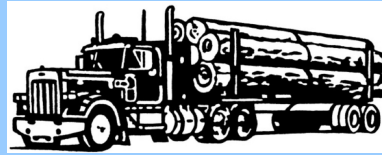


Truckloads of Hidden Costs



Industrial Log Production Imposes Huge Costs on Oregonians

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Introduction

800,000.

That's roughly how many trips loaded log trucks make per year to move logs from Oregon's forests to mills, export facilities, and sorting yards. Industry advocates extol the virtues: logs worth about \$2,500 per truckload, an industry that generates secure jobs for workers and vibrant rural communities, and forest ecosystems made healthy as the industry plants seedlings to replace the trees that are killed to make the logs.

Economic facts, though, disclose the deep deceit in this picture. Few Oregonians enjoy any economic benefits from each truckload of logs. Corporate shareholders outside Oregon enjoy much of the profit from logging. The industry employs few workers. Planting seedlings doesn't offset the environmental damage from clearcutting and other industrial practices.

Moreover – and this is the focus of this report – industrial logging stridently imposes huge economic costs on all Oregonians, resulting in increased unemployment, death, destruction, poverty, and distressed communities. This summary shows the magnitude of these costs:

| Costs Imposed on Oregonians | More than: |
|--|---------------------|
| For Oregon as a Whole | |
| Per Year | \$38 billion |
| Per Household, per Year | \$23,000 |
| | |
| Per Truckload of Logs | \$48,000 |
| Ratio of Costs Imposed on Oregonians to Value of Logs | 19-to-1 |

Efforts to rein-in these costs have gone largely unnoticed, reflecting the industry's success in keeping the costs hidden from view. The key objective of this report is to bring major elements of the costs into the sunshine. In sum, the costs materialize as the timber industry:

- **Aggravates the Climate Crisis.** Greenhouse-gas pollution from clearcut logging already has contributed to deaths, destruction, and poverty in Oregon from heat waves, extreme weather, wildfires, etc. Future clearcuts will make things even worse
- **Degrades Ecosystems.** Clearcut logging degrades ecosystems, depriving us of safe drinking water, salmon habitat, recreational opportunities, and jobs.
- **Collects Tax Breaks and Subsidies.** Each year, the industry collects hundreds of millions of dollars in tax breaks and subsidies. This transfer of money deprives Oregon communities of funds they need to provide important public services. The rest of us must pay more to fill the gap, or leave important public services unfunded.
- **Converts Wages for Workers into Profits for Shareholders.** The industry has dramatically reduced labor costs by eliminating jobs – about 1,000 jobs per year for 30 years, on average – and clawed-back wages from remaining workers.

And things are worse than indicated by the numbers in the table. Recent research indicates that, as the climate crisis and the biodiversity/ecosystem crisis intensify, the numbers in the table

could quadruple within a decade, so that the costs imposed on Oregonians could outweigh the value of logs the industry extracts from the forests by more than 75-to-1. Moreover, the numbers in the table seriously understate the costs imposed on Oregonians that result from logging-related greenhouse-gas emissions, because economists currently lack sufficient information to quantify all the ways in which greenhouse-gas emissions imposes costs on society.

Background

This report responds to requests for assistance in understanding the overall economic importance of clearcut logging in Oregon. These requests come from across Oregon, as timber advocates have spread messages that say the industry deserves applause and support because it gives us healthy forests, a strong economy, abundant jobs, and vibrant rural communities. But, Oregonians want answers to these questions: Aren't these messages deceitful? Doesn't the timber industry also impose negative impacts on Oregonians? What are they? How big are they? Are they big enough to impose serious economic harm on Oregonians, now and in the future? Given the costs, should Oregonians stop subsidizing clearcutting?

This is not the first time that industry advocates have voiced such messages and Oregonians have asked such questions. In the 1970s, for example, research warned that logging must fall precipitously because voracious logging had left Oregon's forests running out of unlogged trees and out of habitat needed to prevent species from going extinct. Mills would have to close, workers would lose their jobs, and timber towns would shrivel.

Did industry leaders help workers and communities secure a better economic future by developing new jobs in new industries? No. Instead, they encouraged workers and communities to stay the course. If workers had looked for jobs elsewhere, labor costs would have risen for timber corporations. So, Oregonians heard that the industry could continue logging at voracious rates and nothing should be allowed to get in the way. Many Oregonians believed this story, failed to prepare for the reality, and suffered greatly when the collapse inevitably occurred.¹

Did industry leaders help workers and communities pick up the pieces? No. Instead, they lobbied for tax breaks and subsidies to timberland corporations, with the promise that they would use the money to allow trees to grow for 80 years, to create stable jobs, to become a steady source of strength for communities and the state's economy.

Did industry leaders keep the promises? No. Instead, they now clearcut trees when they reach 30-40 years of age. They've eliminated about 30,000 jobs over the past 3 decades – on average, about 1,000 jobs per year for 30 years. And they've not used the tax breaks and subsidies to help communities provide education, fire, police and other services. Instead, they converted the tax breaks and subsidies into profits for corporate shareholders.

We hear similar deceitful messages today. Advocates want us to believe that industrial timber production helps solve the climate crisis, produces healthy ecosystems, creates stable jobs, and serves as the foundation for vibrant rural communities. In fact, though, industrial timber production in Oregon:

- Has been the state's largest source of greenhouse-gas pollution, thereby imposing huge, climate-related costs – through higher rates of death, destruction, poverty, and more – on workers, families, and communities.
- Continues to threaten the few natural forests that remain.
- Precludes restoration of ecosystems that have already been degraded, and degrades already degraded forest ecosystems even further.
- Continuously adopts forest practices and technologies aimed at eliminating jobs.
- Uses tax breaks and subsidies to divert hundreds of millions of dollars away from communities and into corporate profits each year.

- Increases risks to rural communities by creating plantations with millions of young trees crowded together that can cause wildfires to burn faster and more intensely.

History shows that these characteristics of industrial timber production have darkened the economic well-being of thousands of Oregon workers and their families and their communities. The lesson from this experience is that, if allowed to continue, the industry's clearcut logging and related practices will darken the future for all Oregonians by increasing the likelihood of death and destruction from extreme storms, heat waves, and other climate events. They will see further degradation of ecosystems necessary for a healthy economy. And they will see rising levels of poverty as the industry continues to suck money out of Oregon's communities via tax breaks and subsidies, and as it eliminates timber jobs. Moreover, communities struggling with these realities will have few options for economic recovery because the timber's negative impacts on climate, on ecosystems, and on the availability of funds to support public services discourages entrepreneurs and investors from coming to these communities and building a new economic future.

This report uses economic information to describe the nature and importance of the deceitful messages and economic harm attached to every log truck. First, it describes the market value of logs produced by timber-production methods that involve clearcut logging. This value is what motivates timberland corporations to pursue clearcut logging so ardently. Second, it describes its negative impacts on climate and ecosystems and the resulting costs imposed on Oregon's workers, families, and communities by increasing the likelihood of death, destruction, poverty, etc. Third, it describes the timber industry's negative impacts on workers, families, and communities as it perpetuates its ability to suck money out of communities via tax breaks and subsidies, and to impose negative impacts on jobs and workers.

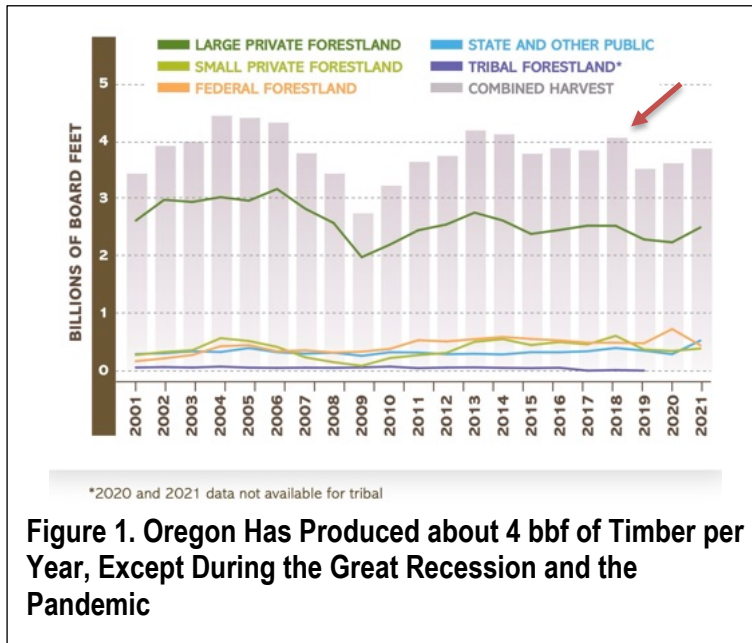
Lastly, it summarizes the economic magnitude of the deception, from three different perspectives. The data show that the annual cost imposed on Oregonians, as a whole, is currently more than \$38 billion. This is equivalent to more than \$23,000 per household per year, on average. Per truckload of logs, the cost imposed on Oregonians is more than \$48,000, which is more than 19 times the value of the logs on the truck. Note: in each instance the actual costs are much "more than" the indicated value, reflecting the current lack of adequate data to analyze all of the ways in which industrial timber production impose costs on Oregonians.

These costs represent the negative impacts of today's industrial timber production on the economic well-being of Oregonians. It is reasonable to expect that future years will see the costs rise quickly, especially those associated with the negative impacts of industrial timber production on the climate crisis and on the ecosystem/biodiversity crisis. Recent and current trends suggest that these costs could increase more than four-fold over the next decade, so that the annual costs in 2033 would rise to more than \$150 billion for Oregonians as a whole and to more than \$88,000 per household. The costs imposed on Oregonians per truckload of logs would rise to more than \$187,000, which is equivalent to more than \$75 times the value of the logs at current prices. Note: again, in each instance the actual costs will be much "more than" the indicated value.

I. Oregon's Log Production

The price of logs can vary widely and quickly and across species and location. But, prior to the market disruptions associated with the pandemic, a generally representative price was \$500 per thousand board feet (mbf). A loaded log truck carries about 5 mbf of logs. So, the value of a truckload of logs was about \$2,500.

Figure 1 shows that, in recent years, Oregon has produced about 4 billion board feet (bbf) of logs per year. Combined, these numbers indicate that Oregon has produced about 800,000 truckloads of logs per year, with a total value of about \$2 billion.



II. Industrial Timber Production Imposes Costs on Oregonians by Intensifying the Climate Crisis and Degrading Ecosystems

The production of each truckload of logs intensifies the climate crisis and degrades ecosystems. These impacts impose economic costs on Oregonians in numerous, substantial ways, with initial estimates totaling more than \$38 billion per year for Oregonians as a whole, more than \$23,000 per household per year, and more than \$48,000, per truckload of logs.

Intensification of the climate crisis occurs as clearcut logging adds carbon dioxide and other greenhouse gases to the atmosphere, thereby increasing the frequency and intensity of climate-related events, such as heat waves, storms, flooding, drought, and wildfires. Past logging has contributed to such events, including, for example, Oregon's extreme heat events of late June and early July 2021. These events already have resulted in death, injury, illness, destruction of property, disruption of commerce, etc. Future logging will impose costs on Oregonians by increasing the probability and intensity of such events in the future.

Degradation of ecosystems deprives Oregonians of valuable goods and services that they otherwise would enjoy from the ecosystems. For example, when clearcut logging has degraded the quality and quantity of water in streams, Oregonians have lost habitat for salmon and other species, reductions in the populations of these species, and opportunities for commercial and recreational jobs associated with these species. Negative ecological impacts on watersheds also have deprived some communities of the safe drinking water they otherwise would have drawn from a nearby stream.² Clearcutting and related practices hurt Oregonians by diminishing the flow of ecosystems goods and services in three ways: (1) they degrade ecosystems directly by converting natural forests to open clearcuts and biologically impoverished tree plantations; (2) they degrade adjacent forests through so-called edge effects and by generating pollution that flows downstream; and (3) they preclude alternative management practices that would restore the health and productivity of ecosystems degraded in the past.

Across Oregon, the timber industry's climate pollution and negative impacts on ecosystems have directly imposed costs directly on Oregonians and on the economy. Also important are the costs that materialize as deceptive messaging about the industry's environmental and economic impacts tears at the social fabric of Oregon's communities. For example, deceptive information that blames unemployment and instability in rural counties on the ecological needs of spotted owls diverts attention away from the industry practices that underlie these problems.³ This is good for the industry, because the deception it avoid being held accountable for the consequences when it lays off workers, deprives the communities of financial resources by grabbing tax breaks and subsidies, and degrades ecosystems so they are unattractive to owls and humans alike. But the resulting confusion and tensions in communities can cripple their ability to make effective decisions. And research shows a connection between the rural poverty that often accompanies extractive industries and the rise of far-right extremism. More specifically, investigative reporting has shown that members of Timber Unity, a group concentrated in spotted-owl counties and funded by the timber industry are aligned with neofascists, anti-government militias, white supremacists, conspiracy theorists and those advocating for violence against climate protesters and politicians.⁴

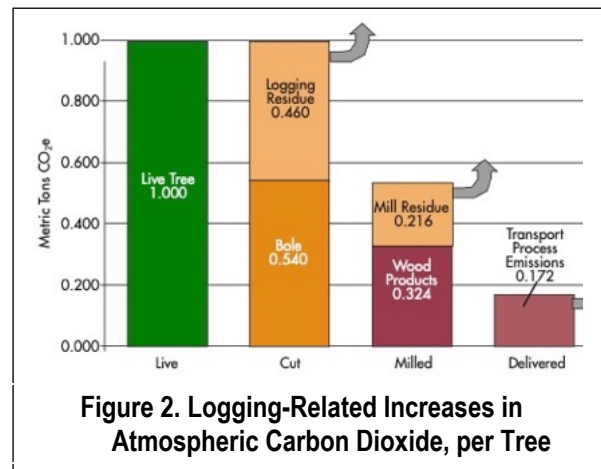
Other tears in the social fabric result as Oregonians realize that, as they endure these costs, the profits from logging quickly flee the state, to increase the wealth of primarily the non-Oregonians who own most corporate stock.⁵

A. Logging Imposes Huge Costs on Oregonians by Increasing Climate Pollution that Intensifies the Climate Crisis

Logging in Oregon increases the amount of carbon dioxide in the atmosphere and the amount is substantial. Industrial timber production increases atmospheric carbon dioxide via three pathways. One, logging releases carbon dioxide to the atmosphere when a large amount of the carbon dioxide stored in a live tree is burned or decomposes after logging kills the tree. Two, logging emits carbon dioxide directly into the atmosphere through the combustion of fossil fuels to move log trucks and other vehicles, to heat logging-related facilities, etc. And three, logging depresses carbon dioxide sequestration when it kills a tree and prevents it from growing bigger. Replacing this tree with a much smaller seedling does not offset the forgone sequestration that would have occurred if logging had not killed the tree.

These three pathways, combined, cause industrial timber production to be one of the largest climate polluters in Oregon, the U.S., and the world. At each of these scales, many industry advocates argue otherwise, for example by pointing out that lumber used in the construction of new housing might hold the carbon dioxide it contains out of the atmosphere for years. But this and other arguments stem from deceptive assumptions that overlook the three pathways described in the previous paragraph. The following evidence and analysis look at the whole picture.

Figure 2 illustrates the logging-related flow of carbon dioxide into the atmosphere on a per-tree basis.⁶ To facilitate the analysis, the green bar represents a hypothetical tree that contains 1,000 kilograms (1 metric ton) of carbon dioxide. The next bar shows that more than half of this amount is in the bole (log) that goes to the mill, and the remainder, 460 kilograms, goes into the atmosphere at the logging site when leaves, limbs, etc. are burned as slash or rot in the forest. The next two bars show that more than one-fifth of the carbon in the log (216 kilograms) goes into the atmosphere when sawdust and other waste products are burned or sold for and other uses where they quickly rot. The two bars on the right show that, after accounting for carbon dioxide emitted during the transport process, only 152 kilograms of carbon dioxide remains out of the atmosphere in lumber, paper, plywood, and other products. In other words, the logging-related increase in atmospheric carbon dioxide equals about 85 percent of the carbon dioxide stored in the live tree, before logging.



It is important to note that even these large numbers do not fully capture the impacts of logging on atmospheric carbon dioxide. They overlook the reality that, when loggers kill a tree, the tree no longer can sequester – remove – carbon dioxide from the air as it grows larger. Thus, logging not only adds carbon dioxide to the atmosphere – by releasing carbon dioxide stored in the tree and by burning fossil fuels – it also kills the ability of a vibrant, growing tree to remove carbon dioxide.

Figure 3 shows that logging has been responsible for about one-third of Oregon’s total greenhouse-gas (GHG) emissions, more than any other source.⁷ Two separate analyses have confirmed this conclusion.⁸ In 2016, researchers for the Bureau of Land Management (BLM) traced the overall impact of logging on the amounts of carbon dioxide in the atmosphere. They then applied an estimate of the economic damage expected to result from each additional ton. This estimate, called the social cost of carbon dioxide, represents the economic cost to human society as each ton added to the atmosphere alters multiple dimensions of the climate and thereby increases the frequency and intensity of harmful events: heatwaves, storms, droughts, floods, insect and disease outbreaks, wildfires, and so much more. In 2016, the BLM used an estimate of the social cost of carbon dioxide that showed logging on BLM lands in western Oregon would yield climate-related economic damage of at least \$5,000 per truckload.⁹ Since then, an updated estimate of the social cost of carbon dioxide indicates that the economic damage, per truckload of logs will be at least \$34,000 per truckload.¹⁰

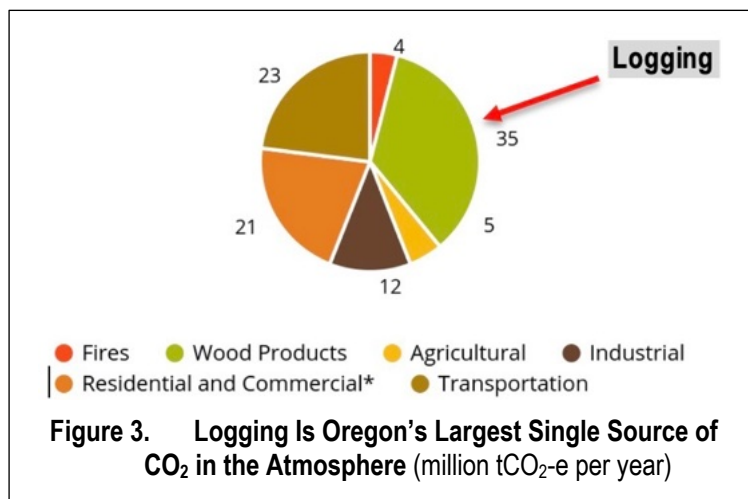


Table 1 shows the current estimates of the climate-related costs of logging, per truckload of logs. It begins, though, by showing, for comparison, the market value of the logs. Each truckload carries about 5 thousand board feet (5 mbf) of logs and recent, pre-pandemic market prices have been about \$500 per mbf, so the market value per truckload is about \$2,500. The climate-related costs imposed on society by each truckload of exceeds the value of the logs by more than (\$34,000 - \$2,500 =) \$31,500. The ratio of costs to the value of logs is more than 14-to-1. The numbers shown in Table 1, represent a direct loss in goods and services and economic well-being.¹¹

The actual climate-related costs will be more than the figures shown, insofar as these numbers represent only five categories of economic harm from increases in atmospheric carbon dioxide and do not include many others.¹² The numbers do not, for example, represent the costs from heatwave-related illness, negative impacts on fisheries, famines, and climate-related increases in violence and involuntary migration. Incorporating these and myriad other costs into the analysis would drive the climate-related costs from industrial timber production much higher.

Table 1. Logging-Related Climate Costs Imposed on Society Far Exceed the Value of Logs

| Positive and Negative Impacts | Per Truckload |
|--|------------------------------|
| Positive Impacts | |
| Value of Logs | \$2,500 ¹³ |
| Negative Impacts | |
| Costs Imposed on Society by Timber's Climate Pollution: More than | \$34,000¹⁴ |
| Ratio of Climate-Related Costs to Value of Logs: More than | 14 |
| Net Economic Cost: More than | \$31,500 |

B. Logging Imposes Huge Costs on Society by Degrading Ecosystems and Biodiversity

Industrial timber production in Oregon generates external costs not just by intensifying the climate crisis but also by contributing to the crisis in ecosystems and biodiversity. This latter crisis has received much less attention than climate, but it is also severe and existential to human life as we know it.¹⁵ This reality is being made more apparent by research conducted and compiled by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which stands parallel to the comparable institution, the Intergovernmental Panel on Climate Change (IPCC).¹⁶

The ecosystem/biodiversity crisis is already severe and getting worse in Oregon and across the globe. Concern about biodiversity and ecosystems arises from research that shows nature makes countless contributions to human well-being, but its capacity to continue providing these so-called ecosystem services is diminishing at an unprecedented rate. This decline is more than just worrisome because more than one-half of the economic activity measured by conventional indicators, such as the world's gross domestic product (GDP) is dependent on ecosystem services from nature.¹⁷ Globally, about one-third of the world's forest area has been destroyed, more than 85 percent of wetlands have been lost, one-third of the topsoil has been degraded, and freshwater species and vertebrate species have experienced population declines of 83 percent and 60 percent, respectively, since 1970. These losses and trends create societal and economic risks through their impacts on human health, global peace, intra- and international trade, gender equity, cultural and social connections between ecosystems and indigenous communities, and economic development. A major driver of these losses and trends has been the industrial scale conversion of natural ecosystems to landscapes dominated by clearcuts, logging roads, and monocultural plantations.

Through its negative impacts on ecosystems and biodiversity, industrial timber production imposes costs on Oregonians. Many of these negative impacts result from practices that include mechanized logging which removes the majority of forest stands on a parcel and replaces them with single-aged stands of conifers (referred to as "regeneration harvest" or "variable retention harvest," but commonly known as clearcut logging), a core feature of industrial timber production in Oregon. For example, this practice has negative impacts on nature by reducing the flow of streams in late summer and raising the water temperature.¹⁸ These effects can

increase the likelihood that streams will experience algae blooms that create risks of illness or death for recreationists and their pets who come in contact with the water, and increase the cost of providing safe drinking water to communities downstream.

These negative impacts on streamflows also can play a role in reducing populations of salmon and other species that depend on cold water and increase the cost of restoring these populations to higher levels.¹⁹ Timber production can have negative impacts on salmon and other cold-water species directly, through the impacts of timber-management on stream flows and temperatures, and indirectly, by increasing atmospheric CO₂ and intensifying the impacts of the climate crisis on stream temperatures. Figure 4 illustrates the findings of research from EPA, which confirms that, if left unchecked, changes in climate will raise stream temperatures enough to eliminate, throughout most of the state, the cold-water habitat salmon require. Industrial timber production in Oregon, with widespread clearcuts, thus, contributes to the warming effects of changes in climate and exacerbates the impacts by diminishing streamflows and exposing them to warm sunlight.

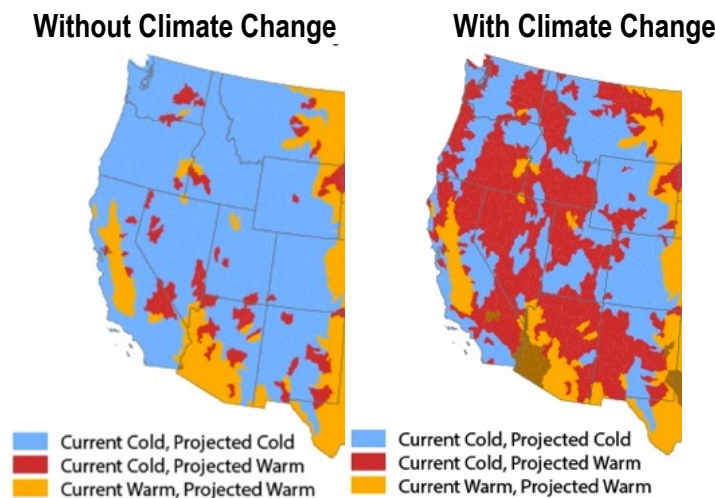


Figure 4. Climate Change Is Raising Stream Temperatures and Threatens to Eliminate Habitat Required by Salmon and Other Cold-Water Fish. Clearcut Logging Exacerbates this Threat

There are no credible estimates of the value of the economic damages the timber industry has caused to Oregon’s commercial and recreational salmon fisheries. There can be no doubt, however, that the external costs exist: a 2009 analysis by a team of regional economists estimated that anticipated declines in the Washington’s salmon populations resulting from climate change would impose costs of \$175 – \$640 per household per year.²⁰ Multiplied times the current number of households in Oregon, these figures indicates that the total potential cost is about \$0.3 billion – \$1.1 billion per year. Industrial timber production makes a significant contribution to these numbers, both by generating increases in atmospheric carbon dioxide and by killing trees that otherwise would grow larger, sequester carbon dioxide from the atmosphere, and thereby diminish the effects of climate pollution from other sources.

Negative impacts on biodiversity and ecosystems also impose external costs on people in many ways. Smoke from burning post-logging slash can harm the health of humans, livestock, and wildlife, for example. Clearcuts and forest roads established to support timber production can

become precursors for landslides. Logging of large, old trees degrades habitat for northern spotted owls and other species dependent on these trees. Spraying herbicides to discourage the growth of brush and other vegetation that might compete with seedlings can pollute streams and devastate biological diversity. These actions and others that degrade biodiversity and ecosystems generate external costs via global and local processes that negatively affect health, peace, intra- and international trade, gender equity, cultural and social connections between ecosystems and indigenous communities, and economic development.

Global efforts to quantify the external costs from negative impacts on biodiversity and ecosystem services have only just begun (they lag behind analogous efforts to quantify the social cost of carbon dioxide, described above). The preliminary evidence suggests that they are huge. For example, the loss of biodiversity and degradation of ecosystems can contribute to the emergence of devastating diseases and diminish soils and degrade their productivity, and the degradation of forest wetlands can diminish their ability to retard, even arrest wildfires.²¹

The global research suggests it would be prudent to expect that the external costs from timber-related negative impacts on biodiversity and ecosystems are equal to or greater than the value of the logs produced. A recent review of global research, for example, reached these conclusions:

“Our analysis shows that both conservation and ecological restoration bring considerable net benefits in terms of public goods and common pool resources, regardless of the habitat or type of ecosystem state change being considered. ... [O]ur findings do suggest that, within the broad habitat and geographic range present in our data, we have typically passed the point where the benefits of further change from nature towards human-modified uses exceed the costs to society.”²²
[bold emphasis added]

Research in the Pacific Northwest confirms this conclusion. For example, after comparing two alternatives – one that would allow logging to proceed, and another that would restrict logging to protect potential nesting sites for northern spotted owls – Washington’s Department of Natural Resources (DNR) concluded that the benefits of protecting the habitat can be 5 times the benefits from logging.²³

These findings are in line with those of a landmark, global assessment.²⁴ Commissioned by the UK Treasury, it found that if, instead of managing lands to extract timber and other materials, lands were managed to restore and conserve healthy ecosystems, the net economic benefits to society as a whole would be about 4 times larger. The assessment also concluded that the differential between the net benefits from restoration/conservation vs. timber and other extractive industries is increasing. These findings arise because human actions “have degraded the biosphere to the point where the demands we make of [ecosystem] goods and services far exceed its ability to meet them on a sustainable basis.”

Table 2 converts these research findings into a summary of the extent to which logging-related damage to ecosystems and biodiversity imposes economic costs on society that exceed the value of logs. As in Table 1, the data are reported on a per-truckload basis, and begin with an estimate of the value of a truckload of logs – \$2,500. The ecosystem/biodiversity costs are estimated to be more than 5 times greater. The overall, net cost from logging is more than \$10,000 per truckload.

Table 2. Costs Imposed on Society by Timber’s Negative Impacts on Ecosystems and Biodiversity Far Exceed the Value of Logs

| Positive and Negative Impacts | Per Truckload |
|---|------------------------------|
| Positive Impacts | |
| Value of Logs | \$2,500 ²⁵ |
| Negative Impacts | |
| Costs Imposed on Society by Negative Impacts on Ecosystems/Biodiversity: More than | \$12,500²⁶ |
| Ratio of Climate-Related Costs to Value of Logs: More than | 5 |
| Net Economic Cost: More than | \$10,000+ |

The discussion above and the numbers in Table 2 clearly show that the timber industry’s current practice of ignoring negative impacts on biodiversity and ecosystems while striving to maximize incomes for corporate shareholders and managers is economically inefficient and operates to the detriment of the broader public in Oregon. Oregonians as a whole would experience increases in economic well-being from implementation of a program that would incrementally and persistently convert forestlands currently managed for industrial timber production to a management regime that reverses ecosystem degradation and focuses on maximizing not the value of logs but the overall net value of all goods and services.

Research specific to the impacts of industrial timber production on water supplies augments the numbers in Table 2. The timber industry imposes costs on Oregon’s households, businesses, and communities by increasing risks to the quantity and quality of water supplies for municipal, industrial, and other uses. And, in some cases, the risk has materialized, with a community losing access to an adequate supply of safe water. This evidence illustrates the scope of the risks and associated costs imposed on Oregonians:

- The timber industry reduces the amount of water flowing in streams. “Average daily streamflow in summer...in 34 to 43-yr-old plantations of Douglas-fir was 50% lower than streamflow...with 150 to 500-yr-old forests.”²⁷
- A community that loses access to adequate water supplies might have to purchase water from a nearby community. Data collected by the U.S. Bureau of Reclamation indicates that the cost for such water purchase might be \$1,000 per acre-foot.²⁸ A typical household uses about 0.5 acre-foot of water per year. Thus, when logging severs access to water, the cost per household might be \$500 per year.
- “In the past two decades, Oregon environmental regulators identified industrial logging as a risk to more than 170 public water systems, listing clear-cutting, road building and pesticide spraying as potential sources of contamination.”²⁹
- Since 2016, Oregon has been denied \$1.2 million in annual federal because National Oceanic and Atmospheric Administration and the EPA determined that logging practices fail to protect fish habitat.
- After logging devastated drinking water supplies from a nearby creek, the town of Corbett, east of Portland with more than 3,000 residents, has faced water shortages. Rockaway Beach, a town in Tillamook County with 1,300 residents, has warned of potential carcinogens in the municipal water supply, which comes from watershed where the industry has logged heavily and sprayed herbicides.

- The timber industry increases the temperature of water in streams. “[The] impact of timber harvest on [maximum] stream temperature [is] 1.3 degree [Celsius] increase on private timber lands.”³⁰ Increases in water temperature are associated with increases in the incidence of harmful algal blooms.³¹ The timber industry’s impacts on water temperature can interact with temperature increases linked to climate change – which the timber industry exacerbates (see above) – with high costs for Oregon households and businesses. The City of Salem, for example, incurred costs of \$75 million – more than \$1,000 per household – in 2018 to respond to an algal bloom in the city’s water supply.³² Similar threats to Eugene’s drinking water have occurred, and, more broadly, higher water temperatures encourage harmful algal blooms that create risks for recreational use in many lakes.³³

Information about how industrial timber production increases wildfires risks also augments the estimates in Table 2. Wildfires in Oregon in 2020 burned more than 1 million acres and destroyed more than 4,000 homes. Data from prior years, with far fewer homes lost, indicate that the risk to Oregonians from future wildfires – directly from the wildfires, themselves, and indirectly from exposure to smoke – may exceed \$12 billion per year, or \$8,000 per household.³⁴ A full accounting of all the factors that contribute to this risk has yet to be completed, but evidence indicates that the timber industry’s contribution is considerable:

- The timber industry accelerates and intensifies changes in climate that exacerbate late-summer conditions, such as very dry vegetation, conducive to explosive wildfires. Across western states, changes in climate correlate with more than one-half of recent increases in the acreage burned.³⁵ Oregon’s timber industry increases atmospheric greenhouse gases by 38 million tons CO₂-e per year (see above). This amount, the state’s largest single source, constitutes more than one-third of Oregon’s total GHG emissions.
- The timber industry creates conditions that make fires more intense and, hence, more dangerous for nearby communities. Current timber-production practices cover the landscape with plantations of young trees crowded together, that “act as kindling for intense fires (i.e., ‘fire’s gasoline’).”³⁶ These plantations burn hotter and faster than forests with older, more widely-spaced trees, increasing the risk that fire will spread more quickly to nearby communities, leaving them little opportunity to prevent homes from burning and prevent other damage.
- The timber industry is depriving communities of financial resources they could use to prepare for and prevent damage from wildfires. The discussion, below, shows that the industry avoids paying harvest and property taxes of about \$400 million per year. Reinstating these taxes would increase the ability of counties, cities, and fire districts to reduce their vulnerability to future fires.

III. Industrial Timber Production Imposes Costs on Oregonians via Tax Breaks and Subsidies and by Cutting Jobs and Discouraging Economic Diversification

The evidence presented below shows that the timber industry punishes communities throughout Oregon by taking more than \$1 billion per year away from communities and workers and, instead, giving it to corporate managers and shareholders. They directly take money away from communities when they pocket tax breaks and subsidies. They take money away from workers when they adopt clearcut logging and related practices that eliminate jobs through a focus on maximizing short-term profits for managers and shareholders rather than implement practices that would produce provide jobs for more workers. In the process, these practices degrade ecosystems, both environmental and social, making communities less attractive to industries that have the capability to provide job growth and economic strength.

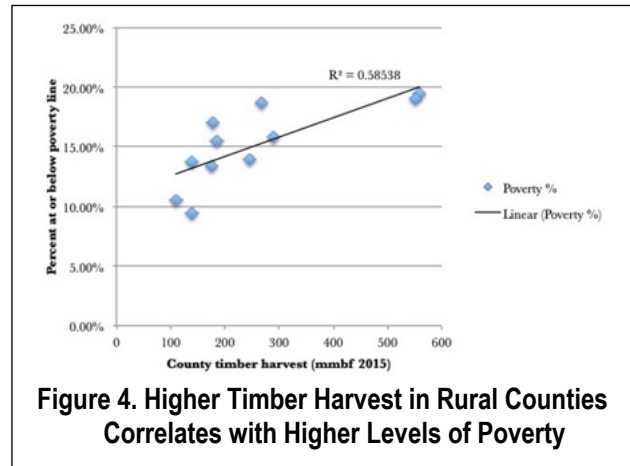


Figure 4. Higher Timber Harvest in Rural Counties Correlates with Higher Levels of Poverty

Supporters sometimes assert that the timber industry is necessary for Oregon to have healthy rural communities. The Trump Administration, for example, asserted that more logging on federal lands is needed to “give weight to the local tax and economic base.”³⁷ The reality is just the opposite. Clearcut logging, with its negative impacts on water, biodiversity, recreational opportunities, and other forest attributes, discourages the expansion of other industries and economic activities that have the capacity to yield more jobs and higher incomes. It comes as no surprise that, then, as Figure 4 shows, that rural counties with higher levels of timber production generally have higher levels of poverty.³⁸ Moreover, the findings from extensive research, shown in Figure 5, demonstrate that there is a negative relationship between timber and community well-being.³⁹ That is, communities with a higher concentration of timber jobs have a higher incidence of harmful behaviors and social characteristics. These harmful outcomes impose costs on those living in timber-dependent communities, by inducing more families to live in poverty and experience higher infant mortality, for example. These costs extend to all Oregonians, even those living in the state’s largest cities, insofar as we all share the burdens when the timber industry induces social ills anywhere in the state.

The factors underlying the negative relationship between the timber industry and community well-being are varied and complex. It seems clear, though, that, by not paying taxes and absorbing subsidies, timber corporations deprive rural communities of funds they need to provide important public services, such as improved health

“In most cases, timber dependency seemed to hurt rather than help communities.”

- Higher unemployment
- More poverty
- Lower birth rates
- Higher infant mortality
- Fewer churches
- Lower income
- Less education
- Higher death rates
- Poorer health care
- More arrests

Figure 5. Communities with More Timber Activity Exhibit More Negative Social Characteristics

care, that would alleviate some of the distress that contributes to higher death rates in timber-dependent communities. By eliminating thousands of jobs, the industry has imposed hardships on workers and injected distress into families and communities across most of the state. By using clearcuts and other practices that boost their profits but cover landscapes in stumps, degrade the quality of water supplies for nearby communities and increase wildfire risks, timber corporations discourage the development of jobs and activity in other industries.

Across all these factors lies one truth: it doesn't have to be this way. Timber corporations could alleviate some of the distress if they abandoned clearcut logging and related practices that aim to maximize short-term profits for shareholders, and, instead, adopted practices that would not impose such huge costs on workers, communities, and Oregon's economic future. In other words, these transfers of money away from workers and communities have already depressed the economic outlook. So, too, have the negative impacts of clearcuts on non-timber sectors of the economy, by making communities less attractive to workers, families, entrepreneurs, and investors. If allowed to continue, these impacts will depress the economic outlook even deeper.

The following sections look separately at the negative impacts on Oregonians and on Oregon's economic future as the timber industry:

- A. Takes Money from Taxpayers and Communities via Tax Breaks and Subsidies
- B. Cuts Jobs and Payments to Workers
- C. Discourages Development and Expansion of Other Industries

A. Timber Corporations Impose Huge Costs on Oregonians via Tax Breaks and Subsidies

The Wall Street-based corporations, called Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs), that own much of the private timberland in Oregon pay no state corporate income tax and no severance tax. They pay a fraction of the property taxes paid by most landowners, and get tax breaks for logging roads and logging equipment. Overall, tax breaks and subsidies to timber corporations transfer more than \$600 million per year from taxpayers and communities to corporations via tax breaks and subsidies. Table 3 presents some of the details.

Their exemption from paying taxes when logging occurs is illustrative. This type of tax is often called a "harvest" tax, but sometimes it is called a "yield", "severance", or "privilege" tax. There is nothing unique or strange about this type of tax. It is common to many situations and resources, and typically is applied to ensure that a state receives some revenue when corporations extract natural resources to be sold to and enjoyed by consumers in other states and countries. In concept, this type of tax seeks to trade one type of asset – the natural resource – for another – the tax revenue – of equal or greater value. When applied successfully, the state's total portfolio of assets increases over time, raising the total wealth of the state's residents. When applied poorly, or not at all, the extractive industry removes natural resource assets, leaves little or nothing behind, and the state's residents become poorer and poorer over time.

Table 3. Money Transferred from Oregon Communities to Timber Corporations via Tax Breaks and Subsidies (Partial Listing)

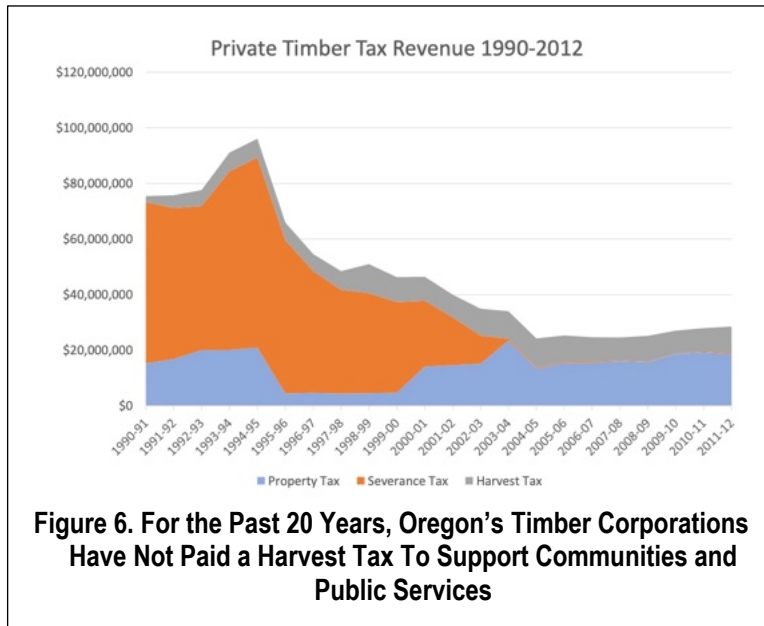
| Tax Break or Subsidy | Annual Amount (million)* |
|---|---------------------------------|
| Harvest (Severance) Tax Exemption | \$100 |
| Property Tax Exemption – Standing Timber | \$250 |
| Property Tax Exemption – Logging Roads | \$22 |
| Property Tax Exemption – Skyline Yarders | \$3 |
| Severance Tax Exemption – Large owners | \$15 |
| Partial Weight-Mile Tax Exemption – Log Trucks | \$5 |
| Large Tract Forestland Special Assessment | \$54 |
| Unreimbursed Costs to State for Firefighting | \$134 |
| Subsidized Federal Timber | \$47 |
| Unreimbursed Oregon Dept. Forestry Private Forest Program | \$23 |
| Subtotal: More than | \$600 |

*Data from Oregon Department of Revenue, Oregon Department of Transportation, Oregon Department of Forestry, US Department of Agriculture, US Bureau of Land Management.

The timber industry is an appropriate target for this type of tax because it extracts multiple resources from Oregon’s forests. Without industrial timber production, the forests would have larger trees, more carbon stored in the larger trees, more habitat for salmon, more opportunities for recreational and tourism activities, and a greater ability to attract skilled workers and entrepreneurs who want to reside in a healthy ecosystem. In contrast, industrial timber production degrades water resources so that communities and other industries must pay extra to make the water safe, businesses and workers in the commercial and recreational salmon industries become unemployed, rural communities face greater risk of being destroyed by wildfire, and cities face more days coping with smoke. And the total list is much, much longer.

Figure 6 shows that, in the mid-1990s, timber producers paid as much as \$70 million (or about \$100 million in today’s economy) per year in harvest tax, when the amount of timber logged was roughly similar to what occurs today.⁴⁰ But, instead, the industry has paid nothing for the past 20 years. Looking further back, a recent analysis by investigative journalists found that these exemptions “have cost counties at least \$3 billion in the past three decades.”⁴¹

Wait! The right side of Figure 6 shows that the timber industry does pay something similar to a harvest tax: the so-called “Harvest Tax” shown in the legend and in the gray data in Figure 6. These payments of about \$10 million per year, however, do not compensate Oregonians for the extraction of the state’s timber resources. Instead, the money is used to benefit the industry, itself. This occurs because the revenues are used to support timber research, help corporate timberland owners overcome regulatory hurdles and suppress wildfire, and finance an entity that provides public-relations and lobbying services for the agency.⁴² So, bottom line: corporate timberland owners in Oregon totally avoid paying any harvest/yield/privilege/severance tax to compensate Oregonians for the loss of natural resource assets that results from industrial timber production.



It is important to note that the industry—often the same corporations—do, in fact, pay harvest/yield/privilege/severance taxes in Washington and California. Washington is the better comparator, because its forests more closely resemble Oregon's. If Washington's harvest-tax rate were applicable in Oregon, industrial timberland owners would have been paying about \$100 million per year.⁴³ This contrast—zero under Oregon law vs. about \$100 million if Oregon applied Washington's law—provides a rough estimate of the amount of taxes that corporate owners of industrial timberland in Oregon fail to pay each year. This amount represents the costs imposed on Oregonians who must either pay higher taxes themselves to fill the gap or go without important public services.

The Department of Forestry explains that, when the property tax on timber was eliminated, in the 1970s, the industry continued to pay a harvest tax that provided some revenue for public services.⁴⁴ The discussion above shows, however, the industry subsequently was successful in eliminating this harvest tax. That two-step elimination of property and harvest taxes means that, each year, timberland owners take millions of dollars from counties, cities, school districts, fire districts, etc., giving nothing of equivalent value in return.

B. Timber Corporations Impose Huge Costs on Oregonians by Eliminating Payments to Workers

Oregonians should never forget this truism: paying workers less leaves more money for corporate shareholders and managers. It explains why, year after year, the managers of timber corporations incessantly have striven to reduce the amount of money they pay workers. The resulting cost to workers occurs primarily through the elimination of timber jobs.⁴⁵

Figure 7 shows that the number of jobs per million board feet (mmbf) of logs removed from Oregon’s forests declined by about 50 percent between the mid 1990s and 2012, with a sharp decline occurring during the Great Recession (2007-09). Overall, between 1990 and 2017, just prior to the pandemic, Oregon’s timber industry eliminated about 23,000 jobs.⁴⁶ During this period, the average annual wage in the industry was about \$50,000.⁴⁷ In other words, these numbers indicate that over the past 25 years or so, timber-corporation managers have eliminated jobs for about 23,000 Oregonians. Each laid-off Oregonian lost earnings of about \$50,000 per year. Overall, these actions reduced the wages timber workers received – and increased the amount available for corporate managers and shareholders – by about \$1.1 billion per year. Additional impacts on workers and their families occurred through the loss of employment-related benefits. Workers in rural counties were hit hardest: more than one-half of the timber jobs eliminated were located in these counties.⁴⁸

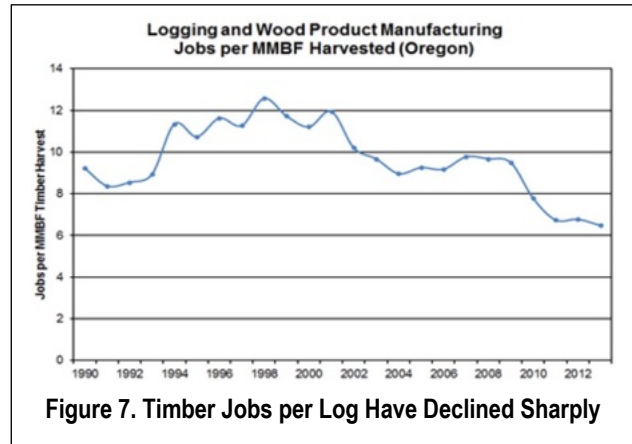


Figure 7. Timber Jobs per Log Have Declined Sharply

The top graph in Figure 8 shows that, during the Great Recession, Oregon’s timber harvest declined (gray bars), and the bottom graph shows that the number of timber jobs also dropped.⁴⁹ By 2013, though, timber harvest fully recovered, to about 4 billion board feet (bbf) per year, but employment did not: about 10,000 jobs were eliminated. This number, multiplied times an average wage of about \$50,000 says that the cost to workers has been about \$500 million per year.

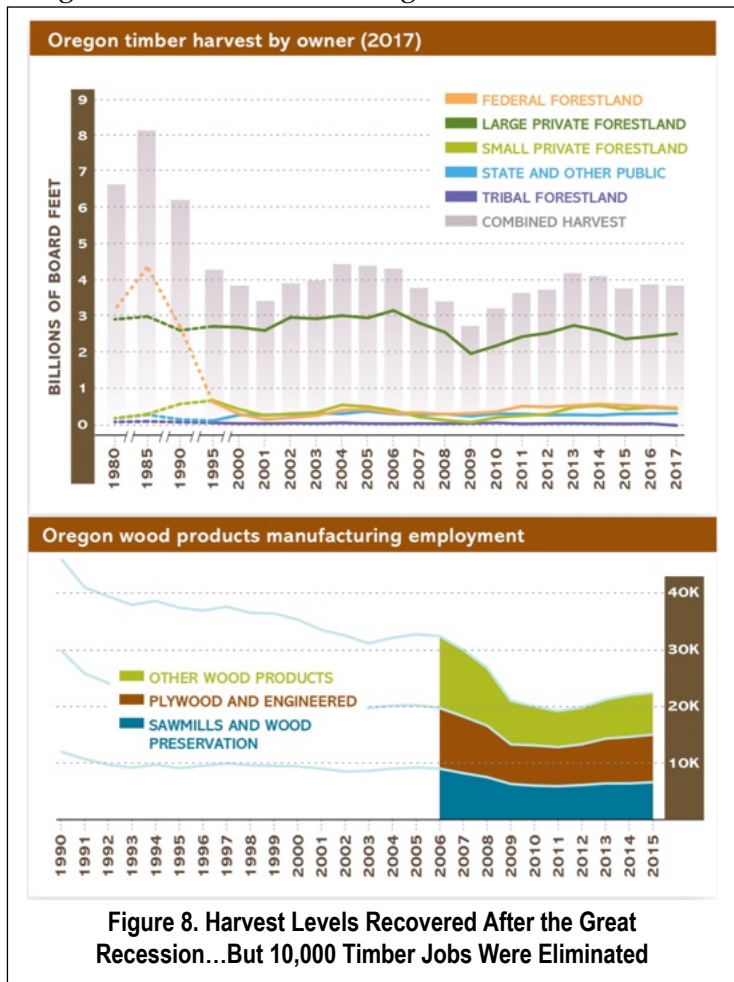


Figure 8. Harvest Levels Recovered After the Great Recession...But 10,000 Timber Jobs Were Eliminated

Strong downward pressure on jobs stems directly from decisions by timber corporations to employ clearcut logging and related practices. These practices emphasize the production and processing of logs much smaller and more uniform than were common in past decades. These logs, from clearcutting of plantations of trees 30-years old or so, can be cut, moved, and processed largely by automated machines. Additional jobs have been eliminated as the industry exports logs rather than sending them for processing at Oregon-based mills. No reversal of these trends can

be seen on the horizon; the negative impacts on workers will continue. As the number of jobs declines, less of the income generated by logging and the conversion of logs into paper and wood products flows to workers and, through them, to local communities. Instead, this income leaves the local area and, instead, flows to the investors and managers of the industry's corporations.

The negative economic impacts of timber production extend beyond timber-industry workers to the communities where the industry and its workers reside. Eliminating jobs in the timber industry, for example, can have ripple effects that increase unemployment and the incidence of families in poverty throughout the local community. These outcomes can diminish activity within the local economy, diminish tax revenues for local communities, and stimulate communities to divert resources from other programs to provide public services to the affected families.

Table 4 summarizes the impacts. Over the past 10 years, about 10,000 workers and their families have lived without timber wages of \$50,000 per year. Local businesses, as well schools, counties, cities, and other units of government in Oregon that rely on spending by workers and families have seen timber-related income drop also.

The negative relationship between timber and the social health of communities was reaffirmed recently by the Bureau of Land Management (BLM), which examined the relationship between log production and local economies. It found that the timber industry is among the world's most volatile, and this volatility has negative spillover impacts on local communities. As a result, the BLM concluded that proposed increases in log production likely would destabilize, rather than stabilize, the economy of nearby rural communities.⁵⁰

Table 4. Cost to Oregon Workers, Families, and Communities Because Timber Corporations Eliminated Jobs

| Timber Jobs Eliminated | Forgone Wage per Worker | Cost per Year |
|------------------------|-------------------------|----------------------|
| 10,000 | \$50,000 | \$500 million |

C. Timber Production Impose Huge Costs on Oregonians by Stifling Jobs and Activity in Other Industries

Substantial evidence indicates that many of Oregon's communities would have a far brighter economic outlook if forests were managed with an emphasis on conservation and restoration. Some of this evidence comes from research that found that proximity to conserved forestlands typically correlates with faster growth in community wealth. Specifically, communities within 10 miles of land designated for species protection "experienced higher growth in community wealth than communities more than 10 miles from...protected land, even among those that were dependent upon logging."⁵¹

Two major factors underlie the likelihood that forest conservation would stimulate an increase in jobs and community prosperity, relative to what communities have experienced and can anticipate with current industrial timber-production practices. One is the outdoor recreation/tourism industry; the other is the movement of families and businesses to communities with attractive amenities. The outdoor recreation/tourism industry is huge—

nationally it is larger than the motor vehicle manufacturing industry, the motion picture industry, and many other economic heavyweights – and it has been growing doggedly and rapidly – about 5 percent annually between 2005 and 2011, a period that includes a major recession and contraction for most industries.⁵² Many communities forgo activity in this industry because timber corporations manage adjacent lands to produce ugly stumps and degrade water supplies. Relative to timber, this industry can pay lower average wages. But, for many workers and families, an industry that can deliver 5 percent growth in jobs, even with lower wages, is preferable to one that promises more layoffs, higher unemployment, and greater social distress.

Communities forgo other economic opportunities when clearcuts and other practices make them unattractive to workers, families, and businesses. This outcome has had and will have powerful, negative impacts. In-migrants often have higher levels of skill and incomes, new families typically have higher incomes to spend in local shops, and new businesses generally have the ability to grow more rapidly than long-established businesses. All of these factors can contribute to a more robust and sustainable local economy, generating economic opportunities for communities near healthy, conserved forestlands, and resources to strengthen the support for schools, healthcare, and other services. But near clearcuts, degraded streams, plantations where wildfire, once ignited, can burn fiercely and move quickly? Not so much.

A recent analysis quantified to potential economic boost for counties with more public land protected from logging and other extractive activities. After statistically controlling for the influence of other factors, the researchers found that, on average, a western county with 10,000 additional acres of protected public land exhibited higher average per capita income, faster growth in per capita income, and faster growth in non-labor per capita income.⁵³

An even more recently completed review of this phenomenon found that it has been transforming the economies of communities across the West:

“A major impetus for economic restructuring in the Western U.S. ... has been amenity migration, a phenomenon in which people relocate to communities for physical and social amenities derived from an abundance of desired ecosystem services as opposed to simply following employment opportunities. These amenity migrants include footloose entrepreneurs, retirees, and people willing to trade income for a higher quality of life. ... [P]ublic lands have consistently been shown to play a role in attracting amenity migrants.”⁵⁴
[Citations omitted]

Combined, the evidence in this section shines a bright light on the deception embedded in the happy-talk from industry advocates about how the timber industry provides a solid economic foundation for rural communities. In reality, the industry, punishes these communities. It takes from them money they could use to support important public services. It has not provided expanded job opportunities for rural workers. Instead, it routinely and persistently kills jobs. It does this by laying off timber workers. And it compounds the harm by making a mess of the environmental and social ecosystem, thereby precluding the development of job opportunities in industries that, absent clearcutting and related practices, would be attracted to the amenities of communities of unlogged forests.

IV. Final Thoughts

Oregon's timber industry and its advocates persistently deceive Oregonians in an attempt to distract them from the reality, that the industry imposes huge costs on workers, on communities, and on every Oregonian. These costs come about as clearcut logging results in large increases in atmospheric carbon dioxide and degrades environmental ecosystems. They also materialize as the industry sucks money out of communities via tax breaks and subsidies, eliminates jobs, and makes landscapes and communities unattractive to entrepreneurs and investors who could develop other jobs and industries. Each of these actions takes wealth and well-being away from Oregonians and converts them into higher incomes for corporate shareholders and managers.

The industry and its advocates are skillful – they accomplish these deceptions in ways that make it difficult for most Oregonians to uncover the truth. But numerous Oregonians have begun asking questions. This report seeks to provide some initial answers. It uses readily available information to quantify four categories of costs the timber industry imposes on Oregonians as it (a) increases climate pollution, (b) degrades ecosystems and biodiversity, (c) takes money from communities via tax breaks and subsidies, and (d) takes money from workers by eliminating their jobs. Table 5 summarizes the findings. It first shows that the total of these four costs is at least \$48,000 per truckload of logs. Actual costs will be much higher, insofar as researchers have not yet fully estimated the damage imposed on society per ton of climate pollution (the social cost of carbon dioxide added to the atmosphere). In other words, the cost imposed on Oregonians, per truckload of logs, is more than 19 times the value of the logs, \$2,500.

Table 5. Summary of Costs the Timber Industry Imposes on Oregonians

| | Quantifiable Amount |
|--|---------------------|
| Per Truckload of Logs: More than | \$48,000 |
| For Oregon as a Whole (annual, billion): More than | |
| Annual: More than | \$38 billion |
| Per Household (annual): More than | \$23,000 |

Table 5 also shows that, when the cost estimate per truckload of logs is multiplied times 800,000 truckloads of logs extracted from Oregon's forests each year, the total cost for Oregon as a whole is more than \$38 billion per year. This amount indicates that the costs imposed by the timber industry on Oregonians each year are more than 16 percent of the state's current annual production of goods and services, or gross domestic product (GDP).⁵⁵ These amounts also indicate that the quantifiable costs imposed on Oregonians each year are more than \$23,000 per household.⁵⁶ This amount is equivalent to about 25 percent of median annual household income.⁵⁷

The future almost certainly will see these costs grow rapidly, especially those associated with the timber industry's negative interactions with the climate crisis and the ecosystem/biodiversity crisis. Recently published research findings show that estimates of the social cost resulting from additional carbon dioxide in the atmosphere have increased by a

factor of 4 over the past ten years.⁵⁸ It would be reasonable to anticipate that this trend will continue, even accelerate in the future. Thus, by 2033, the climate-related costs imposed on Oregonians by the timber industry likely will exceed \$136,000 per truckload, all else equal. And, insofar as the two crises are closely linked, it would be reasonable to anticipate that the ecosystem/biodiversity costs imposed on Oregonians from increased logging also will increase by a factor of 4 in the next ten years, to \$50,000 per truckload. In other words, absent meaningful, robust actions to arrest this growth, the costs the timber industry imposes on Oregonians will outweigh the value of the logs the industry extracts from the forests by more than 75-to-1.

Ernie Niemi prepared this report for Natural Resource Economics, a consultancy in Eugene, Oregon USA, which remains solely responsible for its contents. The report draws from more than four decades of research on the relationship between the timber industry and Oregon's economy.

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¹ The inevitable decline in logging – about 90 percent on federal lands and 50 percent overall – was superficially triggered by court orders aimed at protecting northern spotted owls. The owls, though, were just an indicator of the underlying reality, that, as it was exhausting the ability of Oregon’s forests to provide trees to kill, rampant clearcut logging also was devastating the supply of habitat for owls and other species. The sharp decline in logging would have occurred even if the courts had not ruled in favor of the owls. The decline in owl populations was an indicator of, not the cause of, the decline in logging that occurred in the 1980s and 1990s.

² “Using data and satellite imagery from NASA collected between 1997 and 2023, four researchers from the agency’s Oregon Coast Range Ecological Conservation Team were able to look at logging impacts in forests within 80 Oregon Coast watersheds identified by Oregon Wild. About one-third of the forested land in those 80 watersheds – nearly 600 square miles – had been logged during the last 20 years, according to the study.” [Baumhardt, A. 2023. [NASA Imagery Shows Scale, Impact of Logging in Drinking Water Watersheds in Oregon.](#)]

³ See, e.g. Youngblood, M., 2020. Extremist ideology as a complex contagion: the spread of far-right radicalizations in the United States between 2005 and 2017. *Humanities and Social Sciences Communications* 7, 49 (2020): <https://doi.org/10.1057/s41599-020-00546-3>; Debruin, C., 2019. Right Wing Extremism in the United States. Williams Honors College, Honors Research Projects. 997.

⁴ Leber, R., 2021. Let’s Examine the Ties Between the Timber Industry and Extremists. *Mother Jones*, January 27th, 2021. Available online at: <https://www.motherjones.com/environment/2021/01/timber-unity-capitol-riot/>.

⁵ Schick, T, R. Davis, L. Younes. 2020. [Big Money Bought the Forests, Small Logging Communities Are Paying the Price](#); and Schick, T., and R. Davis. 2020. [Timber Tax Cuts Cost Oregon Towns Billions. Then Clear-cuts Polluted Their Water and Drove Up Its Price.](#)

⁶ Ingerson, A. 2007. [U.S. Forest Carbon and Climate Change](#). The numbers shown represent nation-wide impacts of logging one atmospheric carbon dioxide, and may vary for different regions of Oregon, reflecting species of tree logged, age/size of trees killed, transport distance to mill, and efficiency of mill.

⁷ Segerstrom, C. 2018. [Timber is Oregon’s Biggest Carbon Polluter.](#)

⁸ Law, B.E., et al., 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. *Proceedings of the National Academy of Sciences of the United States of America* 115: 3663- 3668; Talberth, J., 2017. Oregon Forest Carbon Policy: Scientific and technical brief to guide legislative intervention. Portland, OR: Center for Sustainable Economy. Available online at: <https://sustainable-economy.org/osu-research-confirms-big-timber-leading-source-greenhouse-gas-emissions-oregon/>.

⁹ The BLM showed that future logging on BLM lands in western Oregon would result in substantial increases in atmospheric CO₂, and the economic costs resulting from the increases would exceed the value of the logs produced by a ratio of more than 4-to-1. [BLM. 2016. [Proposed Resource Management Plan/Final Environmental Impact Statement: Western Oregon](#). p. 657.] The BLM estimated that the market price of logs would be about \$250 per mbf, so a truckload of 5 mbf would have a market value of about \$1,250, and the accompanying social cost would be at least 4 times this amount, or \$5,000+.

¹⁰ In 2016, the social cost of carbon dioxide used by the BLM was about \$50 per ton. EPA’s update raised this value to \$190, assuming a discount rate of 3% per year, but recognized that, with a lower discount rate, the value would be \$340 per ton. [EPA. 2022. [EPA External Review Draft of Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances.](#)] This report assumes the value is at least \$340 per ton, with reference to [research](#) that shows that, when evaluating the costs from activities that generate pollution that causes environmental deterioration, it is appropriate to use low discount rates, or even negative rates.

¹¹ Some might be tempted to dismiss these estimates of the economic damage resulting from timber production in Oregon because tracing the movement of a molecule of carbon dioxide added to the atmosphere from Oregon’s timber production might reveal that its direct negative impacts on goods, services, and economic well-being occur somewhere else. The global scope of the climate crisis, however, means that carbon dioxide added to the atmosphere somewhere else might trigger reductions in goods, services, and economic well-being in Oregon. This reciprocal relationship means that it is reasonable, and morally imperative, to recognize that the timber industry’s climate pollution has negative impacts on Oregonians.

¹² The estimates per metric ton include damage to coastal communities from sea level rise, net changes in mortality from increased temperatures, reductions in labor productivity from increased temperatures, reductions in production of major crops, and increased expenditure on electricity and other sources of energy for cooling in response to higher temperatures. EPA. 2022. [EPA External Review Draft of Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances.](#) The estimates do not include numerous other categories of economic damages from climate pollution, including, but not limited to these:

More frequent, intense weather

Irrigation water shortages for livestock and crops

Increases in psych-social trauma
Reduced productivity marine ecosystems
Reduced productivity terrestrial ecosystems
Reduced productivity aquatic ecosystems
Degradation of infrastructure from higher temperatures
Increased variability in weather conditions
Increases in violence and conflict

Increases in agricultural pests and diseases
Increased incidence of human diseases
Increased stress on at-risk species
Accelerated spread of undesirable invasive species
Increases in fish and wildlife diseases
Increased migration
Reduced opportunities for outdoor recreation

¹³ Assumes 5 thousand board feet (5 mbf) of logs per truckload, and value = \$500 per mbf.

¹⁴ Calculation from data in BLM (2016), which showed that the social costs from climate pollution resulting from logging on BLM lands would exceed \$5,000 per log-truck load, using estimates of the social cost of carbon dioxide – about \$50 per ton – from the IWG (2013); adjusting to reflect estimates from EPA (2022) that assigns \$340 per ton as the social cost of CO₂ pollution. EPA acknowledges that these numbers are incomplete and that the total costs from climate pollution will be higher. [BLM. 2016. [Proposed Resource Management Plan/Final Environmental Impact Statement: Western Oregon](#). p. 657; Interagency Working Group on Social Cost of Carbon, United States Government (IWG). May 2013, Revised 2015. [Technical Support Document: –Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866](#); EPA. 2022. [EPA External Review Draft of Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances](#).]

¹⁵ A just-published peer-reviewed report from a panel of 50 of the world’s leading biodiversity and climate experts states: “Biodiversity loss and climate change are both driven by human economic activities and mutually reinforce each other. **Neither will be successfully resolved unless both are tackled together.**” [Bold emphasis added. Intergovernmental Platform on Biodiversity and Ecosystem Services, and others. 2021. [Tackling Biodiversity & Climate Crises Together and Their Combined Social Impacts](#).]

¹⁶ For more information about the IPBES, please see the [home page](#).

¹⁷ Support for the facts in this paragraph come from World Economic Forum. 2020. [Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy](#).

¹⁸ Perry, T.P., and J.A. Jones. 2017. [Summer Streamflow Deficits from Regenerating Douglas-fir Forest in the Pacific Northwest, USA](#); and Oregon State University. 2011. [Study Outlines Stream Temperature Changes Following Timber Harvests](#). Referring to Groom, J.D. 2013. [Stream Temperature Responses to Timber Harvest and Best Management Practices](#)

¹⁹ National Marine Fisheries Service, West Coast Region. 2016. [Final ESA Recovery Plan for Oregon Coast Coho Salmon \(*Oncorhynchus kisutch*\)](#).

²⁰ Niemi, E. K. Baird, W. Barnes, and others. 2009. [An Overview of Potential Economic Costs to Washington of a Business-As-Usual Approach to Climate Change](#).

²¹ UN Environment Programme. 2021. [Making Peace with Nature: A Scientific Blueprint to Tackle the Climate, Biodiversity and Pollution Emergencies, Executive Summary](#).

²² Bradbury, R.B., S.H.M. Butchart, B. Fisher, and others. 2021. [The Economic Consequences of Conserving or Restoring Sites for Nature](#).

²³ Krug, D., 2007. [Preliminary Economic Analysis: Forest Practices Rulemaking Affecting Northern Spotted Owl Conservation](#). Olympia, WA: Department of Natural Resources.

²⁴ Dasgupta, P. 2021, [The Economics of Biodiversity: The Dasgupta Review](#). (London: HM Treasury)

²⁵ Assumes 5 thousand board feet (5 mbf) of logs per truckload, and value = \$500 per mbf.

²⁶ Calculation based on research findings in Washington that indicate the value of damage to salmon habitat from logging in can be 5 times the value of logs [Krug, D., 2007. [Preliminary Economic Analysis: Forest Practices Rulemaking Affecting Northern Spotted Owl Conservation](#). Olympia, WA: Department of Natural Resources.]

²⁷ Perry, T.P., and J.A. Jones. 2017. [Summer Streamflow Deficits from Regenerating Douglas-fir Forest in the Pacific Northwest, USA](#).

²⁸ U.S. Bureau of Reclamation. 2016. [Water Marketing Activities Within the Bureau of Reclamation](#).

²⁹ Schick, T., and R. Davis. 2020. [Timber Tax Cuts Cost Oregon Towns Billions. Then Clear-cuts Polluted Their Water and Drove Up Its Price](#).

³⁰ Oregon State University. 2011. [Study Outlines Stream Temperature Changes Following Timber Harvests. Referring to Groom, Jeremy D. 2013. Stream Temperature Responses to Timber Harvest and Best Management Practices](#).

³¹ Ho, J.C., and A.M. Michalak. 2019. [Exploring Temperature and Precipitation Impacts on Harmful Algal Blooms Across Continental U.S. Lakes](#).

³² Bach, J. 2019. [Salem Spending \\$75 Million To Protect Drinking Water from Toxic Algae](#).

³³ USGS. 2020. [Harmful Algal Blooms and Drinking Water in Oregon](#).

³⁴ Niemi, E. 2020. [Bigger than Expected: Climate Change Costs & Emission-Reduction Benefits](#).

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- ³⁵ Abatzoglou, J.T., and A.P. Williams. 2016. [Impact of Anthropogenic Climate Change on Wildfire Across Western US Forests](#).
- ³⁶ DellaSala, D.A., T. Ingalsbee, and C.T. Hanson. 2018. [Everything You Wanted To Know About Wildland Fires in Forests But Were Afraid To Ask: Lessons Learned, Ways Forward](#).
- ³⁷ Federal Register 86(10). 2021. [Revised Designation of Critical Habitat for the Northern Spotted Owl](#). 4834.
- ³⁸ Talberth, J., 2017. Modernizing State Forest Practices Laws to Halt and Reverse Deforestation. Center for Sustainable Economy
- ³⁹ National Research Council. 2000. [Environmental Issues in Pacific Northwest Forest Management](#).
- ⁴⁰ Representative Paul Holvey. 2019. [HB 2495](#). Data retrieved from Oregon Legislative Revenue Offices; State Library of Oregon. 2020. [Oregon Annual Timber Harvest Reports-1994](#).
- ⁴¹ Schick, T, R. Davis, L. Younes. 2020. [Big Money Bought the Forests, Small Logging Communities Are Paying the Price](#).
- ⁴² Schick, T, R. Davis, L. Younes. 2020. [Big Money Bought the Forests, Small Logging Communities Are Paying the Price](#); and Davis, R. 2020. [What Happened When a Public Institute Became a DeFacto Lobbying Arm of the Timber Industry](#); and Schick, T., and R. Davis. 2020. [Timber Tax Cuts Cost Oregon Towns Millions. Then Clear-cuts Polluted Their Water, and Drove Up the Price](#).
- ⁴³ Representative Paul Holvey. 2019. [HB 2495](#). Data retrieved from Oregon Legislative Revenue Offices; State Library of Oregon. 2020. [Oregon Annual Timber Harvest Reports-1994](#).
- ⁴⁴ Oregon Department of Revenue. 2019. [Tax Expenditure Report: 2019-2021](#).
- ⁴⁵ Timber corporations have taken money not just from laid-off workers but also from those workers who remain, as explained by this statement from the Oregon Office of Economic Analysis:
- “Back in the 1970s, the typical forest sector worker earned a wage nearly 40 percent higher than the statewide average. Today, that same industry employee earns just about the state average.”* Lehner, J. 2019. [Historical Look at Oregon’s Wood Product Industry](#). In the 1980s, the premium was about 30 percent more, or \$15,000 per worker.
- ⁴⁶ Rogoway, M. 2019. [Oregon Insight: Wood Products’ Decline Was Steep-But It Remains Vital in Rural Counties](#).
- ⁴⁷ Lehner, J. 2019. [Historical Look at Oregon’s Wood product Industry](#).
- ⁴⁸ Jaquiss, N. 2019. [Layoffs at Stimson Lumber Are Part of a Wrenching Shift in How Oregonians Work in the Forest](#).
- ⁴⁹ Oregon Forest Resources Institute. 2018. [Oregon Forest Facts: 2017-18 Edition](#); 2019. [Oregon Forest Facts: 2018-2019 Edition](#).
- ⁵⁰ Bureau of Land Management, 2016. Final Environmental Impact Statement for the Proposed Resource Management Plan for Western Oregon, page 702. Portland, OR: USDI Bureau of Land Management, Oregon State Office.
- ⁵¹ Weber, Bruce, and Yong Chen. 2012. [“Federal Forest Policy and Community Prosperity in the Pacific Northwest.”](#) Choices. 27(1).
- ⁵² Outdoor Industry Association. 2021. [The Outdoor Recreation Economy](#).
- ⁵³ Rasker, R., Gude P.H., and Delorey, M., 2013. [The Effect of Protected Federal Lands on Economic Prosperity in the Non-Metropolitan West](#).
- ⁵⁴ Hjerpe, E., A. Hussain, and T. Holmes. 2020. [Amenity Migration and Public Lands: Rise of the Protected Areas](#).
- ⁵⁵ Oregon’s annual GDP is about [\\$235 billion](#).
- ⁵⁶ The number of households is about [1.7 million](#).
- ⁵⁷ Median household income in Oregon is about [\\$81,000](#).
- ⁵⁸ Tol, R.S., 2023. [Social Cost of Carbon Estimates Have Increased Over Time](#).