



**OREGON
WILD**

Formerly Oregon Natural Resources Council (ONRC)

Increased Logging is a Threat to Our Global Climate

Impacts of Senator Wyden’s proposed “Oregon and California Lands Act of 2013” (S.1784 and S.2734) and Reps. DeFazio and Walden’s “Oregon and California Railroad Grant Lands Trust Conservation and Jobs Act of 2013” (HR.1526.RH)

Prepared by Oregon Wild, February 2014. [Revised September 2014]

Executive Summary

During the last century, logging in western Oregon contributed to global warming by emitting millions of tons of carbon dioxide (CO₂) into the atmosphere. After logging levels were reduced by the Northwest Forest Plan, the carbon flow reversed and—on federal public forestlands—there is now more carbon being absorbed and stored by growing trees than is being emitted by logging.

Additional opportunities exist to sequester carbon on federal forest land to make up for all the carbon lost to the atmosphere during decades of old growth liquidation. However, Congress is considering proposals to increase logging on western Oregon Bureau of Land Management (BLM) lands, including clearcutting carbon-rich mature forests. Increased CO₂ emissions from logging will reverse progress in direct conflict with Obama Administration policy which is to “preserve[e] the role of forests in mitigating climate change.”¹

These highly productive BLM forests are very well suited for carbon sequestration, which is also highly compatible with many other important public values, such as clean water, fish & wildlife habitat, recreation, and quality of life—important drivers of economic activity and community stability in Oregon. Increased logging—especially clearcutting—is incompatible with climate mitigation and other public values.

Background

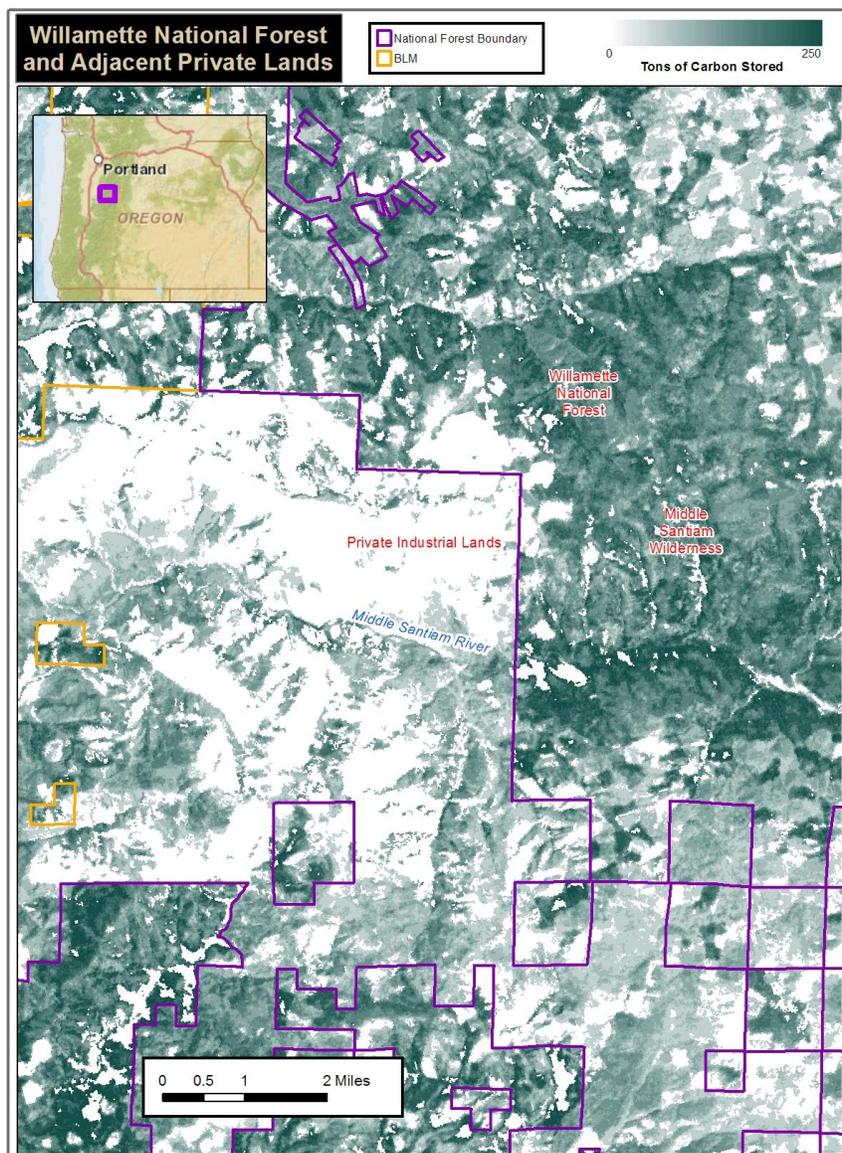
Climate change is caused by excessive levels of heat-trapping gases in the atmosphere—especially CO₂—that have a long residence time in the atmosphere. Earth’s future climate will be largely determined by the cumulative global emissions of CO₂ over the last and next centuries. Climate change won’t be solved by any singular change in technology or land use. The solution will require changed management practices in *every* industry that affects the carbon cycle, including forestry. All CO₂ emissions from all sources are part of the problem; none can be characterized as inconsequential.

Forests play an important role in the global carbon cycle. Trees remove CO₂ from the atmosphere when they grow, and they release CO₂ to the atmosphere as they decompose. Forests help reduce global warming when they grow and absorb more carbon than they emit. Forests can also worsen climate change when trees emit more carbon than they absorb. For instance, logging stops trees from growing, and accelerates the transfer of carbon from the forest to the atmosphere, through fragmentation, accelerated decomposition, and combustion.

Over the past two centuries, forest conversion and forest management have contributed a substantial fraction of the excess CO₂ observed in the atmosphere.² Today's management choices will determine whether forests continue to be part of the problem or become part of the solution.

BLM Forests and Carbon

All forests are not created equal. Some forests are far better at sequestering carbon than others.³ In terms of carbon storage, the famed old-growth forests of the Pacific Northwest (PNW) are among the best in the world.⁴ BLM's low-elevation forests in western Oregon have nearly year-round growing seasons, mild winters, available moisture, and disturbance regimes that allow long periods of carbon sequestration and accumulation. These highly productive forests store significant quantities of carbon⁵ and they have the capacity to store much more (depending on how they are managed).⁶



The darker the green, the older (and more carbon-dense) the forest. The lighter the green, the younger (and less carbon-dense) the forest. Federal public forestlands have the oldest forests and store the most carbon.

As a result of widespread clearcutting and slash burning, the PNW has already contributed more than its share of carbon to the atmosphere. During the 20th Century, vast areas of carbon-rich old-growth forests were clearcut and converted to carbon-deprived plantations. This occurred on both public and private forest lands. Millions of tons of carbon were transferred to the atmosphere. In fact, during the previous century, extensive logging of the productive forests of western Oregon and Washington caused carbon emissions from land use activities 100 times greater than the global average for similar sized areas.⁷

The good news is that the rate of carbon loss from northwest forests was significantly reduced in the mid-1990s with logging reductions resulting from listing of the spotted owl and the marbled murrelet under the Endangered Species Act, and the adoption of the Northwest Forest Plan.⁸ These policies have provided tremendous secondary benefits in terms of carbon storage. Extensive areas that were previously logged are now regrowing. The federal forests in Oregon are now absorbing more carbon than they are emitting, and there is a net flow of carbon from the atmosphere back into the forest—a valuable contribution to climate change mitigation. It will take more than 100 years to re-attain historic carbon stores in the region, and forest policies being debated today can either advance or retard this progress.

Efforts to Increase Logging

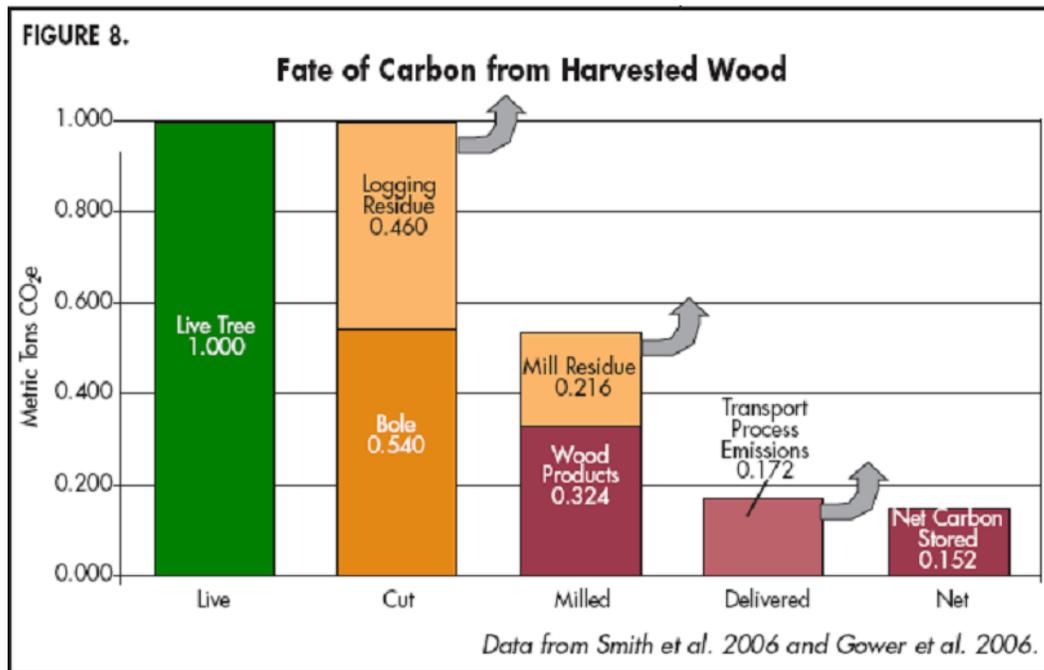
Current congressional efforts to increase logging in Oregon's federal forests threaten to curtail the carbon uptake now occurring. The intent of these legislative proposals is to shift current management away from conservation and toward increased logging. Any carbon benefits in proposed legislation are minor and offset by provisions that increase logging, especially clearcutting of productive forests that have significant growth potential. Logging will increase carbon emissions by “changing patterns of land use from uses that store more carbon per unit area to uses that store less carbon per unit area.”⁹

Carbon Consequences of Logging Policies

Increased federal forest logging will exacerbate climate change. Several analyses shed light on the question of how much carbon is emitted by logging versus sequestered by not logging:

- The more forests that are conserved, the greater the carbon benefits. The more we log, the more carbon is emitted to the atmosphere. Current efforts to increase logging come at a significant climate change opportunity cost. The forests of western Oregon, in particular, have tremendous potential to store carbon.¹⁰
- Over time old-growth forests store approximately twice as much carbon as forests managed on a 100 year rotation, and forests managed on a 50 year rotation store about 38% as much as old growth.¹¹ Recent science indicates that trees continue to grow and absorb carbon throughout their lives,¹² overturning a common myth that old forests are stagnant and decaying. In fact, old-growth trees continue to both absorb and store carbon as they age. Preserving older forests—and restoring younger ones—on federal lands is the only way to realize the carbon value of old forests, as the vast majority of non-federal lands are already committed to short-rotation forestry with adverse climate effects.
- BLM's own analysis shows that past decades of converting old-growth forests to plantations has reduced current stores of forest carbon on BLM lands in western Oregon by 149 million

tons (even after accounting for decades of forest regrowth on logged sites). Some of that carbon was converted into wood products, but most wood products do not last very long, so, of 149 million tons of carbon *missing* from the forest, only 11 million tons of that carbon remains stored in wood products today. This means that logging our public forests to make wood products resulted in approximately 13 times more carbon emissions than carbon storage. For every ton of carbon in wood products, there are 13 tons emitted to the atmosphere.¹³



- BLM estimates that logging approximately 500 million board feet (mmbf) per year would release 180 million net tons of carbon over the next century compared to letting the forests grow.¹⁴ This is equivalent to operating the 585 megawatt Boardman coal-fired power plant for 132 years (Oregon’s single largest point source carbon emitter), or adding one million cars to the road for 132 years. Carbon emissions from H.R. 1526 might be similar. Carbon emissions from S.1784 and S.2734 would be slightly less because they are estimated to produce 338-400 mmbf/yr.¹⁵
- Focusing on Oregon forests, Hudiburg et al (2013) found that intensified timber management like that proposed in the Wyden bill would result in a net increase in carbon emissions, even after accounting for carbon in wood products, reduced fire effects, and fossil fuel substitution effects.¹⁶
- A new report from Dr. Olga Krankina and the Geos Institute indicates that increased logging levels under the Wyden bill (S.2734) would increase carbon dioxide emissions (CO₂) into by approximately 2.7 million tonnes/year which is equivalent to about half of the annual emissions of the Boardman coal-fired power plant, Oregon’s largest point source of greenhouse gases.¹⁷

Policy Goals and Legal Authorities

Increased logging in the carbon-rich forests in western Oregon—as proposed in congressional legislation—conflicts with President Obama’s June 2013 Climate Action Plan¹⁸ which calls for:

- “Preserving the Role of Forests in Mitigating Climate Change: ... Conservation and sustainable management can help to ensure our forests continue to remove carbon from the atmosphere ...” (p 11);
- “Conserving Land and Water Resources: America’s ecosystems are critical to our nation’s economy and the lives and health of our citizens. These natural resources can also help ameliorate the impacts of climate change, if they are properly protected.” (p 15); and
- “Reducing Emissions from Deforestation and Forest Degradation: Greenhouse gas emissions from deforestation, agriculture, and other land use constitute approximately one-third of global emissions.” (p 18).

Other policies, such as Secretarial Order No. 3289¹⁹ and the U.S. government’s position on land use and forestry under the UN Framework Convention on Climate Change²⁰, also direct federal agencies to provide “strong incentives to remove carbon from the atmosphere through sound land management and to protect existing reservoirs of carbon, for example those in mature forests.”

Conclusion

To mitigate for past emissions and help avoid the worst consequences of climate change, BLM should devote the full productive capacity of their western Oregon lands for carbon sequestration. Any forgone opportunity to store carbon essentially imposes real economic costs on communities, industries, watersheds, and ecosystems near and far—and violates BLM’s legal mandates under the O&C Act, the Federal Land Policy & Management Act, and the Endangered Species Act.

Forests conserved for carbon storage and climate mitigation also provide many other public benefits and advance many other policy objectives, including clean water, flood control, fire hazard abatement, fish & wildlife habitat, soil conservation, slope stability, recreation, scenic vistas, and quality of life. Logging undermines climate goals and many of these other important policy objectives.

¹ The President’s Climate Action Plan, June 2013.

<http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>

² IPCC Fourth Assessment Report, Working Group I Report "The Physical Science Basis", Section 7.3.3.1.5 (p. 527) <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter7.pdf> (“Forest clearing (mainly in the tropics) is a large contributor to the land use change component of the current atmospheric CO₂ budget, accounting for up to one-third of total anthropogenic emissions (see Table 7.2; Section 7.3.2.1; also Table 7.1, row ‘land use change flux’).”)

³ See Christine L. Goodale, Michael J. Apps, Richard A. Birdsey, Christopher B. Field, Linda S. Heath, Richard A. Houghton, Jennifer C. Jenkins, Gundolf H. Kohlmaier, Werner Kurz, Shirong Liu, Gert-Jan Nabuurs, Sten Nilsson, And Anatoly Z. Shvidenko. 2002. Forest Carbon Sinks In The Northern Hemisphere. *Ecological Applications*, 12(3), 2002, pp. 891–899q 2002. http://www.whrc.org/resources/published_literature/pdf/GoodaleEcolAppl.02.pdf (“Over 80% of the estimated sink occurred in one-third of the forest area ...”)

⁴ Smithwick, E.A.H., M.E. Harmon, S. M. Remillard, S.A. Acker, and J.F. Franklin. 2002. Potential upper bounds of carbon stores in forests of the Pacific Northwest. *Ecological Applications* 12: 1303-1317. (“The C densities we measured in old-growth forests of the PNW are higher than C density values reported for any other type of vegetation, anywhere in the world. ... Results

showed that coastal Oregon stands stored, on average, 1127 Mg C/ha, which was the highest for the study area ... [T]he highest C density was at stand CH04 at Cascade Head, ORCOAST, with 1245 Mg C/ha.”)

⁵ Woods Hole Research Center 2000. National Biomass and Carbon Dataset. <http://www.whrc.org/mapping/nbcd/index.html>

⁶ Smithwick et al (2002). (“... [T]he upper bounds of C storage in forests of the PNW are higher than current estimates of C stores, presumably due to a combination of natural and anthropogenic disturbances, which indicates a potentially substantial and economically significant role of C sequestration in the region. Subtracting estimates of current forest C storage from the potential, upper bound of C storage in this study, a maximum of 338 Mg C/ha (TEC100) could be stored in PNW forests in addition to current stores.”)

⁷ Harmon, M., Ferrell, W., and J. Franklin. 1990. Effects on Carbon Storage of Conversion of Old-Growth to Young Forests. Science. 9 February 1990.

⁸ Kelly, Peter. 2009. A Greenhouse Gas Inventory of Oregon’s Forests. Oregon Global Warming Commission. October 20, 2009. DNV Climate Change Services. <http://www.keeporegoncool.org/sites/default/files/meeting-supporting-files/A%20Greenhouse%20Gas%20Inventory%20of%20Oregon%E2%80%99s%20Forests.pdf>

⁹ Walker, James C. G., Kasting, James F. (1992/03). "Effects of fuel and forest conservation on future levels of atmospheric carbon dioxide." Global and Planetary Change 5(3): 151-189. (emphasis added) <http://hdl.handle.net/2027.42/30172>.

¹⁰ Depro, B., Murray, B., Alig, R., Shanks, A. 2008. Public land, timber harvests, and climate mitigation: quantifying carbon sequestration potential on U.S. public timberlands. Forest Ecology and Management. 255(3-4): 1122-1134. Alyssa V. Shanks. 2008. Carbon Flux Patterns on U.S. Public Timberlands Under Alternative Timber Harvest Policies. MS Thesis. March 2008. http://ir.library.oregonstate.edu/dspace/bitstream/1957/8326/1/A_Shanks_Thesis_04%2002%2008_final.pdf

¹¹ Harmon, M., Ferrell, W., and J. Franklin. 1990. Effects on Carbon Storage of Conversion of Old-Growth to Young Forests. Science. 9 February 1990.

¹² Stephenson, N. L., A. J. Das, et al. 2014. Rate of tree carbon accumulation increases continuously with tree size. Nature | Letter (2014) doi:10.1038/nature12914 <http://www.nature.com/nature/journal/vaop/ncurrent/full/nature12914.html>; Janet Pelley 2009. Old-growth forests store a treasure trove of carbon. Environ. Sci. Technol., 2009, 43 (20), pp 7602–7603. <http://pubs.acs.org/doi/full/10.1021/es902647k>. Tara Hudiburg, Beverly Law, David P. Turner, John Campbell, Dan Donato, And Maureen Duane 2009. Carbon dynamics of Oregon and Northern California forests and potential land-based carbon storage. Ecological Applications, 19(1), 2009, pp. 163–180 <http://terraweb.forestry.oregonstate.edu/pubs2/Hudiburg2009EA.pdf> (“Contrary to commonly accepted patterns of biomass stabilization or decline, biomass was still increasing in stands over 300 years old in the Coast Range, the Sierra Nevada and the West Cascades, and in stands over 600 years old in the Klamath Mountains.”)

¹³ BLM 2008. WOPR FEIS Figures 3-17 (p 3-221) and Figure 3-18 (p 3-224).

¹⁴ BLM 2008. WOPR FEIS, Table 4-6, p 4-538.

¹⁵ Norm Johnson, Table 1, 11-22-13 (with assistance from BLM Staff). Also, Wyden office, Section-by-Section Analysis of S.2734.

¹⁶ Tara W. Hudiburg, Sebastiaan Luyssaert, Peter E. Thornton, and Beverly E. Law 2013. Interactive Effects of Environmental Change and Management Strategies on Regional Forest Carbon Emissions. Environ. Sci. Technol. 2013, 47, 13132–13140 | dx.doi.org/10.1021/es402903u | http://terraweb.forestry.oregonstate.edu/pubs/Hudiburg%20Interactive%20effects%20of%20envl%20change%20and%20management_EST13.pdf

¹⁷ Krankina, O., DellaSala, D.A. 2014. Projected CO₂ Emissions Due to Increased Logging Under Senator Ron Wyden’s “Oregon and California Land Grant Act of 2013,” Geos Institute Research Note. http://geosinstitute.org/images/stories/pdfs/Krankina_OC_2014_09.pdf

¹⁸ The President’s Climate Action Plan, June 2013. <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>.

¹⁹ Secretary of the Interior. Secretarial Order No. 3289. September 14, 2009. <http://web.archive.org/web/20091001133221/http://www.doi.gov/climatechange/SecOrder3289.pdf>

²⁰ U.S. Department of State. 2000. U.S. Views on Land Use, Land-Use Change and Forests. Framework Convention on Climate Change. Fact sheet released by the Bureau of Oceans and International Environmental and Scientific Affairs. Aug. 1, 2000. http://www.state.gov/www/global/global_issues/climate/fs-000801_unfccc1_subm.html