Draft Natural and Working Lands Proposal[1]

Oregon Global Warming Commission, July 19th, 2021

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[1] This draft will be reviewed and may be modified at the August 4th Oregon Global Warming Commission and subsequently copy edited.

I. Introduction

In Executive Order 20-04, Governor Brown directed the Oregon Global Warming Commission (OGWC) to work in coordination with the Oregon Department of Agriculture (ODA), Oregon Department of Forestry (ODF), and the Oregon Watershed Enhancement Board (OWEB) to develop and submit a proposal for setting a carbon sequestration goal for Oregon's natural and working lands.

With emissions of carbon dioxide—a potent greenhouse gas (GHG)—continuing to be released at unsustainable levels, the Intergovernmental Panel on Climate Change's (IPCC) Global Warming of 1.5°C Special Report emphasized the urgency of climate action and the important role the land sector can and must play as part of a comprehensive climate change mitigation strategy. In it, the IPCC described that in order to avoid the worst impacts of climate change, globally we need to achieve net zero emissions no later than 2050[2]. However, with each passing day, it is increasingly apparent we need as much climate repair as possible, as soon as possible through aggressive fossil fuel emissions reductions and climate smart natural and working lands strategies.

In 2019, carbon (dioxide) sequestered in natural and working lands—referred to by the U.S. Environmental Protection Agency (EPA) as "Land Use, Land Use Change and Forestry"—reduced total GHG emissions in the United States by 12 percent (EPA 2020). Researchers estimate that the amount of carbon sequestered annually in natural and working lands could be more than doubled by protecting and restoring natural habitats and modifying management practices in our forests, farms and rangelands (Fargione et al 2018).

Significant actions are being taken at the federal level and by other states to increase carbon sequestration in natural and working lands. President Biden included enhancing carbon sinks in our forests, agriculture, and oceans as part of his ambitious commitment to an economy-wide target of reducing U.S. GHG emissions by at least 50 percent below 2005 levels by 2030 and to reach 'net-zero' GHG emissions by 2050. Along with aggressive plans for reducing GHG emissions from other sectors, at least eight states have developed climate action plans that include specific strategies and programs to increase carbon sequestration in natural and working lands.[3] For example:

- Facing reports that natural and working lands have become a net source of emissions, the state of California developed a plan for reducing land sector emissions by a cumulative 83 to 84 million metric tons of carbon dioxide equivalent (MMTCO2e) between 2020 and 2045 (or approximately 3.3 to 3.4 MMTCO2e per year) through a suite of state-supported land management, restoration, and conservation activities.
- Maine's Climate Council plans to protect their natural resource industries, increasing land conservation, and providing more technical assistance to landowners as ways of achieving their carbon neutrality goal by 2045. For their coastal resources, Maine has prioritized protecting tidal

[2] Achieving net-zero requires that annual GHG emissions are as close to zero as possible, and that any remaining emissions are canceled out by removing GHGs from the atmosphere, through sequestration or carbon removal technologies.

[3] Including California, Connecticut, Maine, Maryland, Massachusetts, New Jersey, North Carolina, and Wisconsin.

marshes, and eelgrass habitat as well as determining the role seaweed aquaculture could play in carbon sequestration.
- Maryland plans to reforest 68,530 acres and plant 2.65 million urban trees to increase sequestration by between 1.3 and 1.8 MMTCO2e by 2030.
- Massachusetts estimates that they can increase natural carbon stocks by an additional 1 to 2 MMTCO2e per year through afforestation, reforestation, forest management, and natural ecosystem restoration.

With Oregon's carbon-dense westside forests, diverse and productive agricultural and range lands, and high-carbon tidal wetlands, we have the potential, if not the imperative, to deploy our natural and working lands to make a significant contribution to climate change mitigation. Research suggests that investments in practices that increase sequestration in natural and working lands provide multiple co-benefits. Planting trees in urban areas reduces heat island effects and improves air quality. Restoring coastal wetlands improves fish habitat and protects coastal communities from increasing impacts from storm surges. Regenerative farming practices increase soil productivity and moisture holding capacity. Climate smart forest management practices can increase long term fiber supplies. In addition, these practices can contribute to reduced energy and health care costs, create jobs, and generate increased revenue for private land managers.

The following proposal includes a net carbon sequestration goal for Oregon, describes some of the policies, practices, and programs (collectively referred to as "strategies") that can be deployed to achieve the goal and identifies next steps for increasing investments in climate smart natural and working lands strategies.

II. Key Principles and Process for Developing a Proposed Carbon Sequestration Goal on Natural and Working Lands

In July 2020, the OGWC adopted the following principles for developing a net carbon sequestration goal for Oregon's natural and working lands proposal:

- In alignment with guidance from Oregon's Environmental Justice Task Force, the process for developing a proposal will be inclusive and transparent and provide opportunities for broad public engagement and coordination with other Boards and Commissions.
- The carbon sequestration goals will be based on the best available science.
- The proposed goals and recommended policies, practices, and programs will:
  - Prioritize consideration of benefits to Climate Impacted Communities—including Black, Indigenous, and People of Color (BIPOC) communities, tribes, low-income communities, and other historically disadvantaged communities at greater risk to climate impacts;
  - Consider landowner and community interests;
  - Include provisions to ensure a diversity of landowners and managers can participate in any potential market- and incentive-based programs and provide meaningful climate benefits; and
  - Consider co-benefits—or additional societal benefits—resulting from an action that may be relevant for other state goals (e.g., advancement of racial justice, climate resilience, clean water).

Over the past year, the OGWC has worked closely with ODA, ODF, and OWEB as directed in EO 20-04 as well as with the Oregon Department of Environmental Quality (DEQ) and the Department of Land Conservation and Development (DLCD). We engaged tribes, federal agencies, stakeholders and technical experts to inform the level of ambition we should aspire to, and the policies the state should advance to

reach that level of ambition. In total, we engaged over 1,000 individuals through opportunities for public comment, surveys, and focus-group discussions. Input ranged from recommendations on the goal and specific strategies to general considerations for designing policy, practice, and investment frameworks. A brief summary of the input is provided in Sections III and IV below. Specific outreach methods and analyses are described in Appendix A.

III. OGWC Proposed Carbon Sequestration Goal for Oregon's Natural and Working Lands

Tribal and stakeholder input regarding a proposed net carbon sequestration goal for Oregon encouraged the OGWC to recommend the following:

- Address the Urgency of Climate Action: The goal should be bold, ambitious, and practical. Oregon should strive to be a national and global leader in carbon sequestration and GHG emissions reductions.
- Add to Existing Goals: The goal should be additive to the existing emissions reduction goals set by the legislature and as updated by Governor Brown's Executive Order 20-04.
- Advance Equity: Establish goals to ensure natural and working land strategies advance equity and place the most vulnerable communities at the forefront of the benefits of strategies to increase carbon sequestration.
- Create Accountability: The proposal should call for quantified net sequestration and activity-based goals and metrics to ensure we can hold ourselves accountable.
- Ensure Continuous Improvement: The goal should be based on the best available science and a process should be established to ensure that it is improved over time as new information is available.

In setting a goal for net sequestration in natural and working lands we need to consider both management practices that mitigate climate change by sequestering more carbon and management practices that help Oregon's natural and working lands adapt to the climate changes we can't avoid. Broadly speaking, our goal should be to manage Oregon's natural and working lands to be the most resilient and robust climate sink we can achieve while maintaining the health of our economy and communities and enhancing equity and quality of life for all Oregonians.

Several studies have estimated the net sequestration benefits that have, or would result from changes in policies and land management practices in Oregon's: forests (e.g. Cathcart et al. 2007, Latta et al. 2016, Diaz et al. 2018, Law et al. 2018); tidal ecosystems (Kauffman et al. 2019, Beers et al 2021); and farm and rangeland soils (Moore et al. 2021). In the most comprehensive natural and working lands assessment for Oregon, Graves et al. (2020) evaluated the potential of twelve land-use and management practices that could be taken to increase carbon sequestration Oregon's natural and working lands. Based on the assumptions about rates of adoption of the different management practices, the study projects that we could increase net sequestration in Oregon by up to 9.5 million metric tons of carbon dioxide equivalent (MMT CO2e) per year by 2050.

The level of ambition found in the Graves et al. (2020) study needs to be tempered with the following caveats:

- The study did not evaluate the impacts of climate change on net sequestration – especially the impacts of the increasing scale and severity of wildfires or the near-term carbon consequences of management practices designed to reduce fuel loads on net sequestration. Fuel reduction

treatments (thinning and application of prescribed fire) designed to increase the resilience of Oregon's fire prone forests initially create a "carbon debt" on the landscape that may be paid back over time through reduced wildfire emissions.

- The study also did not evaluate the costs or economic consequences of implementing changes in land use and management practices. While many land use and management practices designed to increase net sequestration have been shown to improve productivity and revenue to land managers over time, many come with transition costs and some with consequences that need to be carefully evaluated.

Therefore, and in keeping with the tribal and stakeholder input the OGWC received, we recommend the state set the following goals for increasing carbon sequestration in Oregon's natural and working lands:

Outcome-Based Goal: Sequester an additional 4 to 7 MMTCO2e per year in Oregon's natural and working lands and waters by 2030, and 5 to 8 MMTCO2e by 2050 relative to a 2010 to 2020 net carbon sequestration business-as-usual baseline. The OGWC recommends that the natural and working lands outcome-based goal should be separate from, and in addition to, Oregon's sector-based emissions reduction goals as established by the Legislature and updated in Governor Brown's EO 20-04. Based on preliminary estimates of the current baseline, we estimate that this level of ambition represents a 10 and 20 percent increase in sequestration in natural and working lands.

The outcome-based goal should be assessed and updated as new research is available regarding the opportunities and constraints on the potential to increase net sequestration in natural and working lands. The OGWC recommends the state re-evaluate and update the goal at least every 4 years.

In addition, the OGWC recommends the state develop:

Activity- Based Metrics and Goals: To achieve the outcome-based goal, investments will be needed in technical assistance, incentives, and policy development to support adoption of climate-smart management practices. Activity-based metrics (e.g., number of acres with adoption of soil health practices, acres of maintained resource lands, acres of riparian reforestation, and acres of urban forest canopy expansion) will help us evaluate progress. Activity-based goals for programs designed to incentivize climate smart management practices will help communities, technical assistance providers, and land managers anticipate the opportunity to adopt new practices.

Community Impact Metrics and Goals: Community impact metrics and goals should be developed to inform and evaluate the co-benefits and impacts of natural and working lands strategies. Environmental justice considerations should be prioritized throughout carbon sequestration programs, in line with recommendations from Oregon's Environmental Justice Task Force, the Racial Justice Council and

Oregon's Sector-Based Climate Goals
Oregon's current sector-based goals are to reduce GHG emissions compared to a 1990 GHG emissions baseline by at least 45 percent by 2035 and by at least 80 percent by 2050. This equates to a reduction to 32 million metric tons CO2e (MMTCO2e) in 2035 and 12 MMTCO2e in 2050. Aligning with the new federal economy-wide goal of reducing in-state emissions by at least 50 percent by 2030, Oregon would need to reduce net emissions to at least 32 MMTCO2e by 2030. Assuming a constant level of emissions reduction from 2019 to 2050, our current emissions target for 2030 is approximately 40 MMTCO2e.

Oregon's Interagency Workgroup on Climate Impacts to Impacted Communities. The community impact metrics and goals should be designed to evaluate the benefits and burdens associated with different strategies, practices, and programs. These metrics and goals should include effects on jobs, local economies, health, and access to programs.

The OGWC recommends the state report on Activity, Funding and Community Impact metrics and goals as part of the OGWC's Biennial Report to the Legislature with recommendations on how to address barriers and identify opportunities to improve strategies for increasing carbon sequestration in Oregon's natural and working lands.

IV. Proposed Strategies for increasing sequestration in Oregon's Natural and Working Lands

To achieve the ambitious outcome-based goal and further develop the Activity, Funding, and Community Impact metrics and goals, the OGWC recommends that the Legislature: (1) Position the state to leverage federal lands and investments in climate smart natural and working lands practices; (2) investigate options and create a sustained source of state funding increase sequestration in natural and working lands; (3) fund and direct the agencies to take actions to advance natural and working lands strategies; and (4) invest in improvements to Oregon's natural and working lands inventory. These actions, as described in more detail below should be guided by the recommendations that emerged during the public engagement process used to develop this proposal which is summarized below and described further in Appendix A.

Tribal and Stakeholder Input on Practices, Incentives and Strategic Regulatory Changes

Conservation Practices: Tribes and stakeholders provided input on a wide range of land management practices that could increase sequestration in natural and working lands—from restoring forested tidal wetlands, to lengthening forest harvest rotations, and deploying regenerative agricultural practices (see Appendix B for a list of practices). Land managers identified practices that they are currently using as well as practices they are interested in deploying in the future. They identified key barriers of new practice adoption including concern about the cost of implementation, challenges with accessing programs, as well as the need for the technical support and mentorship. Specific concerns were raised about inequities Black and Indigenous people of color land managers have in accessing financial resources and the added barriers that creates to their adoption of new practices. Commenters recommended that the state work to develop programs to invest in a suite of practices that make sense for the unique conditions and land uses in different region of the state.

Incentive-Based Strategies: By far the most common input was to advance programs that incentivize voluntary conservation measures that land managers can use to adopt practices that increase carbon sequestration. To increase buy-in, commenters recommended that strategies be developed through processes that are both equitable and collaborative, with the inclusion of Tribes, other historically underrepresented groups, land managers, technical assistance providers and conservation organizations. The process used to redesign existing programs and develop new programs needs to recognize and address the inequities and barriers facing Climate Impacted Communities such as inequities in access to information and technical assistance, and barriers to participation in stakeholder meetings (e.g. lack of access to childcare, quality internet and transportation options) as well as language barriers.

To address key barriers to adoption of new practices, tribes and stakeholders identified the need for increased investments in education, technical assistance, and recognition; financial support for land management transitions and new practice adoption including tax incentives; funding for land protection and easement programs as well we habitat restoration. The need for funding for the Oregon Agricultural Heritage Program was specifically identified as an important part of advancing climate smart management practices.

Stakeholders encouraged the state to adopt strategies that are informed by science including Traditional Ecological Knowledge and when possible, to design programs that take employ an integrated systems-based approach by including diverse natural and working lands strategies as well as practices to reduce other sector-based emissions (e.g., energy efficiency, water conservation, on-farm renewable energy development).

Commenters recommended that policies and programs should be streamlined and informed through a continuous improvement process to avoid negative consequences to producers, communities and the economy. Stakeholders also encouraged the OGWC to evaluate and eliminate disincentives for adoption of climate-smart practices in existing policies and programs.

In designing strategies, public input encouraged policy makers to align mechanisms with tribal governments and federal agencies. Tribal representatives underscored the opportunities for collaboration to address the climate crisis. Commenters also emphasized the importance of aligning mitigation strategies with other state needs and goals – related to equity, climate adaption, water quantity and quality, community resilience, and native fish and wildlife habitat protection and restoration.

Strategic Improvements to Regulatory Programs: Some stakeholders identified the need to include strategic improvements to regulatory mechanisms, while others expressed concern about more regulation including concerns that voluntary measures may become the basis for future regulations. For those supporting improvements, two were called out most often: Oregon's State Land Use Planning Program and 19 Statewide Planning Goals and Oregon's Forest Practices Act to increase sequestration in natural and working lands.

(1) Position the state to leverage federal lands and investments in climate smart natural and working lands practices.

There is significant and growing support at the federal level for investments in climate-smart practices. As referenced earlier, President Biden's administration is advancing actions to increase support for climate-smart agricultural and forestry practices. President Biden's Executive Order on Tackling the Climate Crisis at Home and Abroad directed the U.S. Secretary of Agriculture to collect input on how to best use the U.S. Department of Agriculture's (USDA) existing programs, funding, and financing capacities to encourage the voluntary adoption of climate-smart agricultural and forestry practices. President Biden also directed the Secretary of Commerce, through the Administrator of the National Oceanic and Atmospheric Administration, to collect input from fishermen, regional ocean councils, fishery management councils, scientists, and other stakeholders on how to make fisheries and protected resources more resilient to climate change, including changes in management and conservation measures, and improvements in science, monitoring, and cooperative research.

ODA, ODF, and OWEB submitted extensive comments to USDA to inform implementation of this directive. In May, USDA released a Climate-Smart Agriculture and Forestry (CSAF) Strategy: 90-Day Progress Report in response to their initial request for input. The overarching elements and underlying specifics in the report were consistent with the State's recommendations. The Administration has already made investments in actions recommended by Oregon agencies such as a new federal premium benefit for farmers with crop insurance who plant cover crops.

In addition, there is growing support in Congress for increasing investments in climate-smart land and water management. Among other outcomes, bills being considered in Congress would:

- Increase funding for reforestation;
- Provide incentives for agricultural producers to carry out climate stewardship practices;
- Provide information to landowners and managers regarding voluntary carbon markets;
- De-risk private investments in climate-smart management practices;
- Provide support to efforts to assess, protect, restore, and enhance important coastal areas that provide fish and wildlife habitat;
- Provide for ocean-based climate solutions to reduce carbon emissions and global warming;
- Establish a Blue Carbon program to conserve and restore marine and coastal blue carbon ecosystems; and
- Award competitive grants to tribal governments to further achievement of tribal coastal zone objectives.

In Oregon's 2021 Legislative Session, General Funds and funding from the 2021 American Rescue Plan Act were allocated to advance important actions and projects related to natural resources. These incredible one-time investments should be considered a down payment towards a long-term investment strategy to increase sequestration in natural and working lands strategies. Moving forward, the Legislature should continue to track federal program development and legislation to determine where state investments in capacity will be needed to leverage any new federal programs and policies. In addition, the state should investigate and advance options for creating dedicated sustained funding for natural and working lands mitigation strategies for climate mitigation and associated benefits.

By analyzing federal opportunities and aligning Oregon's programs and investments, we can most efficiently and effectively include natural and working lands in our overall climate mitigation strategy. However, doing so will require strategic investment of state funds in the capacity to take advantage of new federal opportunities.

With federal lands making up 53 percent of Oregon's natural and working lands it will also be critical to work with our federal land managing agencies to ensure their land use and management plans and programs support achieving Oregon's sequestration goal. The state of Oregon has a good track record of working collaboratively with federal land managing agencies on approaches for meeting state goals.

(2) Investigate and advance options for sustained state funding to increase sequestration in natural and working lands.

We can achieve some increases in sequestration by including a climate mitigation lens in existing natural and working lands programs. However, to achieve the ambitious goals we recommend, new funding will be needed to:

Oregon Watershed Enhancement Board (OWEB) Grant Program
The OWEB, the Oregon state agency with a mission to provide grant funding to protect and restore healthy watersheds, established a board-level Climate Committee in April 2020 to help carry out the Board's intent to account for climate adaptation, mitigation, and related co-benefits in its grant-making. In 2021, OWEB will begin gathering information about how applicants are considering climate impacts in their project identification and planning. OWEB's Climate Committee will use this information to guide future work and assist applicants plan and evaluate their projects. To assist with the questions, OWEB also is providing a Technical Resources document to help applicants find data about climate impacts relevant to planning their project.

- Fund and staff agencies to develop and implement recommendations and/or required policy changes.
- Strengthen education, engagement, and technical assistance efforts;
- Increase and deploy nature-based solutions in and around our built environment;
- Provide incentives to help land managers adopt climate-smart practices; and
- Protect and restore natural habitats that sequester carbon.

With dedicated funding for natural climate solutions, the state will be better positioned to leverage federal and private philanthropic funding. Having predictable funding sources empowers the state to establish long-term climate priorities that conserve, restore and manage forests and wetlands to help communities mitigate and adapt to climate change. Efforts to advance natural and working lands strategies will be more efficient and effective with dedicated funding that land managers, technical assistance providers and agencies can anticipate and plan on. A study should be conducted to evaluate the feasibility of potential funding mechanisms the state could establish to support natural and working lands sequestration strategies. Several states have conducted feasibility studies to evaluate new potential funding sources. For example, the Trust for Public Land and The Nature Conservancy analyzed nine potential funding strategies for creating dedicated funding for natural and working land strategies for Wisconsin in 2020 (Trust for Public Land 2020). A similar study could be commissioned for Oregon.

(3) Fund and direct state agencies to take actions to advance key natural and working lands strategies.

A) Enhance and maintain Oregon's statewide land use planning program, goals and commit to a no-net annual loss of resource lands and waters.

As described in DLCD's April testimony to the OGWC, "Since 1973, Oregon's statewide land-use planning program has sought to maintain resource lands in the face of increasing development by maintaining forest and agricultural land under protective zoning and limiting growth to areas within urban growth boundaries. Research suggests a very conservative estimate of the emissions reductions benefits resulting from Oregon's land-use planning system at 1.7 million metric tons of carbon dioxide (CO2) emissions per year in western Oregon alone." Continued protection of resource lands means natural and working lands remains undeveloped and available for implementation of practices that sequester carbon.

The Legislature should fund and direct DLCD to conduct an analysis of Oregon's Statewide Planning Goals, planning guidance and tools, and other assistance the agency provides to local governments to determine how the statewide planning goals and their implementation and support mechanisms should be enhanced to best facilitate the protection and restoration of natural and working lands to increase sequestration. Of particular importance to this work will be statewide planning goals 3 (Agricultural Lands), 4 (Forest Lands), 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces), 16 (Estuarine Resources), and 17 (Coastal Shorelands). The plan should also include actions DLCD should take to direct and support local jurisdictions to address climate mitigation in their comprehensive plans and land use regulations.

Land Use Planning Decision Support Tools
The state of California developed TerraCount, a scenario planning tool for use by cities, counties, districts, and other land-use planners that models the greenhouse gas (GHG) and natural resource implications of different development patterns and management activities. TerraCount allows planners to evaluate the application of management activities such as cover cropping, restoration activities (e.g., riparian restoration), and avoided conversion on net GHG emissions from natural and working lands. TerraCount is an open-source planning tool available on the California Department of Land Conservation's webpage.

In addition, DLCD is currently conducting rulemaking for its Climate Friendly and Equitable Communities Program. This program will assist municipalities "extend Oregon's legacy of protecting natural and working lands by encouraging growth in urban areas where people can walk, bike, or take transit to meet their daily needs." The OGWC recommends that the Legislature fund and direct DLCD to support and advance landscape level planning as well as community level planning that evaluate the carbon sequestration benefits of land-use scenarios as part of this planning process.

B) Invest in Oregon's crop and rangelands through the establishment of a comprehensive climate-smart agricultural program and funding for the Oregon Agricultural Heritage Program.

Several states have, or are in the process of developing, soil health and climate-smart agricultural programs. The OGWC recommends the Legislature fund the development of a soil health and climate-smart agricultural program. The program should align and integrate the efforts of ODA, OWEB, agricultural research programs at OSU, and technical assistance provided through OSU Extension, and Soil and Water Conservation Districts to advance climate smart management practices. The program should foster federal partnerships, in particular, leverage Natural Resource Conservation Service programs. The program could be established through the Oregon Agricultural Heritage Program (OAHP) which was established by the State Legislature in 2017 but has yet to be funded. The current program rules and priorities should be evaluated to see if, and how they would need to be updated to best advance climate smart practices.

For Oregon's diverse croplands, an integrated Climate Smart Agriculture program though OAHP should evaluate and advance strategies to incentivize soil health practice adoption as well other climate-smart practices such as nutrient management, manure management, alley cropping and expansion of riparian plantings. In Oregon's rangelands, the program should advance the implementation of rangeland practices that reduce the invasion of non-native annual grasses and restore rangelands that have already been invaded.

The program should:

- Promote climate-smart management practices to Oregon's agricultural communities;
- Promote farmer-to-farmer learning about soil health;
- Integrate outreach and education efforts;
- Collaborate with local partners and landowners to conduct soil health demonstration projects;
- Highlight soil health improvement efforts by Oregon's farmers and ranchers;
- Provide input to conservation funding programs such as the next iteration of the Farm Bill;
- Serve as a liaison with researchers in the state regarding applied research needs associated with climate smart practice priorities; and
- Build relationships with other states and organizations that already have climate smart agricultural programs.

Tribal Leadership to Grow Plants for Habitat Restoration
The Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) Native Plant Nursery grows approximately 70 native plant species. The nursery grows native plants to revegetate natural wildlife habitats in eastern Oregon. The CTUIR have been working with state and federal partners since 2016 to grow plants to restore sagebrush and bitterbrush in eastern Oregon after fires. Both species provide critical cover for the greater sage-grouse.

C) Support the implementation of climate-smart forest management.

The greatest potential for increasing carbon sequestration in Oregon is associated with the management of Oregon's forests and the wood products they produce. The Coast Range and West Cascades are among the most carbon rich regions in the world. The OGWC received significant input on the importance of protecting and increasing sequestration in Oregon's forests and reducing emissions from wildfires and harvest. ODF is in the process of developing a Climate Change and Carbon Plan (OCCP), the first Draft of which was posted to ODF's Climate Change and Carbon Plan Webpage in May. The May draft outlined eight goals for achieving this vision. Consistent with many of ODF's draft goals and the supporting actions, the Legislature should:

- *Dedicate funding to help empower local communities design and implement urban forestry plans and actions that increase the extent and resilience of urban and community forests .*

Canopy cover is an environmental justice issue. Trees in cities provide environmental and health benefits including improved air quality, reduced runoff into local streams and rivers, natural cooling, and reduced energy consumption. Recent research (McDonald 2021) found that low-income neighborhoods have less tree cover than high-income neighborhoods in 92 percent of U.S. cities evaluated. Studies show that communities of color and low-income households are more likely to be exposed to air pollutants which have been shown to cause and amplify respiratory and cardiovascular illnesses.

The Oregon Department of Forestry has had a federally funded urban and community forests program for 30 years that is designed to assist communities in Oregon maintain and enhance their urban tree cover. ODF's Urban and Community Forestry program requested funding during the 2021 Legislative Session to expand their capacity to be able to increase canopy cover with a focus on disadvantaged and underserved communities in Oregon, the OGWC supports funding this request in the future.

- *Adopt revisions to the Oregon Forest Practices Act to improve climate mitigation and adaptation outcomes on private lands in Oregon.*

In 2020, Governor Brown brokered an agreement – the Private Forest Accord – between 13 conservation and fishing groups and 13 timber and forest products entities. The Accord led to the passage of bipartisan legislation charging the Governor with hosting a mediation process to develop recommended changes to the Oregon Forest Practices Act laws and to position the state to secure a statewide Habitat Conservation Plan (HCP) for threatened and endangered aquatic and riparian species listed under the federal Endangered Species Act. The HCP would provide more regulatory certainty for landowners and long-term conservation benefits for fish and wildlife species. Changes to Oregon's riparian buffers rules to benefit aquatic and riparian species would result in increased sequestration on Oregon's private forest lands. The recommendations are due by the end of 2021 and are intended to be formalized through legislation during the 2022 session. The OGWC encourages all parties to consider the carbon benefits in addition to riparian species benefits when weighing policy options and developing recommendations.

Beyond the revisions recommended by the Forest Accord, the Department should periodically analyze and adopt additional warranted improvements in the Forest Practices Act to continue to improve climate and carbon sequestration outcomes in Oregon's forests.

- *Create a blue-ribbon panel to develop an all lands strategic plan for incentivizing climate smart forestry in Oregon's forest while maintaining or enhancing Oregon's harvested wood products infrastructure.*

ODF's draft Climate Change and Carbon Plan (OCCP) identified a goal of advancing a just and equitable transition to climate-informed forestry that optimizes climate mitigation and adaptation, while maintaining a sustainable flow of wood products and ensuring long term benefits for Oregon's forest products inventory.

ODF is working on two studies to evaluate the net carbon sequestration consequences of different management scenarios, in terms of the amount of carbon that can be stored and potentially lost. One is being led by American Forests in partnership with the US Forest Service, the Canadian Forest Service, Northern Institute of Applied Climate Science, and Michigan State University. The other is being led by USFS Pacific Northwest Research Station.

The OGWC recommends that ODF evaluate a bold set of scenarios including: lengthening harvest rotations on state and private forest lands; increasing protections for mature and old growth forests on state and federal lands as well as areas with high carbon storage potential and co-benefits for threatened and endangered species and improved water quality; implementing forest resilience treatments in fire-prone forests; and reforesting understocked stands and riparian floodplain habitats.

To build on these two studies, the Legislature should fund and the state should convene a blue-ribbon panel to develop a strategic plan for how to best facilitate adoption of the climate-smart forest management strategies that show the most climate mitigation and adaptation promise across all lands in Oregon. Oregon's forest owners, managers, forest products industry members and workforce are diverse with different goals, needs, constraints, and opportunities related to strategies that could be deployed to increase carbon sequestration in Oregon's forests. It will be especially critical here to take a systems-based approach that pays careful attention to the needs for the industry as a whole. Strategies

that increase carbon stocks and provide critical community co-benefits, while maintaining or enhancing Oregon's harvested wood products infrastructure and workforce development, should be prioritized and well resourced.

- *Develop a strategic plan for expanding capacity for reforestation in Oregon.*

Reforestation, including adding trees to understocked stands, reforesting after wildfires and planting trees in previously forested lands (e.g., riparian areas), has significant potential to increase sequestration in natural and working lands.

Globally, nationally, and locally, there is significant and growing interest in ambitious tree planting goals. Recent research (Cook Patton et al 2020) estimates that an additional 3.43 MMTCO2e could be sequestered per year in Oregon through reforestation of forests and former forest lands such as riparian habitats. Achieving this level of ambition would require significant expansion of capacity for seed collection, seedling production, workforce development, and improvements in pre- and post-planting practices that would require public support and incentives for landowners.

The need for increased capacity for seedling production is already being felt in Oregon following the large 2020 fires. The OGWC commends the Legislature's investment of $5 million appropriation to the Department's Private Forests Division for post 2020 wildfire reforestation. In a typical year, around 40 million seedlings are planted after harvest in Oregon (OFIC 2020); ODF estimates that somewhere between 80 and 140 million additional seedlings may be needed to reforest just the non-federal lands in Oregon that burned in 2020. ODF should consider working with neighboring states to develop the strategic plan for expanding capacity for reforestation and the Legislature should invest as needed in implementation of the plan.

- *Expand forest resiliency treatments to reduce emissions from wildfire, reduce mortality from drought, prevent increased pest outbreaks, and make our forests and communities more resilient.*

As described in the 2019 report from Governor Brown's Council on Wildfire Response, "Wildfire has been and will remain a permanent part of life in the western states… Over a century of land management practices and changing policy, starting with the removal of tribal communities and subsequent loss of their controlled burning practices, followed by widespread fire suppression and shifts in land use, has enabled fuels to accumulate far beyond historic conditions. Population growth has increased human-caused ignitions, putting people and communities in harm's way. Additionally, fire seasons have become longer, drier and hotter, owing to climate impacts…current conditions are out of balance and demand a swift and enduring response." The OGWC commends the Legislature's 2021 investment in a comprehensive strategy to address this concern. As noted earlier, the state's goals for net sequestration should be updated when this plan is complete and funding levels are known factor in the net impacts of treatments to increase resilience and reduce emissions from wildfires.

Longer Fire Seasons are Putting More Oregon Communities at Risk

In 2018, the Oregon Climate Change Research Institute described that fire seasons have lengthened "over each of the last four decades, from 23 days in the 1970s, to 43 days in the 1980s, 84 days in the 1990s, and 116 days in the 2000s."

- *Expand the Oregon Agricultural Heritage Program to include support for forest landowners.*

As described above, the Oregon Agricultural Heritage Program is designed to provide voluntary incentives to farmers and ranchers to support practices that maintain or enhance agricultural and natural resource outcomes such as fish and wildlife on agricultural lands. The Legislature should expand the program and increase funding levels to provide similar support for family forest landowners.

D) Increase protection and restoration of carbon-rich tidally influenced coastal ecosystems through investments in updating estuary management plans and conservation and restoration of tidal wetlands.

"Blue carbon" collectively refers to Oregon's coastal wetland ecosystems —including seagrass beds, marshes, scrub-shrub wetlands, and forested swamps—which serve as important natural carbon sinks. According to the Pacific Northwest Blue Carbon Working Group, rates of "carbon sequestration has been shown to be very high in tidal wetlands." A recent study (Kauffman et al. 2020) published in 2020 documented the importance of emergent tidal wetlands in Pacific Northwest as important carbon sinks comparable on a per acre basis to the region's old growth forests. Since the 1850s, 58 percent of Oregon's emergent tidal wetlands and over 70 percent of Oregon's forested tidal wetlands – combine just over 70,000 acres – have been converted to other land uses reducing or eliminating their ability to sequester more carbon (Beers et al 2021). In addition to carbon sequestration, Oregon's blue carbon ecosystems provide a range of social, economic, and environmental benefits, such as fish/shellfish rearing sites, buffers against sea-level rise and amelioration of ocean acidification.

The Outside Importance of Forested Tidal Wetlands
For every thousand acres of restored forested tidal wetlands roughly 212,500 MTCO2e could be sequestered by 2050, while providing significant benefits to fish and wildlife.

DLCD has established a no net loss of intertidal and tidal marshes under Statewide Planning Goal 16 (Estuarine Resources) and the Department of State Lands (DSL) implements a no net loss of wetlands under the state's Removal-Fill Law. In addition to continued work to halt coastal wetland loss, the OGWC recommends that the state invest in state sea level rise plan development and implementation. Planning for the landward migration of tidal wetlands and targeted investments in incentives for conservation and restoration of former tidal wetlands would provide significant per acre climate mitigation as well as adaptation benefits.

Sea level rise planning should be advanced through existing Oregon's existing policy frameworks, including Oregon's natural resources planning (Goal 5), estuary management planning (Goal 16), and shorelands planning (Goal 17) DLCD programs. Researchers (Brophy and Ewald 2017) have already mapped potential areas for landward migration of tidal wetlands under several sea-level rise scenarios that can serve as a starting point for planning for future land use policies and programs. Several coastal communities have identified the need to update their Estuary Management Plans (EMPs). In 2020, DLCD received a grant from the National Fish and Wildlife Foundation to develop Estuary Resilience Actions Plans for Coos Bay and one for Tillamook Bay. Such efforts should focus on the ability of healthy estuarine areas to provide vital benefits communities, ecosystems, and the economy while performing long-term carbon storage and sequestration of GHG emissions. The OGWC recommends the state to take the lessons learned through these pilot projects coast wide. We recognize that planning for sea level rise will be complicated, controversial, and will take significant time and resources. The Legislature should allocate sufficient funding for this work to ensure adequate state and local capacity needed for success.

E) Expand climate-smart protection, restoration and improved management training and technical assistance programs.

Repeatedly, feedback from Tribes and stakeholders identified the need for added technical assistance capacity. As identified in our 2020 Biennial Report to Oregon Legislature, getting Oregon's workforce trained and ready for a low-carbon economy will pay dividends over time.

> Monitoring results (Brophy et al 2019) from the project suggest that, over time, the Tillamook Estuary Southern Flow Corridor could store an additional 100,000 tons CO2e. That is the equivalent of taking 21,000 cars off the road for a year.

Currently, federal, state, locally generated public funding as well as private funding support technical assistance in Oregon. NRCS and the U.S. Forest Service provide technical assistance to land managers. NOAA and National Estuarine Research Reserve Programs provides tools, trainings, and workshops to communities and professionals regarding blue carbon. For example, NOAA assisted partners on the Southern Flow Corridor project in Tillamook restore tidal wetland habitat for coho salmon and reduce flooding in the nearby communities. Among other state agencies that provide technical natural resources assistance, OWEB works closely with ODA to administer capacity funding for both Soil and Water Conservation Districts (SWCDs) and Watershed Councils. Oregon State University's Extension Service provides technical assistance services across the state. They receive funding from the state, from counties and from federal sources.

However, staff resources in these federal state and local organizations—and grant dollars to land managers for technical assistance are already stretched thin with existing workloads. In order to meaningfully increase carbon sequestration on natural and working lands, the Legislature should invest additional funds to increase support for technical assistance providers.

Where new natural resources workforce programs are needed, they should be developed in partnership with the Oregon State Apprentice and Training Council. Any new training programs should include union labor and give priority to diversity and equity in the workforce, including communities of color and historically underserved communities.

4) Invest in improvements to Oregon's natural and working lands inventory data and research into climate smart management practices.

Technical experts recommended the state advocate for improvements at the federal level, invest in research to improve state specific sequestration rates, and where needed address gaps in priority federal improvements, especially where the improvements would benefit multiple priority outcomes for Oregon (e.g. investments in eelgrass monitoring). The World Resources Institute (2020) prepared an overview of the current State Inventory Tool and options the federal government, states and others have made—or are planning to make—improvements to the inventory data.

Technical experts we consulted identified several improvements that should be made in Oregon's inventory over time:

Forests: ODF worked with USDA Forest Service Pacific Northwest Research Station (PNW) to produce the Oregon Forest Ecosystem Carbon Inventory: 2001-2016 Report in 2018. The report identified a number of inventory improvements that should be made for Oregon's forests including increasing the density

and frequency of remeasurement of FIA plots. In 2020, the ODF expanded its partnership with the FIA program to increase the number of inventory plots on State forests lands in Oregon. The state should request that the federal government increase the density of plots on private lands in Oregon as well and the remeasurement frequency on all forest lands in Oregon and, if necessary, the Legislature should fund these improvements. Finally, the ODF should better integrate the FIA plot data currently used to inform the forest GHG inventory data with remotely sensed data to paint a more complete picture of net sequestration in Oregon's forest lands.

Blue Carbon: The Pacific Northwest Blue Carbon Working Group (PNBCWG) has several studies already funded and underway to improve GHG sequestration rate coefficients for Oregon's blue carbon. To build on this work the OGWC recommends the Legislature build on this work with additional investments in: (1) development of a comprehensive map of restored, restorable and least disturbed tidal wetlands; (2) completion of more consistent mapping of submerged aquatic vegetation in all Oregon estuaries; and (3) completion of more consistent mapping of kelp in Oregon's territorial water; and (4) research to better understand the sequestration benefit of protecting and restoring eelgrass kelp forests, farming seaweed. The Oregon Department of Fish and Wildlife (ODFW) has an active eelgrass monitoring program (SEACOR) in a subset of Oregon estuaries that could be expanded to create a coastwide eelgrass dataset. In addition to informing our natural and working lands inventory, these projects would also support improved fisheries management, coastal adaptation planning and opportunities for addressing ocean acidification and hypoxia.

Croplands and Rangelands: Due to the wide variety of crops and management practices applied in Oregon's agricultural and rangelands and the variability in environmental factors that influence soil carbon sequestration rates, inventorying soil carbon fluxes is extremely challenging. Mertens and Moore (2021) recommend that the state invest in filling data gaps associated with temporal and spatial explicit management data. They suggest that one such dataset that could be used to do this is the Operational Tillage Information System (OpTIS) which is an automated system to map tillage, residue cover, winter cover, and soil health practices using remote sensing data. They also recommend conducting a more rigorous sensitivity analysis, including additional sample locations and crops sampled, to further refine the methodologies.

Land Use and Land Use Change: ODF currently assesses changes in land use periodically, about every five years. The Legislature should fund the agency to increase the frequency of evaluating land use change as a critical component of development of an accurate LULUCF net sequestration inventory.

V. Next Steps:

In order to continue to advance a natural and working lands sequestration goal and strategies, the Legislature should fund and create a Natural and Working Lands Council. The Council should be charged with establishing a baseline for the outcome-based goal and the activity and community impact metrics within a year of its establishment. To ensure that the metrics put the most vulnerable communities at the forefront of the potential benefits of increasing carbon sequestration, the Natural and Working Lands Council should be composed of a diverse group of council members, including BIPOC and Tribal representatives, as well as land managers, technical experts, conservation interests, and technical assistance providers.

Supporting the work of the Council and tracking progress against the goals and metrics will require added agency capacity. This added capacity could be centralized in one of the agencies or spread across

agencies with defined responsibilities for ODF, ODA, OWEB, DEQ, and DLCD. These agencies should be directed to provide the OGWC with regular updates on progress toward our goals and metrics and implementation of our natural and working lands recommendations. Once the metrics are established, the OGWC will begin reporting on progress the goals and metrics as part of our Biennial Reports to the Legislature. Natural and working lands can and must be an important part of a comprehensive climate mitigation strategy for Oregon.

Appendix A: Outreach Methods and Results

With significant support from the Oregon Water Enhancement Board (OWEB) and the Departments of Agriculture and Forestry, the Oregon Global Warming Commission hosted a suite of engagement opportunities to gather stakeholder and tribal perspectives. Below is a summary of the methods and links to results and/or presentations.

Public Comments: Written comments regarding the natural and working lands proposal were received, reviewed and posted in the materials for all Commission meetings. Opportunities for additional public comment regarding our natural and working lands proposal were provided and comments were received during all of our Commission meetings back to June of 2020.

Natural and Working Lands Targeted Survey: To gather information on current conservation and management practices related to carbon sequestration, as well as incentives, opportunities and barriers supporting these practices, a survey was circulated to Oregon tribes, agricultural landowners/ land managers, forest landowners, technical assistance providers, agriculture/forest interest groups, conservation organizations and environmental justice groups.

The survey allowed participants to self-identify location and group affiliation. The survey included a set of multiple choice and narrative questions intended to gather information on practices, incentives and information sources use now and interested in utilizing in the future. Participants were also asked about barriers to utilizing practices/ incentives and were given the opportunity to write in additional considerations around policy making and practices. The survey was distributed to over 200 statewide and local organizational representatives in December 2020 with a request to forward the survey to their constituents.

The OGWC received a total of 737 responses from the groups identified above. All survey results, as well as the complete list of survey questions, are available here: https://www.keeporegoncool.org/meeting-calendar/2021/5/7/oregon-global-warming-commission-meeting-virtual.

Narrative responses were analyzed by response group using an inductive, qualitative approach (Maxwell 2013). Responses were categorized into common theme groupings that represented the range of recommendations offered. Bar graphs visually compare response categories between all groups. This gives insight on common and differing viewpoints between groups, as well as the range of responses for each narrative question asked. More detailed methods and results, including how response categories were grouped under each theme, and representative quotes, are available here: PowerPoint Presentation (squarespace.com).

Online survey: In addition to the targeted landowner survey, a more general Natural and Working Lands Outreach Survey was posted on the Global Warming Commission website between January 25th and May 3rd, 2021. A total of 122 individuals responded to at least one of the six broad, narrative-style questions that focused on opportunities and barriers to carbon sequestration in Oregon. The list of questions and all responses are available here: https://www.keeporegoncool.org/meeting-calendar/2021/5/7/oregon-global-warming-commission-meeting-virtual

Focused discussions: Focused discussion groups were convened to better understand the practices, incentive and policy options that may be necessary for Oregon to achieve a carbon sequestration goal; inform the success indictors; and to better understand the results of the targeted survey.

A total of 96 individuals participated in eight focused discussions (8-15 participants per group) in April 2021. Four of the discussions targeted group of individuals representing: Conservation organizations; Forestry; Environmental Justice; Landowner interest groups. The remaining four were organized by region – Coast, Willamette Valley, Southern Oregon, Eastern Oregon and included a cross-section of agricultural landowners; technical assistance providers; land trusts; and non-profit organizations:

Background materials provided for the session are available at: https://www.keeporegoncool.org/natural-working-lands. All discussions were facilitated using a common set of questions focused on participant ideas to achieve long-term sequestration goals, benefits, incentives, policy change, barriers, and other feedback to improve carbon sequestration on Oregon's natural and working lands. Participants also reviewed and reflected on the results of the targeted survey, providing insights and perspective on the results. Recommendations were categorized into themes through an iterative process by OWEB staff. Results are summarized and available at: https://www.keeporegoncool.org/meeting-calendar/2021/5/7/oregon-global-warming-commission-meeting-virtual. In addition to general feedback identified here, participants also identified practices that should be considered in addition to those sent out in the survey, particularly on forest lands from the forestry session. The Environmental Justice focused discussion also highlighted a number of suggestions and also suggested organizations to further engage in next steps amongst Oregon's environmental justice organizations.

Tribal engagement: To gather input from Oregon's Tribal Nations, Oregon Global Warming Commission Chair Macdonald attended a government-to-government Natural Resources Working Group in the fall of 2020. A letter was sent to all federally recognized Tribes in Oregon in 2021 inviting them to participate in a focused discussion group and to present to the commission. Robert Brunoe, Natural Resource Director, Confederated Tribes of Warm Springs presented at the April 2021 Commission meeting and Chair Brigham, Chair Confederated Tribes of the Umatilla Reservation presented at the May 2021 meeting. Their presentations and the OGWC discussion can be found can be accessed on the OGWC meeting webpage: https://www.keeporegoncool.org/meetings Chair Macdonald also hosted several individual meetings with tribal leaders and invited all and through presentations and discussions at OGWC meetings.

State and Federal Agency Presentations: Several state and federal agencies have a mission relevant to implementing practices, policies and programs carbon sequestration on natural and working lands, and were invited to provide feedback about the natural and working lands goal to the OGWC. Participants included:

April 2021:

- Stephanie Paige, ODA
- Chair Jim Kelly, Board of Forestry
- State Forester Peter Daugherty, ODF
- Board Member Bruce Buckmaster, OWEB
- Audrey Hatch, OWEB

May 2021:

- Paul Anderson, Pacific Northwest Station Director, US Forest Service
- Barry Bushue, BLM Oregon-Washington State Director

June 2021:

- Ron Alvarado, State Conservationist, Natural Resources Conservation Service

Their presentations and discussions with the Oregon Global Warming Commission can be accessed on the OGWC meeting webpage: https://www.keeporegoncool.org/meetings for meeting materials).

Technical Experts: Since December of 2020, the OGWC has heard from the following technical experts. from

- James Mulligan, Senior Scientist, World Resources Institute (December 2020)
- Dr. Rose Graves, Portland State University (December 2020; June 2021)
- Dr. Ryan Haugo, The Nature Conservancy (December 2020; June 2021)
- Dr. Vivek Shandas, Research Director, Institute for Sustainable Solutions, Portland State University (April 2021)
- Dr. Thomas DeLuca, Dean, School of Forestry, Oregon State University (April 2021)
- Dr. Jennifer Moore, Research Soil Scientist, USDA Agricultural Research Station (April 2021)
- Dr. Steve Crooks, Principal, Wetland Science and Coastal Management, Silvestrum Climate Associates (April 2021)

The following additional technical experts provided technical support for the development of the natural and working lands proposal:

Blue Carbon:

- Craig Cornu, Institute for Applied Ecology
- Laura Brophy, Institute for Applied Ecology
- Pew Charitable Trusts

Crop and Rangelands:

- Judith Callens, ODA
- Diana Walker, ODA
- Markus Kleber, OSU
- Cory Owens, NRCS
- Mike Mertens, EcoTrust

Forest:

- Danny Norlander, ODF
- Andrew Yost, ODF
- Marin Palmer, U.S. Forest Service, Regional 6
- Chad Davis, U.S. Forest Service, Regional 6
- Glenn Christensen, U.S. Forest Service, Pacific Northwest Research Station
- Taylor Lucey, U.S. Forest Service, Pacific Northwest Research Station
- Andrew Gray, U.S. Forest Service, Pacific Northwest Research Station
- Olaf Kuegler, U.S. Forest Service, Pacific Northwest Research Station

Appendix B: Conservation practices that contribute to carbon sequestration:

Agriculture

- Biochar amendments
- Climate-Friendly Nutrient Management
- Compost Application (Or Other Organic Amendments Like Biochar)
- Composting of Manure and Other Organic "Wastes"
- Conservation Crop Rotation
- Cover Cropping
- Hedgerow and Riparian Plantings
- Mulching
- No Till and Reduced Tillage
- Rotational Grazing
- Silvopasture and Agroforestry
- Strip Cropping
- Sustainable and Organic Production Systems

Forestry

- Forest Stewardship Council Management Practices
- Fire prone Forest Health Treatments
- Green Tree Retention
- Lengthening Rotations
- Patch and Selective Logging
- Pest and Pathogen Management
- Post Wildfire Management
- Reforestation
- Riparian and Wetland Buffers
- Tree Planting

Natural Lands

- Algae Farming
- Eelgrass Habitat Protection
- Emergent Tidal Wetland Restoration
- Forested Tidal Wetland Restoration
- Grassland Protection and Restoration
- Kelp restoration
- Pollinator habitat restoration
- Restoration of shrub-steppe habitats
- Riparian Tree Planting
- Upland Forest Protection and Reforestation of Understocked Stands
- Watershed Management