

Work Plan:	Climate Change and Forest Carbon
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WORK PLAN OVERVIEW

Background:

Climate and topography are the two most influential factors in Oregon's forests. Modeled projections of long-term changes in climatic conditions across the Pacific Northwest based on rising concentrations of atmospheric carbon dioxide are accompanied by predictions such as increased temperatures, rising sea levels, declining snowpack, extreme precipitation events, and increased risk of drought and heat waves. Oregon has established various climate and carbon policies since the early-to-mid 1990s, including multiple statutory changes, work groups and agency-driven plans focused on adaptation.

The *Forestry Program for Oregon*, the Board of Forestry's (Board's) strategic plan, includes seven overarching goals to achieve the Board's mission: *Leading Oregon in implementing policies and programs that promote sustainable management of Oregon's public and private forests*. Goal G of the Board's strategic plan is specific to climate change and forest carbon and reads: **Improve carbon sequestration and storage and reduce carbon emissions in Oregon's forests and forest products**. Goal G has seven objectives intended as short-term actions to focus the Board's efforts:

1. Forest land base retention
2. Public and landowner education
3. Accessible carbon-offset markets
4. Advantages of Oregon forest products
5. Biomass as a renewable energy source
6. Biomass/bioenergy/bio-based products
7. Forest sector energy efficiency

In 2015, the Board reaffirmed its commitment to Goal G by adopting seventeen recommendations regarding integration of climate change into the agency's business across all three operating divisions. The Department provided the Board a report at their September 2019 meeting on progress to date in implementing these recommendations (See Appendix 1).

Recently, the Board included climate change among eleven principles for the development of a Forest Management Plan for state forests west of the Cascades. The principle is anchored to mitigation and adaptation.

Principle 11

The FMP will be implemented to adapt to climate change and mitigate its impacts on the management of state forestlands. The FMP will also contribute to climate change mitigation and sequester carbon.

Future changes in temperature, precipitation, and hydrologic processes may alter the distribution of climate conditions, as well as the frequency of disturbances, including insects, disease, wildfire, and drought. Within the context of the Division's overarching adaptive management framework, the plan will implement forest management strategies directed at ecological processes and functional characteristics to determine the potential to promote resilient forest conditions. State forestlands and wood products derived from active management contribute to carbon sequestration, a factor in mitigating global climate change. A focus on strategies that adapt to changing conditions will ensure the Division is able to meet State Forests' management objectives over the long term.

Current Context:

Oregon's forests encompass 30 million acres, 47 percent of the total land area of the state. A variety of statutes and management objectives direct management of our public and private forests. However, across these different mandates, one commonality exists: Oregon's forests are both an asset and at risk to a changing climate. The state's forests have faced other challenges. Policy makers passed the nation's first Forest Practices Act (1971) and land use protections (1974) to maintain Oregon's forests. Due to these actions, 98% of Oregon's wildland forests present in 1974 remain forests today. A changing climate in the state represents a new and different threat to the state's forest ecosystems and communities. We are already seeing examples of forecasted impacts of a warmer climate. In the past decade, large wildfires have shown to be more resistant to suppression actions and tree mortality and susceptibility to disease and insects has increased because of drought stress. Our economy and communities have been impacted as significant areas of the state have been inundated with unhealthy levels of smoke. These impacts increase the risks and costs to state agencies, communities, industries, and homeowners.

- Fire managers use energy release component (ERC) as a strong predictor of heightened fire risk and severity. Since 1995, the percentage of the fire season above a critical threshold has risen from 3% to 33% of the season, staying above the critical ERC for 60 days in 2018.
- A direct result of increased wildfire, smoke intrusions into communities have caused health impacts to residents and economic harm to local businesses forced to alter work, cancel events, or evacuate the active fire areas.
- A "bathtub ring" of drought-induced mortality in Douglas-fir and true firs surrounds the Willamette Valley. These native species are on the fringe of their native ranges and exhibiting signs that they are maladapted to changing climate on a local level.

While the most visible result of climate change at this time is an altered fire environment, there are many other impacts less well understood and studied. Many of these impacts are currently subject to research and monitoring, including species susceptibility to drought and the movement of tree species based on adaptive traits and environmental conditions.

TOPIC A: Analysis of Statutes and Administrative Rules

Overview

Throughout 2019, the Board continued to assert that climate change and forest carbon as an urgent policy topic for their work in 2020-2021. The Board reviewed Board work dating back to 2015 on climate policy and reviewed how ODF Divisions have incorporated climate change into operations. Throughout the year, Board members identified several specific topics of interest, including, but not limited to:

- Impact of climate change on forest water quality, including riparian buffer widths
- Sufficiency of the Forest Practices Act under future climate conditions
- Strategic investments in climate mitigation and adaptation on State Forests
- Policy choices and analysis tools to optimize long-term carbon storage, including forest management and wood products utilization
- Development of a forest carbon offset protocol
- Revision of the Forestry Program for Oregon climate goal and objectives

At its January 2020 meeting, the Board discussed work plan topics related to climate change and forest carbon as part of the Overarching Issues work plan. In response, Department staff offered to develop a specific work plan to house various elements of the Board's work on the topic, rather than to include specific items within division work plans.

Purpose

This work plan provides details on one of two broad topic areas resulting from the Board's January 2020 discussion. The Board acknowledged that this urgent issue interfaces with work in all divisions and opted to pursue a policy analysis of statutes and administrative rules. In addition, the Board committed to reviewing and revising Goal G of the Forestry Program for Oregon as a means to re-establish the Board's overarching policy statement and objectives on climate change and forest carbon.

Board Deliverables with Timelines

The following deliverables are proposed to occur in sequence.

- 1. Evaluate Board's authority and constraints.** This work plan item requires the Board to frame up particular questions of interest relative to the Board's authority under current Oregon Revised Statutes. The Department will request a legal analysis on those questions from the Department of Justice. This analysis will inform the Board's deference to evaluate and potentially revise or create administrative rules. *Estimated timeframe: Spring – Summer 2020.*

- a) ***Establish Board's climate change and forest carbon goal.*** This work plan item will review and revise Goal G in the current Forestry Program for Oregon. Additionally, the Department will work with the Board to identify an indicator to assess progress towards achieving the revised goal. *Estimated timeframe: Spring – Winter 2020.*
 - b) ***Conduct policy analysis of statutes and administrative rules regarding the impact of climate change to achieve outcomes.*** This work plan item includes policy analysis of current statutes and rules to assess the impacts of climate change relative to achieving desired outcomes of those policies. In total, this is a large scope of work and the Board, likely enduring beyond this work plan timeframe of two years. The Board will prioritize a sequence to achieve a comprehensive analysis over time. For example, does the Board prefer an initial analysis on statutes across the agency (e.g., ORS 477, 526, 530) or a more focused analysis of the statutes and related administrative rules within a particular policy area (e.g., Fire Protection Division or the Forest Practices Act)? *Estimated timeframe: Summer 2020 – Spring 2022.*
2. ***Identify gaps in current policy to respond to climate change.*** This work plan item is derivative of 1) and 2b) above and will identify needed revisions and/or new statutes and/or administrative rules to mitigate and adapt Oregon's forests for climate change. This work plan does not include the necessary steps nor time to adopt new policies. *Estimated timeframe: TBD in light of 2b.*

Outreach and Public Involvement

In addition to public comment at Board meetings, the Board will design a specific public input component to revising Goal G per deliverable 2a) above. The particular mechanism to ensure public values in goal formation will be identified as an initial step of goal revision.

TOPIC B: Mitigation and Adaptation Efforts

Overview

During the 2018 Legislative Session, the Legislature charged the Office of Carbon Policy (OCP) to assess carbon in Oregon's forests. The OCP initiated an agreement to have ODF complete this work. ODF contracted with the Pacific Northwest Research Station of the US Forest Service to complete the Forest Ecosystem Carbon Report based on plot data from the Forest Inventory Analysis Program. Department staff presented results of this work to the Board at its April 2019 meeting. Selected highlights from this assessment include:

- Carbon storage in Oregon's forests is approximately 3.2 billion metric tons
- Each year, Oregon's forest sequester approximately 30.9 million metric tons of CO₂ equivalents

Department staff are also working on a second report to quantify the carbon storage and flux in harvested wood products. This work is due to be completed in 2020. Future work will evaluate different management and utilization scenarios to assess potential strategies to increase the ability of Oregon's forests and forest sector to mitigate for climate change.

Since 2018, the Department has participated with staff from twenty-two other agencies to revisit the Oregon Climate Change Adaptation Framework. The Framework describes threats, opportunities, and information gaps arising from climate change and suggests strategies for addressing them. The cross-agency leadership structure developed in the Framework ensures that the highest priority adaptation strategies and actions are identified and implemented across the state and incorporated into budget requests and work plans. This highly coordinated effort charts a path forward on adaptation that makes equitable and efficient use of existing and future state capacity and resources.

Purpose

This work plan includes multiple information items to ensure Board awareness and alignment on various efforts Department staff engages in relative to climate mitigation and adaptation.

Board Deliverables with Timelines

The primary deliverable is review of the Oregon Harvested Wood Products and Sawmill Energy Report. This report is due to ODF in September 2020. At minimum, additional updates regarding the Department's integrated efforts on mitigation and adaptation will be included with the annual assessment agenda topic in September.

Outreach and Public Involvement

Items in this work plan are informational and will follow Board standards for public comment during Board meetings.

Climate Change and Forest Carbon Work Plan	2020					2021					2022			
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Assess Statutory Authority														
<i>Milestones</i>														
• Identify primary questions of interest		d												
• Request DOJ analysis			x											
• Receive legal analysis and report					i									
Issue: Establish Climate Change and Forest Carbon Strategic Goal														
<i>Milestones</i>														
• Review Goal G in Forestry Program for Oregon		d												
• Determine public input for goal revision		d												
• Conduct public input														
• Board workshop to revise goal				i										
• Establish new goal					D									
Issue: Analyze Existing Policies to Achieve Outcomes in face of Climate Change														
<i>Milestones</i>														
• Establish sequence to conduct full analysis of statutes and administrative rules			d											
• Identify priority for initial analysis			i	d										
• Interim report on initial analysis							TBD							
• Final report on initial analysis										TBD				
• Initiate second priority analysis										TBD				
Issue: Identify Gaps in Current Policy														
<i>Milestones</i>														
• To be determined following assessment of statutory authority and analysis of existing policies													i	
Issue: Mitigation and Adaptation Efforts														
<i>Milestones</i>														

• Harvested Wood Products and Sawmill Energy Report				i										
• Annual Update on Mitigation and Adaptation Efforts				i										
• Scenario Planning Model Review						i								
• Update on Scenario Planning with focus on Management and Utilization Strategies										i				
• To be determined														

Matrix Key:

TBD – To be decided

i – Informational item

d – Preceding Decision item

D – Final Decision item

Appendix 1: Climate Change Policy Direction and Business Practices within ODF Divisions

Climate Change Policy Direction and Business Practices within ODF Divisions

September 2019

Climate change is a complex and uncertain issue. The ultimate result of a warming climate are not well known at the ground level and informed decisions have to be made with the information that is available, with the understanding that new decisions will need to be made as more certain information emerges.

In 2015, the Board adopted a set of recommendations regarding integration of climate change into the agency's business. In 2019, the Board reaffirmed its interest in elevating climate change policy with respect to its purview and statutory authority. This white paper includes a synopsis of the Board recommendations relative to each ODF Division and catalogues the work to incorporate climate practices into the agency's business.

Board of Forestry

2015 Recommendations adopted by the Board

- When updating the current *Forestry Program for Oregon* (2011), or developing a new policy document, the Board should consider whether
 - Objectives that mention climate change should remain as is or if they should be modified.
 - The issue of climate change and forest policy should be expanded.
- Climate change should be explicitly considered to the best extent of the available science in the Board's regular business issues.

Private Forests

2015 Recommendations adopted by the Board

- During review of FPA take predictions of future stream flow events in account
- Promote larger scale provenance research and monitoring to inform policy on assisted migration.
- Continue work with PNW research station to monitor insect activity and forest mortality, encourage PNW Research Station to employ full time Entomologist and Pathologist.

Implemented Business Practices

Landscape Scale Data Collection and Assessment of Forest Health

Forest Health Program and Forest Health Assessment – Climate change and associated impacts on forest are realized in the course of drought, disease, and mortality events. Actively assessing forests with a focus on identifying flux is fundamental to assessing areas and impacts of climate change. The Forest Health Program actively assesses forest health on private and public lands through aerial and ground surveys. This informs and identifies changes and trends on forestlands related to insects, disease, invasives, drought, and mortality. This work supports development of information requisite to understanding and identifying tree species health and migration interests.

Climate Change Driven Technical Advice and Training – Information is assessed and utilized to provide technical advice and training to agency personnel, research partners, professional foresters, and landowners.

Collaborative Information Collection and Development – The forest health program actively collaborates with PNW research station, Oregon State University, stewardship foresters and others in the course of collection, evaluation, and dissemination of information and associated training and support. Collectively this work, in conjunction with other data gathering efforts, promotes ongoing research and evaluation both within ODF and in conjunction with other agencies (ODFW, DLCD, OGWC, and USFS) and research partnerships (SOD, species, stream). These relationships allow:

- Active evaluation of forest health and stress events precipitated and or exacerbated by climate change.
- Direction and feedback on rules, resource outcomes, agency training and views, and support to stewardship foresters, landowners, and other forest interests.

<https://youtu.be/9nNMv7Iik2o> - Aerial Survey Video

<https://youtu.be/wHZ1G5wH4r8> - Christine Buhl Drought/Insect Video

<https://www.oregon.gov/ODF/Documents/ForestBenefits/Drought.pdf> - ODF Drought Publication

Seed Orchard and Seed Bank

Climate and Condition Adapted Tree Species – The J.E. Schroeder Seed Orchard is one of the primary sources of seed for growing Oregon's forests. The seed Orchard actively considers changing conditions by focusing on developing seed that will flourish depending on growing region and other conditions.

Seed production actively considers adaptability and changing conditions as seed is developed and provided to promote conservation and forest production. Among the unique seed sources produced are the Willamette Valley strain of Ponderosa pine or Valley Pine. This species is particularly suited to any type of soil in the Willamette Valley wet or dry and can persist on the landscape despite change. Other adapted seed examples include genetically improved Western Hemlock and regionally adapted Douglas-Fir.

Adaptive Evaluation and Development of Species – Ongoing evaluation of seed progeny sites permits ongoing evaluation of seed and species resilience and adaptability. Present focus of progeny sites is limited in diversity of species evaluated, could be broadened to include other species including Valley Pine. Progeny program provides improved ability to discern species adaptability by discerning strong performing and disease resistant species.

Rapid Response to Changing Conditions – The organization and collaborative nature of the seed orchard permits rapid development and delivery of different species as conditions shift. This is critical in a period of shifting zonal conditions and necessary species adaptability.

Collaborative – The orchard works in a cooperative manner and operates as part of a collaborative network of partners including:

- ODF State Forests Division
- Oregon State University
- Bureau of Land Management
- Industrial forests
- Oregon Seed Bank

State Forests

2015 Recommendations adopted by the Board

- Consider climate change implications in forest management plans.
- Review planning in the case of severe weather events that may be attributable to climate change.
- As revenues increase, expand research and monitoring to increase the capacity to monitor regeneration success, changes in species composition, tree growth and mortality, plant phenology, and extent of pest and pathogens on State-owned forestland.
- Continue collaboration with state and federal programs to assist in adaptation planning and strategy development.

Implemented Business Practices

Greatest Permanent Value

Guiding Principles – Guiding State Forests is the statutory obligation requiring that Board of Forestry lands are managed to provide the “greatest permanent value” to the state. Within this construct, climate change is an active element of operational planning as it relates to fulfillment of the principle elements of GPV rule:

- Sustainable and predictable production of forest products and revenues
- Properly functioning aquatic habitats for salmonids and other native fish and aquatic life
- Habitats for native wildlife
- Productive soil and clean air and water
- Protection against floods and erosion.

As climate change entails long-term ecosystem uncertainties, managing for resilient forests coupled with active monitoring is paramount to meeting GPV and associated suite of goods indefinitely. Accordingly, climate change is ongoing element of active and planned SF operations in multiple arenas, but not limited to:

- Inventory and stocking relative to species zonal adaptability and resilience
- Reforestation planning for composition and landscape diversity
- Directed fuels reduction in climate stressed regions
- Monitoring to identify stressors, inform management, and evaluate operational hypotheses
- Assess waterway sensitivity to better prioritize and inform buffer and restoration decisions

The present Revised Forest Management Plan (RFMP) process includes climate change as a guiding principle, incorporating and further developing these and other climate change operational elements.

Protection

2015 Recommendations

- Integrate climate adaptation into future planning and budgeting
- Monitor changing fire risk and monitor the duration of fire season
- Coordinate with National Fire Plan
- Build upon current work to inform future assessments
- Explore funding opportunities for climate change preparedness planning

Implemented Business Practices

Guiding Mission

Adapting to Environmental Change – Adapting to environmental change is a guiding mission of Protection. This is an active response to climate change, ecosystem uncertainty, and an active element of operational planning, assessment, and action.

Assessment, Coordination, and Mitigation

Planning and Budgeting Adaptation – Protection conducts an annual protection adequacy evaluation to assess existing capacity necessary to meet existing and emerging demands to inform operational planning and needs. Relative to these evaluations, the division has developed policy packages in each of the last two biennial sessions seeking resources necessary to address increasing severity of fire risk and season duration.

Monitoring of fire risk, severity, and duration – Protection actively tracks and assesses the nature and change of fire season duration, weather, drought, risk, intensity, and other climate related factors to inform operational planning.

Coordination – Coordination and collaboration relative to assessing, assisting, and addressing climate change occurs across multiple platforms and entities including climate and fire analysis in conjunction with agency, university, and federal partnerships. Participation in the National Fire Plan and Cohesive Wildfire Strategy along with an ongoing commitment to supporting increasingly frequent coordinated response resource events. Increasingly utilization and coordination with the National Guard through training and capacity planning has become an increasingly important element of planning and operations.

Mitigation and Management – Restoration, fuels reduction, and RPA development along with funds directed at improving watershed restoration and health are targeted proactive responses to changing landscape conditions, realized through annual grant requests and expenditures of awards.

Increasing Capacity Commensurate with Change

Incident Management Team Formation – Tracking and evaluating the increasing frequency, duration, and severity of wildfire coupled with ongoing capacity assessment underlines the necessity of additional resources to respond to increasing threats. Active efforts to address these present and future needs presented by climate change has informed the agency initiative relating to formation of an additional Incident Management Team.

Partnership and Planning

2015 Operational Recommendations

Engage with Climate Organizations and Research – Active collaboration, support, and participation with Oregon Global Warming Commission, Oregon Climate Change Research Institute (OCCRI), Forest Service, Bureau of Land Management, US Geological Survey, Adaptation Framework Working Group, and others on climate change research and adaptation policies with regular reporting to the Board of Forestry on significant developments.

Participate with interagency climate change efforts to ensure ongoing dialogue and partnership. Specifically:

- Receive information and updates on progress of the various efforts to develop climate change policies in Oregon.
- Provide participants information about progress that ODF and Board of Forestry make regarding climate change adaptation and forest carbon management.

Develop integrated, long-term, large-scale climate change monitoring. Explicitly consider early-warning indicators of species responses, including range shifts, population status, and changes in ecological systems functions and processes.

- Integrate relevant recommendations from case studies produced for the Olympic National Forest, the North Cascades Region, Washington, and the Blue Mountains Adaptation Partnership into agency planning. Participate in these efforts in the remaining regions of the state.
- Cooperate with Forest Service researchers to integrate large fire modeling projects conducted in partnership through OCCRI and Forest Service within a climate change context. Highlight the need for studies on the interaction between fire, insects, and climate change on the potential for ecosystem loss/change.
- Maintain and provide a bibliography of scientific publications for identifying relevant adaptation options and posting on the Department's climate change website.
- Continue to provide new information on climate change to the agency (i.e., transfer information into the operating divisions), and provide liaison support by engaging with issues from other ODF programs.

Implemented Business Practices

Cooperation and Collaboration with External Partners

The Partnership and Planning Program has often taken a lead agency role in matters relating to climate change in Oregon and in the Pacific Northwest. The Program has been active through collaboration and dynamic partnership across State, Federal, Academic, and other Climate and Carbon focused entities and organizations. Several examples of these working relationships and ongoing efforts include:

- Active participant in the Oregon Global Warming Commission, providing technical support to the Commission's 2018 Forest Carbon Task Force, drafting portions of the "Roadmap to 2020," and providing logistical support for other Commission work and projects. Most recently, Partnership and Planning also provided multiple reviews of the Commission's "Forest Carbon Accounting Project Report 2018."
- Informed and drafted a key section of HB3543 (2007) which established the Oregon Climate Change Research Institute (OCCRI) and Global Warming Commission.
- Provided significant input and preparation of Oregon's 2010 Climate Change Adaptation Framework and the 2019 revision of the Framework.
- Collaborated with USFS Pacific Northwest Research Station researchers to model the climatic suitability of large wildfires for Oregon and Washington. Models developed were instrumental to estimating how much the suitability of large forest wildfires will increase through this century. This work continues to inform and guide fire and climate strategy in regional climate and carbon planning.
- Coordination with the Governor's Office of Carbon Policy to create accounting of forest carbon data and direct development of the Oregon Forest Ecosystems Carbon Report to inform state policies. This work has involved the USFS Forest Inventory and Analysis and PNW Research Station, and generated new and ongoing working relationships with Western states and British Columbia.
- Near completion on a carbon analysis of Oregon's Harvested Wood Products and Sawmill Energy Reports to further inform carbon analyses and state policy. This work has engaged the offices of the USFS Forest Inventory and the Bureau of Business and Economic Research at University of Montana.
- Staff within Partnership and Planning are currently working with USFS FIA Program to study the dynamics of tree species in Oregon using re-measured inventory plots. This research will provide an unprecedented evaluation of how tree species in Oregon are responding geographically to changes in climate. The final analysis will be completed in 2021.
- Work to integrate climate change in to the revision of the forest action plan due out in 2020 as a guidance document for the Departments programs, particularly in Private Forests, and restoration work of the other divisions.

Board of Forestry and Climate

- Developed Strategy G of the 2003 *Forestry Program for Oregon* with the goal of "enhancing carbon storage in Oregon's forests and wood products." Drafted the 2011 *Forestry Program for Oregon* update for Goal G to "improve carbon sequestration and storage and reduce carbon emissions in forests and wood products."

- Drafted both the Climate Change section of the “Emerging Issues Work Plan” and the “History of climate change policy in Oregon.”
- Ongoing support and staffing for the development of indicators reflecting changes in the geography of individual trees and other forest vegetation.
- Provided multiple presentations to the Board regarding the climate and carbon. Several examples include:
 - 2010 Climate Change Adaptation Framework
 - Emerging Issues Work Plan
 - Global Warming Commission’s Roadmap to 2020 and Forest Carbon Taskforces
 - Climate change and the geography of tree species.
 - Analyses and reports for Oregon Forest Ecosystems Carbon, Harvested Wood Products Carbon, and sawmill energy.