoregon.edu.





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