DECLARATION OF DR. DOMINICK A. DELLASALA

*Addressing the climate impacts associated with logging on lands managed by Washington State Department of Natural Resources*

I, Dominick DellaSala, declare as follows:

1. My name is Dominick DellaSala, and I live in Talent, Oregon. I currently serve as Chief Scientist for Wild Heritage, based in Berkeley, California and I am the former President of the Society for Conservation Biology, North America Section. I hold a Ph.D. in Natural Resources from the University of Michigan, Ann Arbor, an MS in Ecology from Wayne State University, in Detroit, and a BS in Biology from Adelphi University, Garden City, New York. I make this declaration based on personal knowledge.

2. I have spent more than three decades studying forests and publishing peer reviewed research on forests, wildfire, and climate change. I am an author of over 300 scientific publications and 8 books on forest ecosystems, wildfire ecology, and climate change. And I have served as chief and managing editor of several leading scientific journals on forests and climate change, including how to best prepare for wildfires in a rapidly changing climate. Importantly, I served for two terms on Oregon Governor Kate Brown's Forest Carbon Task Force reporting to the governor, legislature, and Oregon Global Warming Commission on forestry emissions and carbon accounting methods. My current CV is appended to this declaration.

3. As part of my regular duties, I monitor, comment on, and provide expert support to various initiatives by government agencies and non-profit organizations seeking to protect and restore forest ecosystems for their climate and biodiversity benefits. At the request of Center for Sustainable Economy, Center for Responsible Forestry and Save the Olympic Peninsula I reviewed two programmatic documents that are at the heart of controversies over

the climate impacts of the logging program on Washington State Department of Natural Resources (DNR) lands. These documents include the Final Environmental Impact Statement (FEIS) for the 2015-2024 Sustainable Harvest Calculation (SHC FEIS), pages 3-7 to 3-13; 4-6 to 4-17, and (b) the FEIS for the 2019 HCP Long-Term Conservation Strategy for the Marbled Murrelet (HCP FEIS), pages 3-8 to 3-14; 4-6 to 4-14.

4. I also reviewed information and conclusions from several environmental checklists used by DNR to purportedly fulfill their obligations under the State Environmental Policy Act (SEPA) with respect to analysis of climate impacts. These include the environmental checklists associated with the Drop Tine, Red Adder, West Bell, Malarkey, Name that Harmony, Upper Jones, Corkey, Hopscotch and Plumb Bob timber sales. All but two of these timber sales include units that will log carbon-rich mature forests (~75 years and older) a forest type that I have studied and published on extensively in the Pacific Northwest[1]. Since these checklists contain identical language, my conclusions apply to all other checklists that DNR may publish that include this generic language.

5. For the reasons discussed below, I find that (a) there is no scientific basis in support of the programmatic documents regarding DNR's assertions that logging on their lands has no significant climate impacts; (b) the environmental checklists do not include any analysis of climate impacts, and (c) none of the programmatic documents or environmental checklists contain any indication that DNR considered reasonable alternatives and mitigation measures that would reduce these climate impacts.

[1]Strittholt, J.R., D.A. DellaSala, and H. Jiang. 2006. Status of mature and old-growth forests in the Pacific Northwest, USA. Conservation Biology 20:363-374; Krankina, O., D.A. DellaSala, et al. 2014. High biomass forests of the Pacific Northwest: who manages them and how much is protected? Environmental Management. 54:112-121; DellaSala D.A, et al. 2022. Mature and old-growth forests contribute to large-scale conservation targets in the conterminous United States. Front. For. Glob. Change 5:979528. doi: 10.3389/ffgc.2022.979528

6. With respect to climate impacts, there are three general categories associated with logging projects carried out by DNR: (a) greenhouse gas (GHG) emissions; (b) loss and degradation of carbon sequestration capacity and carbon stored in forests and soils, and (c) increased vulnerability to climate stressors.

7. GHG emissions associated with DNR logging projects are easy to understand and quantifiable using published sources.[2] Trees are half carbon by weight, and when they are cut down and turned into wood products most of the carbon contained in those trees is eventually returned to the atmosphere from decay of the slash, stumps, needles, other debris left over after logging, soil damages, and as the end use products are burned, decay, and are discarded into landfills. Multiple investigations in Washington, in other states, and nationally indicate that on average roughly 80% of the original carbon stored in trees is released into the atmosphere and landfills over a 100-year period through these processes, with much of that released within one or two years of logging. This contrasts with older forests and soils that draw down and store carbon for centuries.

8. In addition, carbon dioxide, methane, and nitrous oxide are released from several processes related to logging, including road building, use of mechanized equipment during logging, application of chemicals and fertilizers, slash burning, transportation of logs to mills energy use at mills, and transportation of finished wood products. Life cycle analysis (LCA)

[2] See, e.g. Law, B., Hudiburg, T.W., Berner, L.T., Kent, J.J., Buotte, P.C., Harmon, M.E., 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. *PNAS* April 3, 2018 115 (14) 3663-3668; Talberth, J., 2017. Oregon Forest Carbon Policy: Technical brief to guide legislative intervention. Portland, OR: Center for Sustainable Economy; Smith, J.E., Heath, L.S., Skog, K.E., Birdsey, R.A., 2006. Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States. Gen Tech. Rpt. NE-343. Morgantown, WV: USDA Forest Service, Northeastern Research Station; Harris, N.L., Hagen, S.C., Saatchi, S.S., Pearson, T.R.H., Woodall, C.W., Domke, G.M., Braswell, B.H., Walters, B.F., Brown, S., Salas, W., Fore, A., Yu, Y., 2016. Attribution of net carbon change by disturbance type across forest lands of the conterminous United States. *Carbon Balance and Management* 11 (24); Hudiburg, T., Law, B.E., Moomaw, W.R., Harmon, M.E., Stenzel, J.E., 2019. Meeting GHG reduction targets requires accounting for all forest sector emissions. *Env. Res. Ltrs.* 14(2019): 095005.

is the gold standard for quantifying all these logging related releases of greenhouse gases, which the Washington DNR did not conduct.[3]

9. Carbon sequestration capacity is permanently lost when via road building in productive forestlands that if actively maintained never reforest. Carbon sequestration capacity also is eliminated for well over a decade when stands are clearcut or via variable retention logging techniques because the carbon emitted from disturbed soils and logging slash is greater than any carbon captured by new growth during this period, which itself takes time for newly planted trees to establish.[4] Even after positive carbon sequestration is re-established by new growth, it can take centuries to recover the carbon storage levels once present in older forests and large trees, which are just entering their time of maximum carbon accumulation (i.e., the largest trees in the forest at about 75-80 years accumulate about 40% or more of all forest carbon present with another 40% or so of the carbon in undisturbed soils).[5]

10. When mature forests are cut down using clearcutting or variable retention techniques that increases the vulnerability of the area to a number of climate stressors, including blow down, increased risks associated with hazardous fuels, heat waves, drought, water shortages, landslides and flooding. For example, I was on a team that investigated 1500 wildfires over a three-decade period across 24 million acres in 11 western states[6]. Our team consistently found that logged areas burned more intensely than forests that are protected in

[3] Law et al., 2018; Hudiburg et al. 2019, Note 2.
[4] Turner, D.P., Guzy, M., Lefsky, M.A., Ritts, W.D., Van Tuyl, S., Law, B.E., 2004. Monitoring forest carbon sequestration with remote sensing and carbon cycle monitoring. *Environmental Management* 33(4): 457-466.
[5] DellaSala, D.A., Mackey, B., Norman, P., Campbell, C., Comer, P.J., Kormos, C.F., Keith, H., Rogers, B., 2022. Mature and old-growth forests contribute to large-scale conservation targets in the coterminous United States. Front. For. Glob. Change 5:979528. doi: 10.3389/ffgc.2022.979528.
[6] Bradley, C.M., C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States? Ecosphere 7:1-13.

wilderness, national parks, and roadless areas. Other studies in the region have since found that the older forests and large trees are more capable of resisting wildfires then younger trees.[7]

11. The programmatic documents I reviewed do not contain the information DNR would need to decide that its logging program has no significant climate impacts. There are four reasons for this. First, DNR has failed to adopt the correct methodology. In both the SHC FEIS and HCP FEIS DNR relied on a flawed methodology that compared the carbon emitted by logging with the amount of carbon stored in forest, soil, wood products in use, and wood products in landfills. Using this method, DNR erroneously concluded, "[u]nder each alternative, more carbon was sequestered than emitted in both the 2015-2024 period and over a five-decade period."[8] This same conclusion was then inserted into the cumulative effects section of the environmental checklists, presumably, to support the draft determinations of non-significance (DNS) of individual logging projects.

12. DNR's chosen methodology is clearly erroneous. Comparing carbon emissions associated with logging with the carbon being captured and stored by forests not cut down each year is like an analyst from the Bureau of Ocean Energy Management concluding that authorizing new offshore drilling platforms will have no climate impact because the ocean is absorbing more carbon than will be released. The reality is that climate change is happening because the gross accumulation of GHG emissions associated with human activities, including logging, have long ago exceeded the Earth's capacity to fully absorb these

[7] Lesmeister, D.B., et al. 2021. Northern spotted owl nesting forests as fire refugia: a 30-year synthesis of large wildfires. Fire Ecology https://fireecology.springeropen.com/articles/10.1186/s42408-021-00118-z
[8] SHC FEIS at 4-9.

emissions and are degrading that capacity further.[9] Because of human activities, atmospheric concentrations of GHG gases and radiative forcing (RF) continue to overheat the planet at an accelerated rate. All new sources of emissions and each new acre of foregone sequestration is contributing to the climate crisis.

13. Instead of erroneously comparing emissions associated with logging with carbon sequestered by forests each year, a credible climate impacts analysis would begin by evaluating the significance of logging related gross GHG emissions by themselves without reference to what is sequestered and stored elsewhere by ecosystems.

14. Secondly, in the context of the SHC and HCP FEISs, DNR did not actually report or decide the significance of logging related emissions. Instead, DNR simply compared the incremental changes in logging related emissions, carbon stored in various pools, and forest cover among several alternatives the agency considered in each FEIS relative to existing levels and then concluded that there were no significant impacts because there were no significant changes.[10] This specious technique hides information about the absolute value of emissions in any given year and led DNR to base its significance determination on these incremental changes and not the actual level of emissions. In the global climate emergency, it matters most what the atmosphere "sees" immediately in the form of gross emissions and all alternatives contribute to unnecessary logging emissions.

15. For example, in the SHC FEIS, changes in emissions attributable DNR's logging activities displayed are in Figure 4.2.1, page 4-10. Relative to existing conditions, this figure reports changes in logging related emissions of < 1,000,000 metric tons carbon over a ten-

[9] Friedlingstein, P., O'Sullivan, M., Jones, M.W., et al. Global carbon budget 2022. Earth Syst. Sci. Data, 14, 4811–4900, 2022. https://doi.org/10.5194/essd-14-4811-2022.
[10] SHC FEIS at 4-9; HCP FEIS at 4-13.

year period, or < 100,000 metric tons per year, implying a relatively small impact. In contrast, and according to Forest Inventory and Analysis (FIA) data for western Washington, logging on DNR lands removes on average 3,397,079 dry short tons of biomass every year, which translates into a carbon emissions footprint of roughly 1.2 million metric tons per year, or 4.4 million metric tons in carbon dioxide equivalent units (4.4 MMT CO2-e/yr) according to standard methods used by forest carbon scientists that deduct 20% of these removals for storage in long-lived wood products and landfills.[11] Statewide, emissions associated with logging are at least 25 MMT CO2-e per year (without adding other LCA contributions noted by Hudiburg et al. 2019, who estimated these emissions at 32 MMT $CO_2$-e/yr) making this sector the second most carbon intensive industry in the state according to the most recent statewide GHG inventory.

16. Because the SHC and HCP analyses focused on incremental changes among alternatives (< 100,000 tC/yr) and not absolute values (> 1,200,000 tC/yr), these documents cannot be used as a basis for assuming that DNR's logging program as a whole or individual logging projects have no significant direct, indirect, or cumulative effects.

17. Third, the SHC and HCP FEISs contain no information about the loss of carbon sequestration capacity associated with clearcutting and road building even though the agency has all the information needed to produce such estimates, for example, by multiplying the acres in recent clearcut condition or covered by logging roads in a given year by the amount of carbon dioxide that could have been captured if these areas were maintained in forested condition. Any reduction in the Earth's carbon sequestration capacity works to increase GHG

[11] USDA Forest Service, Forest Inventory and Analysis Program, Fri, 09 Dec 2022 21:27:56 GMT. Forest Inventory EVALIDator web-application Version 2.0.3. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: http://apps.fs.usda.gov/Evalidator/evalidator.jsp].

concentrations in the atmosphere and associated radiative forcing. Yet any discussion or analysis of these effects are entirely omitted by the FEISs.

18. Lastly, the SHC and HCP FEISs do not address the many ways DNR's logging program is making the land more susceptible to climate change. While the FEISs contain sections addressing the effects of climate change on DNR forestlands, there is no discussion or analysis of the additive impact of new clearcuts, logging roads on water quality, and dense tree plantations on wildfire risk, water shortages from removal of old forests needed to store and slowly release water in dry months, heat waves from loss of cooling effects of older forests, road and logging-related flooding and other climate stressors related to logging (e.g. invasive species).

19. For example, both FEISs acknowledge that wildfire risk will be increasing due to climate change but do not discuss or analyze how DNR's logging activities will increase that risk by converting structurally diverse mature, old growth and 'legacy' forests comparatively resistant to most wildfires into clearcuts and homogenous young timber plantations that include flammable logging slash and densely packed small trees that act as kindling in a fire. As an expert in this field, I know DNR has the capability of determining how its logging projects are affecting the areal extent and distribution of these high-risk fire zones and assessing what degree of risk they may pose to nearby communities and infrastructure. As another example, it is well established that landscapes dominated by clearcuts, logging roads, and timber plantations burn more severely in wildfires[12] and produce far less water (~50%)

[12]Bradley et al. 2016. Ibid; Zald, H.S.J, and C. Dunn. 2018. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. Ecol Applic. First published 26 April 2018 https://doi.org/10.1002/eap.1710

than natural forests during summer dry seasons.[13] More DNR logging means less water for domestic, agricultural, and other beneficial uses. And water shortages will only get worse as climate change unfolds in places. The FEISs are silent on this connection.

20. For the foregoing reasons, the SHC and HCP FEISs cannot and should not be used as a substitute for analysis of climate impacts at the project level or for determining that such projects will have no significant climate impacts.

21. Despite this, DNR has precisely done that in the project level environmental checklists I reviewed. All the environmental checklists contain identical information under the headings "Cumulative Effects" and "Air Quality." Under the Cumulative Effects section, the environmental checklists merely reiterate findings from the two FEISs and state that DNR lands sequester more carbon than is emitted by management activities. There is no further discussion or analysis of the climate impacts of the projects. Under the Air Quality heading, DNR simply acknowledges that project activities will generate GHG emissions but fails to quantify them or identify their sources along the wood products life cycle. Without quantifying GHG emissions associated with these projects, there is no way to make an informed decision with respect to their significance.

22. My last point is that nothing in the SHC FEIS, HCP FEIS, or environmental checklists indicate that DNR considered reasonable alternatives and mitigation measures that would reduce these substantial and avoidable climate impacts. As previously noted, the SHC and HCP FEISs did not consider a true 'no action' alternative that would represent what could be achieved if all DNR forestlands were managed for carbon storage and climate resiliency by letting DNR forests grow and reach their maximum ecological and carbon

[13] Perry, T. D., Jones, J.A., 2016. Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest, USA. Ecohydrology. 1-13.

potential. Nor did DNR consider the climate benefits of no action alternatives in the context of the checklists. None of these documents include mention of any other alternative designed to reduce climate impacts, such as through prohibitions on logging mature and old growth trees, eliminating new road construction, and using variable density thinning and other low impact techniques instead of more intensive methods such as clearcutting and variable retention harvest.

I declare that the foregoing is true and correct.

Dated this 11th day of December 2022 at Montreal, Canada where I am attending the UN global biodiversity summit.

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DOMINICK DELLASALA