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Comments

On the Draft Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management Districts

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Pacific Rivers Council

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I. BACKGROUND AND SUMMARY

In August, 2007, the Bureau of Land Management (BLM) published a draft environmental impact statement (DEIS) regarding alternatives BLM has identified for revising the resource management plans for lands managed by the BLM in western Oregon.¹ These lands, called O&C lands, are governed by the O&C Act of 1937, which stipulates that the lands:

"shall be managed... for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating streamflow, and contributing to the economic stability of the local communities and industries, and providing recreational facilities."²

The Pacific Rivers Council asked ECONorthwest to briefly review the extent to which the DEIS addresses a key element of this requirement, that the BLM should manage the lands **"for the purpose of ... contributing to the economic stability of the local communities and industries..."** This report responds to that request. Our findings are intended to be submitted to the BLM, which we expect it will consider as it makes decisions regarding future management of the O&C lands.

Our review shows that the DEIS contains several, overlapping flaws that distort its findings and render them unsuitable as the foundation for decisions regarding the future management of the O&C lands. The DEIS does not define "the economic stability of the local communities and industries," consistent with economic theory, it does not fully describe the current status of "the economic stability of the local communities and industries," and it does not describe what impact each of the alternatives, if implemented, would have on the "the economic stability of the local communities and industries." Instead, it embodies a simplistic presumption: that higher levels of logging and diminished protections for streams necessarily would have a positive impact on "the economic stability of local communities and industries." This presumption arises from a line of reasoning that has these four elements:

- Diminished protection for streams would enable more logging.
- With increased logging the timber industry would produce additional commodities (lumber and other wood products) and create additional employment for workers in nearby communities.
- The federal government would share revenue from the sale of logs with local counties.

¹ U.S. Department of the Interior, Bureau of Land Management. 2007. *Draft Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management Districts*. Volume I. August. Pg. 3. Retrieved November 27, 2007, from <http://www.blm.gov/or/plans/wopr/deis/index.php>

² 43 U.S.C. §1181a.

- The additional timber-industry activity, additional jobs, and shared revenue would make a positive contribution to “the economic stability of the local communities and industries.”

The DEIS has failed to substantiate the validity of this line of reasoning. Instead, it has disregarded a large body of economic theory, empirical studies, and data that strongly suggest the line of reasoning is false. This body of evidence shows that the relationship between the O&C lands and “the economic stability of the local communities and industries” is complex, so that decisions regarding the future management of the O&C lands will have many different impacts, some positive and some negative. It also indicates that the positive impacts of logging on “the economic stability of the local communities and industries” probably will be smaller than they have been in the past, and the negative impacts probably will be larger, so that, on balance, there is a high likelihood that the negatives will outweigh the positives for alternatives that would lower protections for streams and increase logging on the O&C lands. Thus, although lowering protections for streams and increasing logging on the O&C lands may have some positive impact on “the economic stability of the local communities and industries,” the DEIS probably has overstated this impact. It has totally failed to describe the negative impacts and the overall impacts.

There is no reasonable excuse for the BLM’s failure to integrate this body of evidence into its assessment of the alternatives in the DEIS. The economic theory, empirical studies, and data are widely known and readily available. Indeed, much of this information was developed through research focused on the O&C lands and other federal forests, as well as on the communities and industries in western Oregon.

In sum, the DEIS does not—and without major revisions it cannot—provide a reasonable basis for concluding that implementing an increase in logging would satisfy the BLM’s obligation to manage the O&C lands to “contribute to the economic stability in the local communities and industries.” Evidence ignored by the DEIS strongly suggests that the opposite is true.

In the following paragraphs we explain our findings, separating them into three distinct, but related sections that substantiate address these conclusions:

1. The DEIS lacks an appropriate theoretical and empirical foundation and, hence, it describes the wrong things insofar as it describes the potential impacts of greater logging on “the economic stability of the local communities and industries.”
2. The DEIS overstates the potential positive impacts of logging on “the economic stability of the local communities and industries.”
3. The DEIS fails to describe the potential negative impacts of logging on “the economic stability of the local communities and industries.”

We emphasize that this is not intended to offer an exhaustive examination of the linkages between the BLM’s proposals and its

obligation to “contribute to the economic stability of the local communities and industries.” We present only an introduction to the relevant theoretical and empirical literature to demonstrate the BLM’s failure, in the DEIS, to address these linkages.

II. THE DEIS LACKS AN APPROPRIATE THEORETICAL AND EMPIRICAL FOUNDATION

In the DEIS, the BLM contends that, since the implementation of the Northwest Forest Plan, the O&C lands have been managed to produce less timber than the lands are capable of producing on a sustainable basis and that increasing timber production, under a sustained-yield management policy, would contribute positively to the economic stability of local communities and industries:

“[T]he BLM has re-focused the goal for management of the BLM-administered lands to the objectives of its statutory mandate to utilize the principles of sustained yield management on the timber lands covered under the O&C Act of contributing to the economic stability of local communities and industries, and other benefits from such management to watersheds, stream flows, and recreation.”³

In other words, the BLM would have readers believe that more logging would mean greater economic stability for local communities and for local industries. The BLM, however, provides no theoretical foundation for this assertion and no empirical evidence to substantiate it.

The assertion, that more logging on federal lands would lead to greater economic stability for local communities and local industries, has its roots in the 1937 O&C Act, and may have reflected the economic realities of the time. For decades, however, economists and socioeconomic researchers, both inside and outside the timber industry, have demonstrated that this view is fundamentally flawed and fails to represent the forest-economy relationship accurately.

The reasoning behind the idea that managing federal forests to provide a sustained yield of timber would contribute to economic stability for local communities and industries rests on several flawed premises. It first presumes that logs from O&C lands would be utilized by local mills. It then presumes that a sustained supply of logs from O&C lands would cause the timber industry to maintain a stable level of production and jobs in these mills in nearby communities. Next, it presumes that this stability in the local timber industry would cause overall economic stability for local communities and for other industries in them. Finally, it presumes that, when logging occurs on the O&C lands, there would be no adverse impacts to offset the positive contributions of logging to the

³ U.S. Department of the Interior, Bureau of Land Management. 2007. *Draft Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management Districts*. Volume I. August. Pg. 3 Retrieved November 27, 2007, from <http://www.blm.gov/or/plans/wopr/deis/index.php>

economic stability of local industries and communities. Each of these presumptions is demonstrably incorrect.

Since at least the late 1980s, researchers have shown that managing federal lands in this region to provide a sustained yield of timber does not necessarily result in economic stability for local communities and industries.⁴ They also have shown that higher levels of logging on federal lands does not necessarily contribute to greater economic stability for local communities and industries, or the lower levels of logging contribute to lower levels of economic stability.⁵ A careful examination of the relationships among logging on federal lands, the timber industry, and the industries and economies of local communities reveals that, even under sustained-yield management policies, the jobs and incomes it provides are vulnerable to market fluctuations, as well as technological advances and efficiency improvements that reduce the demand for labor.⁶

A recent study by researchers at the Forest Service's Pacific Northwest Research Station illustrates the extent to which the stability of communities near the federal forests in Western Oregon depends on many more factors than logging and timber-industry employment.⁷ They analyzed a broader picture of stability, which they characterized as "community socioeconomic well-being," in communities in the BLM's western Oregon districts. They developed an index of socioeconomic well-being, composed of indicators derived from census data, such as diversity of employment by industry, percentage of the population with bachelor's degree or higher, percentage of workers unemployed, percentage of persons living below the poverty level, household income inequality, and the average travel time to work. Using these indicators, the researchers developed well-being scores for each community in western Oregon for 1990 and 2000. Although the BLM references these indicators in the DEIS, to our knowledge, it has not investigated how its proposals to

⁴ See, for example, Fortmann, L.P., J. Kusel, and S.K. Fairfax. 1987. "Community Stability: The Forester's Fig Leaf." In D.C. Le Master and J.H. Beuter, eds. *Community Stability in Forest-Based Economies: Proceedings of a Conference in Portland, Oregon, November 16-18, 1987*; Schallau, C.H. 1989. "Sustained Yield Versus Community Stability: An Unfortunate Wedding?" *Journal of Forestry* 87(9): 16-23; Schallau, C.H. 1987. "Evolution of Community Stability as a Forestry Issue: Time for the Dry Dock." In D.C. Le Master and J.H. Beuter, eds. *Community Stability in Forest-Based Economies: Proceedings of a Conference in Portland, Oregon, November 16-18, 1987*; and Routman, K. 2007. "Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us." *Science Findings*. Issue 95. August. Retrieved November 27, 2007, from <http://www.fs.fed.us/pnw/science/scifi95.pdf>

⁵ See, for example, Goodstein, E. 1999. *The Trade-Off Myth: Fact and Fiction about Jobs and the Environment*. Washington, D.C.: Island Press

⁶ See, for example, Robertson, G. 2003. *A Test of the Economic Base Hypothesis in the Small Forest Communities of Southeast Alaska*. Forest Service, Pacific Northwest Research Station. December.

⁷ Donoghue, E.M., N.L. Sutton, and R.W. Haynes. 2006. *Considering Communities in Forest Management Planning in Western Oregon*. United States Department of Agriculture, Forest Service. General Technical Report No. PNW-GTR-693. December.

increase logging on O&C lands would affect these indicators of community well-being.

Nor has the BLM investigated the potential relationship between the land-management alternatives in the DEIS and other indicators of community stability, such as those recently developed to assess socio-economic well being in communities associated with California's forests and rangelands.⁸ This study used a wide range of indicators to assess well being, including those related to income, equity, investment in education, safe and involved communities, and environmental quality of life. It found that there is not a strong linkage between incomes generated in logging and other industries and overall socio-economic well-being. Despite dramatic reductions in logging on federal lands in the region over the past decade and a half, a majority of California's forest and rangeland counties had well-being scores that ranked higher than the state average even though they had average incomes lower than the state average.

The BLM has not described how additional logging on O&C lands would contribute to the economic stability of communities through its impacts on diversity of employment by industry, percentage of the population with bachelor's degree or higher, percentage of workers unemployed, percentage of persons living below the poverty level, household income inequality, and the average travel time to work. Nor has it described how the additional logging would contribute to economic stability through its impacts on equity, investment in education, safe and involved communities, environmental quality of life. Nor has it addressed other indicators of economic stability.

In short, the DEIS lacks a theoretical and empirical foundation that would enable the BLM (or anyone else) has to ascertain how additional logging on O&C lands would interact with today's economic realities in local communities. Instead, the DEIS rolls back the clock several decades and pretends the economies of these communities are far simpler, so that sustained logging on O&C lands would contribute positively to the economic stability of local communities and industries by stimulating additional, stable production and employment in the timber industry in these communities. In the next sections, we briefly discuss evidence indicating there is only a weak connection between additional logging on O&C lands and the timber-industry activity in local communities and that the timber industry often has a negative contribution to "the economic stability in the local communities and industries."

⁸ "Chapter 6: Socio-economic Characteristics." In *The Changing California: Forest and Range 2003 Assessment*. Retrieved November 28, 2007, from <http://frap.cdf.ca.gov/assessment2003/toc.html>

III. THE DEIS OVERSTATES THE POTENTIAL POSITIVE IMPACTS OF LOGGING ON THE ECONOMIC STABILITY OF THE LOCAL COMMUNITIES AND INDUSTRIES

The DEIS would have readers believe that, if the BLM were to sell more timber from the O&C lands on a sustained basis, it would lead to more logs being processed on a sustained basis by local mills, more sustained timber-related jobs for local residents, and, hence, greater economic stability for the local communities and industries. This view misrepresents the economic realities of the timber industry and the factors that determine the economic stability of communities.

A. Logging and the Economic Stability of the Local Timber Industry

Substantial evidence indicates that at least three powerful sets of economic forces—the regionalization of log markets, the price effects of increases in log supply, and globalization of wood-product markets—probably would prevent logging on O&C lands from contributing to the economic stability of the local timber industry in the manner represented in the DEIS.

Regionalization of log markets. The market for logs and other raw wood products has evolved from a large number of small, local markets to a small number of large, regional markets. Before these forces came into play, it would have been reasonable to anticipate that logs from the O&C lands would be processed by one or more mills in the nearby local communities, and an increase in logging from these lands necessarily would increase the number of logs processed in these mills. Now, however, local processing is far less likely to occur. There are far fewer mills in western Oregon, where the O&C lands are located, than in the past, and most milling capacity is concentrated in a few large mills. The mills that remain are part of a vast, regional log market. Each mill may obtain logs from lands hundreds of miles away; some have obtained logs from other states or countries.

Within this regional log market, there would be no certainty that additional logs from a parcel of O&C land would be processed by a mill in a local community. If the logs went to a distant mill, then there would be no contribution to the production of a local mill—if such a mill even exists—or to the level of timber-industry jobs for local workers.

There also might be no additional jobs for local mill workers, even if a local mill were to process the logs. The mill might, for example, keep its level of production constant and process the additional O&C logs rather than logs from somewhere else. The logs that it otherwise would have processed would, instead, be processed by another mill, which also may keep its production constant and relinquish to yet another mill the logs it otherwise would have processed. This ripple effect might continue until the net effect of the logs from the O&C lands would materialize, perhaps in a mill hundreds of miles away.

The DEIS fails to evaluate the contribution its proposals would make to the economic stability of the local communities and industries in the context of the evolving, regionalization of the log market.

Price effect. Absent evidence to the contrary, it seems reasonable to anticipate that the characteristics one usually associates with markets would apply to the regional log market that includes western Oregon. In particular, one should anticipate that increasing the supply of logs from O&C lands would, all else equal, cause the market price of logs to decline.⁹ The lower price might cause some timberland owners to withhold their timber from the market. In the extreme, for every additional log from O&C lands, an equivalent log from elsewhere would be withheld from the market, and the overall, net impact would be zero. In reality, the offsetting impact probably would be less than one-to-one but, even so, the net impact on the local timber industry would be less than the increase in logs from O&C lands.

The DEIS does not quantify the price effect. Hence, it is impossible to discern from it the net effect that increased logging on O&C lands would have on the economic stability of the local timber industry.

Globalization of markets for wood products. The timber industry currently has a glut of timber. This is good news for consumers, but it is very bad news for the ability of higher log production on the O&C lands to make a positive contribution to the economic stability of the local communities and industries.

There is nothing remarkable about these conditions. The U.S. timber industry has long offered a textbook example of a commodity market that exhibits roller-coaster ups and downs. Instability in the industry is exacerbated by its evolving merger with the global industry. During the boom times as prices rise higher and higher, the ride is a blast, but it soon becomes stomach-wrenching when prices plummet and keep on falling. The consequences are not pleasant, for firm owners, workers, or adjacent communities.

The boom-bust cycle of the timber industry is not tied to the supply of timber from the O&C lands. The current dip in the price of lumber products, for example, stems from recent U.S. trade policy, an overall increase in the efficiency and capacity of U.S. and Canadian mills, and a collapse in the housing market. It is not apparent that increasing the supply of timber from the O&C lands would have a significant, if any, impact on overall behavior of the timber industry or on the behavior of individual firms in the industry. Against this backdrop, the DEIS provides no analytical basis for concluding that potential increases in timber from these lands, as proposed in the DEIS' alternatives, would have a positive contribution to the economic stability of the local communities and industries. Indeed, it seems reasonable to conclude that,

⁹ See, for example, Rogue River-Siskiyou National Forest. 2003. "Appendix I Socio/Economics." *DEIS for the Biscuit Fire Recovery Project*.

if the increased logging were to increase the level of activity in a community's timber industry, it might diminish the economic stability of the community and its industries.

B. Logging and the Economic Stability of Local Communities and Industries.

The DEIS presumes, but does not demonstrate, that increased logging on the O&C lands would have a positive contribution to the economic stability of local communities and industries. Moreover, it fails to address the considerable evidence indicating that higher logging is not associated with greater economic stability.

It fails, for example, to evaluate the potential economic impacts of increased logging in the context of predictions—developed little more than a decade ago on behalf of the BLM—of widespread economic collapse if timber sales on O&C lands were curtailed.¹⁰ Those predictions derived from essentially the same reasoning embodied in the DEIS: the higher the level of logging on O&C lands, the higher the level of activity and jobs in the local timber industry and, hence, the higher the positive contribution to the economic stability of the local communities and industries. The predicted outcomes, however, failed to materialize, creating *prima facie* evidence that the reasoning is starkly incorrect.¹¹

This conclusion is reinforced by more recent research, in which researchers found that, even though the amount of timber harvested annually from O&C lands had plummeted, the communities in the Eugene, Roseburg, and Salem BLM districts, where these lands are concentrated, showed statistically significant improvements in socioeconomic well-being between 1990 and 2000.¹² For western Oregon as a whole, 45 percent of communities had higher well-being scores in 2000 than they did in 1990, and another 28 percent of communities had the same score.

These results, and other evidence, clearly calls into question any claim that a potential increase in logging on O&C lands, as proposed in the DEIS, would make a positive contribution to “the economic stability of the

¹⁰ See, for example, testimony before the Endangered Species Committee by Con Schallau, Robert Lee, William McKillop, and Daniel Goldy in support of the BLM's request for exemption under the Endangered Species Act for 44 FY1991 timber sales.

¹¹ See, for example, ECONorthwest. 1996. *The Potential Economic Consequences of Designating Critical Habitat for the Marbled Murrelet: Final Report*. US Fish and Wildlife Service, Portland Field Office. May; Goodstein, E. 1999. *The Trade-Off Myth: Fact and Fiction about Jobs and the Environment*. Washington, D.C.: Island Press; and Niemi, E., E.W. Whitelaw, and A. Johnston. 1999. *The Sky Did NOT Fall: The Pacific Northwest's Response to Logging Reductions*. ECONorthwest. April.

¹² Donoghue, E.M., N.L. Sutton, and R.W. Haynes. *Considering Communities in Forest Management Planning in Western Oregon*. United States Department of Agriculture, Forest Service. General Technical Report No. PNW-GTR-693. December 2006.

local communities and industries.” Until it fully evaluates the proposed increases in logging in the context of this evidence, the DEIS cannot substantiate its presumption fails to demonstrate that the alternatives in the DEIS, if adopted, would comply with the economic-stability requirement of the O&C Act.

IV. THE DEIS DISREGARDS THE POTENTIAL NEGATIVE IMPACTS OF LOGGING ON THE ECONOMIC STABILITY OF THE LOCAL COMMUNITIES AND INDUSTRIES

Forest ecosystems provide a variety of goods and services, other than timber commodities, that contribute to community stability and well-being, and to the stability of a wide range of industries. Moreover, a growing body of research related to amenity-driven growth and the economic importance of ecosystem services demonstrates that the economic stability of communities near federal forest lands is dependent on and influenced by much more than a sustained yield of timber, or employment in the timber industry.¹³ Indeed, the growing consensus among economists is that sustaining a high-quality natural environment probably is the most important determinant of economic well-being in western communities and that industrial activities, such as logging, that can degrade the environment often impose more economic harm than good on these communities.¹⁴

The DEIS fails to fully examine the DEIS’ alternatives in light of their impacts on goods and services other than timber. It fails to determine if the adverse impacts on these other goods and services would offset the potential positive contribution, if any, to economic stability that might materialize through increased logging. In short, the DEIS has not described what are likely to be the most important economic impacts of the DEIS’ alternatives.

¹³ See, for example, Haynes, R.W. and A.L. Horne. 1997. “Chapter 6: Economic Assessment of the Basin.” In T.M. Quigley and S.J. Arbelbide, eds., *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume IV*. Vol. General Technical Report PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. June. 1715-1869; Rudzitis, G. 1999. “Amenities Increasingly Draw People to the Rural West.” *Rural Development Perspectives* 14 (2): 9-13; and Southwick Associates. 2000. *Historical Economic Performance of Oregon and Eastern Counties Associated with Roadless and Wilderness Areas*. Oregon Natural Resources Council and World Wildlife Fund. August 15.

¹⁴ Whitelaw, E. (editor). 2003. *A Letter from Economists to President Bush and the Governors of Eleven Western States Regarding the Economic Importance of the West’s Natural Environment*. December 3.

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Niemi has taught cost-benefit analysis and economic development for the University of Oregon's Department of Planning, Public Policy, and Management. He is or has been a member of the Budget Advisory Committee for Lane Electric Cooperative, the Roads Advisory Committee for Lane County, the Board of Directors of the Pacific Rivers Council, the Board of Directors of the Center for Community and Watershed Health, the Budget Committee for the Pleasant Hill School District, the Technical Advisory Committee on Land Use and Economic Development for the Oregon Department of Land Conservation and Development, the Citizen's Task Force for Developing a Strategic Plan for the Oregon Department of Fish and Wildlife, and the Water Marketing Task Force for the Oregon Water Resources Department.

Environmental Policy and Resource Management

Restoration and Allocation of Water Resources

- Described the economic consequences of strategies proposed in the Columbia Basin Water Management Program for the Washington State Department of Ecology
- Performed an economic evaluation of watershed restoration projects in northern California to facilitate a grant application, West Coast Watershed
- Described the value of water in the Green River Basin by taking an inventory of the various categories of uses and functions of water and determining the economic value of each use and function, Wyoming Water Development Commission
- Calculated the benefits that a public water utility could realize by relying on the protection and planting of trees rather than the expansion of its waste-water treatment facility to meet water-quality objectives, private client
- Analyzed the positive and negative economic consequences of restoring natural streamflows in the Eel River, Center for Environmental Economic Development
- Analyzed and commented on a draft report regarding economic, social, and institutional issues with water allocation in the Klamath Basin, Institute for Fisheries Resources
- Described the competition for water in the Upper Klamath Basin and the relationship between water and the economy, Public Interest Projects
- Determined the share of natural and actual streamflow that originates on national-forest lands in Oregon's Willamette River Basin, U.S. Environmental Protection Agency

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- Assessed the potential economic benefits and costs of the reservoir, related infrastructure, and activities included in the proposed Animas-La Plata project in southwestern Colorado, Earthjustice
- Described economic dimensions of watershed restoration to provide baseline information for designing and evaluating proposals to restore watersheds in the Sierra Nevada, Pacific Rivers Council
- Developed an integrated system for identifying areas of greater ecological and socioeconomic potential for restoration of riparian areas, U.S. Environmental Protection Agency
- Prepared a response to the Draft Environmental Impact Statement for the Columbia River System Operation Review, Confederated Tribes of the Umatilla Indian Reservation
- Described the economic effects of state water-regulation policies, Bullitt Foundation and Water Watch
- Described the economic consequences of alternative hatchery-management programs, Columbia Basin Fish and Wildlife Authority
- Reviewed the proposed economic-evaluation procedures for allocating unappropriated water in the Snake River Basin, State of Idaho Office of the Governor
- Evaluated alternative plans to manage watersheds affected by the eruption of Mount St. Helens, Cowlitz County
- Evaluated recreational fisheries in the Flathead Lake area, State of Montana
- Evaluated proposed policies for leasing wetlands, Oregon Division of State Lands

Forest Management

- Explained common errors in economic assumptions and analysis that accompany proposals for post-fire logging of federal forests
- Evaluated the feasibility of proposals to acquire forest land within a watershed and manage the forest and associated water resources to generate revenue
- Described the economic value of resources at Cooper Spur, in the Mt. Hood National Forest, that would not be developed under a proposed land swap, Crag Law Center
- Described the economic costs that might materialize if logging occurred on national forest lands that had experienced wildfire, Cascade Resources Advocacy Group
- Evaluated economic analyses that had been developed to support the implementation of a proposed habitat conservation plan for private and state-owned forest lands, private client
- Reviewed a draft chapter of a forthcoming book regarding the socioeconomic consequences of the Northwest Forest Plan, private client
- Reviewed the economic elements of the U.S. Forest Service's draft environmental impact statement of salvage logging proposals for the burned areas within the perimeter of the Biscuit Fire in southern Oregon, Siskiyou Regional Education Project
- Evaluated the need for improved voluntary measures and new regulations regarding the application of aesthetic forestry principles and techniques to state and private lands in Washington, private client

- Described the economic issues underlying proposals to conduct salvage logging in areas burned by the Biscuit Fire, Conservation Biology Institute
- Described how forest-management approaches that emphasize sustainability and stewardship can have positive economic consequences, Washington Environmental Council
- Developed a method for determining the sediment-related costs imposed on the City of Salem and its industrial/commercial water users during and following a major flood event in the North Santiam watershed, U.S. Environmental Protection Agency and National Science Foundation
- Analyzed the impacts of wildfire and fire-related programs on communities in the wildland-urban interface and on low-income residents in particular, Center for Watershed and Community Health
- Described the potential economic impacts of the Roadless Initiative in Idaho and Montana, which would prevent commercial logging on roadless areas in national forests, Wilderness Society
- Analyzed economics and collaborative decision-making to make the process of competition for natural resources more efficient and effective, Bolle Center for People and Forests
- Described the potential economic impacts of reducing logging on the national forests, the non-timber benefits the nation enjoys from these forests, and the potential benefits that would materialize if Congress opted to restore damage from past logging, Sierra Club
- Evaluated the social and economic contributions of national forests and analyzed the externalized cost of logging on national forests, Forest Guardians
- Described the economy's response in the Pacific Northwest to logging reductions, Earthlife Canada Foundation and Sierra Club of British Columbia
- Evaluated alternatives for reforestation of marginal agricultural lands in the Lower Mississippi Delta, Business Council for Sustainable Development
- Described the economic effects of forest-management strategies to enhance salmon habitat on six national forests in Idaho, Pacific Rivers Council
- Analyzed the full economic costs of salvage logging on federal lands, Pacific Rivers Council
- Described the appropriate baselines for economic impact analysis related to forest policy alternatives in the Pacific Northwest, Wilderness Society
- Developed recommendations for improving the design and implementation of policies for managing complex forest resources, U.S. Forest Service
- Assessed local economic conditions with and without a change in forest management policy that would protect remaining old-growth forests on federal lands, Wilderness Society

Endangered Fish and Wildlife

- Described the potential economic effects of federal decisions regarding the management of habitat for marbled murrelets and northern spotted owls in Washington, Oregon, and northern California, private client
- Analyzed the economic issues related to protection and restoration of habitat for the red-legged frog in California, Pacific Rivers Council

- Reviewed a draft analysis prepared by NOAA Fisheries of the potential economic consequences of designating critical habitat for 13 species of Pacific salmon and steelhead, Earthjustice
- Analyzed the U.S. Fish and Wildlife Service's draft proposal to designate critical habitat for the California gnatcatcher, Natural Resources Defense Council
- Analyzed the potential economic consequences of designating critical habitat under the federal Endangered Species Act for the cactus ferruginous pygmy-owl in Arizona, Defenders of Wildlife
- Outlined the economic issues that should be addressed in a proposal under the Endangered Species Act to designate critical habitat for bull trout in the Deschutes Basin, Deschutes Board of Control
- Evaluated alternatives for mitigating the potential adverse economic effects and for enhancing the potential positive effects of salmon recovery on the Columbia River Basin, Portland State University
- Reviewed the U.S. Army Corps of Engineers' *DRAFT Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, Trout Unlimited
- Described the economic consequences of salmon conservation along the Pacific coast of North America, Center for Watershed and Community Health
- Evaluated the economic components of the federal government's final supplemental environmental impact statement for spotted owl habitat, Sierra Club Legal Defense Fund
- Described the economic effects of designating critical habitat for the marbled murrelet in Oregon, Washington, and California, U.S. Fish and Wildlife Service
- Described the economic effects of designating critical habitat to support the recovery of two endangered species of fish in the Klamath Basin of Oregon and California, U.S. Fish and Wildlife Service
- Described the economic effects of designating critical habitat to support the recovery of an endangered species of fish in New Mexico, U.S. Fish and Wildlife Service
- Summarized existing studies on the role of fish (salmonids) in the Pacific Northwest economy, Pacific Rivers Council

Sustainable Management of Ecosystems

- Measured impacts of LNG tankers on tourism and fishing in Coos Bay
- Described the potential economic consequences of alternative uses of Nebraska's natural resources, State of Nebraska
- Described common errors in economic-impact studies that cause them to downplay the economic benefits and exaggerate the economic costs of environmental protection, Earthjustice
- Analyzed data on Oregonians' stated importance of and willingness to pay for salmon habitat recovery, U.S. Department of Agriculture, Forest Service

- Managed the drafting of a letter signed by more than 100 economists addressed to President Bush and the governors of eleven western states regarding the economic importance of the West's natural environment
- Provided technical assistance on a handbook for implementing the economic aspects of the Enlibra principles, adopted for managing natural resources, private client
- Described the economic tradeoffs of allowing, limiting, or prohibiting development in significant riparian areas and wildlife habitat in the Portland metropolitan area, Metro
- Described the economic benefits of protecting natural resources in the Sonoran Desert, Coalition for Sonoran Desert Protection
- Analyzed Louisiana's economy to help local stakeholders implement a strategy for moving the state toward conservation-based development, Ford Foundation
- Evaluated the economic consequences of different approaches to managing the environmental resources of Southern Louisiana, particularly its coastal wetlands, W. Alton Jones Foundation

Energy Resources

- Performed a cost-benefit analysis of energy efficiency and renewable energy resources, Alaska Coalition
- Evaluated the environmental externalities associated with electric utility regulation, National Association of Regulatory Utility Commissioners
- Described the impacts of proposed legislation restricting transfer of property between electric utilities, Oregon Public Utility District Association
- Assessed the environmental costs and benefits associated with emissions from one or more generic coal plants in the Pacific Northwest, Bonneville Power Administration
- Provided technical analysis and recommendations concerning incentive electric rates, special services to existing commercial and industrial customers, and recruitment, Emerald People's Utility District of Lane County, Oregon
- Calculated appropriate rates for electricity generated by small independent producers and sold to private utilities, private clients
- Reviewed policies for deregulating small-scale generation of electric power in Idaho, private client

Regional Economic Analysis

Economics of Water Resources

- Analyzed impacts to tourism and fishing due to LNG tankers coming into Coos Bay, Jordan Cove Energy Project L.P.
- Described the economic consequences of strategies proposed in the Columbia Basin Water Management Program, private client
- Detailed the financial implications and considerations of developing a regional wetlands mitigation bank in the Portland metropolitan area, Metro

- Reviewed the methodology for assessing the economic benefits from increased water delivery reliability during major system disruptions, Seattle Public Utilities
- Studied the economic benefits of protecting the water, wildlife, and other natural resources on a stretch of the Upper Mississippi River, private client
- Described the economic conditions in the Columbia River Basin, explained the reasons for the Basin's lagging economy, and highlighted potential transitions the Basin's economy may undergo, Columbia Conversations
- Reviewed the U.S. Army Corps of Engineers' *Final Environmental Impact Statement* on deepening the shipping channel in the Columbia and Willamette Rivers, private client
- Evaluated socioeconomic consequences of ecological restoration projects for the Vermillion River in South Dakota, U.S. Environmental Protection Agency
- Evaluated the economic consequences of alternative management strategies for the Virgin River, Grand Canyon Trust
- Reviewed water management and allocation policies in the Upper Rio Grande, Western Water Policy Commission
- Analyzed the role of the Columbia River in the economy of the Pacific Northwest, Northwest Water Law and Policy Project
- Analyzed the Interior Columbia River Basin Ecosystem Management Project to ensure it internalized the externalities of resource-extraction industries on federal lands in eastern Washington, eastern Oregon, and Idaho, W. Alton Jones Foundation
- Calculated the economic impacts of the Exxon Valdez oil spill on Alaskan businesses and municipalities, private client

Forest Management and the Timber Industry

- Analyzed the pending closure of a lumber mill in northeastern Washington, Wilderness Society
- Developed a methodology for analyzing the economic impacts associated with changes in forest-practices rules, Washington Department of Natural Resources
- Described the economic consequences of sustainable forest management policies in the Southern Appalachia, U.S. Forest Service
- Evaluated the relationships between forested ecosystems and regional economies, National Science Foundation
- Developed a legislative plan for dislocated timber workers, Oregon Joint Legislative Interim Committee on Forest Products Policy
- Analyzed the strengths, weaknesses, opportunities, and threats of cities responding to mill closures, Oregon Economic Development Department
- Assessed the fiscal impact of proposed alterations to timber-sales contracts for state-owned timber, Oregon Division of State Lands

Sustainable Economics

- Worked with representatives from organized labor, distressed rural communities, and urban neighborhoods to identify potential new sustainable industries and jobs, Center for Watershed and Community Health
- Developed an analytical framework for integrating resource-conservation and economic-development strategies, Ford Foundation Rural Poverty and Resources Program
- Developed recommendations for ensuring that governmental actions reinforce Oregon's strategic plan, Oregon Economic Development Department
- Evaluated economic issues associated with the Bureau of Land Management's request for an exemption from the Endangered Species Act, U.S. Fish and Wildlife Service
- Analyzed the economic impact of a plant closure and developed a strategy for a community-wide response, Dallas, Oregon, Mid-Valley Council of Governments
- Developed a comprehensive portrait of a corporation's role in Idaho's local and state economies, private client
- Prepared the socioeconomic component of draft environmental impact statements for proposed gold mines in Idaho and Montana, private clients
- Developed procedures for determining the taxable value of residential, commercial, and industrial property, Montana Department of Revenue
- Evaluated opportunities for growth in non-wood manufacturing, Lane County
- Described relationships between land-use policy and economic development, Oregon Department of Land Conservation and Development

Energy Resources

- Developed a handbook on the economic factors associated with relicensing a hydroelectric dam, Hydropower Reform Coalition
- Evaluated the feasibility of energy-conservation measures for new homes, Oregon Department of Energy
- Described the economic impact of the development of independently owned, small electricity generators, Oregon Public Utility Commission
- Described the economic impacts of the formation and expansion of public utility districts, Oregon Public Utility District Association
- Analyzed the economic, demographic, fiscal, and community-service impacts of siting a high-level nuclear waste repository at Hanford, Washington Department of Ecology
- Assessed the local economic impacts associated with the construction, operation, and decommissioning of the coal-fired electric generating facility in Boardman, Oregon, Bonneville Power Administration

Expert Testimony

- Provided testimony on the costs and benefits of water use by an energy company on the Hudson River, 2005

- Prepared a declaration challenging the U.S. Army Corps of Engineers' plan to deepen the channel of the Columbia River, 2004
- Evaluated the U.S. Army Corps of Engineers' *Final Supplemental Environmental Impact Statement* regarding the proposed Columbia River Channel Deepening Project, 2003
- Analyzed the determination of wages for firefighters in Coos Bay, 1994
- Evaluated damages stemming from the Exxon Valdez oil spill, 1994
- Evaluated claims that a manufacturer of snowmobiles violated antitrust laws, 1994
- Analyzed the determination of wages for Portland firefighters, 1985

Litigation Support

Economic Damages to Natural Resources

- Conducted a benefit-cost analysis of the State of California's ban on the use of MTBE as a gasoline oxygenate for a NAFTA arbitration matter
- Analyzed the economic damage to homeowners caused by hazardous waste pollution from mining and mineral processing activities
- Determined economic damages sustained from oil spilled from a grounded ship
- Analyzed the economic damages incurred by citizens of the State of Yap, in the Federated States of Micronesia, from a ship that grounded on the coral reef and spilled oil into the mangrove-reef ecosystem
- Reviewed economic analyses, prepared by the U.S. Department of Agriculture and the U.S. Environmental Protection Agency, of the potential economic impacts of court-ordered restrictions on the use of pesticides near salmon-bearing streams in the Pacific Northwest
- Determined the economic damages incurred by a Native American tribe after the building of a river dam
- Calculated the economic damages to the Oregon coast resulting from the abandonment of a section of the New Carissa shipwreck
- Evaluated the economic impacts to municipalities in Alaska of the oil spilled from the Exxon Valdez
- Analyzed the potential economic effects of mandatory medical monitoring for agricultural workers exposed to a toxic pesticide
- Evaluated damage claims by area businesses and property owners affected by a pesticide spill in the Sacramento River
- Calculated damages to a rose nursery from actions by a natural-gas utility

Microeconomic Analysis

- Analyzed the formation of an integrated health care delivery system in the Portland-Vancouver area
- Assisted the City of Coos Bay in its wage arbitration with municipal employees
- Analyzed the market for new frozen-potato products

- Calculated the present discounted value of alleged damages sustained by Chrysler Corporation resulting from actions of a franchisee
- Evaluated patent-infringement claims for agricultural machinery
- Evaluated the economic substance of a property sale-lease-back scheme

Antitrust Economics

- Analyzed relevant product and geographic markets for video superstores
- Evaluated potential antitrust violations by an association of licensed river pilots operating under state regulations
- Evaluated the relevant market, barriers to entry, and degree of competition in the production of maraschino cherries
- Analyzed the relevant market, impact on competition, and damages associated with alleged restrictions on the sale of replacement roller bearings for rock crushers
- Evaluated claims that a natural-gas pipeline corporation violated antitrust laws
- Evaluated claims that the suspension of a physician's hospital privileges constituted a violation of antitrust laws

Economics of Public Policy

- Analyzed the potential condemnation of privately held generating facilities by a publicly owned electric utility
- Evaluated a state's economic interest in recreational fisheries on an Indian reservation and the tribal impacts of state regulation of these fisheries
- Analyzed a public agency's proposed property condemnation, which displaced a planned private-sector development

Publications

- "Future Water Allocation and In-Stream Values in the Willamette River Basin: A Basin-Wide Analysis." *Ecological Applications* 14 (2): 355-367. With D. Dole. April 2004.
- "The High Cost of Free Water." *Oregon Quarterly*. With E. Whitelaw. Spring 2003.
- "Building Common Ground: Business, Labor, and the Environment in Louisiana." *LUCEC Miscellaneous Publications* (1): 34-44. With P. Templet. November 2002.
- The Potential Economic Benefits of Protecting Natural Resources in the Sonoran Desert*. With K. Lee. January 2002.
- "The Sky Will Not Fall, Economic Responses to Protection of At-Risk Species and Natural Ecosystems." *Fisheries* 27 (1): 24-28. January 2002.
- "Bridge Over Troubled Water." *Oregon Quarterly*. With E. Whitelaw. Winter 2001.
- Wildfire and Poverty: An Overview of the Interactions Among Wildfires, Fire-Related Programs, and Poverty in the Western States*. With K. Lee. December 2001.
- Coping with Competition for Water: Irrigation, Economic Growth, and the Ecosystem in the Upper Klamath Basin*. With A. Fifield and E. Whitelaw. November 2001.

- Sustainable Practices, Public Buildings, and Jobs.* With J. Knight. November 2001.
- The Economic Benefits of Renewable Energy and Cost-Effective Energy Efficiency.* Alaska Coalition. With E. MacMullan and A. Fifield. September 2001.
- Competition Matters: An Economist's Perspective of Collaborations and the National Forests.* With E. Whitelaw. January 2001.
- Protecting Roadless Areas and Montana's Economy: An Assessment of the Forest Service Roadless Initiative.* With A. Fifield. January 2001.
- Estimating Streamflows from National Forests in the Willamette River Basin, Oregon.* U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. With E. Whitelaw. 2001. (6654)
- "Bird of Doom...Or Was It?" *The Amicus Journal* 22 (3): 19-25. With E. Whitelaw and E. Grossman. Fall 2000.
- Seeing the Forests for Their Green: Economic Benefits of Forest Protection, Recreation, and Restoration.* Sierra Club. With A. Fifield. August 2000.
- An Economic Assessment of the Proposed Animas-La Plata Project.* With E. Whitelaw. April 2000.
- "Salmon and the Economy." *Conservation Biology in Practice* 1 (1): 20-21. With E. Whitelaw. Spring 2000.
- Salmon, Timber, and the Economy.* Pacific Rivers Council, Oregon Trout, Audubon Society of Portland, and Institute for Fisheries Resources. With E. Whitelaw, M. Gall, and A. Fifield. December 1999.
- Salmon and the Economy: A Handbook for Understanding the Issues in Washington and Oregon.* With E. Whitelaw, D. Lindahl, A. Fifield, and M. Gall. November 1999.
- Assessing Economic Tradeoffs in Forest Management.* U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-403. With E. Whitelaw. Revised July 1999.
- The Sky Did NOT Fall: The Pacific Northwest's Response to Logging Reductions.* Earthlife Canada Foundation and Sierra Club of British Columbia. With E. Whitelaw and A. Johnston. April 1999.
- An Economy in Transition: The Klamath-Siskiyou Ecoregion.* With M. Gall and A. Johnston. 1999.
- Southern Forests and the Economy: Asking the Right Questions.* 1999.
- An Economic Assessment of the Proposed Logging Project on the Bering River/Carbon Mountain Tract.* 1999.
- "An Economic Evaluation of Flood-Control Alternatives in the Vermillion River Basin, South Dakota." *Great Plains Natural Resources Journal* 3 (1). With T. Power. Fall 1998.
- The Economic Consequences of River and Wetland Restoration: A Conceptual Manual.* With T. Power. 1998.
- The Economics of ICBEMP: An Initial Assessment of the Draft Environmental Impact Statement for the Interior Columbia River Basin Ecosystem Management Project.* With M. Gall. 1998.
- The Ecosystem-Economy Relationship: Insights from Six Forested LTER Sites.* National Science Foundation. With P. Courant and E. Whitelaw. November 1997.

- An Analytical Typology for Examining the Economic Effects of Ecosystem Management.* University of Michigan, School of Public Policy. Working Paper No. 407. With P. Courant and E. Whitelaw. May 1997.
- Water Management Study: Upper Rio Grande River Basin.* Western Water Policy Review Advisory Commission. With T. McGucken. 1997.
- Facing the Tradeoffs: Economic Development and Resource Conservation in Louisiana.* With C. Heflin, A. Gorr, and E. Whitelaw. June 1996.
- The Potential Economic Consequences of Designating Critical Habitat for the Marbled Murrelet: Final Report.* U.S. Fish and Wildlife Service, Portland Field Office. With E. MacMullan, E. Whitelaw, and D. Taylor. May 1996.
- Pacific Northwest Regional Economic Elements Affected by Fish Hatchery Management Decisions.* Columbia Basin Fish and Wildlife Foundation. With E. Whitelaw. 1996.
- Facing the Tradeoffs: Economic Development and Resource Conservation in Louisiana.* With E. Niemi, C. Heflin, and A. Gorr. 1996.
- Environmental Protection and Jobs: A Brief Survey.* With E. Whitelaw. October 1995.
- Economic Consequences of Management Strategies for the Columbia and Snake Rivers.* Confederated Tribes of the Umatilla Indian Reservation. With E. MacMullan and E. Whitelaw. July 1995.
- Integrating Economics and Resource-Conservation Strategies.* With E. Whitelaw. June 1995.
- The Columbia River and the Economy of the Pacific Northwest.* With E. Whitelaw, A. Gorr, and E. MacMullan. May 1995.
- The Full Economic Costs of Proposed Logging on Federal Lands.* With E. Whitelaw. March 1995.
- Economic Consequences of an Injunction to Protect Salmon Habitat on the Wallowa-Whitman and Umatilla National Forests: Preliminary Report.* With E. MacMullan and E. Whitelaw. 1995.
- The Potential Economic Consequences of Critical Habitat Designation for the Lost River Sucker and the Shortnose Sucker: Final Report.* U.S. Fish and Wildlife Service, Portland Field Office. With E. MacMullan and E. Whitelaw. 1995.
- Economic Critique of the FSEIS on Management of Old-Growth Habitat.* With E. Whitelaw. March 1994.
- A Method for Estimating the Economic Effects of Habitat Protection.* U.S. Fish and Wildlife Service, Portland Field Office. With A. Sullivan and E. Whitelaw. January 1994.
- Environmental Externalities and Electric Regulation.* National Association of Regulatory Utility Commissioners. With E. Whitelaw. September 1993.
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- Pacific Northwest Forest-Policy Baselines.* Wilderness Society. With E. Whitelaw. April 1993.
- "New Conflicts Stir Managers of U.S. Forests." *FORUM for Applied Research and Public Policy* 6 (3): 5-12. University of Tennessee, Energy, Environment, and Resources Center and Oak Ridge National Laboratory. With R. Mendelsohn and E. Whitelaw. Fall 1991.
- Transition Strategies for Timber-Dependent Communities.* Wilderness Society. With E. Whitelaw and C. Batten. 1990.

- New Perspectives and the Forest Service: A New Way of Thinking.* U.S. Department of Agriculture, Forest Service. With R. Mendelsohn and E. Whitelaw. 1990.
- Investing in Dislocated Families.* With E. Whitelaw. 1990.
- Looking Beyond the Owls and the Logs: A White Paper.* Prepared for Governor Goldschmidt's statewide Timber Summit. With E. Whitelaw. June 1989.
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