(carbon)plan

SEP 30, 2025

Mr. Jordan Wildish
Department of Ecology
300 Desmond Drive SE
Lacey, WA 98503

RE: Additional comments pertaining to US Forest Protocol Draft rule language

Dear Mr. Wildish:

Thank you for the opportunity to comment, for a second time, on the Department of Ecology's Draft US Forest Protocol (hereinafter, "Draft Protocol").[1] Throughout this comment, I will also refer to a document that provides additional justification for Ecology's proposed changes (hereinafter, "Justification Document").[2]

Much of this comment relates to concerns I raised in the last round of public comment.[3] This letter highlights shortcomings that remain in Ecology's proposed approach to calculating the risk of wildfire and disease/insect to forest carbon. First, I discuss Ecology's spatially explicit estimates of these natural risks. Second, I discuss the inadequacy of Ecology's proposed approach to accounting for how management actions might lower these reversal risks. I conclude by answering a question posed by Ecology concerning tonne-year accounting.

My technical feedback underlies an overarching concern: the Draft Protocol contains numerous provisions that conflict with the best available science, and Ecology does not offer justification for these departures. In its current form, the Draft Protocol cannot meet the statutory requirement that all offsets are real and permanent.[4] This leaves Ecology's offset program vulnerable to legal challenge.

The best available science tells us that huge expanses of forest across the western US are no longer in equilibrium with the modern climate. More frequent and severe wildfires and hotter, more deadly droughts promise to significantly erode the forest carbon sink across the West.[5] The future of carbon storage in western forests is especially relevant to Ecology, as forest offsets within its program must either provide direct environmental benefits to the state or occur within a linked jurisdiction.[6] For the immediate future, that means Ecology can expect most, if not all, of its forest offset projects to occur across the

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1 Washington Department of Ecology, Draft U.S. forest protocol (Sep. 5, 2025).

2 Washington Department of Ecology, Proposed revisions to U.S. Forest Protocol (Sep. 5, 2025).

3 Grayson Badgley, RE: Comments pertaining to US Forest Protocol Draft rule language (Aug. 18, 2025).

4 RCW § 70A.65.170(2)(b).

5 *See, e.g.,* Jazlynn Hall et al., Forest carbon storage in the western United States: Distribution, drivers, and trends, *Earth's Future* (2024); William R. Anderegg et al., Future climate risks from stress, insects and fire across US forests, *Ecology Letters* (2022).

6 RCW § 70A.65.170(2)(a).

American West. That requires that Ecology carefully and conservatively assess the risks these forests will face in the decades to come.

The best available science does not naturally lead to the use of a buffer pool as a policy mechanism. Ecology has chosen to use a buffer pool, and must explain how it arrived at this decision. While it may be tempting to argue that "other offset programs use this approach," this would ignore the profound uncertainty surrounding what forests of the future might look like. Given this uncertainty, Ecology should go to great lengths to demonstrate the conservative nature of its choices about the design of its buffer pool.

To be clear, I am not suggesting that Ecology must have perfect knowledge before acting. Science continually grapples with questions that defy simple characterization. Our understanding of the world is always incomplete and no model is perfect. However, the existing body of evidence makes clear that the world's forest carbon sink is poised for significant change as the planet warms. In the face of this evidence, Ecology's approach to its buffer pool lacks clear scientific justification. Critical values, such as the risk of wildfire reversal over the next 100 years, or the amount that management actions can reduce carbon losses, are unjustified and even *contradict* what the best available science tells us.

In its Justification Document, Ecology asserts its belief that "the approach outline[d] is a significant advancement from prior versions of our adopted protocol[.]"[7] While that may be true, the authorizing statute requires Ecology to adopt a protocol that ensures real and permanent emissions reductions, not merely a "significant advancement" from earlier protocols, like those developed by the Climate Action Reserve and the California Air Resources Board. While Ecology isn't responsible for the inadequacy of existing protocols, the law unambiguously requires it to stand up a program that works, rather than simply adhering to or improving upon precedent.

01 — Unjustified reversal risk numbers

Ecology's Draft Protocol contains estimates of carbon reversal risk from wildfire and disease/insect that have little or no scientific justification. Ecology proposes capping the risk of wildfire reversal, over the next 100 years, at 12 percent, without justification or citation. Ecology again proposes that the risk of disease/insect reversal, over the next 100 years, is no more than 8 percent, without justification or citation. Both choices appear to be arbitrary, and blatantly conflict with the scientific literature.

Take the Sierra Nevada, for example. A growing body of literature shows that conifer forests in that region are poised for steep declines as the planet warms.[8] By one estimate, the maximum carbon carrying capacity of the region's forests could decline by as much as 75 percent before the end of the century.[9] These concerns have existed for years and, as early as 2013, were raised in the context of California's forest offset program.[10] However,

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[7] Justification Document *at* Revision 6.

[8] Avery P. Hill et al., Low-elevation conifers in California's Sierra Nevada are out of equilibrium with climate, *PNAS Nexus* (2023); Zachary L. Steel et al., Mega-disturbances cause rapid decline of mature conifer forest habitat in California, *Ecological Applications* (2022).

[9] Alexis A. Bernal et al., Biomass stocks in California's fire-prone forests: mismatch in ecology and policy, *Environmental Research Letters* (2022).

[10] Matthew D. Hurteau et al., Aligning ecology and markets in the forest carbon cycle, *Frontiers in Ecology and*

Ecology contends that the combined reversal risk of wildfire, drought, and disease/insect could be as low as 6.5 percent (after accounting for vegetation management deductions) in parts of the Sierras. How does Ecology explain such a stark contrast?

The same goes for assigning a maximum risk value of 8 percent for disease/insect risk. Counterexamples abound, with pests like the emerald ash borer and *Phytophthora ramorum* (the cause of sudden oak death) immediately coming to mind. These diseases threaten the functional extinction of whole species of trees. Yet, Ecology's approach suggests that vegetation management activities could render those risks as low as 4 percent. Again, how does Ecology explain such a stark contrast?

Furthermore, Ecology has failed to adequately disclose the methods used to arrive at its wildfire and disease/insect risk values. At present, Ecology's description of its method consists of just two sentences in its Justification Document.[11] This falls short of the scientific standard that an expert reader should be able to reproduce an analysis on the basis of its disclosed methods.

Having access to Ecology's methods would help resolve outstanding questions I have about its approach. For example, the Welsh Creek - Franklin D Roosevelt Lake HUC10 that lies just north of Wilbur, WA has a lower risk value than its neighboring watersheds. How should I understand this incongruity? Does the lower value result from the Columbia River running through the middle of the polygon? Or is the difference attributable to how Ecology's approach treats fire risk as a function of landcover? It's nearly impossible to understand such patterns without additional details about Ecology's approach.

Similarly, I find myself wondering if Ecology's risk values account for the disparity between credited carbon and onsite carbon. Ecology's Draft Protocol only credits a fraction of onsite carbon and, of that credited carbon, only a fraction is placed into the buffer pool. In contrast, Ecology evaluates reversals on the basis of total onsite carbon. This results in an incongruity where the total carbon subject to reversal by definition exceeds the amount of carbon used as the basis for capitalizing the buffer pool.[12] Reversal risk numbers that fail to account for this feature of Ecology's Draft Protocol will necessarily be too small. How does Ecology account for this dynamic?

02 — Unjustified risk management reduction numbers

Ecology compounds the apparent arbitrariness of its natural risk values by allowing projects to further reduce those risks by implementing unspecified management actions.[13] On the one hand, Ecology is right to point out that certain management actions can reduce the risk of wildfire and disease/insect carbon losses. But even a cursory review of the literature reveals there is little consensus as to the net effect of forest management on these risks. Instead, the literature shows that the effect of management on risk is highly context specific, requiring — at a minimum — careful consideration of the tree species and specific

the Environment (2012).

[11] Justification Document *at* Revision 6 (discussing input datasets and use of the FVS-FFE model).

[12] Grayson Badgley et al., California's forest carbon offsets buffer pool is severely undercapitalized, *Frontiers in Forests and Global Change* (2022), 11 (describing the implications of the difference between credited and onsite carbon in the context of California's forest offset program).

[13] Draft Protocol *at* § A.5.

risks involved. The literature similarly highlights that management actions sometimes don't work and can even result in unintentional increases in tree mortality.[14] In short, I am unable to find any literature that remotely suggests projects should be granted a blanket *50 percent* reduction in wildfire and disease/insect risks for simply implementing a "vegetation management plan."

The appearance of arbitrariness grows stronger when examining Ecology's revisions to the Draft Protocol between July 5 and September 15. In the July 5 version, Ecology proposes that implementing a vegetation management plan would allow projects to reduce wildfire and disease/insect risks by 80 percent. In the latest version, that figure decreases to 50 percent. Despite the magnitude of this change, Ecology offers no explanation for it, merely stating that "[r]evisions have been made to the buffer pool contribution deductions related to vegetation management plans."[15] On what basis did Ecology arrive at the original 80 percent value? What evidence caused Ecology to reevaluate that value to 50 percent? As far as I can tell, neither value derives from the scientific literature.

The risk reduction factors that a project can apply if it implements a management plan are all the more mysterious given that Ecology says almost nothing about what such plans would involve. As written, the Draft Protocol simply requires that a project have a vegetation management plan. It imposes no requirements that the management plan demonstrate that it would reduce wildfire or disease/insect risks. Similarly, the Draft Protocol has no provisions to ensure that those management activities stay in place for 100 years. If management actions are critical to lowering risk, those activities must take place for the project's full duration to ensure carbon storage over the long-term.

A functioning protocol would treat these types of natural risks conservatively. Unfortunately, Ecology's proposed approach falls short of that ideal and, instead, invites systematic underestimation of risk that could threaten the program's long-term solvency.

03 — Whether a tonne-year accounting approach could be used to quantify buffer pool withdrawals

No. Ecology should not consider adopting any form of tonne-year accounting in its offset program. By treating 100 years of carbon storage as permanent, the Draft Protocol already represents a significant compromise compared to the atmospheric lifetime of fossil CO_2.[16] Fossil CO_2 remains in the atmosphere for millennia, not just 100 years.[17] From a physical standpoint, Ecology has already heavily discounted the harms caused by fossil CO_2 by truncating its definition of permanent to encompass a mere 100 years. Adopting tonne-year accounting would only further erode Ecology's already weak definition of

[14] *See, e.g.,* Andrew M. Liebhold, Forest pest management in a changing world, *International Journal of Pest Management* (2012); Guillaume Moreau et al., Opportunities and limitations of thinning to increase resistance and resilience of trees and forests to global change, *Forestry* (2022); Michaela Roberts et al., The Effect of forest management options on forest resilience to pathogens, *Frontiers in Forests and Global Change* (2020).

[15] Justification Document *at* 5.

[16] Draft Protocol *at* §3.4.

[17] *See, e.g.,* David Archer et al., Atmospheric lifetime of fossil fuel carbon dioxide, *Annual Review of Environment and Resources* (2009); Raymond T. Pierrehumbert, Short-lived climate pollution, *Annual Review of Environment and Resources* 42: 341-79 (2014).

permanence. Treating temporary carbon storage as permanent, especially in the context of a compliance program where offsets substitute for otherwise real emissions reductions, will compromise efforts to stabilize global temperatures.[18] As such, there is no scientific justification for considering tonne-year accounting within its offsets program.

Sincerely,

Grayson Badgley
Research Scientist
grayson@carbonplan.org

[18] Danny Cullenward et al., Carbon offsets are incompatible with the Paris Agreement, *One Earth* (2023).