From: Old Sol <oldsolbees@gmail.com>
Sent: Wednesday, March 10, 2021 2:22 PM
To: Oregon GWC * ODOE <Oregon.GWC@oregon.gov>
Subject: Please reconsider the restrictive LCDC rules for utility scale solar

The caps imposed by the LCDC for solar on class 1 and 2 soils have severely hampered the growth of utility scale solar in Oregon. Dr Chad Higgins (OSU) research shows that we can produce all the power we need on as little as 1% of farm land. Farm land is where we need pollinator habitat the most due to intensive monoculture cropping. These large scale solar arrays offer a great opportunity to create long term pollinator habitat since the projects last on average 30 years. These rules were implemented with the notion of preserving farmland which is very important, and as a commercial beekeeper I couldn't agree more, however the LCDC rules are misguided since utility scale solar is really not a threat to farmland. On the contrary, when these sites are located on farm land they create stable diversification in farm income and help farms stay in business. The dual use model is known as agrivoltaics, and can be a great tool to reach our renewable energy goals and saving pollinators.

Thank you for your time and consideration.
John Jacob
President, Oregon State Beekeepers Association

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Old Sol Enterprises LLC
www.oldsolbees.com

Sent via form submission from *Keep Oregon Cool*

Name: Chong Kee Tan

Email Address: tanchongkee@gmail.com

Subject: Governor Brown's Executive Order 20-04

Message: Dear sirs and mdms,

I am a small farmer in Marion County Oregon. I'm writing to advocate for increasing the funding for local SWCDs through grants and assistance programs so that they can better help Oregonian farmers implement best farming practices to conserve natural resources, improve soil health, and sequester carbon.

In this late stage of climate change, we have to pull out all stops to have a chance of keeping global temperature rise to below 4 degrees. Agriculture is traditionally a large emitter of carbon, but we already have the technology to make it a net sequester of carbon instead. What is missing is a concerted effort to propagate such knowledge, and to incentivize farmers to adopt them quickly.

This is why I think they work you do is vital and urgent. Please support OrCAN's policy recommendations to combat climate change through regenerative agricultural practices.

Yours truly,
Dr Chong Kee Tan

TO: Oregon Board of Forestry
CC: Oregon Global Warming Commission
DATE: 3/23/21
RE: Written testimony on post-fire management
Agenda Item: No. 6
Santiam State Forest Restoration and Recovery

Dear Oregon Board of Forestry members,

Thank you for the opportunity to submit written testimony for the Board of Forestry (Board)'s March 3rd, 2021 meeting. We, the undersigned organizations, are participants in the Oregon Climate Action Plan (OCAP) coalition's forest policy sub-table, tasked with coordinating stakeholder advocacy around implementation of Governor Brown's Executive Order 20-04 (EO 20-04). Responsibly managing forests in the context of wildfire is directly tied to the directives highlighted in EO 20-04,[1] specifically to *"prioritize actions that reduce GHG emissions in a cost-effective manner,"* and *"prioritize actions that will help vulnerable populations and impacted communities adapt to climate change impacts."* Therefore, we are submitting written testimony in response to Agenda Item No. 2 — the Santiam State Forest restoration and recovery efforts.

The Oregon Department of Forestry's (ODF) heavy focus on post fire logging operations highlights the agency's revenue-driven approach to forest management over other values such as habitat, water quality, recreation, and climate. The Board's mandate, to "secure greatest permanent value," of state forest lands does not properly incorporate the need to address climate change — through reducing emissions from logging and through increasing the amount of carbon stored on the landscape.

The Santiam State Forest covers approximately 50,000 acres across Clackamas, Marion and Linn counties, and during the 2020 Santiam complex fire nearly a quarter of the state forest burned. ODF's hyper focus on post-fire logging in order to generate revenue from burned trees and rapid replanting in order to support future logging demonstrates the imbalance of the agency's priorities. Many of the areas targeted for post-fire logging include older forests (which store the most carbon), and stands that are designated as HCA's under the HCP. The inadequate decision making process for the original Santiam post-fire recovery plan cast aside considerations for carbon storage, climate change, and biodiversity — all of which should be key factors in forest management decisions. We are pleased that the Board and ODF are working to revise the original plans, with better attention to these key considerations — but the plan still falls far short of maximizing objectives, with an ongoing overemphasis on post-fire logging. We would like to

[1] EO 20-04. https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

encourage the Board to go further, and reconsider the underlying policies and practices that led to such a poorly constructed original plan.

ODF, with guidance from the Board, must modernize its approach to both managing forests for wildfire risk, and restoring forests following a wildfire. It is the Board's responsibility to ensure that ODF uses its management authority in a manner that is ecologically appropriate, watershed-wise, and climate responsible, with consideration for not just short-term revenue, but the enduring values of these forestlands. The following two sections in this testimony outline key considerations and specific policy recommendations for 1) post-fire, ecologically appropriate restoration, and 2) protecting communities from the threat of wildfire.

Ecologically appropriate post-fire restoration

Logging in general is a far more significant source of greenhouse gas emissions than wildfire, particularly on the west-side of Cascades. And while wildfire does cause carbon emissions, only 5-10 percent of stored carbon is emitted compared to over 50 percent emitted by logging.[2] In addition, fire is a natural process that supports a diversity of ecosystems across a landscape. Leaving burned trees on the landscape allows the carbon they contain to remain stored for decades, and released slowly through natural decomposition, often transferring the remaining carbon to the soil.

If partially burned trees are harvested for timber, very little of the stored carbon will be contained in long-lived wood products. Approximately half of harvested carbon is emitted to the atmosphere soon after logging.[3] In Oregon, 65 percent of wood carbon harvested since 1900 has returned to the atmosphere, 16 percent is in landfills, and only 19 percent remains in long-term products.[4] And because much of a forest's carbon is stored in the soil (nearly 50 percent on average in Oregon's forests), soil disturbance from logging operations can release additional carbon that is challenging to re-sequester.[5]

Allowing forests to recover naturally following a wildfire also ensures complex forest structure with diverse vegetation, which in turn supports increased biodiversity. Removing burned trees and snags and replanting the forest with monoculture Douglas-fir can prevent development of

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[2] Law, B.E., Waring, R. 2015. Carbon implications of current and future effects of drought, fire and management on Pacific Northwest forests, Forest Ecology and Management. https://doi.org/10.1016/j.foreco.2014.11.023

[3] Harmon, M.E. 2019. Have product substitution carbon benefits been overestimated? A sensitivity analysis of key assumptions. Environ. Res. Lett. 14 065008. https://iopscience.iop.org/article/10.1088/1748-9326/ab1e95

[4] Hudiburg, T.W., Law, B.E., Moomaw, W.R., Harmon, M.E. and Stenzel, J.E. 2019. Meeting GHG reduction targets requires accounting for all forest sector emissions. Environ. Res. Lett. 14 095005. https://iopscience.iop.org/article/10.1088/1748-9326/ab28bb

[5] Christensen, G.A., et al. 2019. Oregon Forest Ecosystem Carbon Inventory: 2001-2016. https://www.oregon.gov/ODF/ForestBenefits/Documents/Forest%20Carbon%20Study/OR-Forest-Ecosystem-Carbon-2001-2016-Report-FINAL.pdf

this complex structure, harming fish and wildlife.[6] Further, if burned forests are allowed to keep their structural complexity, according to the Bureau of Land Management, they can develop old growth forest characteristics twice as fast[7] as dense, replanted forests, and old growth forests store far more carbon than young growth.

Burned landscapes are already at increased risk of sediment runoff, flooding, and landslides, but that risk is dramatically amplified by post-fire logging which disturbs the soil and removes standing trees that would otherwise help anchor soil until new vegetation regenerates. This can lead to even more sediment runoff which in turn can clog waterways, degrade fish habitat, and impact drinking water for local communities. Widespread planting of young, single aged, single species trees after large fires not only creates conditions that are conducive to future large fires,[8] but also leads to a significant increase in evaporative water demand which depletes summer streamflow and degrades fish habitat.[9] Overall, post-wildfire logging can hinder forest regeneration, does not reduce future fuel loads,[10] and can even increase future fire risk.[11]

However, while post-fire logging holds little ecological value, other post-fire restoration practices can help forests recover in an ecologically appropriate manner. Especially in dry forests, climate change is impacting fire regimes and leading to bigger fires and longer fire seasons. Combined with other ecological stressors, such as drought and invasive vegetation, and human caused stressors, such as fire exclusion, past timber harvest practices, livestock grazing, and water diversion, the ecological integrity of some forests can be undermined. Because resources for post-fire, ecologically appropriate restoration are limited, it is essential that managers use the best available science to determine when and where post fire recovery efforts are actually needed. For example, West of the Cascades there is little evidence that climate change is impacting the natural, infrequent fire regimes of our moist temperate rainforests.

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[6] Swanson, M.E., Franklin, J.F., Beschta, R.L., et al. 2010. The forgotten stage of forest succession: early-successional ecosystems on forest sites. Front Ecol Environ 2010; doi:10.1890/090157 https://www.fs.fed.us/pnw/pubs/journals/pnw_2010_swanson001.pdf and Donato, D.C., Campbell J.L, and Franklin J.F., 2012. FORUM Multiple successional pathways and precocity in forest development: can some forests be born complex? Journal of Vegetation Science 23 (2012) 576–584 http://people.forestry.oregonstate.edu/john-campbell/sites/people.forestry.oregonstate.edu.john-campbell/files/Donato_2012_JVS.pdf

[7] Bureau of Land Management 2008. Western Oregon Plan Revision Draft Environmental Impact Statement. https://www.blm.gov/or/plans/wopr/files/Science_Team_Review_DEIS.pdf

[8] Zald, H.S.J,. Dunn, C.J., 2018. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. Ecological Applications. Online Version of Record before inclusion in an issue. 26 https://phys.org/news/2018-04-high-wildfire-severity-young-plantation.html and Thompson, J.R, Spies, T.A., and Ganio L.M., 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences. PNAS. http://www.fs.fed.us/pnw/pubs/journals/pnw_2007_thompson001.pdf

[9] Perry, T. D., and Jones, J. A. 2016. Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest, USA. Ecohydrology http://onlinelibrary.wiley.com/doi/10.1002/eco.1790/full

[10] Leverkus, A.B. et al 2020. Salvage logging effects on regulating ecosystem services and fuel loads. Frontiers in Ecology and the Environment. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/fee.2219

[11] Donato, D. et al. 2006. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. Science 311(5759):352 https://www.researchgate.net/publication/7371922_Post-Wildfire_Logging_Hinders_Regeneration_and_Increases_Fire_Risk

Recommendations for post-fire recovery

1. Encourage fire-affected local communities to rebuild in a responsible, fire-wise manner that improves community safety and resilience to future wildfires.
2. Managers should focus efforts on the restoration or maintenance of essential ecosystem services, such as:
    a. Carbon storage and sequestration (e.g., promoting old growth forest characteristics),
    b. Water quality and quantity (e.g., preventing soil erosion and avoiding tree plantations),
    c. Soil productivity (e.g., ensure burned vegetation remains on the landscape), and
    d. Biodiversity (e.g., preserving habitat for at risk wildlife).
3. Focus on stabilizing watersheds by mitigating damage caused by past fire suppression (such as fire lines), limiting erosion using native fibers and native plants, and treating weeds. Other smart adaptations to deal with climate-driven shifts in precipitation and hydrology should include installing bigger culverts and decommissioning roads that increase the risk of erosion, mudslides, and peak stream flows.
4. Focus danger tree felling on imminent hazards located within 150 feet of high use areas, such as developed sites, parking lots, and paved roads. Do not remove felled danger trees from reserves, including the full extent of riparian reserves. If danger trees are removed, use them for restoration of streams and old clearcuts that lack large wood.
5. Retain all large wood to mitigate the shortage of snag habitat and for long-term ecological benefits and carbon storage. Fires create an apparent abundance of snags, but that is misleading because snags are ephemeral; the abundance of snags is short-lived and hides the fact that after those snags fall down, there will be a long-term shortage of snags that lasts until large trees regrow. Post-fire logging will exacerbate the expected shortage of snags.

Avoid the following post-fire practices:

1. Avoid post-fire logging. Post-fire logging can have significant negative impacts on water quality, fish and wildlife habitat, and forest successional trajectories. If post-fire logging is deemed necessary, managers should focus on removing trees that pose a threat to infrastructure, such as power lines and roads.
2. Avoid removal of live, green trees. Surviving trees can help to rebuild the ecosystem and can serve as a legacy structure and a recruitment pool for future large trees and snags.
3. Avoid road construction, including temporary roads, as they have long-term impacts on watersheds, soil, and vegetation, can introduce invasive weeds, and fragment habitat. Many watersheds are already damaged by hundreds of miles of hastily constructed firelines.

4. Avoid dense, monoculture replanting. Such practices can create hazardous fuel conditions and truncate development of a desired complex early seral forest. If replanting is deemed necessary, replant diverse species in patches, at low density, far from existing seed sources. In drought impacted areas of the state, selecting more drought-tolerant species to plant may help forests recover.

Protecting communities from the threat of wildfire

Most large fires are driven by extreme weather conditions – high temperatures, low fuel moisture, high winds and drought – and so our rapidly changing climate, coupled with a massive expansion of homes into fire-prone areas, will increasingly influence the extent and impacts of fire in the West. To address these issues, studies suggest focusing on treatments in the home ignition zone is a more effective strategy than logging operations in more distant forested regions.[12] Factors such as the type of materials homes and buildings are made of and the design and maintenance of our infrastructure are huge factors in determining residential losses,[13] and addressing these factors is the best use of limited funding.

While some small-diameter tree thinning can reduce fire intensity when coupled with burning of slash debris under appropriate conditions,[14] recent evidence shows intensive forest management characterized by young trees and homogenized fuels burn at higher severity.[15] Reduced forest protections and increased logging tend to make wildland fires burn *more* intensely.[16] Studies have clearly demonstrated that increased wildland logging is *not* an effective strategy for reducing a community's wildfire risk. The extremely low probability (less than 1 percent)[17] of thinned sites encountering a fire especially limits the effectiveness of such activities to forested areas near homes.

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[12] Calkin, D.E., et al. 2014. How risk management can prevent future wildfire disasters in the wildland-urban interface. Proc. Nat. Acad. Sci. 111: 746-751. https://www.pnas.org/content/111/2/746

[13] Calkin, D.E., et al. 2014. How risk management can prevent future wildfire disasters in the wildland-urban interface. Proc. Nat. Acad. Sci. 111: 746-751. https://www.pnas.org/content/111/2/746

[14] Perry, D.A., et al. 2004. Forest structure and fire susceptibility in volcanic landscapes of the eastern High Cascades, Oregon. Conservation Biology 18: 913-926. http://www7.nau.edu/mpcer/direnet/publications/publications_p/files/Perry_et_al_2004.pdf and Strom, B.A., and P.Z. Fulé. 2007. Pre-wildfire fuel treatments affect long-term ponderosa pine forest dynamics. International Journal of Wildland Fire 6: 128-138. https://www.fs.fed.us/rm/pubs_other/rmrs_2007_strom_b001.pdf

[15] Zald, H.S.J., and C.J. Dunn. 2018. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. Ecological Applications 28:1068-1080. doi: 10.1002/eap.1710. https://pubmed.ncbi.nlm.nih.gov/29698575/

[16] 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 USA? Ecosphere 7: article e01492. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.1492

[17] Schoennagel, T., et al. 2017. Adapt to more wildfire in western North American forests as climate changes. Proceedings of the National Academy of Sciences of the USA 114: 4582–4590. https://www.pnas.org/content/114/18/4582

Further, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. This is an ecologically inappropriate strategy for thinning, as it can severely degrade the resilience of ecosystems already stressed by the impacts of climate change — such as heat waves and more frequent drought. The shade and healthy root system provided by large mature trees helps retain moisture in the soil, and keep rivers and streams cool as fish also contend with more severe impacts.

Mechanical thinning also results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that almost always exceed those of wildfire emissions.[18] As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined.[19] And, unlike logging, fire cycles nutrients and helps increase new forest growth. Thinning across broad landscapes is costly, by some estimates $2,000 per acre, and also causes collateral damage to the ecosystem from increased road building, creating pathways for the introduction of invasive species and more human entry and more ignitions.[20]

<u>ODF should align its actions with sound strategies for wildfire risk reduction</u>

1. Increase emergency planning and preparedness for rural communities located in and near forested areas. Well established evacuation routes, designated "safe" areas where people can shelter in place, and established channels of communication where residents can go for trusted information can save lives and property.
    a. Wildfire information should be made available in Spanish and other Indigenous Latin American languages to ensure that our most vulnerable populations, including migrant and Latinx communities living and working in rural areas, are prepared for fire emergencies. ODF could coordinate with and provide financial and technical support to community-based organizations already serving Latinx populations to disseminate information and increase preparedness.[21]
2. Increase fire-wise home hardening and retrofitting (i.e., application of construction design and materials that are fire resistant). Hardening homes to fire can be > 95% effective at preventing structure loss. Wind-driven fire events can ignite homes from

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[18] Hudiburg, T.W., et al. 2013. Interactive effects of environmental change and management strategies on regional forest carbon emissions. Environmental Science and Technology 47: 13132-13140. https://europepmc.org/article/med/24138534 and Campbell, J.L., M.E. Harmon, and S.R. Mitchell. 2012. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Frontiers in Ecology and Environment 10: 83-90. https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/110057

[19] Harris, N.L., et al. 2016. Attribution of net carbon change by disturbance type across forest lands of the conterminous United States. Carbon Balance Management 11: Article 24. https://cbmjournal.biomedcentral.com/articles/10.1186/s13021-016-0066-5

[20] Balch et al 2017. Human-started wildfires expand the fire niche across the United States. National Academy of Sciences. https://doi.org/10.1073/pnas.1617394114

[21] Alai Reyes Santos. Oct. 22, 2020. Fires shed light on marginalized groups. Available at https://www.registerguard.com/story/opinion/columns/2020/10/22/fires-shed-light-marginalized-groups/5999702002/.

flying embers miles ahead of the fire front, and there are examples of home burning even though the actual fire was never in direct contact with the buildings.

3. Reduce fuels in the home ignition zone. Reducing fuels in close proximity to houses (within 200 feet of the home) can help protect property from damage in the event of a fire.
4. Limit new development in high-risk areas. It is critical that land use planners account for the increased risk of wildfire. Building homes in fire adapted ecosystems carries risk, and developers and landowners need to be made aware of this risk.
5. Ensure disadvantaged communities have equal access to resources. It is the most vulnerable populations that carry the highest costs when a fire impacts a community. Investing in air filtration systems for disadvantaged communities is an affordable and effective way to ensure vulnerable people have a safe space to shelter from smoke inhalation and the associated health impacts.
6. Use ecological fire management to restore natural fire regimes in appropriate areas. In the West, the health of some forest ecosystems has declined as a result of past fire suppression. Restoring natural fire regimes, through a place-specific combination of ecologically appropriate thinning and prescribed fire, should be a priority for land managers as they seek to restore ecological health.
7. Avoid or minimize actions that increase fire hazard such as clearcutting and dense monoculture replanting. Encourage more thinning and longer rotations on plantations as these forest management strategies will reduce the proportional area of forest in the most vulnerable dense, young fuel conditions.

We hope that the Board and ODF will strive to implement near-term policy solutions that position Oregon as a world leader in climate-smart forest management and carbon sequestration and storage — including climate-smart management of our forests in the context of wildfire. In order to confront the threat of climate change, we must ensure the scope and scale of our solutions match the magnitude of the challenge.

Sincerely,

Lauren Anderson
Forest Climate Policy Coordinator
Oregon Wild

Felice Kelly, Ph.D.
Co-lead, Forest Defense Team
350PDX

Joseph Vaile
Climate Program Director
KS Wild

Grace Brahler
Oregon Climate Action Plan & Policy Manager
Beyond Toxics

Catherine Thomasson, MD
Chair Environmental Caucus
Democratic Party of Oregon

TO: Oregon Board of Forestry
CC: Oregon Global Warming Commission
DATE: 3/23/2021
RE: Written testimony on woody biomass for energy production
Agenda Item: No. 7
Oregon Global Warming Commission – Natural and Working Lands Goal Update

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Dear Oregon Board of Forestry members,

The below letter summarizes the most recent literature concerning the challenges of using woody biomass for energy production, and offers recommendations for best practices. We are concerned that the current objectives outlined in Goal G — the Oregon Department of Forestry's climate change goal — do not reflect the best available science on woody biomass and climate change mitigation.

Currently, Goal G directs ODF to:

- Advocate for public and private forestland biomass to be considered on an equal basis with other renewable energy sources and as a key component of Oregon's strategy for meeting state greenhouse gas reduction and renewable energy portfolio standard policy goals.
- Continue to support research and develop policies and incentives that will drive the growth of the biomass/ bioenergy/ bio-based products industry in the state.

These objectives misrepresent the carbon benefits of using woody biomass for energy production, and fail to account for the numerous environmental and equity challenges associated with biomass. An updated review of the best available science invalidates the case for treating all woody biomass "on an equal basis with other renewable energy resources" and the need for agency incentivization of biomass.

These issues with biomass *must* be addressed in the revision of Goal G, in order to ensure that the burning of woody biomass does not exacerbate the climate crisis, endanger vulnerable communities, or degrade ecosystems and biodiversity in Oregon. We recommend that the agency take the following policy recommendation into account with regards to biomass as they revise Goal G:

Do not define biomass as carbon neutral

Woody biomass emits significant amounts of carbon when burned to produce energy. A detailed analysis of biomass energy generation commissioned by Massachusetts, the Manomet Study, compared the lifetime greenhouse gas effects of a continuous harvesting and replanting scenario to burning natural gas to generate the same energy. This analysis showed that, considering the first 35 years of operation, the biomass plant would have one and a half times the net CO2 emissions of a natural gas plant generating the same amount of energy.[1] Based on this study and many others,[2] incentivizing biomass energy generation will put Oregon *further behind* on its current 2050 greenhouse gas goals, which aim to reduce greenhouse gas emissions in the state by at least 45 percent below 1990 levels by the year 2035, and by 80 percent by 2050.[3]

Advocates of the biomass-as-carbon-neutral policy claim that when biomass is removed from the forest and combusted for energy, the emitted carbon is eventually re-sequestered by the forest's regrowth; however, this stance does not account for the long time lag between the immediate short-term of release of carbon emissions from logging and combustion of the wood products, and the long-delayed tree regrowth and recapture of carbon in the ecosystem. The carbon stocks of forests are a result of two factors: carbon capture by biomass growth and the duration of carbon in biomass.[4] Therefore, the longevity of trees in the forest matters a great deal in terms of maximizing carbon benefits.

Further, there is no guarantee that replanted trees will eventually reach the same maturity as those that were cut down — drought, fire, insects, climate change, or land use conversion could prevent the same level of sequestration even in the long-term.[5] And because much of a forest's

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[1] Manomet Study 2018. https://www.manomet.org/wp-content/uploads/2018/03/Manomet_Biomass_Report_Full_June2010.pdf

[2] McKechnie J, Colombo S, Chen J, Mabee W and MacLean H L 2011 Forest bioenergy or forest carbon? Assessing trade-offs in greenhouse gas mitigation with wood-based fuels Environ. Sci. Technol. 45 789–95 https://pubs.acs.org/doi/abs/10.1021/es1024004,
Bernier P and Paré D 2013 Using ecosystem CO2 measurements to estimate the timing and magnitude of greenhouse gas mitigation potential of forest bioenergy *GCB Bioenergy* 5 67–72 https://onlinelibrary.wiley.com/doi/full/10.1111/j.1757-1707.2012.01197.x,
Walker T, Cardellichio P, Gunn J S, Saah D S and Hagan J M 2013 Carbon accounting for woody biomass from massachusetts (USA) managed forests: a framework for determining the temporal impacts of wood biomass energy on atmospheric greenhouse gas levels J. Sust. Forest 32 130–58 https://www.tandfonline.com/doi/abs/10.1080/10549811.2011.652019,
Stephenson A L and MacKay D J C 2014 Life Cycle Impacts of Biomass Electricity in 2020 (London: UK Department of Energy and Climate Change) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf, and
Laganière J, Paré D, Thiffault E and Bernier P Y 2017 Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests GCB Bioenerg. 9 358–69 https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12327.

[3] EO 20-04 https://www.oregon.gov/gov/Pages/carbonpolicy_climatechange.aspx

[4] Köhl M., Neupane P.R., Lotfiomran N. 2017. The impact of tree age on biomass growth and carbon accumulation capacity: A retrospective analysis using tree ring data of three tropical tree species grown in natural forests of Suriname. PLoS ONE 12(8): e0181187. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0181187

[5] Duffy, Moomaw, Schlesinger et al 2016. Scientists letter to Congress about carbon neutrality of biomass energy. 2-22-2016. http://whrc.org/letter-to-the-senate-on-carbon-neutrality/

carbon is stored in the soil (nearly 50 percent on average in Oregon's forests), disturbance can release additional carbon that is also challenging to re-sequester.[6] These near term greenhouse gas emissions are a serious problem from a climate change perspective. Even if the forest someday recovers the carbon emitted decades earlier by biomass combustion, there is no way to mitigate the warming that occurred during the lag period due to the excess CO2 released into the atmosphere.

Avoid impacts to vulnerable communities

EPA data shows that even the best-performing biomass plants produce as much or more air pollution as a similar-sized coal plant.[7] These pollutants include nitrous oxide that generates ozone, small particulate matter that drives lung inflammation, volatile organic compounds, and other harmful compounds. The American Lung Association "does not support biomass combustion for electricity production" and "strongly opposes the combustion of wood and other biomass sources at schools and institutions with vulnerable populations."[8]

Air pollution is clearly linked to decreased lifespan, causing more than 100,000 early deaths in the United States every year.[9] Power plants are often located in low income and minority neighborhoods, and so the effects of air pollution are unequally distributed in ways that perpetuate historical environmental injustices. Black Americans have the highest mortality rate from exposure to fine particle air pollution.[10]

Avoid negative impacts to forest carbon storage and biodiversity

An expansion of industrial biomass for energy production also would lead to an increased demand for biomass fuel. This demand could be disruptive to existing Oregon industries that currently rely on the same raw materials, as new demand may not be fully met by mill and logging residue alone. Many of these alternative uses of waste are better for the climate — for instance, making particle-board from wood chips can lead to long-term carbon storage in furniture and subfloors. If the demand for clean chips leads to increased harvest through shorter rotations, deforestation, or the conversion of native forests to timber plantations, it will reduce

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[6] Christensen, G.A., et al. 2019. Oregon Forest Ecosystem Carbon Inventory: 2001-2016. https://www.oregon.gov/ODF/ForestBenefits/Documents/Forest%20Carbon%20Study/OR-Forest-Ecosystem-Carbon-2001-2016-Report-FINAL.pdf

[7] Partnership for Policy Integrity (2011). Air pollution from biomass energy. https://www.pfpi.net/air-pollution-2

[8] American Lung Association (2019). Policy Principle on Energy. https://www.lung.org/policy-advocacy/public-policy-positions/public-policy-position-energy#:~:text=The%20American%20Lung%20Association%20does,as%20construction%20and%20demolition%20waste

[9] Fann, N et al. (2012). Estimating the National Public Health Burden Associated with Exposure to Ambient PM2.5 and Ozone. Risk Analysis (32) 81-95. https://doi.org/10.1111/j.1539-6924.2011.01630

[10] Maninder, PS et al. (2019). Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography. *Environmental Science and Technology* (53) 14010–14019. https://doi.org/10.1021/acs.est.9b02527

carbon storage on the landscape and degrade the forest habitats that support biodiversity and the survival of some of Oregon's most important species.

If biomass is associated with large tree removal, road building, commercial logging, or meeting timber targets, this can have far-reaching ecological impacts that can negatively affect the area's biodiversity. Mature and old forest habitats are still quite rare compared to the conditions necessary to sustain healthy populations of Oregon native fish and wildlife. Expanded biomass energy development will make it harder to restore mature and old forests and perpetuate the creation of young forests that are already vastly over-represented on the landscape.

Avoid displacement of zero-emissions energy and ensure better environmental outcomes

Zero-emission energy resources, such as wind, solar, and geothermal are critical for decarbonizing the power sector. Oregon's decision makers should be focusing the state's resources on supporting the growth of these industries. Continuing to encourage and subsidize biomass energy infrastructure will compete with wind, solar and other carbon free energy sources for scarce resources needed to advance these critical technologies. Using the same amount of land area,[11] solar panels produce up to 80-times as much electricity as wood burning with no point source emissions at all.[12]

Define the scope of "renewable" biomass appropriately

Given that the U.S. Energy Information Agency estimates that for each 1 percent of forest biomass electricity added to current U.S. electricity production an additional 18 percent increase in U.S. forest harvest is required,[13] strict limits on the role of biomass electricity generation from woody debris are needed to avoid destruction of intact ecosystems and loss of old growth and late successional reserves, which hold far more carbon than the reseeded monoculture that would replace them if harvested. The following examples, while not comprehensive, highlight renewable (and environmentally appropriate) categories for woody biomass:

- Byproducts of wood or paper mill operations;
- Woody matter removed from within 100-200 yards of any man-made structure or campground for the purposes of hazardous fuels thinning;
- Thinned small diameter trees (<12" dbh) that are removed to restore fire adapted ecosystems; and,

[11] All energy infrastructure should be sited in a manner that minimizes impacts to the environment. See, e.g, Defenders of Wildlife 2012. Smart from the Start. https://defenders.org/sites/default/files/publications/smartfromthestartreport12_print.pdf

[12] Duffy, Moomaw, Schlesinger et al 2016. Scientists letter to Congress about carbon neutrality of biomass energy. 2-22-2016. http://whrc.org/letter-to-the-senate-on-carbon-neutrality/

[13] Duffy, Moomaw, Schlesinger et al 2016. Scientists letter to Congress about carbon neutrality of biomass energy. 2-22-2016. http://whrc.org/letter-to-the-senate-on-carbon-neutrality/

- Logged residues such as slash piles that would otherwise increase wildfire risk or hinder ecologically appropriate restoration.

Use woody biomass for biochar production or as heating fuel locally

Some types of biomass, such as slash for logging operations, is too "dirty"[14] to be used in electricity generation, but can still be used to produce biochar. In addition to retrofitting existing biomass facilities, managers can also utilize biochar kilns[15] in the field to address the challenges of burning slash after logging operations. According to practitioners, "When compared to the pile burning method, this approach produces considerably less smoke, does less damage to the soil, is safer, extends the season possible for fuel reduction efforts, sequesters carbon, and yields biochar, a charcoal-like product made from organic material."

Where appropriate to reduce wildfire risk for communities, use wood waste as a source of biomass.

Oregon's communities that are in high wildfire risk areas should focus resources on community defense and emergency planning. Part of these defensible-space efforts can incorporate vegetation management near vulnerable infrastructure in order to establish a defensible zone for fire prevention. Vegetation waste can be transported to biomass facilities where it can be burned safely, or burned on site via biochar kilns. This vegetation removal should be focused in close proximity to infrastructure (specifically within 100-200 yards of a structure), as this is the most effective way to mitigate future wildfire risk.[16]

Conclusion

As the literature review and best practices above demonstrate, utilizing woody biomass for energy production in an environmentally responsible manner is challenging. In order for Oregon to meet its goals for reduction of near-term carbon emissions, preservation of intact forests for maximal carbon sequestration, water quality and quantity, wildlife conservation, and equity and justice, the state's decision makers must take a nuanced and cautious approach to any expansion of woody biomass energy production.

Sincerely,

[14] Forest residues are often unsuitable for use because of their high ash, dirt and alkali salt content. See: Brack, D. 2017. Research Paper Woody Biomass for Power and Heat Impacts on the Global Climate. Chatham House. https://www.chathamhouse.org/2017/02/woody-biomass-power-and-heat

[15] Utah State University 2019. https://forestry.usu.edu/news/utah-forest-facts/hazardous-fuels-reduction-using-flame-cap-biochar-kiln

[16] Cal Fire 2019. https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/

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TO: Oregon Board of Forestry
CC: Oregon Global Warming Commission
DATE: 3/23/2021
RE: Written testimony on revision of Goal G and climate-smart forestry
Agenda Item: No. 7
Oregon Global Warming Commission – Natural and Working Lands Goal Update

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Dear Oregon Board of Forestry members,

Thank you for the opportunity to submit written testimony for the Board of Forestry (Board)'s March 3rd, 2021 meeting. We, the undersigned organizations, are participants in the Oregon Climate Action Plan (OCAP) coalition's forest policy sub-table, tasked with coordinating stakeholder advocacy around implementation of Governor Brown's Executive Order 20-04 (EO 20-04). Our submission therefore focuses on the Board's work plan for 2021, updating Goal G in the Forestry Program for Oregon, and the need for concrete agency actions beyond Goal G. These actions include policy development, rulemaking proposals, and incentive programs. We are disappointed in the progress the Board has made to date in implementing EO 20-04, especially the following aspect of the Board's work plan:

> *"Commensurate with the work plan item relating to the analysis of statutory authority, the plan entails a review and revision of Goal G in the Forestry Program for Oregon. Goal G reflects the Board's carbon and climate interests through the Forestry Program for Oregon. Revisiting this goal allows for the integration of new scientific information and contemporary values of the Board to guide the analysis of Departmental policies."*[1]

It is critical that the Board take action to slow the most dire impacts of climate change and safeguard against ongoing climate impacts. This requires a re-thinking of many of Oregon's land-management practices, especially the management of our carbon rich temperate forest ecosystems.

The Oregon Department of Forestry's (ODF) response to the directives in EO 20-04 could enable the state to harness the globally significant carbon sequestration and storage potential of Oregon's forests, and restore the ecological health and climate resiliency of our state's landscapes, the fate of which is intertwined with that of our forests and climate. It is essential that the greenhouse gas (GHG) emissions reduction targets stipulated in EO 20-04, as well as the directive to "[p]rioritize actions that will help vulnerable populations and impacted communities

[1] Agenda item 2. See, e.g. attachment 2, page 2 of 5. https://www.oregon.gov/odf/board/bof/20210106-bof-agenda.pdf

adapt to climate change impacts,"[2] are embedded in all aspects of agency planning. This necessarily includes revision of the Forestry Plan and specifically Goal G.

Revision of Goal G, however, is not and should not be a substitute for meaningful policy. While an updated climate change goal can set an intention for Oregon to be a world leader in climate-smart forest management and carbon sequestration, this must be followed up with concrete agency actions to protect our forest ecosystems and communities for present and future generations of Oregonians.

The Best-available Science: How Oregon's Forests Can Address Climate Change

The two biggest steps Oregon can take to confront the global threat of climate change are to protect and grow its forests to sequester and store more carbon on the landscape, and reduce its greenhouse gas emissions from logging — its largest source of carbon emissions.

A growing scientific consensus has developed around two aspects of Oregon's ecosystems: (1) that they have an incredible potential for sequestering and storing atmospheric carbon; (2) that this potential is being significantly underutilized due to outdated forest management practices.

In its draft biennial report, the Oregon Global Warming Commission cites several of the leading studies in support of these propositions, which we summarize and supplement below:

- Diaz et al. 2018: Expanded riparian protections, increased green tree retention, and the extension of rotation ages can translate into substantially higher carbon storage than contemporary common practice for Douglas-fir management in the Pacific Northwest. The combination of forest practices required for FSC certification always stored more carbon than business-as-usual.
- Fain et al. 2018: On private forest lands west of the Cascades, extending harvest rotations,[3] maximizing utilization of harvested biomass, focusing on production of durable and long-lived wood products, and altering harvest practices to retain more live trees on-site, all could result in significant net carbon gains.
- Law et al. 2018: Reforestation, afforestation, lengthened harvest cycles on private lands, and restricting harvest on public lands in Oregon is projected to increase net ecosystem carbon balance by 56% by 2100, with the latter two actions contributing the most.
- Harmon 2019: Half of harvested carbon is emitted to the atmosphere almost immediately after logging.

[2] EO 20-04. https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf
[3] 80-120 years depending on assumptions about product longevity and substitution.

- Hudiberg et al. 2019: 65% of the forest carbon removed by logging Oregon's forests in the past 115 years has been returned to the atmosphere, just 19% is stored in long-lived products and 16% is in landfills.
- Houghton and Nassikas 2018: Letting forests grow and halting land conversions would bring carbon dioxide removal rates closer to current emission rates globally.
- Graves et al. 2020: Changes in forest-based activities including deferred timber harvest, riparian reforestation, and replanting after wildfires have the highest GHG reduction potential (76 to 94% of the overall potential annual reductions) among natural climate solutions (i.e., changes in land management, ecosystem restoration, and avoided conversion of habitats) in Oregon.
- Mildrexler et al. 2020: Large-diameter (≥21″ dbh) trees in eastside Oregon forests store disproportionately large amounts of carbon.

Based on a review of these studies and others, we have established a set of principles for developing climate-smart forest policy.

OCAP Forest Table's Guiding Principles for Climate-Smart Forest Policy

1. Use the best available science[4] for all forest management decisions, and focus on climate solutions that are durable and within each agency's control. Agencies should ensure all studies referenced during the decision-making process come from reputable academic and research institutions, have been subject to rigorous peer review, and that the funding for referenced studies remains independent of timber industry interests.
2. Ensure that vulnerable, disadvantaged and other impacted communities, including communities from geographic regions with a population largely composed of individuals who are low income, very low income, or persons of color, are given fair and equal access to the decision-making process.
3. Ensure that equity, justice and inclusion are considered alongside desirable environmental outcomes in any forest policy, and that agencies apply a climate and equity lens to budget and resource allocation requests.
4. Ensure forest management policies account for lifecycle greenhouse gas emissions. For example, policymakers have argued in the past that biomass is a carbon neutral fuel source, but the scientific literature demonstrates that near-term emissions from burning

[4] To achieve high-quality science, scientists should conduct their studies using what is known as the scientific process, which includes the following elements: a clear statement of objectives; a conceptual model, which is a framework for characterizing systems, making predictions, and testing hypotheses; a good experimental design and a standardized method for collecting data; statistical rigor and sound logic for analysis and interpretation; clear documentation of methods, results, and conclusions; and peer review. See, e.g. https://www.fws.gov/wafwo/fisheries/Publications/Fisheries3109.pdf

biomass undercut the validity of this argument and can directly hinder climate change mitigation efforts.[5]

5. Ensure forest management policies promote both near-term and long-term ecological health. Climate-smart forest management[6] should not be adopted as "one-size-fits-all" practices, but should be tailored for each climate and geographic sub-region. For example, some management, such as ecologically appropriate prescribed fires in Oregon's dry forests (preceded where necessary by thinning of small-diameter trees, may result in near-term emissions), but if done correctly could ensure ecological health[7] and better climate resilience in the long-term.
6. Ensure that the carbon benefits of any policy recommendation are quantifiable and account for both direct and indirect impacts to the carbon pool, including soil carbon, carbon in dead biomass, carbon in wood products and waste material from logging and processing.
7. Ensure that forest management practices optimize net carbon sequestration, storage, and stocks. Efforts to enhance carbon sequestration and grow Oregon's forest carbon sinks should be compatible with other ecological values, such as clean water, watershed protection and biodiversity conservation. Management practices must also benefit public health values such as clean drinking water, clean air and community safety from landslides and flooding. Agency cost-benefit analyses and other decision-making processes should incorporate a social cost of carbon that reflects Oregon's high vulnerability to climate change (i.e. assume both a social cost of carbon at the high-end of estimates and a low-range discount rate).[8]

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[5] See, e.g. Mark Jacobson, 2014. Effects of biomass burning on climate, accounting for heat and moisture fluxes, black and brown carbon, and cloud absorption effects. Journal of Geophysical Research-Atmospheres. https://doi.org/10.1002/2014JD021861

[6] Climate-smart forest management integrates the challenges and opportunities of climate change mitigation and adaptation into forest policy, planning and practices, aiming to optimize carbon storage and sequestration in a manner that accounts for the worsening impacts of climate change. See, e.g. Stein, B.A., P. Glick, N. Edelson, and A. Staudt (eds.). 2014. Climate-Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation, Washington, D.C. https://www.nwf.org/~/media/PDFs/Global-Warming/Climate-Smart-Conservation/NWF-Climate-Smart-Conservation_5-08-14.pdf, David D. Diaz, Sara Loreno, Gregory J. Ettl and Brent Davies 2018 Tradeoffs in Timber, Carbon, and Cash Flow under Alternative Management Systems for Douglas-Fir in the Pacific Northwest. Forests 9 (8) 447 https://www.mdpi.com/1999-4907/9/8/447, OGWC 2018 Forest Carbon Accounting Project Report 2018. Keep Oregon Cool, Oregon Global Warming Commission. https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5c2e415d0ebbe8aa6284fdef/1546535266189/2018-OGWC-Biennial-Report.pdf

[7] Although ecosystem health cannot be defined precisely, ecologists have identified a number of specific components that are important in this concept. These include the following indicators: (1) an ability of the system to resist changes in environmental conditions without displaying a large response (this is also known as resistance or tolerance); (2) an ability to recover when the intensity of environmental stress is decreased (this is known as resilience); (3) relatively high degrees of biodiversity ; (4) complexity in the structure and function of the system; (5) the presence of large species and top predators; (6) controlled nutrient cycling and a stable or increasing content of biomass in the system; and (7) domination of the system by native species and natural communities that can maintain themselves without management by humans.

[8] See, e.g. Institute for Policy Integrity 2020. https://policyintegrity.org/documents/Policy_Integrity_EO_20-04_report_comments_2020.06.15.pdf

These principles are consistent with Governor Brown's Executive Order 20-04 and emphasize an equity- and science-based decision-making framework as the Board develops near-term policy solutions to the threat of climate change. The following section offers specific policy recommendations for the Board as it moves forward with revision of Goal G.

Policy Recommendations for Revision of Goal G

As noted in the Board's "Report on Proposed Actions for Executive Order No. 20-04," the Board intends to focus on revising the specific objectives within Goal G with opportunities for public engagement.[9]

Currently, Goal G states that ODF will work to: *"Improve carbon sequestration and storage and reduce carbon emissions in Oregon's forests and forest products."*[10] While this is a promising starting point, the Board is missing a broader opportunity to protect and expand upon Oregon's globally significant carbon stores in a manner that positions the state as a world leader in science-based natural climate solutions. Instead, the goal should read: "*Establish the state of Oregon as a world leader in climate-smart forest management and significantly increase carbon storage and sequestration*[11] *in Oregon's forests.*" If defined correctly, climate-smart forest management[12] can encompass the full scope of challenges and opportunities associated with climate change mitigation and adaptation. The Board should update forest policy, planning and practices to optimize carbon storage and sequestration in a manner that accounts for the worsening impacts of climate change and enables Oregon's forest managers to grow the state's natural carbon sinks as much as possible in order to maximize sequestration in an ecologically appropriate manner.

Currently, the objectives outlined in Goal G call for the Board to:

1. Encourage maintaining and increasing Oregon's forestland base and promote the maintenance and expansion of urban forests.

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[9] See, e.g. Oregon Department of Forestry 2020. Report on Proposed Actions for Executive Order No. 20-04. https://www.oregon.gov/gov/Documents/2020%20ODF%20EO%2020-04%20Implementation%20Report.pdf

[10] See, e.g. Oregon Board of Forestry 2011. Forestry Program for Oregon — A Strategy for Sustaining Oregon's Public and Private Forests. https://www.oregon.gov/ODF/Board/Documents/BOF/fpfo_2011.pdf

[11] See, e.g. USGS What is carbon sequestration? Excerpt: "Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide." https://www.usgs.gov/faqs/what-carbon-sequestration?qt-news_science_products=0#qt-news_science_products

[12] Climate-smart forest management integrates the challenges and opportunities of climate change mitigation and adaptation into forest policy, planning and practices, aiming to optimize carbon storage and sequestration in a manner that accounts for the worsening impacts of climate change. See, e.g. Stein, B.A., P. Glick, N. Edelson, and A. Staudt (eds.). 2014. Climate-Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation, Washington, D.C. https://www.nwf.org/~/media/PDFs/Global-Warming/Climate-Smart-Conservation/NWF-Climate-Smart-Conservation_5-08-14.pdf, David D. Diaz, Sara Loreno, Gregory J. Ettl and Brent Davies 2018 Tradeoffs in Timber, Carbon, and Cash Flow under Alternative Management Systems for Douglas-Fir in the Pacific Northwest. Forests 9 (8) 447 https://www.mdpi.com/1999-4907/9/8/447, OGWC 2018 Forest Carbon Accounting Project Report 2018. Keep Oregon Cool, Oregon Global Warming Commission. https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5c2e415d0ebbe8aa6284fdef/1546535266189/2018-OGWC-Biennial-Report.pdf

2. Promote increased public and forest landowner understanding of the potential contributions of trees, forests, and forest products in sequestering and storing carbon.
3. Ensure that carbon-offset markets as well as emerging markets for other ecosystem services provide easily accessible sources of revenues and do not discriminate against forest landowner participation based on regulatory requirements exceeding those for other land uses.
4. Encourage greater consumer awareness of the environmental advantages of using Oregon forest products and their use as substitutes for more energy intensive building materials.
5. Advocate for public and private forestland biomass to be considered on an equal basis with other renewable energy sources and as a key component of Oregon's strategy for meeting state greenhouse gas reduction and renewable energy portfolio standard policy goals.
6. Continue to support research and develop policies and incentives that will drive the growth of the biomass/ bioenergy/ bio-based products industry in the state.
7. Promote research and innovation towards increasing energy efficiency and reducing the use of fossil fuels in the Oregon forest sector.

These objectives may have been useful for framing the conversation in the past, but they are insufficient to inform the specific policy outcomes the Governor is seeking in EO 20-04. There are also several key considerations that either misrepresent the carbon benefits of certain policy outcomes, such as the efficacy of biomass as a climate solution, or are otherwise missing from the list of objectives. Decades of scientific study — including research from world leaders in forest climate science from Oregon State University[13] — demonstrates the need for action. While some climate-smart[14] opportunities will be more challenging and time-consuming to fully implement, the Board has the authority to act quickly on other fronts even as it continues to facilitate further research.

The following policy opportunities represent "low-hanging fruit" for the Board and ODF to adopt as the Oregon's decision-makers work to *"prioritize actions that reduce GHG emissions in a cost-effective manner,"* and *"prioritize actions that will help vulnerable populations and impacted communities adapt to climate change impacts"* as directed in EO 20-04.[15]

1. **<u>Lengthen logging rotations</u>** *(EO 20-04, ss. 3.A, 3.C.(1), 12.A).* The best available science[16] has made clear that current standard logging rotations (often as short as 35

[13] See, e.g. Terrestrial Ecosystem Research and Regional Analysis group (TERRA-PNW) publications: http://terraweb.forestry.oregonstate.edu/publications

[14] Refer to footnote 12.

[15] EO 20-04. https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

[16] See, e.g. Beverly E. Law, Tara W. Hudiburg, Logan T. Berner, Jeffrey J. Kent, Polly C. Buotte, Mark E. Harmon 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences DOI: 10.1073/pnas.1720064115 https://web.archive.org/web/20180727130028/http://www.pnas.org/content/pnas/115/14/3663.full.pdf

years) undermine the ability of forests to optimize carbon stored.[17] By allowing trees to grow for longer time periods, managers can improve carbon stocks while also increasing timber yield and timber quality. Studies suggest that rotations of 80 years in Coastal Douglas fir may provide optimal carbon storage benefit, depending on assumptions about product longevity and substitution.[18]

2. **Increase green tree retention on the land during harvest and promote diversity of species as opposed to monoculture plantations** *(EO 20-04, ss. 3.A, 3.C.(1)-(3), 12.A).* Greater retention of standing trees (especially bigger and older trees) after logging will keep more carbon on site, help to make regrowing forests more resilient to natural disturbance, increase availability of native seed stock for future restoration efforts, and provide for more higher-quality habitat for native species.
3. **Eliminate logging in biologically significant, carbon-rich mature and old growth forests, and in forests with the highest carbon sequestration potential** *(EO 20-04, ss. 3.A, 3.C.(1), 12.A)*
   Mature and old growth forests store and sequester immense amounts of carbon. Wherever native stands of large trees exist, they should be protected as climate reserves. Further, decision makers should work to identify additional areas of the highest carbon storage potential that should also be protected as part of this carbon reserve. These same stands also provide high quality habitat for salmon and other at-risk wildlife, helping managers achieve two objectives at once.
4. **Manage forests for clean water as a climate adaptation tool.** *(EO 20-04, s. 3.C.(2))*
   Healthy forests protect clean water resources for people and wildlife. Clearcuts increase the risk of mudslides and sediment runoff, negatively impacting Oregon's rivers and streams. Further, pesticide spraying can also pose a risk to local communities. As the impacts of climate change worsen (including drought, heat waves, and more extreme precipitation events), Oregon's forests need to also be managed for clean water quality and quantity, and flood prevention as an adaptation tool.
5. **Seek climate-smart provisions in the upcoming Habitat Conservation Plan (HCP) process** *(EO 20-04, ss. 3.A, 3.C.(1), 12.A)*. Upcoming negotiations based on the passage of SB 1602 in 2020 will focus on modernizing the Oregon Forest Practices Act in order to benefit aquatic and riparian-dependent species. These negotiations should also optimize potential climate co-benefits outlined in EO 20-04, along with other key environmental concerns including science-based standards for riparian buffers, chemical-based vegetation management, steep slope logging, and cumulative impacts.

[17] See, e.g. Mark E. Harmon, 2019. Have product substitution carbon benefits been overestimated? A sensitivity analysis of key assumptions. Environmental Research Letters https://doi.org/10.1088/1748-9326/ab1e95

[18] See, e.g. Stephen J. Fain, Brian Kittler, Amira Chowyuk, 2018. Managing Moist Forests of the Pacific Northwest United States for Climate Positive Outcomes. Multidisciplinary Digital Publishing Institute. DOI: 10.3390/f9100618. https://www.researchgate.net/publication/328229114_Managing_Moist_Forests_of_the_Pacific_Northwest_United_States_for_Climate_Positive_Outcomes

6. **<u>Ensure better incentives for small family forest owners to implement climate-smart forestry on their lands</u>** *(EO 20-04 s. 3.C(1))*
    a. Agencies should prioritize promoting stronger incentives and market development for small family forest owners willing to implement climate-smart forest management[19] on their lands (such as protection of larger stream buffers and late successional characteristics), including better state incentives for the production of FSC certified wood products.
    b. Small family forest owners should be allowed to aggregate small acreage into larger more impactful projects.
    c. Agencies should develop accountability standards to ensure incentives are awarded to forest owners who are currently practicing verifiable climate-smart forestry or will adopt verifiable, high standards of climate-smart forestry.
7. **<u>Focus wildfire defense investments on preparing communities for increased risk, and ensure post-fire recovery efforts account for equity concerns.</u>[20]** *(EO 20-04, ss. 3.C(2)-(3))*
    a. Increase emergency planning and preparedness for rural communities located in and near forested areas,
    b. Increase fire-wise home hardening and retrofitting (i.e. application of construction design and materials that are fire resistant),
    c. Reduce fuels in the home ignition zone,
    d. Limit new development in high risk areas, and
    e. Ensure disadvantaged communities have equal access to resources.
8. **<u>Elevate best practices in post-disturbance management, focused on ecological restoration</u>** *(EO 20-04, s. 3.C(2))*
    a. Reduce aerial and ground pesticide spraying. Longer rotations, greater tree retention and promoting biodiverse tree species are practices that will immediately reduce the need for chemical-based vegetation management and will help maintain the groundcover needed to retain soil carbon and increase soil stability and productivity .
    b. Ensure post-fire logging is focused on trees that pose a high risk to communities and their infrastructure, such as power lines and public roadways.

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[19] Climate-smart forest management integrates the challenges and opportunities of climate change mitigation and adaptation into forest policy, planning and practices, aiming to optimize carbon storage and sequestration in a manner that accounts for the worsening impacts of climate change. See, e.g. Stein, B.A., P. Glick, N. Edelson, and A. Staudt (eds.). 2014. Climate-Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation, Washington, D.C. https://www.nwf.org/~/media/PDFs/Global-Warming/Climate-Smart-Conservation/NWF-Climate-Smart-Conservation_5-08-14.pdf, David D. Diaz, Sara Loreno, Gregory J. Ettl and Brent Davies 2018 Tradeoffs in Timber, Carbon, and Cash Flow under Alternative Management Systems for Douglas-Fir in the Pacific Northwest. Forests 9 (8) 447 https://www.mdpi.com/1999-4907/9/8/447, OGWC 2018 Forest Carbon Accounting Project Report 2018. Keep Oregon Cool, Oregon Global Warming Commission. https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5c2e415d0ebbe8aa6284fdef/1546535266189/2018-OGWC-Biennial-Report.pdf

[20] See, e.g. National Fire Protection Association 2020. https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire

c. Reduce slash burning in industrial timber lands and increase R&D investment into alternatives to slash burning. Slash burning immediately releases carbon to the atmosphere and puts significant quantities of smoke into local airsheds, exposing nearby residents to fine particulate matter and air toxics for multiple days. Incentivize projects to turn slash into biochar or soil nutrients.
d. Evaluate hiring practices for post-disturbance recovery crews through an equity lens. Consider inequitable toxics exposure when hiring workers of color for ground spraying or burning. Transition to hiring diverse reforestation crews that promote biodiverse forest landscapes to provide employment opportunities that are economically beneficial and non-toxic for workers of color.

9. **Establish new partnerships with Tribes, indigenous communities, and tribal climate activists**. *(EO 20-04, ss. 3.C.(2)-(3), 3.E)* Incorporate tribal climate mitigation and adaptation practices that can support increased carbon storage and sequestration in Oregon's forests, and seek to build bridges between Western (conventional) and Indigenous practices, including through use of prescribed fire in Oregon's eastern and southern forests.
10. **Establish a new Diversity, Equity and Inclusion (DEI) office within ODF** *(EO 20-04, ss. 3.B, 3.C(3)*. Climate-smart forest policy should also account for diversity, equity, and inclusion across all decisions the Board and ODF makes. A dedicated staff person will help ensure this need is met.

In addition to reframing the current list of objectives, the Board should also strive to ensure priorities are accurately focused on true carbon and climate benefits. For instance, most if not all commercial biomass facilities are not carbon neutral within a meaningful time frame for climate action. While fuel from wood is technically renewable (trees can be regrown), emissions from burning this product are released all at once, while the benefits of new sequestration can take decades, or even hundreds of years, to pull that same amount of carbon back out the atmosphere.[21] And because much of a forest's carbon is stored in the soil (nearly 50 percent on average in Oregon's forests), soil disturbance from logging operations can release additional carbon that is challenging to re-sequester.[22] Development of woody biomass for energy

[21] See, e.g. Mark Jacobson, 2014. Effects of biomass burning on climate, accounting for heat and moisture fluxes, black and brown carbon, and cloud absorption effects. Journal of Geophysical Research-Atmospheres. https://doi.org/10.1002/2014JD021861 and see, e.g. Searchinger, T. D, Beringer, T., Holtsmark, B., et al. 2018. Europe's renewable energy directive poised to harm global forests. Nature communications. Excerpt: "Unlike wood wastes, harvesting additional wood just for burning is likely to increase carbon in the atmosphere for decades to centuries. This effect results from the fact that wood is a carbon-based fuel whose harvest and use are inefficient from a greenhouse gas (GHG) perspective. Typically, around one third or more of each harvested tree is contained in roots and small branches that are properly left in the forest to protect soils but that decompose and release carbon. Wood that reaches a power plant can displace fossil emissions but per kWh of electricity typically emits 1.5x the CO2 of coal and 3x the CO2 of natural gas because of wood's carbon bonds, water content (Table 2.2 of ref. 17) and lower burning temperature (and pelletizing wood provides no net advantages) (Supplementary Note1)." https://www.nature.com/articles/s41467-018-06175-4

[22] Christensen, G.A., et al. 2019. Oregon Forest Ecosystem Carbon Inventory: 2001-2016. https://www.oregon.gov/ODF/ForestBenefits/Documents/Forest%20Carbon%20Study/OR-Forest-Ecosystem-Carbon-2001-2016-Report-FINAL.pdf

production is likely to increase logging since waste from thinning operations and logging is insufficient to provide a significant power source for the state. Biomass facilities also have significant direct air pollution impacts for neighboring communities.[23] A climate strategy that promotes the use of biomass is therefore counterproductive and inconsistent with EO 20-04, insofar as it runs counter to the need for urgent and immediate action to reduce GHG emissions and mitigate near-term climate impacts to the greatest extent possible, and creates direct pollution risks for already vulnerable populations and impacted communities.[24]

We hope that the Board and ODF will strive to implement near-term policy solutions that position Oregon as a world leader in climate-smart forest management and carbon sequestration. In order to confront the threat of climate change, we must ensure the scope and scale of our solutions match the magnitude of the challenge and are sufficient to contribute substantially to meeting the interim target and final goal of Governor Brown's Executive Order 20-04.

Sincerely,

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Klamath-Siskiyou Wildlands Center

Catherine Thomasson, MD
Vice-Chair Environmental Caucus
Democratic Party of Oregon

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[23] See, e.g. Gilman, J.B, Lerner, B.M., Kuster, W.C. et al. 2015. Biomass burning emissions and potential air quality impacts of volatile organic compounds and other trace gases from fuels common in the US. Atmos. Chem. Phys. https://acp.copernicus.org/articles/15/13915/2015/acp-15-13915-2015.pdf and Jayarathne, T., Stockwell, C.E, Yokelson R., et al. 2014. Emissions of Fine Particle Fluoride from Biomass Burning. https://pubs.acs.org/doi/full/10.1021/es502933j

[24] We will submit additional policy recommendations on biomass in a forthcoming letter to support better practices around this source of energy.

Felice Kelly, Ph.D.
Co-lead, Forest Defense Team
350PDX

Cheryl Bruner
Williams Community Forest Project

Nora Lehmann
Board Co-President
Families for a Livable Climate

Grace Brahler
Oregon Climate Action Plan and Policy Manager
Beyond Toxics

Memorandum

To: Chair McDonald and Members of the Oregon Global Warming Commission (OGWC)

From: Ron Bunch

RE: Written comments on the Commission's Consideration of Natural Working Lands (NWL) Climate Goal

Date: April 8, 2021

Introduction

I was a land use/city planner and public administrator for many years and worked in both rural and urban Oregon doing both project and program management. I am presenting these comments representing myself. It is from the above perspective that I reviewed and commented on the seven key questions that will be addressed at the Commission's April 16, 2021 meeting. My comments are reflective of my recent experience of reviewing, several state agency climate action plans prepared in response to the Governor Brown's Executive Order EO20-04.

A Lack of Institutional Capacity at the State Level to Address Climate Change

I am concerned from an organizational and administrative perspective that the well-intentioned climate change planning and goal setting being done by state agencies and the OGWC is undermined by the state's lack of institutional capacity for implementation. This is critical because work needs to be done now to address the immediate challenges posed by the climate emergency.

Both organizational changes among agencies and reliable funding are needed now. A good place to start would be to convene a strategic fiscal planning work group at the executive level to identify potential funding sources, then to develop proposals and present options to fund climate mitigation and resiliency work on Oregon's natural and working lands.

The Oregon Department of Fish and Wildlife Should be Considered a NWL Agency

The Oregon Department of Fish and Wildlife (ODFW) is deeply involved with natural and working lands and should be engaged by the OGWC in the NWL discussion. High quality habitat is synonymous with the capacity of the landscape to sequester carbon and provide other important natural resource functions and values. ODFW is deeply connected to natural and working lands in this regard. For example, the agency and its commission has done excellent work to complete its Ocean and Climate Change Policy. The Oregon Conservation Strategy is also a notable and important policy tool.

Topic Review and Discussion

1. How ambitious should Oregon be in setting the natural and working land's goal?

Oregon should have an ambitious and comprehensive goal of mitigating climate impacts on Oregon's natural and working lands and waters (NWL) and enlisting these resources in lessening the impacts of climate change especially through their ability to sequester carbon and to impart a wide range of environmental, social, cultural, and economic co-benefits.

The OGWC, in setting the parameters of its Natural and Working Lands goal, should refer to the definition of the same as used by HB 2020 (2019 Session) as follows:

"Natural and working lands" means:

(a) Land that is actively used by an agricultural owner or operator for an agricultural operation that includes, but need not be limited to, active engagement in farming or ranching.

(b) Land producing forest products.

(c) Lands consisting of forests, grasslands, deserts, freshwater and riparian systems, wetlands, coastal and estuarine areas, watersheds, wildlands, or wildlife habitat.

(d) Lands used for recreational purposes such as parks, urban and community forests, trails, greenbelts, and other similar open space land; or

(e) Indian trust lands.

2. What type of goal should we recommend (emissions-reduction based, activity-based, or both)?

The natural and working lands goal should include both. Significant greenhouse gas emissions arise from both agriculture and forestry practices/activities and can be reduced. Furthermore, the downstream emission impacts of food waste are significant. Simultaneously the carbon mitigation potential of agricultural soil and forests is vast and the NWL goal should emphasize this through appropriate management of working lands and preservation and protection of forests, wetlands, estuaries, etc.

3. How detailed do we want the land sector goal to be?

As above the NWL Climate Goal should be overarching and inclusive in its definition. However, it could be stated simply such as:

Protect, restore, and manage Oregon's natural and working lands and waters to mitigate the impacts of climate change through carbon sequestration and related natural resource and social and economic co-benefits:

From a practical and implementation perspective the Goal should be supported by policy statements for each sector or category of natural and working lands the OGWC decides to include.

These in turn could be supported by distinct implementation/action measures based on categories. This approach would provide the OGWC, the Governor and legislature a framework for future administrative policy, legislative and program/budgetary decision-making. From a practical perspective, Oregon's land use planning framework provides a good example of how to do this – establishing goals, policies, implementing measures and programs. Its comprehensive land use planning model could be applicable here.

4. **What should the relationship be between the land sector goal and the state's existing emissions reduction goals?**

Reducing emissions from land sector activities is essential. However, it is important to sperate the state's emission reduction requirements from the carbon sequestration potential of the state's natural and working lands and waters. Oregon cannot ignore the need to reduce greenhouse gases (GHG) emissions based on the premise that these future emissions can be mitigated away through carbon sequestration on natural and working lands or that there exists an off-setting reservoir of sequestered carbon.

5. **How frequently should we update the inventory and goal and what criteria should we use to inform any such change?**
6. **What types of programs, investments, and policies should we recommend be prioritized to achieve the goal?**

Periodic review of how, and to what extent the goal is being implemented is important and should happen. It is difficult to answer this question, however, without a program being further developed that explicitly defines needed, category-based policies, action measures and performance criteria. A follow-on need is a commitment to fund program implementation of the Natural and Working Lands Goal. This requires a strategic fiscal planning effort to identify and develop funding and other resources.

The lack of an administrative / institutional framework necessary to do this work on the ground is, in my opinion, a significant weak point of doing this type of planning. It requires concurrent or timely subsequent work to develop the commitment and capacity at the departmental level.

Ideally the Natural and Working Lands Goals should be the basis for a statewide program based on discrete geographic areas that correspond to broad physiographic and climatic characteristics. Implementation of explicit programs such soil carbon sequestration, forest preservation and management must be place-based and relevant to local culture and socio-economic characteristics. Also, Oregon's land use program is essential to preserve the state's capacity to sequester carbon by preventing conversion of forest and agricultural lands and other resource lands to non-resource uses.

7. What should the consequences be of not meeting the land sector goal?

This is difficult to determine without objective performance benchmarks being set. However, from the perspective of private property it would be unwise to propose governmental standards to regulate property management to sequester carbon on farms and ranches. Property owner/managers involvement must be based on voluntary participation and/or through incentives. Only in the instance where there is a quid-pro-quo could consequences be applied.

Memorandum

To: Chair McDonald and Members of the Oregon Global Warming Commission (OGWC)

From: Ron Bunch

RE: Written Comments on the Commission's Consideration of Natural Working Lands (NWL) Climate Goal

Date: April 8, 2021

The following addresses the following OGWC questions presented on its April 16, 2021 Meeting Agenda.

- What practices, programs and/or policies should be considered to Oregon increase sequestration on natural and working lands?

- What additional benefits would these practices generate? What issues should the Commission keep in mind in setting a sequestration goal?

Oregon Agriculture (ranching and farming) present ready opportunities to mitigate climate change through practices that promote carbon sequestration that includes a broad range of co-benefits such as improvement of soil health and productivity, soil water retention and drought resilience, improved wildlife habitat, prevention of soil erosion, and reduced fertilizer use. There are also economic benefits including increased soil health and productivity, decreased fertilizer and chemical costs and the potential for soil carbon offset payments.

The OGWC's efforts to develop a natural and working lands carbon sequestration plan/goal can set the set stage for agriculture to play a much more significant role in mitigating climate changes in Oregon. Furthermore, improved soil health can assist farms and ranches to become more resilient to climate impacts.

Therefore, the following, programs and/or policies should be by the OGWC's s to increase soil carbon sequestration on natural and working lands?

Healthy soils legislation should be considered by the Oregon Legislature such as that which has been approved in other states like California, Washington, and New Mexico. Such legislation would include including funding and other resources to support:

- State agencies such as the Oregon Department of Agriculture and the Oregon Watershed Enhancement Board in working with farmers and ranchers and Soil and Water Conservation Districts to improve soil health and implement best practices for climate resilience.

- State universities to undertake applied soils science research and inventories and to work directly with farmers and ranchers
- Demonstration projects, technical assistance, and educational resources
- Financial Incentives directed to property owners and managers, such as grants, and technical assistance to improve soil carbon sequestration and overall soil health.

The OGWC Natural and Working Lands Plan should also express support for other state agencies that have a policy relationship with ODA and OWEB such as DLCD, ODFW, DEQ and OWRD and the same for other government entities including SWCDs, Watersheds Councils and non-governmental organizations whose primary focus is preservation and protection of natural and working lands and waters. The Natural and Working Lands Plan should also call for close coordination and cooperation with federal agencies including NRCS, USDA and BLM regarding land management measures regarding matters of soil carbon sequestration and climate resilience.

Other specific measures to implement a NWL Soil Health and Climate Resilience Plan include:

1. Support expansion of technical assistance provided by Soil and Water Conservation Districts, Oregon State University Extension, NGO's and/or ODA to support implementation of best practices for climate resilience including:

    a) Increased program and project capacity for NRCS and ODA including the means to hire additional soil health technicians to work on behalf of the state to support farmers and ranchers.
    b) Free/reduced-cost soil health testing program to help producers understand the state of their soils, the potential for improving soil health on their land, and assist researchers in improving soil health testing and linking management practices to outcomes. This could potentially provide baseline data necessary to implement carbon offset markets.

2. Improve Oregon's Soil Health Inventory to include:

    a) Preparation of a comprehensive report covering current soil health practices,
    b) Past successes and challenges by region,
    c) Estimates of future carbon sequestration on agricultural lands, utilizing existing tools such as American Farmland Trust's CaRPE tool and Ecotrust's mapping too.

4. Provide funding to support the adoption of other climate change mitigation and adaptation strategies beyond soil health/carbon sequestering practices, including:

    a) climate-friendly nutrient management to reduce N2O emissions.
    b) composting of manure and other organic "wastes", to reduce emissions.
    c) sustainable and organic production systems, to reduce emissions.

d) on-farm renewable energy use and other strategies to reduce fossil-fuel usage.

5. Create a sustained source of funding for research on climate change and climate mitigation and adaptation strategies on Oregon's agricultural lands.

6. Facilitate multi-stakeholder collaboration, both public and private, to advance the recommendations above.

7. Fund the Oregon Agriculture Heritage Program

File: OGWC Ag Testimony for 41621 Meeting

OrCAN
Oregon Climate & Agriculture Network

Public Comment for Oregon Global Warming Commission meeting April 16, 2021
Submitted 4/8/21 by Oregon Climate and Agriculture Network (OrCAN)

Chair Macdonald and members of the Oregon Global Warming Commission:

Below is Oregon Climate and Agriculture Network's (OrCAN) response to a couple of the questions that the Commission will consider at the April 16th meeting:

What type of goal should we recommend (emissions-reduction based, activity-based, or both)?
Both. An emissions reduction goal is important for determining whether we are making progress toward the state's emissions reduction goals. The Commission should consider whether to recommend both an emissions reduction and carbon sequestration goal separately, or at least clarify how sequestration is calculated into an emissions reduction goal, if it is part of that goal.
An activity-based goal will provide an opportunity for natural and working lands stakeholders, including farmers and ranchers, to engage. It can help to determine whether new programs, policies and practices have been effective and are resulting in measurable changes. An example of an activity-based goal is: Increase adoption of practices that have the potential to reduce emissions and/or sequester carbon in the soil.
Without both emissions reduction and activity-based goals, it will difficult to determine that the programs, investments, and policies and practices have resulted in emissions reductions.

What types of programs, investments, and policies should we recommend be prioritized to achieve the goal?
OrCAN's initial policy recommendations are detailed on page 2. We will continue to refine these recommendations based on additional input from our stakeholders, and we look forward to providing more formal recommendations soon.

Thank you for your consideration and your service.

Megan Kemple, Co-Director, Oregon Climate and Agriculture Network (OrCAN)
Director of Policy Advocacy, Operations and Fundraising

Oregon Climate and Agriculture Network's initial recommendations for practices, incentives and other policy options Oregon should pursue to achieve a natural and working lands emissions and sequestration goal.

1) Improve Oregon's Soil Health Inventory to include:
    a) a comprehensive report covering current implementation of soil health practices;
    b) past successes and challenges by region; and
    c) estimates of possible future carbon sequestration on agricultural lands, utilizing existing tools like American Farmland Trust's CaRPE tool and Ecotrust's mapping tool to help estimate soil carbon sequestration potential.

2) Support expansion of technical assistance provided by Soil and Water Conservation Districts, Oregon State University Extension, NGO's and/or ODA to support implementation of best practices for climate resilience including:
    a) Increased capacity for NRCS and ODA: Funding for soil health technicians to work on behalf of the state to support farmers and ranchers; and
    b) Free/reduced-cost soil health testing program to help producers understand the state of their soils, the potential for improving soil health on their land, and assist researchers in improving soil health testing and linking management practices to outcomes.

3) Create a Soil Health Grant program via Healthy Soils Legislation using models from other states like California and New Mexico including:
    a) Incentives, such as grants, for implementation of soil health practices including those that promote carbon sequestration (California's Healthy Soil Program is a model);
    b) Support for demonstration projects, technical assistance, and educational resources;
    c) Funding administered by OWEB and distributed through SWCDs.

4) Create a sustained source of funding for research on climate change and climate mitigation and adaptation strategies on Oregon's agricultural lands.

5) Provide funding to support the adoption of other climate change mitigation and adaptation strategies beyond soil health/carbon sequestering practices, including:
    a) climate-friendly nutrient management to reduce N_2O emissions;
    b) composting of manure and other organic "wastes", to reduce emissions;
    c) sustainable and organic production systems, to reduce emissions; and
    d) on-farm renewable energy use and other strategies to reduce fossil-fuel usage.

6) Facilitate multi-stakeholder collaboration, both public and private, to advance the recommendations above.
7) Fund the Oregon Agriculture Heritage Program to support farmland conservation.

Oregon Association of Conservation Districts

April 7, 2021

To Oregon Global Warming Commission (OGWC)

Via: oregon.GWC@oregon.gov

From: Oregon Association of Conservation Districts (OACD)

Re: **Response to Questions Regarding Sequestration on Natural and Working Lands for Commission Meeting on April 16, 2021**

OACD represents Oregon's 45 Soil and Water Conservation Districts, special districts governed by elected boards. The Districts protect and enhance soil quality, water quality and quantity, and habitat by supporting voluntary conservation in partnership with private landowners and managers as well as federal, state, and nonprofit partners.

We appreciate that the OGWC has invited responses to several key questions related to establishing a natural and working lands sequestration goal in response to Executive Order 20-04. Following are OACDs responses to each of the questions.

How ambitious should Oregon be in setting the natural and working lands goal?

It is important to recognize the large potential for greenhouse gas (GHG) sequestration in natural and working lands and that the practices that promote sequestration have substantial additional benefits related to a healthy environment. Therefore, the goals need to be ambitious in encouraging development of sequestration practices in natural and working lands. However, it will take time to develop and implement the practices, so the goals also need to be broad and flexible. As the practices evolve, so must the goals.

What type of goal should we recommend (emissions-reduction based, activity-based, or both)?

We recommend that the development of practices that promote sequestration in natural and working lands be shepherded with a suite of measures and targets, not a single goal. In essence we recommend setting up a performance management system that drives us in a positive direction over time. The measures and targets would be periodically adjusted to reflect new understandings and situations. In the early years it would be premature to set a target for metric tons of CO2e sequestered in natural and working lands, but perhaps 5 years down the road this should be done when we have a more refined understanding of what we can achieve.

The early efforts must focus on developing our knowledge, setting up our institutional framework, and developing protocols for sequestration in natural and working lands. The protocols must include methods for sequestering greenhouse gasses, methods for assuring long term performance, monitoring, and measurement of actual sequestration. The protocols must also have the means to distinguish whether implementation will provide benefit that would not have otherwise been achieved. To address different types of natural and working lands, protocols should be developed for agriculture, forestry, grasslands, and wetlands.

Examples of performance measures that should be considered in an early phase include the following:

- Expenditures on data collection and research to support development of protocols
- Milestones for development of governing programs for sequestration in natural and working lands
- Number of protocols in development
- Number of protocols approved
- Cost effectiveness of key practices

As protocols begin to be implemented on a regular basis, we should add performance measures such as:

- Number of approved projects to sequester GHGs
- Number of acres of land with projects to sequester GHGs

As we obtain substantial experience, we should add performance measures that specify certain amounts of GHGs sequestered in natural and working lands by a given date.

How detailed do we want the land sector goal to be?

As discussed above we are not recommending a single goal. Instead, we suggest development of a suite of performance measures and targets that evolve over time. The suite of performance measures should be sufficiently detailed to guide the program effectively but should not create unnecessary administrative burdens.

What should the relationship be between the land sector goal and the state's existing emissions reduction goals?

The two programs, emission reductions and sequestration, must work together to take advantage of synergies between the two. If the State establishes challenging emission reduction requirements, sequestration in natural and working lands can provide a useful tool to offset some emissions to provide compliance flexibility. In doing this, GHG emitters will have incentive to promote the development of sequestration practices in natural and working lands.

Ultimately, both programs can bring substantial climate benefits. When both paths are chosen, Oregon will be able to achieve much more than is possible with only one path.

In the short term we need the paths to work together, and in the long run we need the benefits of both.

How frequently should we update the inventory and goal and what criteria should we use to inform any such change?

The natural and working lands performance measures and targets need to be regularly updated because we will be learning much in the coming years and we need to adjust to account for our new understandings. Reviewing the performance measures and their targets on an annual basis would be a good practice.

What types of programs, investments, and policies should we recommend be prioritized to achieve the goal?

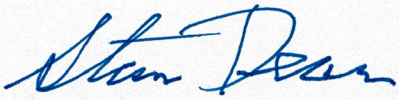
We need to focus on developing and implementing protocols in several key areas that include agricultural, forest management, wetland management, and grasslands management. In all these areas soil health is very important. To develop and implement protocols we will need the following:

- Financial investments in data collection and research to support development of protocols
- Financial support for our natural resource agencies to develop protocols and the institutional framework to oversee implementation
- Funding to incentivize implementation of projects
- Funding for communication and education

What should the consequences be of not meeting the land sector goal?

The consequences of not developing a strong program for sequestration in natural and working lands should be more stringent goals for emission reductions.

Thank you for the opportunity to provide input into your decision-making process.



Stan Dean, Advocacy Committee Chair
Oregon Association of Conservation Districts
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Southern Oregon Climate Action Now

SOCAN

Confronting Climate Change

https://socan.eco

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The problem for

April 15th 2021

SOCAN Comments for OGWC, April 16th 2021

I write on behalf of, and as co-facilitator of Southern Oregon Climate Action Now, as to offer the following comments and concerns regarding the developing Oregon Climate Action Plan resulting from agency responses to the Governor's 2020 Executive Order 20-04. During the last several months I have been actively involved with the statewide coalition in monitoring and offering input to several agencies as the develop programs. This experience has left me quite disappointed about how agencies are approaching the task.

A Goal of Electrification?

Early in the March 18th DEQ Rulemaking Advisory Committee meeting, a question was posed by a proponent of Renewable Natural Gas (RNG) about whether the goal of DEQs Climate Protection Plan was to promote electrification across the economy. In response, Manager of the DEQ Office of Greenhouse Gas Programs Colin McConnaha indicated that he supported RNG while DEQ Director Whitman indicated he also supported RNG and added Hydrogen.

Electrification is reasonably argued as a positive step in efforts to reduce greenhouse gas emissions from the transportation sector because electric motors are vastly more efficient than the Internal Combustion Engine (ICE), so electric vehicles are preferred even if the electricity is generated from a fossil-fuel-powered facility. Meanwhile, in general domestic, commercial, and industrial settings, electricity is a preferred energy source especially if it is generated from genuine renewable energy largely in the expectation that electricity generation will turn away from fossil fuels towards renewables. One concern with promoting electrification, however, is that, if successful, this will likely increase the demand and thus the generation need. If electricity generation is from natural gas plants, and these remain unregulated, enhanced electrification of our economy could increase the greenhouse gas emissions resulting from natural gas usage (see Fossil Gas Myth below). However, we should anticipate that electricity generation will soon become localized, based entirely on genuine renewable sources, and thus render fossil gas obsolete as should be the case.

The Fossil Gas Myth

In considering how to reduce greenhouse gas emissions, it is important to appreciate that all fossil fuels result in greenhouse gas emissions. While the majority of these emissions occur when the fuel is combusted, emissions also occur throughout the lifecycle of those fossil fuels: during extraction, processing, and transmission/transport. When the life cycle emissions are gases that are more potent as warming agents than carbon dioxide, it is important to assess these emissions. In the case of natural gas, the prime gas emitted throughout the lifecycle prior to combustion is methane. This is because natural gas is some 90% methane and the gas leaks (called fugitive emissions). Regrettably, methane is some 86 times more powerful than carbon dioxide as a global warming agent on a 20-year basis and some 34 times worse on a 100-year basis. Assuredly, natural gas companies would prefer that leakage does not happen, but they have seemed unable to stop the phenomenon. While the claim that fossil gas is 'the clean fossil fuel' may have persuaded many folks that fossil gas is clean, it most profoundly is not (https://socan.eco/fossil-gas/)! While new extraction facilities and new pipelines may well result in fewer leaks than aging structures, the reality is that every new structure ages. With an expected life span of up to 50 years ((e.g. WILLIAMS TRANSCO CENTRAL PENN LINE SOUTH: A CITIZEN'S GUIDE), it is inevitable that pipelines will age and leakage will increase. Regrettably, the fugitive emissions of methane over the fossil gas lifecycle negate combustion benefits of this fuel compared to coal and oil. A study of emissions from natural gas versus electricity in California revealed: "The largest driver of greenhouse gas emissions savings in all-electric buildings comes from eliminating carbon dioxide emissions from natural gas combustion." (Mahone et al. 2019).

Even if we forget the lifecycle emissions that result from natural gas extraction, processing, and transmission, and focus only on the emissions of greenhouse gases in Oregon during the end use and in its combustion to generate electricity (https://en.wikipedia.org/wiki/List_of_power_stations_in_Oregon#Natural_gas), we find that these emissions resulted in 10.8 MMT of greenhouse gas emissions according to DEQ's 2019 data (https://www.oregon.gov/deq/aq/programs/Pages/GHG-Emissions.aspx). This represents over 50% of the emissions from all DEQ permitted facilities in 2019 and some 17% of total regulated In- Boundary emissions for 2019. There can be little doubt that natural gas is not a solution. The solution offered by the fossil gas industries is to convert to so-called Renewable Natural Gas. The problems with this are discussed immediately below.

The Renewable Natural Gas Scam

Essentially two methods are available for producing the methane that comprises so-called Renewable Natural Gas (RNG): one process realizes a ***synthetic RNG*** product that results from splitting water (H_2O) molecules into hydrogen and oxygen and then inserting the hydrogen into carbon dioxide (CO_2) to produce methane (CH_4) with oxygen as a by-product. The process is energy intensive so this process can only result in a renewable product if the energy source is itself renewable (i.e., not a fossil fuel). Note, this is also the mechanism for producing Hydrogen. The second process involves capturing the methane that results from decomposition of biomass under oxygen free (anaerobic) conditions. The ***biogas*** results from decomposition in an anaerobic digester where bacteria break down the organic matter and release methane. This is what happens in the gut of ungulates that emit methane (enteric fermentation) and in landfills that are covered and sealed. One problem with this is that to produce substantial methane requires a vast amount of decomposing organic matter. However, one advantage of this process over the fracked natural gas alternative is that it requires a sealed environment thus eliminating the leakage that occurs in fracking. However, leakage that occurs during transmission under

pressure through pipelines remains, so methane leakage as pipelines age remains a problem. Two relatively plentiful sources of biogas are the decomposition of biomass in landfills and of manure in Confined Animal Feedlot Operations (CAFOs). We must therefore beware that reliance on RNG does not become a justification for increasing biomass waste productions and increasing the number of landfills or further expansion of the unfortunate CAFO industry.

The main environmental concerns regarding RNG are availability, cost, carbon intensity, and industry obfuscation as discussed briefly here: The Four Fatal Flaws of Renewable Natural Gas. Meanwhile, a recent 2020 report revealed: "RNG is not inherently climate friendly. Based on consideration of both the source of methane used to produce RNG and the likely alternative fate of that methane, and using reasonable assumptions about likely system methane leakage, it is unlikely that an RNG system could deliver GHG negative, or even zero GHG, energy at scale."

The bottom line with RNG is that it should not be considered a renewable solution unless its production and transmission result in net zero emissions, it is sufficiently available to replace natural gas, and that it is cost effective compared to genuine renewable energy sources. However, Mahone et al (2018) report that, for California: "RNG faces large technical obstacles. Biomethane supplies within California are limited, and on their own fall short of meeting the long-term demand for low-carbon gaseous fuel in the state's buildings and industries, without electrification." If RNG is insufficient for replacing natural gas in California, is there any reason to think Oregon is different?

The DEQ 'leaning' regarding electrical utilities.

As we know, the Department of Environmental Quality is developing a Climate Protection Plan designed to address the Executive Order 20-04 signed by Governor Brown in March. 2020.

This order charges state agencies with reducing greenhouse gas emissions in Oregon at least 45% below 1990 levels by 2035, and at least 80% below by 2050. It is inevitable that, in order to achieve the interim target and final goal, the agencies will be obliged to achieve reduction of emissions within their purview a commensurate amount.

When the agencies began their discussions last year of how to develop a response to the charge in the EO, I was very impressed, excited and enthusiastic about how DEQ initiated the process. This was generated by the open and transparent nature of the process and the willingness of staff to listen to suggestions. However, as the months have passed, my enthusiasm has waned as the developing program has seemed not only to ignore submitted comments, but also to ignore the interim target and goal stated in the E.O.

Most recently, DEQ has identified as a strong 'leaning' in its proposed Climate Protection Plan exempting the electricity sector. This means that electricity generation facilities fueled by fossil (natural) gas will be exempt from the program. This creates a serious flaw in the program because:
(a) natural gas extraction, processing, and transmission result in substantial emissions of the potent greenhouse gas methane thus causing phenomenal leakage of emissions out-of-state (see Fossil Gas Myth above), and
(b) because these facilities themselves (see adjacent table) emit huge amounts of greenhouse gases as CO_2e.

Oregon Natural Gas Electricity Generation		
PGE	Boardman	2543943
Hermiston Power LLC		1700894
PGE	Coyote Springs	1364781
Klamath Cogeneration		1350083
Hermiston Generating CO		1154924
PGE	Carty	1152211
PGE	Port Westward I	1027716
PGE	Beaver	274905
PGE	Port Westward II	186666
Klamath Energy LLC		49,735
TOTAL		10805858

Oregon's estimated total greenhouse gas emissions for 2019 stands at 65 Million metric tons. Of this, as can be seen in the adjacent table from DEQ facility data for 2019, the total emissions from Oregon's natural gas-powered generation facilities are 10,805,858 MT of carbon dioxide equivalent greenhouse gases. This amounts to 51% of source emissions for which DEQ issues permits and nearly 17% of the state's total emissions. This, alone, should indicate we cannot afford **not** to cap and reduce these emissions.

Notably, total GHG emission for 1990 are listed by DEQ at 58 MMT. If the state is to achieve emissions 80% below the 1990 level, that target is 11.6 MMT. If the 2050 goal is to be taken seriously, clearly the electricity sector exemption suggested by DEQ means there is almost no opportunity to exempt any other emitters beyond that sector.

Threshold for Fuel Suppliers

In discussing the threshold for inclusion of fuel suppliers in the program, DEQ offered 300,000 MT accounting for 86% of emissions, 25,000 MT accounting for 99% of emissions and 5,000 MT accounting for 99.8% of emissions as potential values. Unfortunately, 300,000 should simply not even be considered since the 3.4 MT of annual emissions would result in 14.2 MMT of emissions and blow the EO 2050 target.

During the RAC meeting public comments, a fossil fuel proponent suggested that there exists a high likelihood of fuel suppliers simply gaming the system. To keep their emissions below whatever threshold is applied, it was argued, they would shuffle their supplies among companies to keep everyone's emissions below the threshold. As a result, I have come around to the position that the threshold should be as close to zero as possible simply to allow an exemption for *de minimus* emitters.

What the calculation presented above reveals is that the Climate Protection Plan simply cannot allow any further exemptions of any meaningful proportion if the Governor's Executive Order 2050 goal is to be within range

Furthermore, this calculation does not even account for the fact that the drive to electrification, which is most valuable if that electricity is generated from renewable energy sources, will cause

an increase in demand that, absent DEQ regulation, will likely be met by the utilities increasing their fossil gas usage rather than turning to renewable energy sources.

I have been engaged in advocacy for climate action for some three decades. I was alerted to the threat posed by global warming projections when teaching ecology at Southeast Missouri State University. While teaching a segment on community ecology - i.e., the factors of temperature and precipitation that determine the distribution of natural ecosystems (forests, woodlands, grassland, deserts, wetlands, tundra) across the globe, I realized that the projections at the time would devastate these ecosystems and the biodiversity of flora and fauna they comprise. We have since seen a massive increase in extinctions, confirming that fear. Incidentally, our agriculture, forestry, and fisheries are dependent on the same factors. If we do not collectively reduce our greenhouse gas emissions and remove a substantial percentage of those already released, we will confront an existential crisis. This is urgent. Anyone who is not alarmed, is simply not paying attention. We owe it to our children and grandchildren - if we care about them - to take this seriously. Oregon should do its part to reduce and remove greenhouse gases.

We urge the state agencies to take seriously the interim target and goal identified in the Governor's EO. This would at least mean eliminating from consideration the exemption of electrical generation and rejecting the 300,000 MT threshold for fuel suppliers.

Relevant to OGWC, the problem for the statewide plan posed by the current 'leanings' expressed by the DEQ in developing the Climate Protection Program is that all other agencies will need to pick up the slack. If the DEQ plan alone will not and engage either in greater than the EO greenhouse gas emissions break through the emissions goal of the EO, other agencies will need to increase the emissions reductions they impose to compensate. In the case of ODF, DOA, OWEB, and OGWC, the DEQ plan to exempt more than the target emissions means there is a need to stimulate massive programs for carbon sequestration to counter the excess emissions the DEQ proposals will inevitably allow.

Sincerely,

Alan R.P. Journet

Co-Facilitator
Southern Oregon Climate Action Now

PACIFIC BIRDS
HABITAT JOINT VENTURE

March 19, 2021

Ms. Catherine Macdonald, Chair
Oregon Global Warming Commission
550 Capitol St. NE
Salem, OR 97301
Submitted via email: Oregon.GWC@oregon.gov

RE: Pacific Birds Habitat Joint Venture's comments on the Global Warming Commission's Natural and Working Lands Proposal

Dear Ms. Macdonald and Global Warming Commission

Thank you for the opportunity to comment on the Oregon Global Warming Commission's (Commission) work plan to fulfill Governor Brown's Executive Order 20-04. While this proposal elevates a suite of actions, Pacific Birds Habitat Joint Venture's primary objective in relation to the Natural and Working Lands Proposal, is to emphasize the critical role coastal wetlands play as "blue carbon" habitats by sequestering and storing carbon and their importance to migratory and resident shorebirds and waterbirds.

Tidal marshes, seagrass beds, and tidal forests are exceptional at storing blue carbon. The Pacific Northwest has higher average total ecosystem carbon stocks than other areas of the U.S. In fact, regional marsh carbon stocks are twice the global average[1]. While Oregon has lost 96.5% of its historic coastal wetlands[2], conservation and restoration of these declining ecosystems can significantly contribute to carbon storage in Oregon. For example, restoration of 150 acres in Port Susan Bay, Washington is estimated to capture 4.5 to 9 tons of carbon, equivalent to removing 3.5 to 7 thousand cars from the road[3]. Habitat conservation and restoration strategies, with carbon storage as a priority, have been deployed across the U.S. and Canada in forest, grassland, and agricultural landscapes and provide numerous co-benefits, including but not limited to improved bird and fish habitat, protection from flooding and drought, improved soil health, and cleaner more resilient waterways.

The same estuaries and associated freshwater wetlands that store carbon are vital breeding, resting, refueling, and overwintering habitat to millions of migrating birds in the Pacific Americas Flyway. Across North America, there are 2.9 billion fewer breeding birds than there were in 1970. Shorebirds, a group reliant on intact coastal habitats, have lost more than one-third of their population[4]. Oregon's estuaries are critical for shorebird populations, with Coos Bay, the Lower Columbia River, and Tillamook being some of the most important places for shorebird migration between the Frasier River and San Francisco Bay. Estuaries also provide essential habitat for juvenile fish and marine mammals.

People highly value coastal ecosystems for hunting, fishing, birding and other recreational activities. Forty-three percent of U.S. adults visit an estuary at least once a year generating $12 billion in annual revenue[5]. In 2019, visitors to Tillamook County alone spent $240 million, supporting Oregon coastal communities[6]. The outcomes of protecting blue carbon stocks can be coupled with co-benefits like providing critical habitat to birds, providing recreation opportunities, and reducing risks from

impacts like sea level rise and more frequent and intense coastal storms in Oregon's coastal communities.

Living shoreline management approaches are a win-win-win for carbon storage[7], birds and other wildlife, and coastal communities. We encourage the commission to include blue carbon habitats in the baseline inventory and projections. Thank you for the opportunity to comment on the Commission's efforts and we look forward to engaging as the work progresses.

Sincerely,

Monica Iglecia
U.S. Coordinator, Pacific Birds Habitat Joint Venture

Jeff McCreary
Chair, U.S. Steering Committee, Pacific Birds Habitat Joint Venture

[1] Kauffman J.B. et al. 2020. Total ecosystem carbon stocks at the marine-terrestrial interface: Blue carbon of the Pacific Northwest Coast, United States. *Glob Chang Biol.* 2020 Oct; 26(10):5679-5692. doi: 10.1111/gcb.15248. Epub; Aug 11. PMID: 32779311.

[2] Brophy, L.S. 2019. Comparing historical losses of forested, scrub-shrub, and emergent tidal wetlands on the Oregon coast, USA: A paradigm shift for estuary restoration and conservation. Prepared for the Pacific States Marine Fisheries Commission and the Pacific Marine and Estuarine Fish Habitat Partnership. Estuary Technical Group, Institute for Applied Ecology, Corvallis, Oregon, USA.

[3] Poppe, K. and J. Rybczyk. 2019. A blue carbon assessment for the Stillaguamish River Estuary: Quantifying benefits of tidal marsh restoration in the Pacific Northwest

[4]Linwood Pendleton. 2009. The economic and market value of coasts and estuaries: what's at stake. Produced by: Restore Americas Estuaries. Arlington VA.

[5]Dean Runyan Associates. 2019. Oregon Travel Impacts, 1992-2018. Prepared for Oregon Tourism Commission.

[6] Rosenberg, K.V. et al. 2019. Decline of the North American Avifauna. *Science* 365(6461). doi: 10.1126/science.aaw1313

[7] Davis, J. et al. A. 2015. Living shorelines: Coastal Resilience with a Blue Carbon Benefit. *PLoS ONE*; 10(11): e0142595. https://doi.org/10.1371/journal.pone.0142595

Climate Smart Forestry needs a working definition which includes public values of forests besides harvesting wood, namely ecosystems, watersheds, and sequestration of carbon.
I like the following:

Climate smart forestry relies on forest stewardship that increases carbon storage across the forest landscape while also recognizing the need to increase forest resilience. Research shows that the biggest bang for the buck from natural climate solutions is to keep trees in Pacific Northwest forests standing longer before logging them – 80 years or more can provide good timber production while increasing stored carbon. We also need to keep more diverse species of trees - especially mature and old growth trees - on the land. If we do this, we increase stored carbon, promote biodiversity and protect our drinking water supplies.

Thank you for your consideration,
Emily Herbert, daughter of a forester
Portland

--
“Not knowing when the dawn will come
I open every door.”
- Emily Dickinson (1830-1886)

Sent via form submission from *Keep Oregon Cool*

Name: John F Christensen

Email Address: nagarkot247@gmail.com

Subject: Climate-smart forestry

Message: My wife Julie and I are small woodland owners managing our forest in the rural area of east Multnomah County. We are one of the first family-owned woodlands in Oregon to enter a contract with the California Air Resources Board to sequester carbon in our forest and to sell carbon credits on California's cap and trade exchange. Climate smart forestry relies on forest stewardship that increases carbon storage across the forest landscape while also recognizing the need to increase forest resilience. Research shows that the biggest bang for the buck from natural climate solutions is to keep trees in Pacific Northwest forests standing longer before logging them – 80 years or more can provide good timber production while increasing stored carbon. In our case we agree to defer harvesting of trees for 120 years. We also need to keep more diverse species of trees - especially mature and old growth trees - on the land. If we do this, we increase stored carbon, promote biodiversity and protect our drinking water supplies. It is important that the Oregon Global Warming Commission incorporate climate-smart forest management into its menu of tools to meet Oregon's greenhouse gas emission goals.

Name: Daniel Frye

Email Address: danieldfrye@gmail.com

Subject: Climate smart forestry

Message: Chair Macdonald and members of the Oregon Global Warming Commission,

Our forests are not being managed with mitigating climate change as one of the top-line goals. I urge the Commission to change this and adopt the principle of climate smart forestry as one of the governing principles for Oregon forest management.

Climate smart forestry relies on forest stewardship that increases carbon storage across the forest landscape while also recognizing the need to increase forest resilience. Research shows that the largest positive impact from natural climate solutions comes from keeping trees in Pacific Northwest forests standing longer before logging them – 80 years or more can provide good timber production while increasing stored carbon. We also need to keep more diverse species of trees - especially mature and old growth trees - on the land. If we do this, we increase stored carbon, promote biodiversity and protect our drinking water supplies.

Please consider formally this or an equivalent definition at the earliest possible time to begin using Oregon forest to help fight the climate crisis.

Sincerely,

Daniel Frye, PhD
Portland 97212

Hello Cathy,

My name is Ira Cuello and I am the policy associate at PCUN, Oregon's Farmworker Union. I have been following the implementation of Gov Brown's EO 20-04, OCAP, and I am interested to learn about the Commission's efforts of including farmworkers in your engagement with stakeholders to OGWC's goals related to natural and working lands.

Any insight would be greatly appreciated.

Thank you,
Ira

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Hello,

I am following up on an email I sent out two weeks ago. Please let me know who I need to contact to get an update on farmworker engagement.

Thank you,
Ira

On Tue, Mar 23, 2021 at 5:56 PM Ira Cuello-Martinez <iracuello@pcun.org> wrote:
Dear Oregon Global Warming Commission,

My name is Ira Cuello-Martinez and I am the climate policy associate at PCUN. I have been following the implementation of Gov Brown's EO 20-04, OCAP, and I am interested to learn about your efforts of including farmworkers in your engagement with stakeholders to create state goals for carbon sequestration and storage.

Any insight would be greatly appreciated.

Thank you,

Ira

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Ira Cuello-Martinez (he/him/el)
Climate Policy Associate
iracuello@pcun.org | 503-902-0367 ext. 240

Farmworkers & Latinx Working Families United
300 Young St. Woodburn, OR 97071
www.pcun.org

Cathy, FYI

From: Old Sol <oldsolbees@gmail.com>
Sent: Wednesday, March 10, 2021 2:22 PM
To: Oregon GWC * ODOE <Oregon.GWC@oregon.gov>
Subject: Please reconsider the restrictive LCDC rules for utility scale solar

The caps imposed by the LCDC for solar on class 1 and 2 soils have severely hampered the growth of utility scale solar in Oregon. Dr Chad Higgins (OSU) research shows that we can produce all the power we need on as little as 1% of farm land. Farm land is where we need pollinator habitat the most due to intensive monoculture cropping. These large scale solar arrays offer a great opportunity to create long term pollinator habitat since the projects last on average 30 years. These rules were implemented with the notion of preserving farmland which is very important, and as a commercial beekeeper I couldn't agree more, however the LCDC rules are misguided since utility scale solar is really not a threat to farmland. On the contrary, when these sites are located on farm land they create stable diversification in farm income and help farms stay in business. The dual use model is known as agrivoltaics, and can be a great tool to reach our renewable energy goals and saving pollinators.

Thank you for your time and consideration.
John Jacob
President, Oregon State Beekeepers Association

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Old Sol Enterprises LLC
www.oldsolbees.com