Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009:

Employment and Economic Analysis

A Report for Oregon Wild

Authors:
Taylor Hesselgrave
Sarah Kruse, PhD

June 30, 2010

Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009: Employment and Economic Analysis

National Forest System Lands, East Oregon

Executive Summary

Proposed in December 2009, the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009 aims to strengthen restoration-based management of Oregon's eastern forests while maintaining local timber industries. Fifty million dollars, which would likely go towards planning and preparation, would be authorized to implement the legislation.

While this analysis is of a limited scope and cannot provide specific estimates of the total benefits of implementation, this report quantitatively estimates the potential direct, indirect, and induced employment and economic effects of this $50 million, and possible further long-term benefits under several possible implementation scenarios.

This analysis suggests immediate positive benefits resulting from the initially authorized funds and even further benefits from the ensuing stewardship contracting, restoration activities, and improved ecosystem services as a result of this act.

Employment and Economic Benefits of Authorized Funds

Using current economic multipliers supplied by the University of Oregon's Ecosystem Workforce Program and a likely Forest Service spending plan, we find that investing $50 million in planning and preparation for this act may potentially result in an estimated 566–858 jobs and $68–$97.8 million in economic output per year. These estimates cover only the time period until the authorized funds are completely spent and do not represent the total benefits accruing from implementation of this act.

Further Benefits

Through mandated stewardship contracting and ecological restoration projects, additional benefits associated with both economic output and employment are expected in restoration based sectors. It is too early to give numerical estimates, however, as information regarding exact funds to be raised or spent per restoration activity is not yet available. We do examine the types of restoration activity likely to occur based on previous restoration proposals and find that each forest under the purview of the Act likely has different needs and will likely focus on distinct restoration strategies. We also provide economic multipliers per type of restoration based activity; on average, every $1 million invested towards general watershed restoration projects results in an estimated 11.6–16.3 jobs and $1.9–$2.4 million in economic output. Every $1 million of investment towards mechanically based forest restoration is estimated to generate 11.9–17.2 jobs and output of $1.8–$2.4 million.

Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009: Employment and Economic Analysis

National Forest System Lands, East Oregon

Introduction

The Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009 was introduced in the United States Senate on December 16th, 2009 by Senator Ron Wyden. The purpose of this act is to reinforce and strengthen existing protections for old-growth forests and streams, while placing a greater focus on restoration activities in National Forests in eastern Oregon. This report estimates the total economic value-added benefits of the legislation through direct, indirect, and induced effects potentially associated with the immediately provided funding. In addition, although longer-term benefits cannot be fully estimated as the details of future restoration projects are not yet set nor are their costs determined, we conduct a quantitative analysis of potential benefits accruing during and as a result of the interim projects under several possible implementation scenarios. Lastly, a qualitative discussion about additional potential long-term benefits is included.

Oregon Eastside Forests and Legislation

The struggle between conservationists and the timber industry over Oregon's eastern forests (nearly 10 million acres) has been described as a "long and bitter battle"[1]. However, the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009 (hereon referred to as the 'Act') has been supported by both parties and is largely hailed as a truce. The Act is a substantial piece of legislation, not just making simple changes, but altering the way of thinking about forest management.

The Act specifies the following restoration goals for all areas in eastern Oregon managed by the Chief of the Forest Service and not currently covered by the Northwest Forest Plan;

(1) conservation and restoration of forests and watersheds health;
(2) reduction in the risks of uncharacteristic disturbances;
(3) allowance of characteristic natural disturbances; and
(4) increase in resistance and resiliency to uncharacteristic disturbances.

To achieve these objectives, the Secretary of Agriculture, through the Chief of the Forest Service, and aided by the Science and Technical Advisory Panel (STAP) created through the Act, must prepare a Landscape Forest Restoration Assessment (LFRA). The LFRA will characterize and prioritize restoration needs and project areas based on the best available science, determining large-scale multi-year Ecological Restoration Projects (ERPs). These projects, working towards forest and watershed restoration, must also consider the need to support locally based restoration economies, including the timber industry (Sec. 2). Explicit protections for old-growth trees, implicit protection for old-growth habitat, and protections for aquatic resources are laid out in the Act, along with guidelines for reducing the impacts of forest road systems. Fifty million dollars would be authorized to carry out the Act.

[1]Leslie Kaufman, "Foes Unite to Support Bill on Old-Growth Forests," *New York Times*, December 16 2009, http://www.nytimes.com/2009/12/17/science/earth/17timber.html

Table 1 displays the timeline implicit within the Act. In the first 90 days after enactment, the Secretary must establish the STAP and begin working on the LFRA. The LFRA is to be completed within two years time and ERPs must begin one year after its completion, or three years after enactment. In the meantime, interim ecological restoration projects are required. These will cease to happen as soon as the official LFRA ERPs begin. The ERPs continue consistently for each year at least over 10 years. At the five year mark, an 'experimental ecological restoration project' must be prepared, testing age-based versus diameter-based prohibitions on the harvesting of trees.

TABLE 1. Timeline

	ENACTMENT	INTERIM
90 DAYS	STAP established	
1 YEAR	Secretary and Panel begin working on LFRA	1 or more mechanical treatment restoration projects not less than total 80,000 acres
2 YEARS	LFRA completed with restoration projects defined focusing over 10 years	1 or more mechanical treatment restoration projects not less than total 100,000 acres
3 YEARS	ERPs scheduled to begin not more than one year after completion of LFRA	1 or more mechanical treatment restoration projects not less than total 120,000 acres
EACH SUBSEQUENT YEAR	1 ERP per forest per year on area not less than 25,000 acres	(No longer required once ERPs begin)
5 YEARS	Experimental ecological restoration projects to be prepared prohibiting the harvest of any tree over 150 years	

Methodology

We used economic multipliers to estimate the potential employment and economic benefits of the funds authorized to enact the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009. An economic multiplier is a number that is used to estimate the total economic benefit of an investment. For example, a multiplier of 2.0 implies that every $1.00 spent generates an additional $1.00 in economic activity, for a total economic benefit of $2.00 resulting from the initial investment. Each multiplier typically includes the direct, indirect, and induced effects of spending. Direct effects are the most straightforward being precisely the spending itself as used for the wages and output generated by the investment. Indirect effects account for the additional purchases made for supplies, equipment, and any other additional necessary services. Induced effects measure the purchases made by those employed in the direct and indirect sectors on further goods and services not related to the project, but made possible by the additional incomes generated.

The multipliers used in this analysis were provided by the Ecosystem Workforce Program of the University of Oregon, who recently released a working paper entitled 'Economic and Employment Impacts of Forest and Watershed Restoration in Oregon'[2]. The purpose of this study was, "to examine the employment and economic impacts of public investment in forest and watershed restoration in Oregon"[3]. To derive the multipliers, the study used the economic impact modeling software IMPLAN, which contains county and federal economic statistics specialized by region, U.S. Census Bureau payroll statistics, and collected local data from completed Oregon forest and watershed restoration projects. The resulting multipliers are thus directly relevant to this analysis and presumably allow for greater

[2]Max Nielsen-Pincus, Cassandra Moseley, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", *Ecosystem Workforce Program*, Working Paper Number 24, (Spring 2010).
[3]Ibid, p. 4.

accuracy as restoration activities do not generally fit neatly into traditional economic sectors. The timing of this report was also fortunate (Spring 2010) in that the provided multipliers can better account for the current economic climate.

According to the Region 6 (Pacific Northwest) Forest Service Assistant Director of Natural Resources, it is typical that money legally authorized for this kind of work generally breaks down into the following allocations: 65% to project planning and environmental documentation, 20% to ground preparation, and 15% to contract administration[4]. Following this estimate, the $50 million authorized for the Act would break down as $32 million for planning and documentation, $10 million for ground preparation, and $7.5 million for contract administration. We assume that this funding will last into the interim period to create the LFRA and not exceed a time frame over three years. The following analysis examines the temporary effects of this funding only. Additional long-term funding for the restoration projects themselves will be provided through other means yet to be determined and stewardship contracting; wherein Forest Service timber revenues are retained and reinvested into further restoration projects. Potential longer-term benefits are explored later in this report.

Table 2 displays the employment and economic output multipliers for every $1 million invested in forest and watershed restoration contracting work as derived by the Ecosystem Workforce Program, University of Oregon. The description of the different contracting work is quoted directly from the study:

- **Technical planning and design work** including conducting field surveys, engineering, and writing planning documents
- **Labor-intensive work** such as site preparation, tree and shrub planting, and cutting small trees and brush by hand
- **Equipment-intensive watershed work** such as constructing stream habitat features or excavating of floodplain and wetland features
- **Equipment-intensive forestry work** such as forest thinning, small-diameter and selective logging, and mowing and masticating ground fuels[5]

To estimate project planning and documentation effects we used the 'technical planning and design work' multiplier, listed in Table 2. For ground preparation we used the 'labor-intensive' multiplier. Contract administration has not been given an employment multiplier as we assume that this activity will be handled by currently employed government officials, therefore creating no direct contract jobs[6]. We do, however, account for the direct economic output effect of the funds allotted for contract administration, but conservatively assume no indirect or induced effects. Although we did not use the Workforce's equipment intensive multipliers for forestry and watershed contracting work, they may be useful in future analyses and are thus also included in Table 2.

[4]T. Beck (personal communication, June 4, 2010).

[5]Nielsen-Pincus, Moseley, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", p. 6.

[6]For the official definition of contract administration please see: *A Guide to Best Practices for Contract Administration*, Office of Federal Procurement Policy, Washington, 1994.

TABLE 2. Multipliers for effects per $1 million invested in forest and watershed contracting[7]

Type of Contracting	Employment		Economic Output	
	Type I	Type II	Type I	Type II
Labor-intensive	17.0	23.9	1.5	2.2
Technical	12.2	19.1	1.4	2.1
Equipment-intensive (watershed)	10.6	15.8	1.8	2.4
Equipment-intensive (forestry)	11.9	17.2	1.8	2.4

Note: Type I multipliers measure only direct and indirect effects; Type II multipliers measure direct, indirect, and induced effects.

Employment and Economic Benefits of Authorized Funds

Table 3 displays the possible range of employment and economic output generated by the authorized $50 million being spent as previously described. The lower values in the range are calculated by using Type I multipliers, which measure only the direct and indirect effects of the investment. The higher values in the range are calculated by using Type II multipliers, which measure the direct, indirect, and induced effects of the investment. A range of estimated employment and economic benefits allows for greater approximation; Type I multipliers generate more conservative values while Type II multipliers portray the macro-scale effects of an investment.

If the authorized $50 million is indeed split as 65% to planning and documentation, 20% for ground preparation, and 15% towards contract administration, it is estimated that 566–858 jobs potentially would be created or retained and total economic output potentially would range from $68 to $97.8 million.

While the legislation does not explicitly state the time frame over which the $50 million must be spent, the timeline for the Act (see Table 1) suggests that it is likely to be spent within a three-year period. Assuming the $50 million is evenly spent over a three year period, the potential annual benefits are estimated to be 189–289 jobs and $22 to $33 million in economic output.

TABLE 3. Estimated potential employment and economic output

Activity	% of Total spending	Funding ($ millions)	Employment multipliers		Estimated employment generated (# of Jobs) LOW	HIGH	Output multipliers		Estimated output generated ($ millions) LOW	HIGH
Planning & Documentation	65%	$32	Type I	12.2	396	622	Type I	1.4	$45.5	$68.3
			Type II	19.1			Type II	2.1		
Ground Preparation	20%	$10	Type I	17.0	170	236	Type I	1.5	$15	$22
			Type II	23.6			Type II	2.2		
Contract Administration	15%	$7.5	Type I	n/a	0	0	Type I	1	$7.5	$7.5
			Type II	n/a			Type II	1		
Total	**100%**	**$50**			**566**	**858**			**$68**	**$97.8**
Total (per year for 3 years)		**$17**			**189**	**286**			**$23**	**$33**

Note: Type I multipliers measure only direct and indirect effects; Type II multipliers measure direct, indirect, and induced effects.

[7]Nielsen-Pincus, Moseley, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon".

Further Benefits

The above analysis only explores the short-term benefits of the funds used to plan and prepare for the implementation of the Act, not the full long-term effects. Naturally, the remainder of the Act spans a much greater length of time (theoretically, in perpetuity) and is expected to create additional jobs and economic output. Currently, however, it is nearly impossible to reasonably estimate the extensive range of likely resulting benefits. This is because the explicit details of the mandated restoration projects are yet to be determined. Once the LFRA is completed and an estimate of the necessary funds to be invested is available, a more complete economic and employment analysis will be possible. In the meantime we present a quantitative analysis based on best available information, multipliers for future restoration activities, and example scenarios.

We do know that the timber industry is to be supported and its contracts perhaps even expanded under this legislation through greater stewardship contracting. This suggests potentially greater employment and economic output for the timber industry. The American Forest Resource Council (AFRC), a lobby group representing 100 companies in the logging and forestry industry, expects the legislation to bring a number of direct jobs within the timber industry itself and has estimated a total of $37.5 million in revenues to the Forest Service from the first three years of interim projects[8]. This estimate assumes that every acre will be subject to mechanical treatment; however, environmental groups suggest this assumption is too optimistic and that perhaps only 50% of acres will be treated yielding therefore half the revenues from stewardship contracting, or $18.75 million[9].

Other future funding sources to support restoration activities may include federal and private grants. Although final investment amounts brought by this legislation are currently uncertain, as are current funding needs, we do know the standard return from restoration investments and these are listed below. Once funding amounts and plans have been established, these multipliers can be used to determine the approximate resulting benefits to employment and the overall economy.

Table 4 displays the employment and economic output multipliers for every $1 million invested in forest and watershed restoration projects. (See Table 2 for multipliers for forestry and watershed contracting work.) These multipliers also come from the Ecosystem Workforce Program and include the following projects:

- **In-stream projects** that focus on enhancing stream habitat and function
- **Riparian projects** that focus on enhancing and restoring native riparian vegetation
- **Wetland projects** that focus on restoring wetland and estuarine habitat
- **Fish passage projects** that focus on removing barriers to fish passage such as culverts and dams, and screening to protect fish from water withdrawals
- **Upland projects** that focus on agricultural water management, juniper management, and noxious weed treatments
- **Other projects** that typically combine a diversity of the above project types together[10]

[8] This was calculated using an average of 2,500 thousand board feet removed per every acre of required interim projects over three years and priced at $50 per thousand board feet, supplied by American Forest Resource Council (personal communication, June 14, 2010).

[9] Andy Kerr, "Oregon Eastside Forests Restoration, Old-Growth Protection and Jobs Act of 2009: Interim Acreage Treatment Mandate", (received from Oregon Wild, personal communication June 8, 2010).

[10] Nielsen-Pincus, Moseley, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", p. 6.

TABLE 4. Multipliers for effects per $1 million invested in forest and watershed projects[11]

Project Type	Employment		Economic Output	
	Type I	Type II	Type I	Type II
In-stream Projects	10.6	14.7	1.7	2.2
Riparian Projects	17.8	22.9	1.7	2.4
Wetland Projects	12.2	17.3	1.8	2.4
Fish Passage Projects	10.8	15.5	1.8	2.3
Upland Projects	10.7	14.8	2.0	2.6
Other Projects	10.2	14.6	1.8	2.3
All Projects	**11.6**	**16.3**	**1.9**	**2.4**

Note: Type I multipliers measure only direct and indirect effects; Type II multipliers measure direct, indirect, and induced effects.

An average value for all project types is included under 'All Projects', shown above in bold type. Using these average multipliers, one can infer that every $1 million invested towards forest and watershed restoration projects generates, on average, an estimated 11.6–16.3 jobs and $1.9–$2.4 million in economic output. It should be noted, however, that these estimates clearly vary depending on the exact project type.

To helps us better understand possible ecological restoration plans to emerge from the Act, we examined three 10-year restoration proposals recently submitted by the Fremont-Winema[12], Deschutes[13], and Malheur[14] National Forests under the Collaborative Forest Landscape Restoration Program (CFLRP). Each of these forests will be either fully or partially affected by the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009 making the comparison relevant. Table 5 compares the CFLRP proposal projects by forest. We found that yearly implementation costs, acreage planned for restoration, average percentage of funds to come from stewardship contracting, and types of restoration activities vary greatly from forest to forest.

Clearly the areas and intensities of restoration, and thus the likely associated costs and benefits, are too different to be able to generalize or be used to estimate future restoration projects to be implemented under the Act. Table 5 also illustrates the greatly varied role stewardship contracting can play in funding restoration projects depending on the forest and projects planned; estimates range from just 3% of total funding in Deschutes to over 20% in Malheur's proposal. Though funding was reported per year for each of the proposals by source, there were limited details as to how much would be spent on each activity specifically (e.g. the cost per acre for aspen treatment or the cost per culvert replacement). This information is necessary in order to apply restoration multipliers to produce employment and output benefits estimates per investments over time, and we suggest that future proposals and reporting activities include this information to better enable future economic analyses.

[11] Nielsen-Pincus, Moseley, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", p. 6.

[12] Malheur National Forest, "Collaborative Forest Landscape Restoration Proposal Proposed Treatment", available online at: http://nw.firelearningnetwork.org/projects/25

[13] Deschutes National Forest, "Deschutes Skyline Landscape: A Proposal from the Deschutes National Forest and their Collaborators for the Collaborative Forest Landscape Restoration Program", May 2010, available online at: http://nw.firelearningnetwork.org/projects/21

[14] Lakeview Federal Stewardship Unit, "Collaborative Forest Landscape Restoration Program: Proposal", May 2010, available online at: http://nw.firelearningnetwork.org/projects/22

Table 5: Comparison of restoration activity proposals by forest

10 year Restoration Plan Details by Forest		Fremont-Winema	Malheur	Deschutes
Approximate total acres included *		265,000	180,000	60,000
Average funding cost estimate per year		$6,092,500	$6,245,524	$2,239,950
Average cost per acre per year *		$23	$35	$37
Average proportion of funding from stewardship contracting per year		11%	20%	3%
Restoration Activities Proposed by Forest				
Equipment-Intensive Forestry Work	Commercial Thinning, Biomass Removal for Fuel Reduction	X	X	X
	Pre-commercial Thinning		X	
	Non-commercial Thinning			X
	Aspen Treatment	X	X	
	Mt. Mahogany Treatment	X		
	Old Growth Enhancement	X		
Equipment-Intensive Watershed Work	Road Decommissioning/Closure	X	X	X
	Road Reconstruction/Maintenance	X		
Labor Intensive Work	Reforestation	X		
In-stream Projects	Stream Channel Restoration			X
Riparian Projects	Riparian/Stream Improvements	X		
	Exotic Aquatic Species Management		X	
	Riparian Thinning			X
	Large Woody Debris/Riparian Fence/Plant		X	
Wetland Projects	Wetland Enhancement/Establishment			X
Fish passage Projects	Fish Passage/Improvements		X	X
	Culvert Replacement	X		
Upland Projects	Invasive Plant Treatments	X	X	X
	Juniper Thinning	X		
	Meadow Restoration	X		
Other Projects	Prescribed Burning	X	X	X
	Wildlife/Forage Enhancement		X	

** Note: Total acre estimates may be too high as sometimes treatment acres overlap each other. In such instances, average cost per acre estimates would actually be greater.*

An Example Scenario

Here we consider three hypothetical scenarios to explore possible economic output and employment benefits accruing from ERPs following the interim projects. We know that:

1. the AFRC estimates approximately $37.5 million dollars in revenues to the Forest Service resulting from stewardship contracting during the initial three year interim period and;
2. a proportion of these retained receipts from the interim projects will constitute some of the funding for the ensuing ERPs (Sec. 15(c)(1)).

The Malheur CFLRP proposal states that on average, stewardship contracting "retained receipts returned to the Forest [Service] would be around 60%, which would be used to invest in additional restoration treatments" [15]. Using these two estimates, we have created Table 6, which:

- takes 60% of the supposed stewardship contracting revenues over three years of $37.5 million ($22.5 million);
- assumes this amount has been saved over the interim period to be applied as funding for the first year of large-scale ERP implementation,
- applies a range of funding proportion schemes from 3–20% (inspired by findings displayed in Table 5);
- estimates total funding amounts; and
- estimates potential benefits of restoration projects for the first year of large-scale ERPs over all forests using the generalized 'All Projects' restoration multipliers from Table 4.

Table 6. Estimated employment and output benefits for first year of large-scale ERP implementation from various funding proportions of 60% of interim three year timber revenues totaling $37.5 million

% of Revenues of Total Funding	**3%**		**11%**		**20%**		**Multipliers**	
Estimated Total Funding ($ millions)	$750.0		$204.5		$112.5		Type I	Type II
Estimated Employment Range (# of jobs)	8700	12225	2373	3334	1305	1834	11.6	16.3
Estimated Output Range ($ millions)	$1,425	$1,800	$389	$491	$214	$270	1.9	2.4

Note: Type I multipliers measure only direct and indirect effects; Type II multipliers measure direct, indirect, and induced effects.

It should be noted that this is merely a hypothetical example, created with multiple assumptions and exclusions, showing a range of potential benefits associated with several possible implementation scenarios. Based on the scenarios examined, an estimated 1,305–12,225 jobs potentially could be created and economic output could range from $214 million–$1.8 billion. Applying the aforementioned environmentally-based assumption that only half as much acreage, and thus revenue, would be result from interim projects, the results would correspondingly be halved.

In this example, possible total funding amounts vary significantly depending on the actual proportional contribution of stewardship contracting revenues to total restoration costs, but these vary greatly on their own, as can be seen in Table 5. The range of 3–20% of contributing revenues taken from the previous proposals were particular to each individual project; because the Act explicitly asks that stewardship contracting be employed to the extent practical, it may be likely that an even greater percentage would occur. The above estimates only represent the first year of implementation of the large-scale ERPS, and furthermore, give no details as to how exactly the benefits originate by restoration activity (e.g. $100 million from riparian projects, $200 million from forestry work, $50 million from fish passage work, etc. towards final figures).

Additionally, potential benefits accruing in future years may or may not be represented by these estimates as in both cases total benefits are dependent on the base funding amount per year. It is

[15] Malheur National Forest, "Collaborative Forest Landscape Restoration Proposal Proposed Treatment", p. 13

expected that future plans will have different funding structures and therefore different employment and economic benefits. The AFRC estimate of $37.5 million in revenues is calculated off the acreage and treatment guidelines specified during the interim period. This roughly averages to approximately 16,000 acres per forest per year, or a total of almost 50,000 acres per forest over the full three–year period. We then assume that this entire amount is saved to be invested on the initial 'kick-off' year of large-scale ERP implementation under the Act. The later ERPs are required to cover areas not less than 25,000 acres per forest per year, and we assume stewardship contracting receipts from one year will provide stewardship contracting funds for the following year.

While it is difficult to assess how closely our assumptions are likely to match actual implementation, the results provided here do serve as a summary of potential benefits under several possible implementation scenarios.

Discussion

The potential benefits estimated and examined in this report have been limited to employment and economic output. Restoration activities are not only designed to improve species habitat and overall forest health, but, indirectly, also may support improved opportunities for recreational activities (e.g. fishing, wildlife viewing, hiking, etc.). These improvements potentially could increase Forest Service revenues from forest users.

It is also important to acknowledge the numerous ecosystem services generated by forests and watershed areas. Such services will likely only be enhanced by such focused concentration on ecological restoration goals as mandated in the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009. To mention a few: purification of air and water, mitigation of droughts and floods, generation and preservation of soils and renewal of their fertility, detoxification and decomposition of wastes, pollination of crops and natural vegetation, dispersal of seeds, cycling and movement of nutrients, control of the vast majority of potential agricultural pests, and more[16].

More specifically, according to Wiedinmyer and Hurteau (2010), the valuable potential of forests to support climate change mitigation is "an existing technology that can be utilized to stabilize atmospheric greenhouse gas concentrations"[17]. Prescribed fire, not only serving as an option for reducing risk of wildfire, may also support forest carbon sequestration by reducing loss of carbon (and other) emissions associated with wildfire[18]. These climate services are becoming increasingly important every day. While it is both difficult and controversial to monetize these benefits, they are significant and should not be disregarded when considering potential restoration benefits.

Conclusion

The Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009 is expected to deliver substantial employment and economic benefits to Oregon. Although these benefits cannot be fully estimated at this time, due to lack of specific funding information, we can make some estimates based on the known authorized funding and explore potential benefits of possible future funding.

---

[16] Gretchen Daily. *Nature's Services: Societal Dependence on Natural Ecosystems.* (Washington, DC: Island Press, 1997).

[17] Wiedinmyer C., and M.D. Hurteau (2010) Prescribed Fire As a Means of Reducing Forest Carbon Emissions in the Western United States. Environ. Sci. Technol. (44): 1926–1932.

[18] Ibid.

The initial legally authorized investment of $50 million may result in an estimated 189–289 jobs and $22–$33 million in economic output per year (assuming three years for implementation). Several years of ecological restoration projects will follow and, using the Ecosystem Workforce Program multipliers, may create, on average, an additional 11.6–16.3 jobs and $1.9–$2.4 million return for every additional $1 million invested. Similarly, additional jobs and economic output associated with the timber industry are anticipated throughout restoration work. Again using the Ecosystem Workforce Program multipliers, for every $1 million of investment on mechanically based forest restoration, between 11.9–17.2 jobs and output of $1.8– $2.4 million can be estimated. The AFRC itself estimates a high number of direct jobs resulting from the increased stewardship contracting opportunities mandated by this legislation.

We examined existing eastern Oregon National Forest restoration proposals and found that each forest has distinct characteristics and restoration needs. This extends to each forest's capacity to utilize funds from stewardship contracting towards further future restoration. Based on these observations, we explored the possible benefits from funding schemes utilizing 3%–20% of total funding from stewardship contracting. Though using a generalized restoration multiplier for all investments, we found that benefits vary greatly depending on total funding amounts; yet all generally produce significantly high potential employment and economic output benefits.

Finally, other incalculable but important benefits from enhanced forestry and watershed ecosystem services will also likely result from the implementation of the Oregon Eastside Forest Restoration, Old-growth Protection and Jobs Act of 2009. These range from increased recreation revenues to vital ecosystem services such as carbon sequestration and water purification.

Once the Act's Landscape Forest Restoration Assessment has been completed and projected funding levels and uses have been determined, a more detailed and complete employment and economic analysis will be possible using the multipliers and methods described in this report.