

Below-Cost Timber Sales on Federal and State Lands in Oregon: An Update

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Summary

The sale of timber from federal and state lands in western Oregon declined in the 1990s in large part because of resistance to below-cost timber sales, in which sale revenues didn't cover the costs that logging imposed directly on taxpayers and indirectly on non-timber sectors of the economy. Using peer-reviewed research and data recently developed by the Bureau of Land Management (BLM), this study shows that today's below-cost timber sales are far more severe than those of the 1990s.

A. Timber-sale receipts fall far below costs. Revenues from below-cost timber sales currently proposed by the BLM will cover only a small percentage of the costs:

Total timber-sale revenues:	\$6,400/acre logged
Timber-sale costs	-\$5,200/acre logged
Recreation costs to Oregonians and visitors:	-\$3,200/acre logged
Costs from logging that jeopardizes habitat for sensitive species:	\$22,400/acre logged
Costs from reduction in streamflow, especially in summer:	-\$800/acre logged
Costs from reduction in water quality of streamflow:	-\$500/acre logged
Costs from climate-related damage:	-\$370,000/acre logged
Revenue percent of costs	less than 2%

B. Net financial costs to U.S. taxpayers. The BLM passes one-half of its timber-sale receipts to local counties, so U.S. taxpayers will directly incur net financial costs:

Revenues to U.S. taxpayers:	\$3,200/acre logged
Costs to U.S. taxpayers:	-\$5,200/acre logged
Direct net costs to U.S. taxpayers:	-\$2,000/acre logged

C. Additional, unquantified costs. Logging on public lands generates additional costs, but the BLM has not provided sufficient data to support their quantification:

Reductions in the value of private property near public forests:	Unquantified
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D. Not just the BLM. Insofar as the lands managed by the BLM are similar to those managed by the U.S. Forest Service and the Oregon Dept. of Forestry, timber sales by those two agencies likely will exhibit similar below-cost characteristics.

Note: All the numbers shown above are estimates reflecting the data and research described in the Supporting Material. Additional research may show that the actual below-cost severity of future timber sales on public lands in western Oregon is higher or lower than shown. As explained below, however, there are strong reasons to anticipate that timber sales will be more, rather than less, below-cost.

Supporting Material

A. Below-cost timber sales: resurrection of an old concern

Until the early 1970s, there was widespread support for the assumption that the revenues from timber sales on public lands in the U.S. exceeded the costs generated by logging. Then, some economists began to notice an increasing number of below-cost timber sales, where revenues did not cover the costs of planning, managing, and recovering from the sales. Initial analyses focused on the cashflow from logging on the national forests: the extent to which timber-sale receipts covered taxpayers' expenditures on timber-sale programs. Over time, though, concerns about below-cost timber sales expanded (Gorte 2004). Attention spread to other federal lands managed by the Bureau of Land Management (BLM) in western Oregon, and state-owned lands.

Forest managers, at first, countered that below-cost timber sales were desirable because logging produced environmental and other benefits. This argument eventually fell apart:

“By the mid to late 1980s, however, arguments that uneconomic timber programs are in the national interest because they are used to improve wildlife habitat, or to further the health and productivity of forests, or to support rural employment and community stability had lost political credibility and acceptability. It seemed to a skeptical public and environmental community, and increasingly even to agency employees, that such arguments had simply become an excuse to rationalize the agency's bias towards timber production. Voices within the agency began to question openly whether too much emphasis was being put on commodity production to the detriment of other resource responsibilities.” (Cortner and Schweitzer 1993)

Growing evidence about the negative economic consequences of logging's impacts on land and water resources and on salmon and other sensitive species broadened the scope of the concern about below-cost timber sales. The controversy no longer focused just on the direct costs logging imposed on taxpayers but also increasingly included the indirect costs that materialize as logging negatively affected the environment.

Concern about below-cost timber sales in the Pacific Northwest diminished as logging on federal lands declined following adoption of the 1994 Northwest Forest Plan. New concern is emerging, however. The BLM, in its recently issued new plan for managing the 2.5 million acres it manages in western Oregon (BLM 2016), has chosen a level of logging higher than the conservation-oriented alternative. The Oregon Board of Forestry has initiated a process that could lead to selling the 84,000-acre Elliott State Forest to the timber industry. Linn County has filed a lawsuit claiming that the State of Oregon, by not conducting more intensive logging, failed to maintain the “greatest permanent value” of benefits derived from some of the lands it manages. The county seeks damages of \$1.4 billion in forgone logging revenues.

The material presented below provides an overview of the potential severity of below-cost timber sales on public lands in western Oregon. Much of the underlying data comes from (2016). As appropriate, the analysis also draws on relevant, peer-reviewed research. The analysis demonstrates that revenues from the BLM's proposed timber sales cover less than 2 percent of the costs, which total more than \$370,000 per acre. Similar numbers probably apply to timber sales by the U.S. Forest Service and Oregon Dept. of Forestry.

B. Revenues from the BLM's proposed timber sale in western Oregon will not compensate U.S. taxpayers for the agency's timber-sale costs

BLM (2016) presents a new logging proposal for western Oregon. Data supporting the proposal shows the agency believes that, on average, each acre of forest it manages holds about 26 thousand board feet (Mbf) of merchantable timber, and it expects to incur costs of \$200/Mbf to sell timber from those lands. These numbers indicate the BLM will incur costs of -\$5,200 per acre logged. Note that this amount understates the true costs, as it excludes timber-related costs that will materialize in the BLM's Oregon state office and the national office.

The BLM also expects to realize timber-sale revenues of \$245/Mbf, or \$6,370 per acre logged. The agency will turn over one-half of the revenues as a subsidy to local counties, however, so that U.S. taxpayers will receive only \$3,200 (rounded). Taxpayers will incur a direct, net financial cost of -\$2,000 per acre logged:

Costs to U.S. taxpayers:	-\$5,200/acre logged
Revenues to U.S. taxpayers:	\$3,200/acre logged
Net costs to U.S. taxpayers:	-\$2,000/acre logged

C. Logging on public lands will degrade outdoor recreational opportunities

Data provided by BLM (2016) permits comparison of the agency's proposed logging program with a more conservation-oriented approach, which the BLM defines as "Alternative D." The comparison reveals that the proposed logging program, which calls for logging an additional 2,166 acres, will reduce the value of outdoor recreation in western Oregon by -\$6.9 million, or -\$3,200 per acre logged.

Recreation costs to Oregonians and visitors:	-\$3,200/acre logged
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D. Logging that jeopardizes habitat for sensitive species generates costs at least 3.5 times the value of the timber

BLM (2016) ignored studies that indicate the potential costs that would materialize if logging on the lands it manages were to harm habitat for at-risk species, such as salmon or northern spotted owls. This research stems from the early 1990s, while controversy was at its highest over proposals to restrict logging on federal forests to protect the northern spotted owl. At that time, economists carefully assessed the value U.S. households place on protecting the owls and the old-growth forests that provide them habitat (Hagen et al. 1992). To complete their analysis, they compared the costs of logging against the benefits, i.e., the value of owl habitat destroyed by logging against the value of the timber produced. They found that the costs of logging exceed the benefits by a ratio of at least 3.5-to-1.¹ This finding is consistent with similar analyses of the costs and benefits of actions that jeopardize other rare, threatened, or endangered species. A 1996 review of 20 studies of the economic value Americans place on such species found that the costs per household of protecting endangered and threatened species fall "well below" the benefits (Loomis and White 1996).¹ A 2009 update of the review found that Americans' valuation of threatened and endangered species has increased over time (Richardson and Loomis 2009).

¹ The researchers found that, under different assumptions, the ratio of the habitat-related costs of logging to the value of the timber produced can be as large as 42.6-to-1.

This research indicates that, if future logging of public forests jeopardizes habitat for northern spotted owls, the associated costs would be at least 3.5 times the value of the timber, which the BLM has estimated to be about \$6,400 per acre logged.

Costs from logging that jeopardizes habitat for sensitive species: \$22,400/acre logged

E. Logging imposes costs by reducing streamflows

If logged, the forests of public lands in western Oregon would decrease flows in the region's rivers and streams, especially in summer. The decrease would occur because these lands no longer would have trees filtering moisture from fog. Logging of large trees will have the greatest impact because they have the greatest area on which fog can condense (Franklin and Spies 1991). Within the Bull Run watershed that supplies drinking water for much of the Portland metropolitan area, for example, fog filtering contributes 30 percent of the total precipitation that reaches the earth under old-growth trees, and the total precipitation is 25–29 percent higher on lands with old-growth forests than on adjacent, logged lands (Harr 1982). Annual precipitation reaching the earth under trees in an old-growth forest near the Oregon coast was 20 inches greater than in a nearby clearing (Isaac 1946). Water in Oregon is typically measured in terms of acre-feet, which equals the amount of water that would cover one acre of area one foot deep. An additional 20 inches per acre is equivalent to 1.67 acre-feet per acre of water.

Water flowing from public lands in the Pacific Northwest has a value of at least \$30 per acre-foot (Brown 2004). This amount represents the value of water used for irrigated agriculture, municipal/industrial uses, hydroelectricity, instream recreation, and some aspects of environmental protection, such as diluting pollutants. At \$30 per acre-foot, if future logging on public lands reduces the annual precipitation reaching the ground by 1.67 acre-feet of water per acre, the cost totals \$50 per acre per year. As a new forest grows in the logged area, it would slowly regain its ability to condense fog and deliver additional water to streams. Assuming that this recovery would occur linearly over 80 years, when the forest would again have its full capacity to capture condensed fog, the series of annual costs is equivalent to a one-time, present value of \$800 per acre.²

Costs from reduction in streamflow, especially in summer: -\$800/acre logged

F. Logging imposes costs by degrading water quality

If logged, the forests of public lands in western Oregon would produce not just less water but also dirtier water. The degradation of water quality would occur as logged forests increase stream sediment by disturbing soils so they become more prone to erode and by increasing peak runoff that will carry sediment to streams (Seeds 2010). Erosion will increase from the logged site itself, from the roads used to carry logs from the site, and from debris slides that become the legacy of logging activity (Gucinski et al. 2001, Forman and Alexander 1998, Frissell and Trombulak 2000, Jones et al. 2000, Wemple et al. 2000).

Past clearcut logging has generated about 3.5 tons per acre per year for about 25 years (Gant and Wolff 1991). Increases in stream sediment will impose costs of about \$11 per ton onto individuals, families, businesses, and communities downstream (Hansen and Ribaudo 2008). If

² This calculation, and the one for the costs of reductions in water quality apply the discounting process and use a discount rate of 3 percent per year.

future logging generates sediment at the same rate as past clearcuts, the cost would total about \$500 per acre logged.

Costs from reduction in water quality of streamflow: -\$500/acre logged

G. Logging will intensify the global damage from climate change

The public forests of western Oregon’s have such a large capability to store carbon that how they are managed will substantially affect future climate-related damage, locally and around the world. Managing them to store more carbon will lessen the damage, as trees grow and withdraw CO₂ from the atmosphere. Managing them to produce industrial timber will, instead, increase the damage, by converting most of the stored forest carbon stored into atmospheric CO₂. Data from the BLM (2016) and peer-reviewed research indicates the climate-related damage will total at least \$370,000 per acre logged.

1. Oregon’s forests substantially affect climate change

The world’s forests contain more carbon than the atmosphere (Achat et al. 2015). The Paris Agreement, signed by the U.S. and more than 190 other countries on 22 April 2016, recognizes that forests must be managed appropriately if we are to limit global average surface temperatures “well below” a rise of 2°C beyond pre-industrial levels. The Agreement states that, “Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gasses as referred to in Article 4, paragraph 1(d), of the convention, including forests.” This obligation reflects the importance of America’s forests, which remove nearly 12 percent of the nation’s annual greenhouse-gas emissions (Executive Office of the President 2013) and hold carbon equivalent to about 2 billion rail cars of coal (Figure 1).

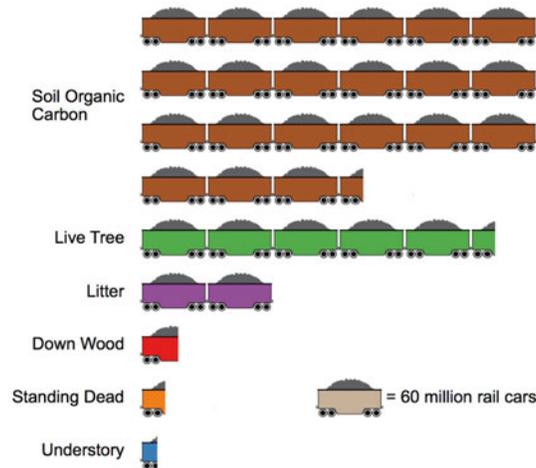


Figure 1. Carbon stored in U.S. forests: carbon stored in forest soils is equivalent to emissions from burning 1.2 billion rail cars of coal, carbon stored in live trees is equivalent to emissions from burning 330 million rail cars of coal, etc. (Woodall et al. 2015)

The forests of western Oregon have some of the highest stores of forest carbon, and logging of these forests generates some of the nation’s highest levels of CO₂ emissions (Figure 2).

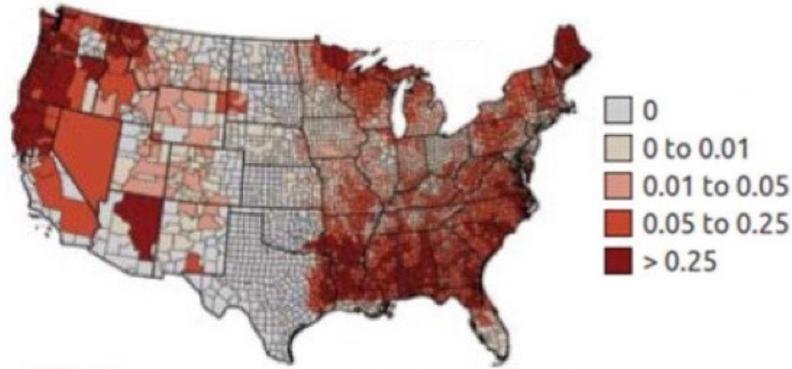


Figure 2. Average annual forest emissions (Tg C/year) from timber harvest, 2006-2010 (Woodall et al. 2015)

2. Social cost of carbon

The social cost of carbon (SCC) is a term commonly used to represent the damage caused by increases in atmospheric CO₂ and other greenhouse gases (GHGs).³ It typically estimates the present value of the stream of annual damages expected to result from the emission of one metric ton (MT) of CO₂.

An Interagency Working Group (IWG 2015) of U.S. federal agencies has developed partial estimates of the SCC, focusing on potential costs arising from the effects of climate change on terrestrial portions of the globe: changes in agricultural production, flooding, wildfire, human health, water supply, drought, and the like. The IWG estimates that the SCC for emissions in the next decade will probably be about \$50 per metric ton CO₂.

This amount represents a low estimate of the SCC because the IWG did not fully consider all the ways in which atmospheric CO₂ will impose harm on individuals, families, businesses, and communities. The IWG has acknowledged, and others have observed, that the IWG's estimates understate the full environmental cost of atmospheric CO₂ because they do not incorporate many types of damage, such as ocean acidification, caused by GHG emissions

Three peer-reviewed studies have filled in some of the gaps in the IWG's estimates of the SCC:

1. Moore and Diaz (2015) fills the gap that occurs because the IWG looked only at the direct damage that would occur on a year-by-year basis from climate-related events, such as storms. Moore and Diaz (2015) recognized, as did many others, that this damage also would slow long-run economic growth and calculated the economic value of this economic loss. Adding the long-run costs to the mix increases the IWG's estimates of the social cost of carbon at least sixfold.
2. Hope and Schaefer (2015) concludes that the effects of melting permafrost in the Arctic would increase the IWG's estimates of the social cost of atmospheric carbon dioxide by about 13 percent.

³ Economists use the term, social cost of carbon, to represent the negative effects of GHG emissions because carbon serves as shorthand for CO₂, which generally plays a larger role in climate change than other GHGs, and the costs of other GHGs are often measured in CO₂-equivalent units (Hanemann 2015).

- Cai et al (2016) quantifies the potential economic costs associated with the likelihood that human-caused increases in atmospheric carbon dioxide will cause several elements of the climate system to cross tipping-point thresholds. The authors conclude that the risks associated with five tipping points increase “nearly eightfold” the IWG’s estimates of the social cost of carbon.

Combined, the current research findings suggest that emitting a metric ton of CO₂ will cause economic damage totaling \$700, i.e., the actual SCC is at least \$700 per MT CO₂. On-going research regarding additional gaps in the IWG’s analysis of the ways in which CO₂ emissions cause economic damage likely will raise the estimate of the SCC even higher. The SCC will increase over time as future emissions cause ever-increasing levels of climate-related damage.

3. Each acre logged will generate climate-related costs of at least \$370,000

In its Final Environmental Impact Statement for its proposed logging plan, BLM (2016) provides data showing that logging an additional acre will generate climate-related damages of \$26,400. This amount reflects the IWG’s estimate of the social cost of carbon, \$50 per MT CO₂. Adjusting the amount to reflect the estimate of the social cost of carbon supported by current research, \$700 per MT CO₂, shows that logging will generate climate-related costs of \$370,000 per acre logged. The actual costs likely will be higher, as it seems reasonable to anticipate that future research will demonstrate that the social cost of carbon exceeds \$700 per MT CO₂.

Costs from climate-related damage: -\$370,000/acre logged

H. Many costs of logging on public lands remain unquantified

Peer-reviewed research indicates that logging on public lands in western Oregon will generate additional costs, stemming from its negative impacts on scenic and other amenities that affect the value of nearby private lands. Scenic and other amenities provided by unlogged public forests in western Oregon increase the value of nearby private lands. Logging reduces this value. The extent of the risk is exhibited by communities of 100–2,500 residents in western Oregon, where protected, unlogged public forests within five miles increase the mean value of private property by 29-100 percent (Chen et al. 2015). The BLM, however, has not acknowledged these research findings or assessed their implications for its logging proposal.

Reductions in the value of private property near public forests: Unquantified

I. Timber sales by the U.S. Forest Service and Oregon Dept. of Forestry likely exhibit similar below-cost characteristics

Forests in western Oregon managed by the U.S. Forest Service (USFS) and Oregon Dept. of Forestry (ODOF) generally resemble those managed by the BLM. BLM (2016) reports that the lands it manages store, on average, 150 metric tons of carbon acre, and the corresponding numbers are 133 tons for the USFS and 122 tons for ODOF. These amounts stand in sharp contrast with privately owned lands, which store 34 tons per acre. The similarities suggest that timber sales by the USFS and ODOF likely have below-cost characteristics similar to those described above for the BLM, all else equal.

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