UNIVERSITY OF OREGON

Ecosystem Workforce Program

BRIEFING PAPER #13

A Preliminary Estimate of Economic Impact and Job Creation from the Oregon Watershed Enhancement Board's Restoration Investments

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The Oregon Watershed Enhancement Board (OWEB) has proposed nearly $40 million in watershed restoration projects for state and federal stimulus funding.[1] OWEB's investments in ecological restoration play a large role in public and private natural resource management with projects ranging from stream habitat enhancements and fish passage to irrigation canal improvements, riparian reforestation, road decommissioning, forest thinning, and wildlife habitat enhancement. As with other capital improvements, watershed restoration activities such as those that OWEB is proposing have considerable economic impact and job creation potential. Unlike other sectors of the economy, such as transportation infrastructure, there has been little research to quantify the economic potential of these activities. In this briefing paper, we provide a preliminary assessment of the potential economic and employment impacts for watershed restoration activities.[2]

Approach

To calculate the economic impact and job-creation potential of OWEB's proposed investments in watershed restoration, we used published research and the U.S. Bureau of Economic Analysis Regional Input-Output Modeling System (RIMS) in a four-step analysis. First, we categorized all proposed projects in OWEB's proposal for state and federal stimulus by the dominant economic activity involved in the project. Second, we used OWEB match funding data to estimate a range of additional public and private funds that will be leveraged with OWEB's investment. Third, we used published research on OWEB's grantee expenditures to estimate the economic capture of these funds within Oregon. Fourth, we use RIMS economic and employment multipliers for Oregon as a whole to estimate economic and employment impacts.

Findings

We find that the projects OWEB is proposing to implement with state and federal stimulus funds are likely to create considerable economic activity and jobs across the state. Specifically, our data suggest that OWEB's proposed $40 million investment in watershed restoration projects would:

1. Create or retain nearly 600 jobs and generate over $72 million in total economic activity in Oregon.
2. Strategically leverage between $38 and $59 million in additional funding from other public and private sources that would create or retain an additional 570 to 885 jobs and $71 to $110 million in additional total economic activity.

The Economic Impacts of Watershed Restoration Activities

OWEB investments fund labor-intensive riparian and upland restoration projects, equipment intensive aquatic restoration projects, mechanical forest restoration projects, and a variety of water conservation projects (Table 1). These activities create long-term improvements in the state's ecosystems and create economic activity in several sectors of the economy.

Every dollar invested in watershed restoration projects travels through the economy of Oregon in several ways. Restoration project managers hire consultants, contractors, and employees to design, implement, and maintain projects. Consultants and

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Table 1. Restoration Activities by Category

Restoration Category	Restoration Activities
Labor-Intensive Riparian & Upland Restoration	Native planting and seeding, noxious weed treatments, fencing, rangeland restoration, manual fire hazard reduction, juniper management
Equipment-Intensive Aquatic & Road Restoration	Log and boulder placements, instream structure construction, streambank stabilization, floodplain connectivity and channel reconfiguration, fish passage and screening improvements, wetland mitigation and restoration, tide gate and small dam removal, upland erosion control, road decommissioning and maintenance, culvert/bridge replacement and removal
Forest Restoration	Mechanized riparian and upland vegetation management, voluntary tree retention, mechanized fire hazard reduction
Water Conservation	Canal piping and lining, irrigation efficiency, delivery system improvements

contractors hire field crews, rent or purchase equipment, and buy goods and services needed to implement projects. Employees spend wages on goods and services to support their livelihoods. Economic and employment multipliers represent this voyage through the economy. A multiplier measures the degree to which economic activity in one economic sector creates additional economic activity in other sectors of an economy. We obtained US Bureau of Economic Analysis RIMS multipliers for Oregon and linked the above restoration categories to the economic industries represented in the RIMS data (Table 2).[3]

The RIMS data show that labor-intensive work has the highest job creation potential (nearly 50 to 100% greater than other restoration categories) at nearly 29 jobs per million dollars investment in that type of work compared to only 13 to 20 jobs for other sorts of restoration activities.[4] Labor-intensive jobs, however, tend to be lower pay and lower quality, but can be an important source of quick job creation. In contrast, equipment-intensive activities tend to create greater total economic activity due to higher wages and greater integration with other economic industries. For example, using a helicopter crew to place large logs in inaccessible streams has job creation potential similar to forest restoration and water conservation, but the total economic activity generated by utilizing helicopters is nearly double that of other restoration activities due to the amount of support infrastructure needed to maintain and operate a helicopter operation.

The Economic and Employment Impacts of OWEB's Proposed Investment

OWEB's investments in watershed restoration are made through its capital grants program, most of which is awarded to local watershed councils and soil and water conservation districts.[6] Previous research on grantee expenditures reported that approximately 80% of OWEB's investments are spent locally in the county in which the grantee is located, and over 90% is spent within Oregon, supporting local jobs and local economies often in rural and economically distressed areas of the state.[7]

We calculated the estimated economic and employment impacts of OWEB's proposed investments in watershed restoration by multiplying the investment proposed in each restoration category by the 90% rate of state economic capture, and by the RIMS economic output multiplier and RIMS employment ratio per million dollar investment, respectively.

On average, every $1 million invested in OWEB's capital watershed restoration program will create approximately 15 jobs and $1.86 million in total economic activity (Table 3). The economic engines of OWEB's proposed watershed restoration projects are water conservation and equipment intensive work, which will generate over 80% of the economic impact from OWEB's proposed investment.

Table 2. Economic and Employment Multipliers by Restoration Categories

Restoration Category	Economic Industry	RIMS Economic Output Multiplier	RIMS Employment/ $1 M Investment
Labor-Intensive Riparian & Upland Restoration	Forestry & Agricultural Support Services	2.11	28.8
Equipment-Intensive Aquatic & Road Restoration	Construction, Air Transportation[5]	2.32, 3.93	20.0, 12.5
Forest Restoration	Logging	2.17	13.4
Water Conservation	Water, Sewage and Other Systems	1.85	12.59

Leveraging OWEB Investments through Match

Between 1995 and 2008 total public and private investments in watershed restoration in Oregon was nearly $500 million and OWEB was the largest source of non-federal watershed restoration funds. The Oregon Watershed Restoration Inventory (OWRI) tracks the accomplishments and matching funding sources of all completed OWEB-sponsored projects.[8] Between 2004 and 2007, total matching funds reported in OWRI varied between 0.97 in 2006 to 1.52 in 2004. This range is a conservative estimate of actual matching funds because match reporting to the database is voluntary above the minimum requirement of 0.25.

OWEB's capacity to leverage its investment will further increase its economic and employment impacts by contributing from 570 to 885 additional jobs and $71 to $110 million in total additional economic activity.[8] Leveraging funding will raise OWEB's overall impact in total job creation to between 1,150 and 1,460 jobs and in economic activity to between $145 and $182 million. With its capacity to leverage funding for capital watershed restoration projects, OWEB is poised to make a substantial contribution to the economy of the state of Oregon at a time of critical need for jobs and economic activity.

Limitations and Assumptions

This analysis is based on several assumptions. First, we assume that each project in OWEB's proposal for state and federal stimulus is dominated by one economic activity (e.g., excavator work or tree planting). From experience we know this assumption does not always hold true. Restoration projects sometimes include a variety of activities lumped into one proposal. We make the assumption that lumping is not biased towards any one category and that as such the lumping of economic activities is likely balanced across activities. Second, we assume RIMS multipliers accurately depict the economic impacts of restoration activities. This assumption is untested and it is unclear what the impact of this assumption might be. Over the course of the next year, the Ecosystem Workforce Program will continue an empirical investigation to test this assumption. Until that project is completed, the conclusions presented in this briefing paper should be viewed as a preliminary estimate of the economic impacts of watershed restoration.

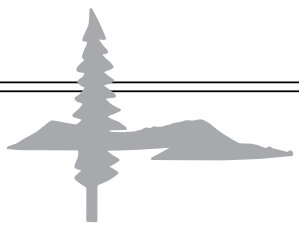
Next Steps

Over the next year the Ecosystem Workforce Program will embark on an empirical investigation of the economics of forest and watershed restoration activities in Oregon. We will work with the Oregon Watershed Enhancement Board and the Pacific Northwest Research Station of the United States Forest Service to quantify and profile the economic impacts of watershed restoration on the state and local economies. We will develop new robust models of the relationship between a variety of restoration activities and economic activity in a four stage analysis. First, we will conduct semi-structured interviews of watershed council and soil and water conservation district representatives focused on staffing and labor costs. Second, we will use these interviews (and federal procurement databases) to build a database of restoration contractors that work in Oregon. Third, we will undertake a survey of restoration contractors working in Oregon focused

Table 3. Potential Economic & Employment Impacts of OWEB's Proposed Watershed Restoration Investment

Restoration Category	Economic Industry	OWEB Proposed Investment	Potential Job Creation in Oregon	Total Economic Activity in Oregon
Labor-Intensive Riparian and Upland Restoration	Forestry and Agricultural Support Services	$3,929,524	101.8	$7,475,604
Equipment-Intensive Aquatic and Road Restoration	Construction, Air Transportation	$10,972,715	203.2	$24,809,860
Forest Restoration	Logging	$939,007	11.3	$1,833,205
Water Conservation	Water, Sewage and Other Systems	$23,077,027	261.5	$38,371,327
	Total	**$38,918,272**	**577.8**	**$72,489,995**
	Average Impact per $1.00 Million Invested		**14.9 Jobs**	**$1.86 Million**

Note: This table does not include matching funds.



on (1) general information about contractors working in watershed restoration, (2) average wage and salary rates for watershed restoration workers, (3) spending patterns for each restoration activity in the typology. Fourth, we will develop statistical models quantifying estimated economic impacts and jobs creation by restoration activity. Working with both agencies simultaneously, we will develop a common tool for understanding the economic impacts of forest and watershed restoration that is scalable and transferable.

Endnotes

[1] Personal Communication, Tom Byler, Executive Director, Oregon Watershed Enhancement Board, January 20, 2009.

[2] Over the coming year, the Ecosystem Workforce Program will be building more robust models of economic impacts models of a range of forest and watershed restoration activities, funded by the Oregon Watershed Enhancement Board and USDA Forest Service.

[3] The US Bureau of Economic Analysis Regional Input-Output Modeling System allows users to construct a region based on an aggregation of US counties. The Oregon model is built upon 1997 national account data from the US Economic Census and updated with 2006 regional economic data. RIMS economic industries are based on the North American Industry Classification System at the 4-digit level for the industries referenced in Table 2. For more information on RIMS, please go to URL: http://www.bea.gov/regional/rims/.

[4] The RIMS data is confirmed by research from other economies that demonstrate job creation potential between 11 and 21 jobs per million dollars of restoration investment depending on the type of activity. See Baker, M. 2004. Socioeconomic Characteristics of the Natural Resources Restoration System in Humboldt County, California. Forest Community Research. Taylorsville, CA. (finding that a aproximately 300 jobs were created in Humboldt County, CA in 2002 as a result of a $14.5 million investment in aquatic, riparian, and road restoration). See also Hjerpe, E.E., and Y.-S. Kim. 2008. Economic Impacts of Southwestern National Forests Fuels Reductions. Journal of Forestry. 106:311-316 (finding that a near $41 million investment fuels reduction in New Mexico created nearly 500 jobs).

[5] Air Transportation reflects large woody debris placement projects where logs are transported and placed in a stream by a helicopter crew.

[6] Oregon Watershed Enhancement Board. 2006. The Oregon Plan for Salmon and Watersheds: 2005-2007 Biennial Report. Salem, Oregon.

[7] Hibbard, M. and S. Lurie. 2006. Some community socio-economic benefits of watershed councils: A case study from Oregon. Journal of Environmental Planning and Management 49:891-908.

[8] See OWEB 2006 *supra* note 5; Oregon Watershed Restoration Inventory Database, 2009.

[9] This finding is based on the assumption the match funds are directed to the same basic economic activity as the original investment and that match funding is uniformly distributed across the proposed restoration categories in Table 1.

For more information:

This study is a preliminary effort in a larger program of research at the Ecosystem Workforce Program on the economic impacts of forest and watershed restoration on local communities in Oregon. Please contact the Ecosystem Workforce Program at ewp@uoregon.edu for more information.

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