

The Oregon Department of Forestry
Climate Change and Carbon Plan



2021

Approved by the
Board of Forestry
November 3, 2021

Purpose:

Make forestry in Oregon a leader in climate change mitigation and adaptation. The Oregon Department of Forestry will be a leader in promoting climate-smart forest policies and actions that achieve our vision by operationalizing goals, implementing actions, and measuring progress to achieving climate goals.

Vision:

Oregon's Board of Forestry and Department of Forestry are national leaders in climate-smart and socially equitable forest policies that promote climate health, resilient forests and watersheds, community wellbeing, and a viable forest products industry.

Principles:

- Climate change is a serious threat. We have less than a decade to alter behaviors if we want to avoid catastrophic impacts. We must be innovative, creative, and proactive in working toward solutions, not simply react to the results of climate change.
- Black, Indigenous, and People of Color (BIPOC), natural resource dependent communities, and those growing up in intergenerational poverty have been and continue to be some of the most climate-impacted communities. Forest policies will be shaped through the lens of social justice and equity. Actions will prioritize benefits to historically and currently underserved communities as they adapt to a changing climate.
- Oregon's forest sector offers opportunities for significant sequestration and storage both in the forest and in harvested wood products. Forests also provide opportunities to promote clean water and air, while preserving forest resilience in the form of flood control, biodiversity, thermal refugia, etc.
- As changing climates affect forests, incorporation of the best available science and practices will be key to adaptive management and planning across ownership type, size, and goals.

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Definitions

Adaptation:	Long-term, transformative actions implemented to adapt to life in a changed climate.
Carbon Finance:	A market-based mechanism to pay for sequestration and storage of carbon dioxide.
Carbon Offset:	An action or project (such as the planting of trees or extending rotations) that counterbalances the emission of carbon dioxide or other greenhouse gases from anthropogenic sources.
Carbon Storage:	Long-term storage of carbon dioxide in woody biomass, forest soils, harvested wood products, or landfills, among other places that follows the sequestration process of carbon dioxide removal from the atmosphere.
Climate-Informed Silviculture:	Silvicultural systems and prescriptions that specifically take into consideration climate-smart forest principles and practices and works to adapt the forest for climate change and mitigate the amount of greenhouse gases in the atmosphere. Potentially could include the following actions, among others: <ul style="list-style-type: none">• Reforestation using alternative tree species,• Reforestation using alternative planting spacings and densities,• Reforestation using diverse species mix (bet hedging)• Use of, and planning for, longer rotations and silvicultural pathways that balance carbon stored in forests and harvested wood products
Climate Refugia:	Identified areas where ecosystems may be more resilient to the effects of climate change. May include vegetation types, cold water stretches, cold air drainages.
Climate-Smart Forestry:	An extension of sustainable forest management developed to guide active management of forests in ways specific to climate change adaptation and mitigation efforts and to support climate-impacted communities ¹ .

CO ₂ e:	Carbon dioxide equivalent.
FECR:	Forest Ecosystem Carbon Report
Greatest Permanent Value:	Healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits to the people of Oregon. See ORS 530.050 and OAR 629-035-0020.
Greenhouse Gas:	Atmospheric gases that trap heat and cause an increase in the temperature of Earth. Examples include carbon dioxide and methane.
HWP:	Harvested Wood Product(s)
IPCC:	Intergovernmental Panel on Climate Change
Mitigation:	Reducing heat-trapping greenhouse gases in the atmosphere by reducing sources (e.g., the burning of fossil fuels for electricity, heat, or transport) of and sequestering these gases.
Natural and Working Lands:	Includes forests, rangelands, farms, urban green spaces, and wetlands.
Partner Agencies:	Government agencies outside of the state of Oregon government. Examples: WA Department of Natural Resources, USDA Forest Service, Natural Resource Conservation Service, among others.
Sequestration:	Enhancing the “sinks” that accumulate and store greenhouse gases such as carbon dioxide (e.g., the oceans, forests, and soil). Forest carbon sequestration takes place through photosynthesis, where the biologic process uses the sun's energy to power chemical reactions that form complex carbon molecules from atmospheric carbon dioxide.
Sibling Agencies:	Government agencies within the executive branch of Oregon state government. Examples: Oregon Department of Agriculture, Oregon Department of Environmental Quality.
Smoke Intrusions:	See the ODF Smoke Management Directive

Climate Change and Carbon Plan Foundations

Problem Statement

Climate change is threatening Oregon’s forest and forest products industry through increased severity and incidence of wildfire, drought, and greater susceptibility to insects and diseases. Climate change is an existential problem that differentially affects vulnerable populations, including people of color and lower-income Oregonians.

Without substantial behavior changes and mitigation efforts to limit global warming to less than 1.5°C (2.7°F) by 2030, the region and the world is likely to experience high levels of ecosystem degradation and species extinctionsⁱⁱ. Regionally, effects of climate change are already present, as there is a distinct upward trend in size and severity of wildfire in the state since the 1980s, a trend expected to continue in the near and long termⁱⁱⁱ. Most recently, these events were prominently experienced in the September 2020 fires and the difficulties in fire containment and record-breaking heat waves in 2021. Even with mitigation efforts across sectors and societies, the impacts of the warming and previous CO₂ emissions may be irreversible for decades to centuries^{iv}.

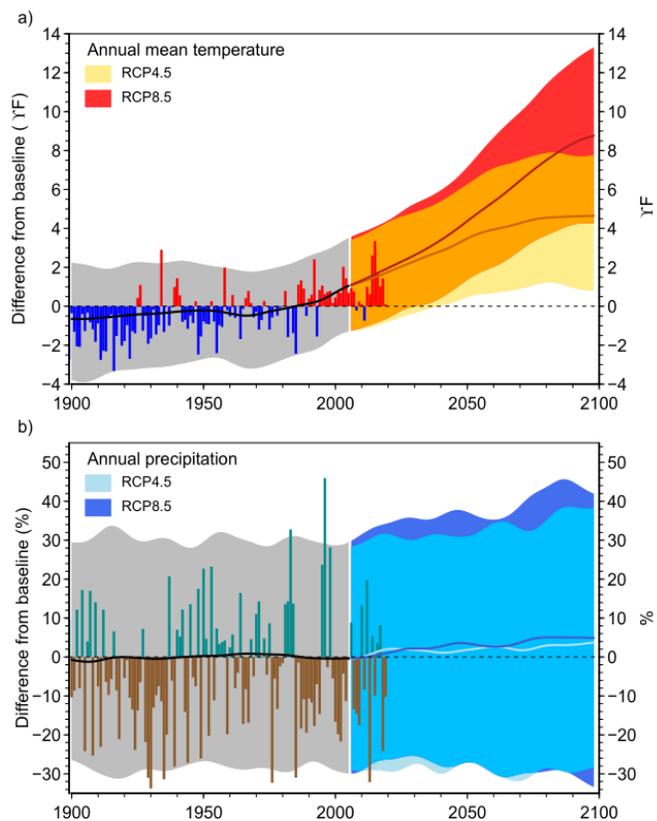


Figure 1: Observed, simulated, and projected changes in Oregon’s mean annual (a) temperature and (b) precipitation relative to 1970–1999 (baseline) under RCP 4.5 and RCP 8.5 future scenarios. Colored bars are observed values (1900–2019) from the National Centers for Environmental Information. The thicker solid lines are the mean values of simulations from 35 climate models for the 1900–2005 period, which were based on observed climate forcings (black line), and the 2006–2099 period for the two future scenarios (orange [RCP 4.5] and red [RCP 8.5] lines in the top panel, light blue [RCP 4.5] and darker blue [RCP 8.5] lines in the bottom panel). Shading indicates the range in annual temperatures or precipitation from all models. The mean and range were smoothed to emphasize long-term variability.

Dalton, M., and E. Fleishman, editors. 2021. *Fifth Oregon Climate Assessment*. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. <https://blogs.oregonstate.edu/occri/oregon-climate-assessments/>.

Beyond the visibility, severity, and high costs (ecological, social, economic) of wildfire, other climate-driven disturbances, such as drought, extreme events (ice storms, wind events, extreme heat, etc.), insects, and diseases, will become increasingly persistent, damaging, and difficult to manage and mitigate^v (Figure 2). Additional systemic ecosystem events will occur. For example, models indicate increasing stream temperatures, reducing potential habitat for threatened and endangered fish species^{vi}. Over time, forest managers will face a growing number of issues when looking over the horizon of a stand rotation and face a growing set of risks and concerns, known and unknown. Crossing climatic thresholds may cause sudden and unexpected shifts in natural systems with a ripple effect throughout the region, nation, and world. Once crossed, these tipping points may lead to ecosystems unable to return to pre-threshold states even with reductions in atmospheric carbon levels. Increasing drought pressure can result in changes to water dynamics. Stream flows will likely be affected as will drinking water sources; both may decrease or potentially become more periodic or sporadic. To address these issues, the Department is committed to utilizing national and international climate and carbon science and organizational directives to inform, mitigate, and adapt to our changing world through policy implementation and management decisions.

The changing landscape means that the state and the forestry sector will need to work not only on mitigation but on adaptation in a changing climate. A business-as-usual approach will not accomplish the needed adaptations, mitigations, and transformations. Increasing impacts on natural systems will force the human element to adapt in ways that are not fully understood at this time. Efforts to build climate resilient systems will need to be explored and implemented as the Department works to further increase resiliency efforts. All of this will have to be undertaken with an eye toward equity, recognizing that climate change most directly impacts those least able to adapt and engage. The trade-offs between action and no action as well as the impacts on ecosystems and social structures will need to be considered with changes in policies.

In March 2020, Governor Brown signed Executive Order 20-04. This EO highlighted that the state is experiencing an increase in frequency and severity of wildfires that endangers public health and safety and damage rural economies. It also points agencies including ODF to “prepare and plan for the impacts of climate change and to take actions to encourage carbon sequestration and storage.”

In August of 2021, the Intergovernmental Panel on Climate Change released its Physical Science Basis of its sixth assessment report. It states: “it is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.” Additionally, “evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5.” Overall, it paints a grim picture, but there is hope. The report proposes some potential opportunities to reduce greenhouse gases, including on natural and working lands.

Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming

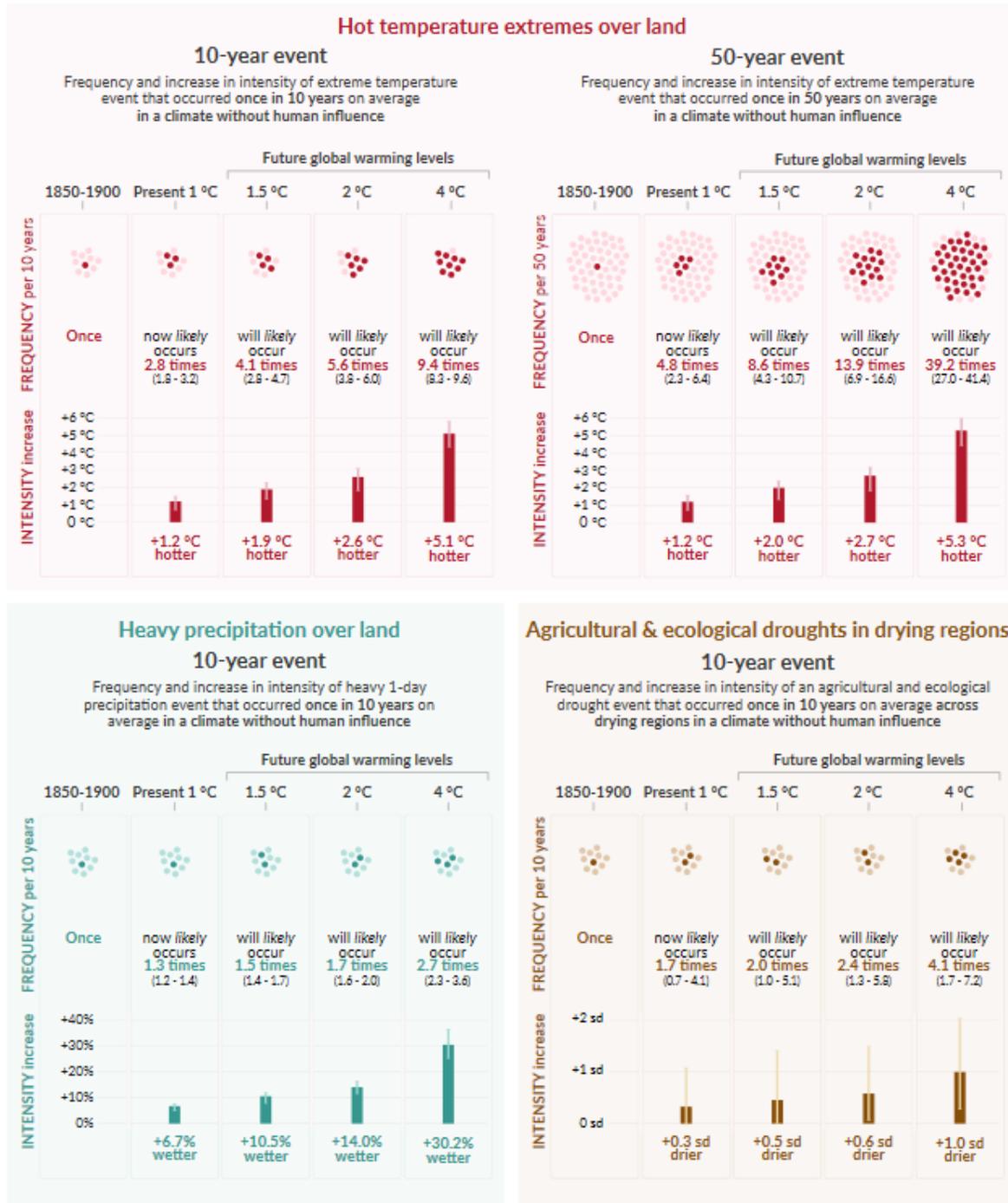


Figure 2: IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

Opportunities

Oregon's forests, from urban centers to far reaching wilderness, as well as its forest products industry, are part of the climate mitigation and adaptation solution. Forests play a significant role in climate mitigation by sequestering and storing carbon and providing biogenic alternatives to carbon-intense materials. Beyond carbon mitigation, urban forests provide essential social and climate change services by mitigating climate change effects, such as heat islands, and actively decreasing energy use.

Oregon has a long history of innovation in forestry, including first-in-the-nation forest protection laws. Climate change consideration is no different. The Oregon Department of Forestry has been engaged in climate change and global warming related work for over 30 years. While this history provides a foundation of support for the Department's increasing focus on climate action, climate change effects are occurring nonetheless as the earth passes climatic thresholds and tipping points. The state's forests are experiencing increasing impacts from heat and drought-induced mortality and from increasing wildfire severity. Recognizing the threats regionally and globally, Oregon's forests and harvested wood products sector have been identified as playing an important role in the mitigation of climate change; however, there is also a need to implement adaptation measures^{vii} to ensure that the state's forests are healthy, productive, and capable of producing mitigation benefits.

Oregon's forests are a source of high quality, clean water. Streams originating in the state's forests provide water for multiple uses and benefits. The Forest Practices Act and its modifications have the aim of perpetuating these benefits and future consideration of rules can account for climate change and its impact on the water resource.

The Department has worked with the Oregon Global Warming Commission (OGWC) to establish a goal for natural working lands (i.e., forests, agriculture, tidal wetlands, etc.) as outlined in Executive Order 20-04. The OGWC recommendation is an additional 5 MMTCO_{2e} can be sequestered on an annual basis by 2030 and an additional 9.5 MMTCO_{2e} annually by 2050. The bulk of this additional sequestration would come from the forest sector. The report and recommendation also highlighted areas for further investment and improvement including inventories and emissions calculations.

The Department has several potential opportunities to address both climate mitigation and adaptation measures in the near term. In the time the Department has been working on climate change issues, it has made significant progress in some areas, but all members of the forest sector need to take additional, bold steps as we enter a critical phase in climate mitigation and adaptation. Some measures are already in place, including working to reduce emissions through building efficiency (Appendix A), retiring inefficient vehicles with electric and fuel-efficient vehicles, allowing and promoting remote work where appropriate, and maintaining healthy and functioning ecosystems. The Department is working to incorporate climate change factors into its high-level planning and to also ensure that climate-impacted communities are included in all planning processes.

Statutory analysis by the Oregon Department of Justice^{viii} indicates that the Board of Forestry has broad authority over all forest policy in the state, including arenas with carbon and climate change implications. Department staff have been working with national workgroups to identify barriers and remedies for these barriers to comprehensive adoption of climate-smart forestry, improve adoption of carbon finance as mitigation tools, and to identify how state forestry agencies can best engage to advance the carbon finance field.

Federal initiatives are increasingly acknowledging and incorporating climate change and may expand the availability of programs and resources that focus on climate and climate-smart forest practices. These opportunities are being assessed as this plan is being developed. Where appropriate the Department will work with partners at all levels to integrate and leverage federal resources into regional work and opportunities. This may include technical assistance, financial assistance or cost share, or in-kind work from all parties involved.

Barriers

While Oregon's forests and forest sector have many opportunities to adapt to and mitigate climate change, there are also barriers that may slow the adoption of climate-smart forestry in the state. These are both human and ecosystem imposed, some have simpler fixes, others are very complex.

Natural barriers to moving to climate-smart forestry include a rapidly changing climate and events causing tree and forest damage and mortality at a speed and magnitude that exceeds management and forest's ability to adapt. With higher emissions scenarios, the proportion of atmospheric CO₂ that working and other resource lands and oceans can sequester decreases (Figure 3), representing a barrier to relying on forests as a long-term solution without additional behavior changes across societies and economies.

Additionally, the wide array of ecotypes that are represented in Oregon entail different forest management strategies and concerns.

Human and social barriers are much broader and include topics like prevention of economic harm to impacted communities, various rules and statutes, and public perceptions. Below is a list (not exhaustive and in no particular order) of potential barriers – both agency specific and general – that may hinder advancement and adoption of climate-smart forest practices.

The Oregon Department of Forestry Climate Change and Carbon Plan

Potential Barrier:	Resolution or means to address issue:
Limited staffing capacity	Pursue additional positions and capacity through Policy Option Packages, legislative funding
Public perceptions	Provide transparent processes and increase engagement opportunities
Concerns over leakage and substitution effects	Contribute to research, data collection, and improve understanding of leakage dynamics and promote production and utilization that limits leakage
Concerns about the impacts of Measure 49 claims	Change in federal statutes and rules, financial resources
Conflicting statutes (e.g., ORS 526 and ORS 477)	Legislative
Agency and Board requirements under ORS 527.714	Full accounting of costs/benefits including future projections; Legislative revision of statute
Lack of trust in agency leadership and management	Improve communication and transparency
Pressures to produce revenue (internally and externally; county payments)	Extend economic valuation to services, carbon, and alternative production capital
Timber tax system/lack of flexibility to provide tax incentives	Legislative
Lack of valuation of ecosystem services	Additional capacity and resources to contribute and support valuation work
Lack of nursery capacity and supply of future climate appropriate seedlings	Support (financial and other expert) to expand capacity and supply needed seedling diversity, coordination with consulting and extension foresters
Lack of suitable markets for some products	Additional capacity and capital
Lack of authority over some forestland owners/managers (e.g., Federal)	Work within bounds of Shared Stewardship and GNA agreements
Lack of adequate forest workforce to complete actions/achieve goals	Stable capital, education, and partnership with stakeholders

The proportion of CO₂ emissions taken up by land and ocean carbon sinks is smaller in scenarios with higher cumulative CO₂ emissions

Total cumulative CO₂ emissions taken up by land and oceans (colours) and remaining in the atmosphere (grey) under the five illustrative scenarios from 1850 to 2100

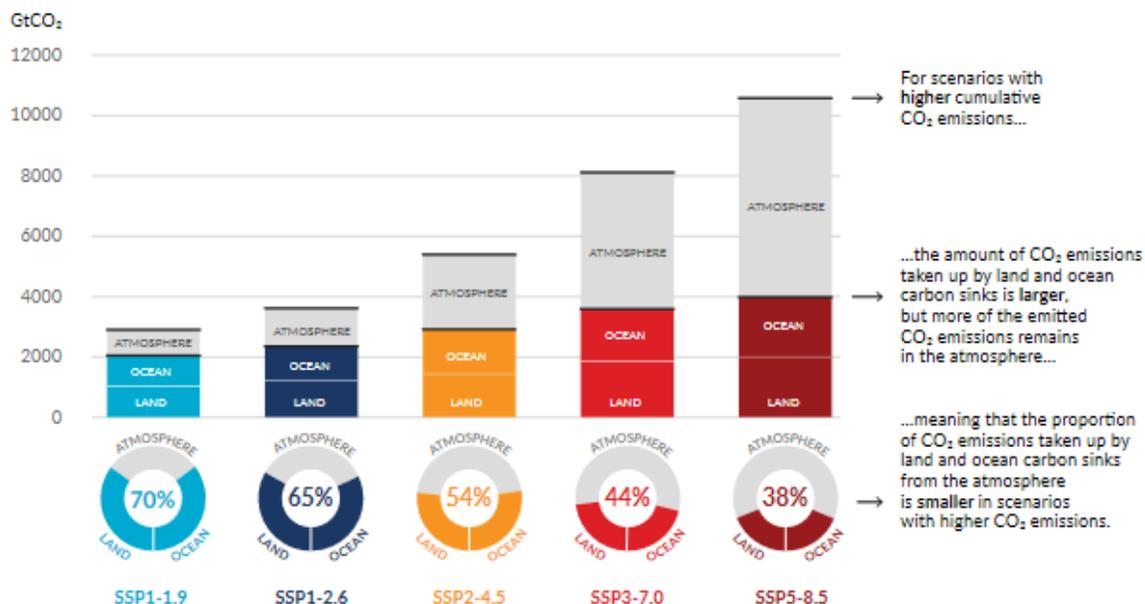


Figure SPM.7: Cumulative anthropogenic CO₂ emissions taken up by land and ocean sinks by 2100 under the five illustrative scenarios.

The cumulative anthropogenic (human-caused) carbon dioxide (CO₂) emissions taken up by the land and ocean sinks under the five illustrative scenarios (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5) are simulated from 1850 to 2100 by CMIP6 climate models in the concentration-driven simulations. Land and ocean carbon sinks respond to past, current and future emissions, therefore cumulative sinks from 1850 to 2100 are presented here. During the historical period (1850-2019) the observed land and ocean sink took up 1430 GtCO₂ (59% of the emissions).

The **bar chart** illustrates the projected amount of cumulative anthropogenic CO₂ emissions (GtCO₂) between 1850 and 2100 remaining in the atmosphere (grey part) and taken up by the land and ocean (coloured part) in the year 2100. The **doughnut chart** illustrates the proportion of the cumulative anthropogenic CO₂ emissions taken up by the land and ocean sinks and remaining in the atmosphere in the year 2100. Values in % indicate the proportion of the cumulative anthropogenic CO₂ emissions taken up by the combined land and ocean sinks in the year 2100. The overall anthropogenic carbon emissions are calculated by adding the net global land use emissions from CMIP6 scenario database to the other sectoral emissions calculated from climate model runs with prescribed CO₂ concentrations³³. Land and ocean CO₂ uptake since 1850 is calculated from the net biome productivity on land, corrected for CO₂ losses due to land-use change by adding the land-use change emissions, and net ocean CO₂ flux.

Figure 3: IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

What Is Climate-Smart Forestry?

Climate-smart forestry is engaged forest management that prepares the forest for a changing climate while working to reduce greenhouse gases in the atmosphere and supporting forest-dependent communities^{ix}. Within the Climate Change and Carbon Plan (CCCP), the active management component of climate-smart forestry is anchored in sustainable forest management (SFM) (Figure 4) and is a cornerstone of the Forestry Plan for Oregon, the Board of Forestry's strategic plan (see sidebar). Climate-smart forestry evolved from climate-smart agriculture ideas in the early 2010s and is distinct from climate-smart restoration, though some principles are similar and overlap.

The holistic view of this plan is that there is a need for all types of management, including no management across the forest landscape. As a policy guiding document, this plan looks to promote, establish, and maintain forests across the state that accomplish the three tenets of climate-smart forestry.

Adaptation of forest ecosystems, from wildland to urban, will require active measures and seeks to build resilience to the effects of climate change. Adaptation includes using different tree species or genetics, changes to the structure of the forest stand and landscape, and employing a mix of management approaches (mixed species, uneven ages, different structures) to ensure that forests are able to

Forestry Plan for Oregon 2011: What is sustainable forest management?

It is important that Oregonians agree about what sustainable forest management means and how to evaluate our forests' performance in meeting sustainability goals. In this context, the Board of Forestry defines "sustainable forest management" as meaning:

Forest resources across the landscape are used, developed, and protected at a rate and in a manner that enables people to meet their current environmental, economic, and social needs, and also provides that future generations can meet their own needs [based on Oregon Revised Statute 184.421].

On a statewide basis, sustainable forest management will provide:

- Healthy and diverse forest ecosystems that produce abundant timber and other forest products;
- Habitat to support healthy populations of native plants and animals;
- Productive soil, clean water, clean air, open space, and recreational opportunities;
- Healthy communities that contribute to a healthy state economy; and
- Accountability and trust between all parties, where human well-being and equity are goals of the process as well as outcomes of the decisions.

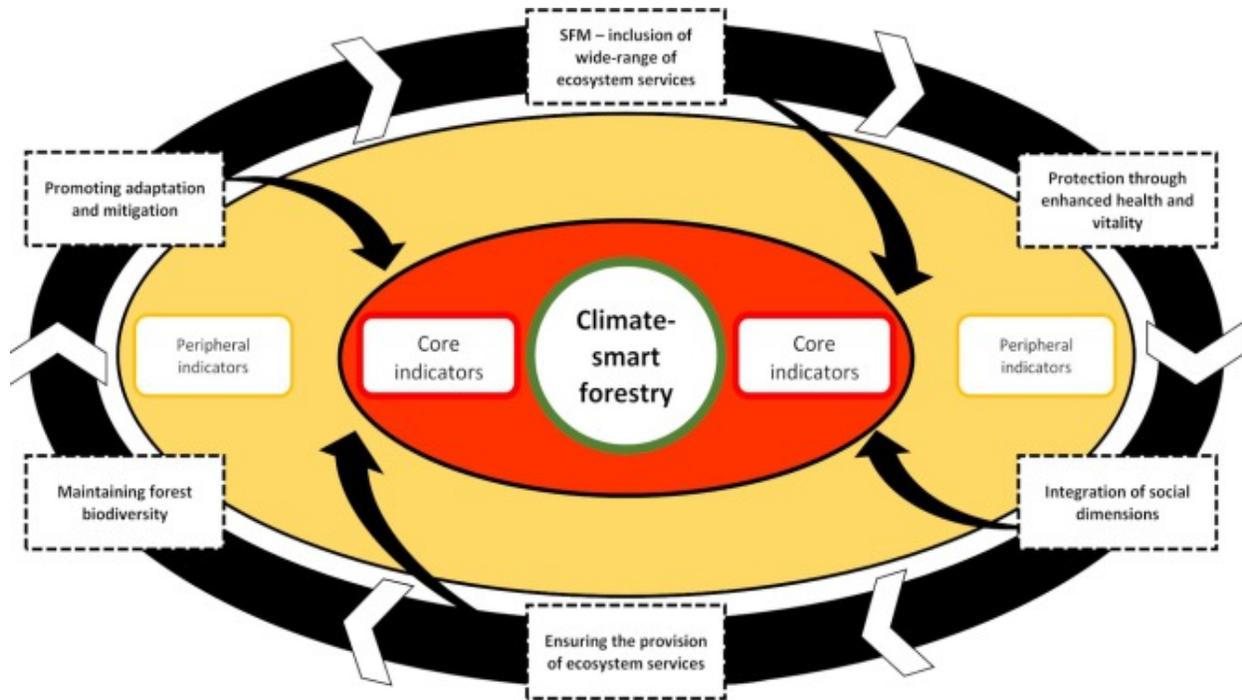


Figure 4: From Euan Bowditch, Giovanni Santopuoli, Franz Binder, Miren del Río, Nicola La Porta, Tatiana Kluvankova, Jerzy Lesinski, Renzo Motta, Maciej Pach, Pietro Panzacchi, Hans Pretzsch, Christian Temperli, Giustino Tonon, Melanie Smith, Violeta Velikova, Andrew Weatherall, Roberto Tognetti, What is Climate-Smart Forestry? A definition from a multinational collaborative process focused on mountain regions of Europe, Ecosystem Services, Volume 43, 2020, <https://doi.org/10.1016/j.ecoser.2020.101113>

maintain growth and function at a landscape level. Adaptation means that forest managers are looking forward at future climate rather than relying historic norms and practices. It will require that bold steps are taken to ensure that forests remain forests and do not shift to an alternative vegetation type due to climate induced mortality events, increasing insect and disease pressure, and increasing destructive wildfire season. Successful adaptation will ensure continued mitigation into the future as forests remain healthy and productive.

Along with changes in societal behaviors, forests have an innate ability to provide **mitigation** benefits to the global carbon balance. Natural working lands contain an inherent ability to sequester carbon from the atmosphere. Increasing sequestration will play an important role as societies seek to establish behavioral changes and work to reduce the concentration of carbon dioxide in the air. Forests sequester and store very high levels of carbon in the above-ground biomass and in soils. Leaving trees in place to allow for additional sequestration and storage prior to harvest, will likely provide the greatest mitigation benefit in the forest. Realizing this benefit at a landscape level will require multiple approaches that are yet to be substantially developed or realized across ownerships. Beyond realizing greater sequestration potential, larger timber can yield

greater lumber recover factors in processing^x and a wider array of durable products with long-lived potential, increasing and extending the carbon storage capability of products. Moreover, wood products can continue carbon storage in lower embodied carbon wood products and displace high-carbon cost materials and fuels^{xi}. However, more work supporting and advancing long-lived wood product development and utilization needs to be done to ensure that the harvested fiber is sequestered long-term. For example, increasing the use of longer-lived products like mass timber can help displace high carbon cost materials, but reducing the emissions from the harvest and manufacturing of wood products will need to be addressed, both of which are proportionally reduced through longer lived and larger timber. Reduction of emissions and decarbonization is important as harvested wood products represent an annual net source of CO₂ to the atmosphere when the emissions (with and without energy capture) are included^{xii}. The wood products manufacturing industry should be commended for their reductions in emissions and increase in efficiency over the last 40+ years^{xiii}. While these achievements are positive moves in relation to carbon emissions, additional decarbonization methods and technologies must be explored to meet further mitigation needs.

The **social and economic dimension** of climate-smart forestry will require careful coordination and communication to ensure all voices are heard and incorporated. Natural resource dependent, disproportionately climate impacted, and traditionally underserved communities are important parts of Oregon's culture and economy and are at great risk from climate-change impacts. Ensuring they are included in planning and decision-making and are not left behind as the forest sector works to adjust and transition to a changing environment and landscape is key. The cultural significance of forests (wildland, community, and urban) and forest products, timber and beyond, is highly important. Harvesting traditional foods, recreation, tourism, and wood fiber extraction from the state's forests all support a diverse set of communities including Tribes, natural resource-dependent jobs and people, and those at a disproportionate risk from the effects of climate change. People working to adapt to and mitigate climate change will need to heed these voices.

Urban, municipal, and community forests have multiple benefits for those living and working in towns and cities. Increasing the percentage of urban land covered by tree canopy reduces temperatures, lowers energy use and moderates the climate in areas where the bulk of the state's population lives. Increasing efforts in urban and community areas can have substantial co benefits through the climate-smart lens.

Accountability Measures

Agency Leadership: Department leadership will prioritize climate change in their planning to align with Executive Order 20-04. The statewide executive level and local district leadership levels will be affected by the goals and actions laid out in this plan. They will need to be aware of how the plan interfaces with the multitude of other planning processes and documents, including the agency strategic plan, the forest action plan, annual operating plans, and forest management plans as examples. Executive Order 20-04 states that:

Agency Decisions: To the full extent allowed by law, agencies shall consider and integrate climate change, climate change impacts, and the state's GHG emissions reduction goals into their planning, budgets, investments, and policy making decisions. While carrying out that directive, agencies are directed to:

- (1) Prioritize actions that reduce GHG emissions in a cost-effective manner;*
- (2) Prioritize actions that will help vulnerable populations and impacted communities adapt to climate change impacts; and*
- (3) Consult with the Environmental Justice Task Force when evaluating climate change mitigation and adaptation priorities and actions.*

As such, leadership will work to incorporate this plan into operational and budgetary planning processes. Encouraging and considering opportunities and ideas that are new and bold will be a positive step toward reaching the goals of this plan and of the Executive Order. Additionally, Department leadership will ensure staff have access to trainings and workshops focused on using climate-smart forestry in their day-to-day work.

Through the development and implementation of biennial workplans the Department can lay out its work and highlight how each division or work area can incorporate climate-change vision and implement the actions that are provided in this roadmap document. These workplans are submitted to and approved by the Board of Forestry which will set the policies to be followed in their implementation.

Board Accountability: Like the Department leadership, the board may undertake rule making related to climate change and that process may be impacted by the EO 20-04:

GHG Reduction Goals. Agencies shall exercise any and all authority and discretion vested in them by law to help facilitate Oregon's achievement of the GHG emissions reduction goals set forth in paragraph 2 of this Executive Order.

Expedited Agency Processes. To the full extent allowed by law, agencies shall prioritize and expedite any process and procedures, including but not limited to rulemaking and agency dockets, that could accelerate reductions in GHG emissions.

Board work plans and Department policy direction should reflect the scope of the problem at hand. Expectations, decorum, and guidance should be in line with the Best Practices laid out by the Governor's Office, and by the Board's own guiding documents.

Staff Level: Staff will be required to implement the operational specifics related to this plan, EO 20-04, and any Board policies and rules established under these. Staff should also be empowered by agency leadership to look for ways to enhance the mitigation and adaptation measures that the Department lays out. As has been stated, this is a moment for bold direction and ideas and contributions can come from all operational facets of Department operations. Not all of these come from the top and staff play a key role in finding solutions.

Public Process

The Department has been directed through multiple avenues to ensure that there is a robust public process for its policy and planning process. Utilization of the tools at hand will be key to making sure that this is done equitably and includes those that have traditionally been at a disadvantage to participate. Executive Order 20-04, 2021 Senate Concurrent Resolution 17, and previous legislative direction all indicate an increased incorporation of traditionally underserved communities, climate-impacted communities, and broad outreach efforts. The Department will utilize best practices for reaching out to these groups and communities in future policy and rule development processes. One tool to look to is the Equity Blueprint contained in the Statewide Climate Adaptation Framework.

Revision Timeline

Like all plans, there is a need for periodic re-assessment and revision. This plan is intended to capture needs at the time of drafting; future updates will be required. It is important that this plan be revisited and updated every five years to ensure that the research and monitoring portions are consistent with current science and climate impacts and projections as well as being able to capture the work that is accomplished.

To achieve adaptive management and the goals in this plan, agency staff will periodically bring progress assessments to the Board. These assessments will inform the revision and public and stakeholder engagement as the Departments works on updating the plan in-line with the timeline.

Climate-Smart Forestry Goals

Climate-Smart Forestry in Silviculture

Goal: Establish a just and equitable transition to climate-informed silviculture and climate-smart forestry that optimizes climate mitigation and adaptation, while maintaining a sustainable flow of wood products to ensure long-term resource benefits and viability of the forest products industry and flow of long-lived forest products.

Many of the Department’s environmentally focused programs and projects rely on the use of regulatory programs and voluntary measures to mitigate past degradation and to head off future problems. Climate change offers an opportunity to pursue additional voluntary measures that will benefit forests, the broader environment and ecosystems, citizens of Oregon, the region, and the globe. Encouraging climate-informed forest silviculture practices will help State forests, family forests, small non-industrial ownerships, and industrial forestlands contribute to meeting the challenges of forest climate mitigation and adaptation. Mechanisms to encourage various forest owners to participate in climate-informed and climate-smart forestry will be discussed later in this document, but examples include formal recognition, promotion, and focus on climate-smart forest practices instituted by landowners and managers, economic incentives to increase sequestration through easement tools, and Department support for forest carbon offset and finance programs.

This goal takes the principles used in sustainable forest management and includes forward-looking projections to manage forests in a climate and ecologically sustainable manner. As will be mentioned in later goals, monitoring, research, and reassessment will be a key part of the adaptive nature of climate-informed silviculture.

Climate-Informed Silviculture:

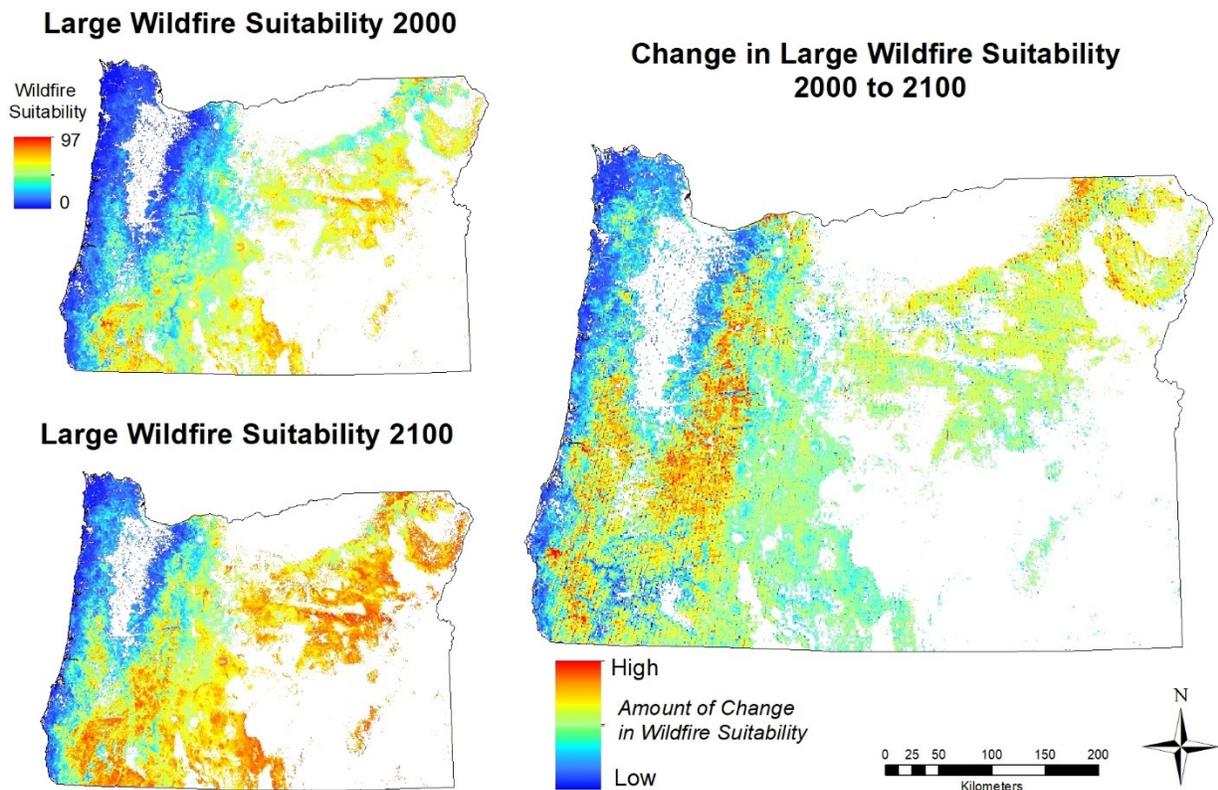
Silvicultural systems and prescriptions that specifically take into consideration climate-smart forest principles and practices and work to adapt the forest for climate change and mitigate the amount of greenhouse gases in the atmosphere. Among others could potentially include:

- Alternative tree species
- Alternative planting spacings and densities
- Planting of multiple species (bet hedging)
- Use and planning for longer rotations

Fire Management, Response and Fire / Smoke-Adapted Communities

Goal: Modernize Oregon’s complete and coordinated wildfire protection system to respond to the increased severity of wildfire. Promote fire and smoke-adapted communities in the wildland-urban interface and beyond, to mitigate the impacts of climate-induced increases in wildfire severity.

Rising concentrations of greenhouse gases are resulting in climatic conditions where natural systems and natural working lands are experiencing wildfire severity and extent not observed in the accessible human historic record. The severity and duration of drought conditions has caused extreme reductions in fuel moisture. Coupled with increasing temperatures, this is making forest fuels more receptive to fire. Additionally, large-scale fire suppression over the last century combined with forest changes from management strategies and objectives, have resulted in higher levels of fuel in forests. These issues are present in, and not limited to, managed natural forests and planted



*Figure 5: A predictive model for the environmental suitability for large wildfires was calibrated on fires that occurred during the climate normal of 1971-2000 and then projected into the future based on climate predictions through 2100. The change in large wildfire suitability was derived by subtracting the cell values in the suitability map for 2000 from the map for 2100. Areas in red depict the greatest amount of increase in suitability for large wildfires. Maps of large wildfire suitability were published in Davis, R., Yang, Z., Yost, A., Belongie, C., Cohen, W. 2017. The normal fire environment—modeling environmental suitability for large forest wildfires using past, present, and future climate normals. *Forest Ecology and Management* 390: 173-186*

stands. Taken together these present an increasing risk to the viability and health of forests, dependent and interconnected ecosystems, health, the economy, and built infrastructure throughout Oregon.

Adapting to climate-induced changes in the “normal” fire environment (Figure 5) will be an ongoing challenge for fire organizations. Meeting that challenge will require a well-coordinated effort with emphasis on prevention, adaptation, and recovery across agencies, communities, landowners, industry, and natural systems stakeholders.

Natural resource agencies and stakeholders working together to increase forest resiliency through restoration and resilience activities, such as thinning, prescribed fire, and afforestation with more diverse or alternative species will be essential to adapt and maintain functioning forest ecosystems in a changing fire environment. Altering the managed forest environment to include alternative species and hardwood mixes can have positive outcomes in wildfire risk reduction and suppression activities.

Some forest ecosystems within the state have fire return events that are stand replacing. Various climate scenarios and research^{xiv} indicate an expected increase in these stand-replacing events and a decrease in the return intervals (time between fires) in these systems due to the changes in the environmental conditions. Where ecological function restoration efforts would not be feasible for natural or social reasons, Department work should focus on strengthening community infrastructure resistance to fire through cooperative strategies. These include providing guidance and resources to homeowners for home hardening work, communities working on evacuation and shelter-in-place strategies, and other risk mitigation and adaptation work largely undertaken by partner and sibling agencies. The Department does realize that these strategies can be implemented across the board, but will prioritize actions in those areas where fire and climate resiliency work is not an option.

While much of the work that the Department is committed to occurs in the local fire environment, other communities are indirectly affected, largely by smoke impacts. While there may not be any way to address this issue directly during a wildfire, the Department should continue working with local and sibling agencies (e.g., Oregon Health Authority) to establish ways for these impacted populations to avoid smoke impacts as well as research and monitoring to assess other resource and health effects. Additional restoration burning will produce varying levels of smoke. Current efforts should continue to be used to prevent smoke intrusions.

State Forests Management

Goal: Lead by example and demonstrate climate-smart forest management on State Forests to achieve adaptation, mitigation, and the achievement of forest resource goals.

Greatest Permanent Value

As provided in [ORS 530.050 \(Management of lands acquired\)](#), “greatest permanent value” means healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits to the people of Oregon. These benefits include, but are not limited to:

- (a) Sustainable and predictable production of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;
- (b) Properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;
- (c) Habitats for native wildlife;
- (d) Productive soil, and clean air and water;
- (e) Protection against floods and erosion; and
- (f) Recreation.

Oregon’s forests, particularly those in the western Cascade Mountains and the Oregon Coast Range, have the potential for some of the highest rates of carbon sequestration and storage in the world. Therefore, Oregon’s forest productivity has potential for significant climate mitigation benefits. Climate-informed management of the lands under the Department’s control can provide broad public benefits and provide a model for others regionally and nationally on how to achieve broad long-term, climate-positive public benefits (including clean water, recreation, fish and wildlife habitat, and carbon storage) while continuing to meaningfully contribute as a carbon positive and viable economic driver to rural and resource-dependent economies. Policies put in place by the Board of Forestry and Department leadership will pave the way for on-the-ground, climate-smart forestry practices.

The Department will lead by example and demonstrate climate-smart forest management on State Forests to achieve adaptation, mitigation, and the achievement of forest

resource goals. This concept will be incorporated into the State Forests Management Plans (FMPs). The draft Western Oregon FMP includes Guiding Principle 11, which states that the FMP “will be implemented to adapt to climate change and mitigate its impacts on the management of state forest lands. The FMP will also contribute to climate-change mitigation and sequester carbon.”

Part of the carbon equation includes using long-lived harvested wood products. Climate-smart forest practices used to manage State Forests will provide a sustainable source of wood fiber. Coupled with this climate-smart focus, the Department will work with its own resources (beyond the State Forests Division) and with partner agencies, organizations, and entities to support and encourage the use of wood as a long-term mechanism for the storage of carbon. This includes using wood fiber in place of more resource-intensive and high carbon cost manufactured products like steel and cement, among others, where it is reasonable and prudent.

Forestlands Climate Resilience and Ecological Function Restoration

Goal: Accelerate the pace, scale, and quality of climate appropriate forest restoration to increase the resilience to increased wildfire, drought, and biotic disturbance severity and incidence.

Support implementation of the recommendations of the Governor's Council on Wildfire Response.

A century of fire suppression, climate change, and other factors have created landscape scale forest health issues that threaten to derail the potential of Oregon's forests as a climate-change mitigation tool. With exclusion of fire from natural ecosystems, there has been an increase in overstocked forests prone to fire, damaging insects, and forest diseases (Figure 6). The combined impacts of climate change, including higher temperatures, drought stress, and increasing vapor pressure deficits, result in more susceptibility to insect and disease infestations in individual trees and entire stands. Forests under stress from these pests and pathogens create conditions favorable for the rapid spread of fire and greater challenges for managing fire across the landscape. Site-appropriate fuels reduction and fire risk mitigation work will vary widely across the state. It is important that work to reduce wildland fire risk take into account the historical, current, and future predicted local fire behavior and frequency.

Adding to the issues above are invasive species that are either present or could be introduced. These insects, diseases, and invasive plants all disrupt the natural and managed forests of the state and threaten the viability of native ecosystems due to their impact on species from the specific to the broad. An example of this is the loss of tanoak trees from sudden oak death in southwest Oregon. The removal of this keystone species could result in both ecological and cultural disruption.

Working with Tribes, impacted communities, state and federal agencies and stakeholders, the Department will prioritize landscapes for resilience work and implement projects and programs that will increase the resilience of communities to catastrophic fire and natural resource damage. The Department will largely undertake these prioritization and planning efforts in separate processes where the Legislature has

provided enhanced capacity to do so (e.g., a 20-year Forest Restoration Plan). These other planning efforts will take into account the impacts of future climate change on the ecological and the fire environments and prescribe treatments accordingly.



Figure 6: Hood, Sharon M.; Lutes, Duncan C.; Crotteau, Justin S.; Keyes, Christopher R.; Sala, Anna; Harrington, Michael G.; Munger, Gregory T. 2018. Lick Creek historic photographic series: a century of change in a ponderosa pine forest in western Montana, U.S. Fort Collins, CO: Forest Service Research Data Archive. Updated 04 June 2019. <https://doi.org/10.2737/RDS-2018-0023>

Urban and Community Forests

GOAL: Increase the extent and resilience of urban and community forests to maximize the climate mitigation and health benefits of urban forest canopy.

Urban forests represent different issues than those found in wildland forests. These often impact populations that have historically been discriminated against, marginalized, and underrepresented in decision making that affects them. For example, previous practices of blockbusting, redlining, and discrimination in lending such as exclusion from FHA loans prior to the Fair Housing Act of 1968 (Public Law 90-284 82 Stat 73) led to segregation in metropolitan areas. Under-funding and other discriminatory civic policies left those marginalized communities with substantially fewer trees and less tree canopy. Those discriminatory practices continue to this day to impact human health, property values, and quality of life.

Through climate-aware urban forestry, the Department will work with local jurisdictions and disproportionately impacted communities to address the inequitable impacts of increased extreme heat events on vulnerable human populations, especially lower-income communities and communities of color. This may include working with local governments and community-based organizations to empower local communities to improve the natural ecosystem around them through design and implementation of urban forestry plans and actions.

Urban areas not only experience extreme heat events, but greater impacts from winter storms and extreme rain events due to the altered nature of streams as they flow through towns and cities. The Department will work to enhance the function of existing riparian areas and work with the appropriate level of government to increase riparian function and green infrastructure in urban areas to improve water quality and aquatic habitat.

Reforestation and Afforestation

Goal: Facilitate and encourage the reforestation of areas burned by wildfire and afforestation of low-productivity lands that are understocked or not in forest use.

Our forests face increasingly detrimental temperature, drought, and biotic changes. Climate predictions paint a picture of even more dramatic shifts. One of the most visible and dramatic effects of these changes is the increase in wildfire size and severity. These destructive forces have the potential to roll back climate gains through the re-emission of forest carbon to the atmosphere and cataclysmic disruption to sensitive ecosystems. To help recover the carbon lost in these destructive events, the Department will work to build and integrate internal and external programs to facilitate and

encourage the reforestation of burned lands, where appropriate, and guided by the best available science on species selection and future climate benefits. This includes full use of federal incentive programs through the Department's Federal partner agencies. The Department will use Good Neighbor Authority and Shared Stewardship agreements to work with Federal land managers to achieve the goals of the Department, state and its partners.

There may be instances where the most current knowledge of plant communities and climate envelopes indicate that there should be alternative management on affected lands. This may include the use of alternative, non-traditional tree species, alternative seed sources, or a shift from traditional forest management to a long-term ecologically-sustainable ecosystem. Foresters, the near-forest community, and society in general will need to be provided educational opportunities to see the vision of climate-smart forestry where past forest types may no longer be the most suitable approach. The ODF seed orchard will be a valuable resource for providing seed for appropriate, resilient, and climate-adapted planting stock including seed used for assisted migration.

Recent studies have indicated that planting trees on currently non-forested lands (forestation generally; including reforestation and afforestation) may result in large climate benefits and key mitigation impacts^{xv}. While Oregon's strong land-use laws have largely prevented the conversion of the state's wildland forests, there remains opportunity to plant trees in areas that are currently in a low-productive use and non-forest use. This may include some agricultural lands, lands determined as low productivity forestlands, areas in rural and municipal jurisdictions, and areas where current forest management practices result in low productivity due to either biotic or abiotic factors. Afforesting and managing tree species appropriate to the future-climate in planted stands or toward complex forest structure and habitat can have beneficial results by sequestering and storing carbon on the landscape^{xvi}. Future work will be needed with sibling and partner agencies to identify lands that are available and to follow through on the best carbon management of these lands.

Maintain and Conserve Forests

Goal: Support a strong, but flexible, Land Use Planning System as a cornerstone of maintaining Oregon's forests on private lands.

Since the inception of Oregon's pioneering and nation leading land-use laws, the state has lost less than three percent of existing wildland forest. This retention is significant from both a carbon potential and ecosystem perspective. Beyond limiting the conversion of forestlands, afforestation presents a significant opportunity to advance

forest carbon, ecosystem, and economic values and will be an objective of the Department. The Department will continue to work with its sibling agencies to support and maintain this land-use system through risk identification, technical support, and striving to maintain the current scope of law. Where possible, and in line with previously highlighted efforts, the Department will strive to not only maintain, but increase the amount of forestland protected by these land-use laws.

Conversion of forestlands to other land-use types, especially those outside of the natural working lands spectrum, causes significant and continued emissions from lands that once acted as a net carbon sink. The Department will work closely with its sibling and partner agencies to minimize the loss of these important areas. The issue of conversion has been especially strong for landowners with smaller tracts and parcels and the family forestland owners of the state. Incentivizing keeping these lands as working forests is one of the prime areas to work toward in the near term.

Conservation and resilient restoration of forests is another key area where the Department can work cooperatively with other agencies, nongovernmental organizations, tribes, and private individuals and companies to find ways to conserve valuable forested areas. This will be key as areas of climate refugia become increasingly threatened and are identified for additional protection. Conservation and preservation of these key areas will be important in maintaining healthy habitat for forest-dwelling species, ameliorating the impacts of climate change on forest abiotic factors such as stream temperature, sediment transfer, and water quality.

Research and Monitoring

Goal: Maintain a research and monitoring program to track the status and trends of ecological, economic, and social indicators and the effects of climate change and to track progress related to this plan.

Governments, organizations, scientists, and researchers across the planet are deeply involved in research to understand effects on climate from rising greenhouse gas concentrations in the atmosphere and the effects on forests and other ecosystems. The Department is committed to using this research and understanding to fully implement climate-smart forestry as laid out in this plan. Some of the major questions being explored include:

- To what extent will forest ecosystems change in response to rising atmospheric CO₂?

- What processes in forest ecosystems are sensitive to climate change, and the related physical and chemical changes?
- How will future physical and chemical climate changes influence the structure, function, and productivity of forests and other ecosystems?
- What factors influence whether forests are a net source or sink of carbon relative to the atmosphere?
- What are the implications for forest management and how must forest management activities be altered to sustain forest productivity, health, and diversity?
- What are the most effective practices and policies for increasing carbon sequestration and storage in Oregon's forests in the near-term?
- What are the most effective practices and policies for improving climate resilience in Oregon's forests in the near term?
- What are the risks and benefits of using alternative seed zones or species when considering assisted migration or switching species?

A region's climate is a major controlling factor on the productivity and health of forest ecosystems, the composition of trees and other species, and the dynamics of wildfire. Long-term changes in climate that will continue to occur with rising concentrations of greenhouse gases will continue to affect the health, productivity, and wildfire regimes of Oregon's forest ecosystems. Understanding the impacts of climate change on the benefits we value and expect from Oregon's forests requires a robust, long-term research and monitoring system that provides reliable information reported on a regular basis.

The goal of research and monitoring is to regularly collect information upon which reliable analyses can be conducted. This will help us maintain and improve our ability to track the status and trends of the natural resources under our stewardship, project the dynamics of forests health and function, and assess and adequately respond to anticipated outcomes of our management decisions. Understanding the status and trends of natural resources is fundamental to our ability to adaptively manage them with informed responses to current and future conditions. In essence, the goal of research and monitoring is to collect, analyze and deliver information that is relevant to policy and management operations. Monitoring the effectiveness of actions is essential to inform and adjust management in a changing world. Reliable information and analysis from research and monitoring will be fundamental to our ability to adapt to

climate change, maintain ecosystem resilience, and continue production of ecosystem services.

Monitoring changes and trends in forests and forestry is a long-term prospect that must be supported through time, thus embedding the monitoring process is crucial. While there must be a long-term objective to the monitoring, it is also essential that results are delivered within a reasonable timeframe to support imminent decisions and provide feedback for adjusting methods. Addressing social, environmental as well as economic issues in forests and forestry requires that a large number of relevant variables are included in the monitoring and assessment design relating to biophysical as well as socio-cultural dimensions. Actively providing results to the policy dialogue and the debate on implications and responses is an integral part of the monitoring and assessment process.

The Department has established research and policy relationships with federal, academic, and stakeholder partners and neighboring states to assess and account for forest carbon and impacts of climate change. The Pacific Temperate Forest Memorandum of Understanding^{xvii} (Oregon, California, Washington, and British Columbia) formalizes this relationship and involves active research participation and support around regional forest carbon and climate change. The policy and research efforts vary but relate directly to the relationship between carbon, climate and Oregon's forests and natural working lands.

Supporting the suite of carbon and climate goals referenced in this plan requires that there be robust monitoring followed by adaptation measures where issues are identified. The complexity of the natural and managed systems inherent in 21st century forestry requires that efforts to constantly increase the knowledge base will be needed in the both the near term and the long term.

Supporting Actions

Note on Supporting Actions: Supporting actions are linked to multiple **Goals** (listed above). Depending on the action, impacts can and will extend to several goals, they are not limited to a one-to-one goal relationship. These **supporting actions** will be incorporated into agency planning, which includes documents and processes like Board Work Plans, Forest Management Plan, Implementation Plans, and Annual Operating Plans, among others. Many of these other plans and processes lay out, in short time segments (e.g., biennium), what the Department’s work will be. Icons indicate which goal(s) each action is linked to.

	Climate-Smart Forestry in Silviculture
	Fire Management, Response and Fire / Smoke Adapted Communities
	State Forests Management
	Forestlands Climate Resilience and Ecological Function Restoration
	Urban and Community Forests
	Reforestation and Afforestation
	Maintain and Conserve Forests
	Research and Monitoring

Integration of Statewide Climate Plans and Frameworks, Increase Cross Agency Collaboration:

Agencies within Oregon state government have been coordinating and working on a variety of climate change adaptation, mitigation, and related planning processes. This includes, but is not limited to, the Statewide Climate Adaptation Framework, the Natural Hazards Mitigation Plan, and the 100-Year Water Vision. The Department should be informed by and align its policies and operations with these plans and processes that have been collaboratively developed and thoroughly vetted through various agencies and government levels as they provide a clear and readily usable guide or framework for building adaptation and mitigation into the agency.

Additionally, the Oregon Global Warming Commission has been directed to develop goals related to climate change and natural and working lands. These goals should be used to guide the Department as it works to implement programs aimed at reducing greenhouse-gas emissions and carbon sequestration projects.

Integrate Climate Change in FPA Rule Revision Processes

Incorporating climate change into rule development and revision – Thorough analysis of the FPA for climate change sufficiency: Through the analysis of existing rules and policies and guided by the robust, reviewed scientific literature, the Department will identify where there are gaps in protection, adaptation, mitigation, resilience, and restoration actions related to climate change that fall under the FPA. This has begun with analysis of the statutory authority the Board has in developing FPA rules and will be continued by an agency analysis of individual rules. Where resource degradation is identified, the board may opt to undertake its rule-making authority to change or enhance the FPA rules.

Climate-Smart Forestry Incentives on Private Forestlands

Incentivizing climate-smart forestry – One leg of the three-legged stool of the Department’s interaction with forestland owners and managers is voluntary measures. Through agency identification and facilitation of means to incentivize the adoption of climate-smart forestry practices. Those that choose to participate, will receive assistance (primarily monetary) they need to realize and implement actions on the landscape and in forestland decisions beginning with species selection, diversity, management, and harvest regimes.

Providing public recognition of those that are innovative and impactful in stewardship toward mitigating global warming and adapting to climate change -- Recognition of operators and organizations that innovate and work to implement climate-smart forestry practices, harvest, and utilization in a manner that advances climate aware, climate-smart, and ecosystem conscious outcomes. To date, there has not been specific recognition of forest conservation, innovation, and long-term stewardship in Oregon. The Department will start a yearly recognition program that highlights landowners, organizations, or managers that are innovative and working toward stewardship and/or addressing the impacts of climate change in their practices. For example, this could include actions that support resilience, habitat, carbon storage, sequestration, protection and/or increase of forestlands, or the incorporation of climate justice practices into land management decisions, or other stewardship action on climate change.

Forest Management Plan and State Forests Carbon Storage

Incorporate climate change into the Forest Management Planning (FMP) and Implementation Planning (IP) process – Board of Forestry lands and state lands overseen by the State Forests division are managed under FMPs that provide overall

goals and strategies for management over a long-time horizon, with more specific management objectives for 10-year periods detailed in IPs. Integration of these supporting actions will take place during the development of the draft Western Oregon FMP and associated IP planning processes. In line with Executive Order 20-04, this plan should integrate climate mitigation and adaptation practices including those listed below:

- Implement silvicultural pathways and harvest rotations that increase carbon storage in the forest while maintaining wood fiber flow to the forest products industry^{xviii}. Different tree species, forest types, and ecological zones achieve maximum carbon storage rates at different stand ages. These variations will be accounted for when making silvicultural decisions, including, but not limited to, reforestation and young stand management, mature stand density management, age of final harvest, harvest deferral, and retention of green trees.
- Identify areas particularly susceptible to the deleterious effects of climate change and work to conserve them. This includes climate-sensitive habitats, areas of high conservation value, and areas of cultural significance that may become threatened by climate change. This should be done with input from tribal and community-based organizations.
- Restore areas impacted by insect pests and diseases to productive forests through removal of susceptible species and use of site appropriate species. An example of such areas would be stands in the Coast Range affected by Swiss needle cast, which has greatly slowed or ceased measurable growth of Douglas-fir. These stands should be managed to restore ecosystem services, including carbon sequestration, through use of appropriate alternative species and stand management.
- Identify areas that have high carbon storage potential, especially for those that can provide benefits for threatened and endangered species habitat, water quality, and educational and recreation opportunities for Oregonians. Establish priorities for these areas that include long-term carbon storage.
- Identify areas to increase soil carbon and maintain forest carbon on the site when stands are harvested by maintaining slash post-harvest instead of pile burning, and increase alternatives to burning biomass in the forest. Consider emerging alternatives such as biochar to achieve multiple benefits, including increasing soil carbon and water-holding potential.

Internal Carbon Pricing Process

Many global organizations have begun to integrate an internal carbon price in their decision making. The internal carbon price represents the price of carbon that would result in a change to their business practices. For forestry, it could be a variety of measures from selling carbon offsets to adjusting harvest to capitalize on changing long-lived product ratios. The Department, and specifically the State Forests Division, should work toward setting an internal carbon price for the lands and forests that it manages. Having this information incorporated into future forest management planning and decisions will allow the State Forests Division to implement carbon-smart forestry on Board of Forestry and Common School Fund forestlands throughout the state.

Managing the Fire Environment: (Prescribed Burning, Predefined Incident Objectives, Post-Fire Restoration)

Operationalize Shared Stewardship to accelerate the pace, scale, and quality of Federal Forest Restoration to increase resilience to increased wildfire severity and restore ecological function. Incorporate resource and community severity and risk assessments in directing restoration and resiliency action and investments. Support implementation of the Governor's Council on Wildfire Response recommendations.

Implement a prescribed fire program within the Department and work with outside agencies to gain the needed experience and tools for conducting safe, successful burns in degraded landscapes. Capacity and direction to establish this work was provided by the Legislature in the 2021 legislative session.

Continue and increase landowner assistance and incentives to reduce the impact of wildfires on private forestlands, particularly those in the smaller ownership classes using both State and Federal funds. Financial and some staffing capacity to provide this assistance was provided by the Legislature in the 2021 legislative session through Senate Bill 762.

Work with landowners and managers, large and small, to create resilient landscapes. Work with the same landowners and managers to identify areas that can have alternative priorities for fire suppression. The results would be pre-identified actions that may take place based on the burning environment at the specific time and the anticipated impact the fire would have. The ultimate aim would be appropriately returning fire to natural systems.

Working with state, federal, and nonprofit resources, the agency can work with affected landowners to restore ecosystem function and carbon-sequestering trees to fire-affected areas. While we do not want to lose ground to uncontrolled wildfires, replanting post-fire will help minimize the carbon impact of the fire. This issue, like fire, crosses boundaries and addressing forest restoration is needed across all land ownerships.

As with climate-smart forestry, the agency should work to develop fire-smart management when undertaking projects related to fire mitigation, restoration, or community hardening. These can include, but are not limited to, planting appropriate species, alternative spacing, and adding fire breaks and control points when planning projects.

Community Resilience and Adaptation

Working closely with partner agencies (DLCD, OSFM, OEM, OHA, etc.), the Department has the potential to create a more resilient fire landscape. ODF recognizes that it does not have the statutory authority, guidance, or financial resources to work in the built environment, but more frequently the wildfire and forest environment and the urban and built environment occupy the same locations. This requires increased cooperation across agencies and stakeholders. Pursuing additional cooperative relationships with other agencies will strengthen the Department's ability to implement the goals of this plan and benefit partners as well.

Afforestation of Low Productivity Lands

Consideration of native and culturally significant species can play an important role in afforestation activities. Many of the species that were historically present within respective ranges are expected to be more drought tolerant than the higher elevation conifers that have replaced them. At lower elevations in and around the Willamette Valley, species like Oregon white oak and the Willamette Valley ponderosa pine variant are more drought tolerant and may be better options for reforestation or afforestation where there has recently been drought and heat-induced mortality of other species. Encouraging a mix of species both in the overstory and the understory will play a role in enhancing forest resiliency to climate change in coming decades.

The Department will explore the various resources that are available to support and advance afforestation efforts throughout the state where such actions would be supported. Working closely with the ODF seed orchard and seed bank to identify

proper species and seed zone plantings will also be key, otherwise there is the risk of exacerbating the unwanted biotic and abiotic effects on the afforested areas.

The Department will work closely with industry, particularly the forest nursery industry, to ensure that there is an ample supply of seedling trees for these initiatives and that trees go in the right places for which they are best suited.

There may be a place for the use of genetically improved trees to increase the uptake of carbon by the trees or to ensure that they are resilient in the anticipated climate envelopes that they will be planted in. Genetic improvement of tree species has been taking place for centuries, largely to achieve greater fiber yields and increasing desirable form.

Further use of resilient native species, like the Willamette Valley ponderosa pine variant, will help to lessen the risk of mortality to maladapted species in the lower elevations of western Oregon. Similar examples exist for other ecoregions of the state.

Afforestation of low-productivity lands in the urban environment needs to be done in conjunction with urban planners, the local communities, and organizations that represent climate-impacted communities, especially Black, indigenous, and people of color (BIPOC) communities. It is important to ensure that they have ample input.

Maintenance and Expansion of the Urban Tree Canopy

The Department looks to establish a grant program of \$2 million per year to empower local communities to invest in urban and municipal canopy that meets their needs. This will need long-term legislative support that the Department will work to build in future legislative sessions.

The Department will seek to increase its ability, support its footprint in urban and community spaces by increasing staff and capacity, creating liaison positions to support local communities (beyond the municipal paradigm) and to work with those communities so that the urban tree canopy receives appropriate monitoring, care, and remains healthy, and to facilitate expansion so that the inherent benefits therein can be extended.

Development of Community Forest Management Model

Explore aspects of community forests and operationalize these interests and facets to the extent practical. Support local non-private forest ownership to meet the goals of

interested and engaged communities. Public-private partnerships may provide communities with a greater ability to successfully manage the forests that surround and support them to meet their specific objectives.

Forest Carbon Finance and Markets

While ODF has the statutory authority to implement a forest carbon offset program (ORS 526.780 to 526.789), it has not had the staffing capacity or demand to progress into rulemaking and program development. Principles guiding the establishment of a carbon finance program within the Department will be developed and will largely focus on the areas that the Department has historically succeeded in. These include providing education and technical assistance to partner organizations, landowners, forest managers, the public, and stakeholders. These efforts will focus on the availability of both government-regulated programs (e.g., California market) and non-governmental voluntary carbon markets. Much of this will focus on the need for projects to have accountability, durability, and additionality.

There has been significant growth in the voluntary markets for carbon projects in recent years. Large corporate entities have been providing funding to offset their carbon footprints to a variety of different private and non-governmental organizations. The Department may be able to foster greater use of these programs by supporting and coordinating these interests by bundling, aggregating, or creating a clearinghouse of options for landowners to become involved while facilitating these opportunities.

Additional programs to establish Carbon Easements through financial payments may become available through the Department's Federal partners. In this case, the Department may look to its established relationships with these partners to help landowners be successful in establishing and maintaining these easements. As previously noted, these are not projects that a manager can walk away from. There will need to be some amount of work done to maintain the health and function of these forestlands to maximize their carbon storage potential.

With the direction provided to the Department of Environmental Quality (DEQ) and the Environmental Quality Commission (EQC) by EO 20-04 regarding programs to cap and reduce greenhouse-gas emissions in several sectors, ODF will coordinate with their rulemaking processes regarding any development of forest carbon offsets that are linked to those new programs. The Department will communicate with DEQ and seek inclusion in this program development work over the next 18 months as it relates to

forest carbon. Staffing capacity will likely continue to be an issue for the Department and may provide a barrier to the development of the forest carbon finance program.

Mid-term Timber Harvest Deferral

Recent studies (Graves 2018) have highlighted the carbon benefits of deferring harvest in the mid-term. Working with partners to incentivize landowners to defer harvest voluntarily can lead to greater sequestration and storage over the next 30 to 50 years (e.g., 2050-2070), a period when our natural and working lands will be leaned on heavily until technologies and other sectors can catch up and work to reduce atmospheric carbon. This mechanism would rely on easements, active management for resilient landscapes, and efforts to increase the resiliency of enrolled programs through thinning and appropriate forest management practices.

Monitoring and Research

Past, Present, and Future Forest Carbon Research

The Department has been and continues to be involved with assessing the storage and flux of carbon both in the forest and in post-harvest activities. This work forms the backbone of the forest carbon accounting framework and is cooperatively done across government levels and across state boundaries. These reports and research are intended to be periodically updated with new measurements and monitoring efforts to ensure that there is appropriate accounting.

Examples of these efforts include:

- Forest Carbon Sequestration and Flux – The Department has worked cooperatively with the USDA Forest Service Pacific Northwest Research Station (PNWRS), research institutions, and stakeholders to produce the Forest Ecosystem Carbon Report (FEER) that quantifies the amount of carbon that is currently stored in Oregon’s forests. The report is intentionally consistent with forest carbon reporting in California and Washington to facilitate regional analysis and comparison. This methodology has helped establish a baseline for the storage and flux of carbon in forest ecosystems across the Pacific coast region. This approach is a critical aspect to understanding and informing carbon and climate policy within and beyond Oregon. Forest ecosystem carbon reporting in Oregon will be iterative, using ongoing federal Forest Inventory Analysis (FIA) data collection across all forestland ownerships. It will continue to be dynamic and current with updates expected as field plots are remeasured.

- Wood Product Carbon Flux – The Department with the PNWRS and State partners to produce a report on the storage and flux of carbon in harvested wood products (HWP). This report provides estimates of carbon in products currently in use, in landfills, and emitted from burning and decay (by ownership) based on timber harvests in Oregon since 1906. This report was completed in spring 2021 along with an assessment of sawmill energy usage and production in Oregon. The Department included a stakeholder committee during the production of both the Forest Ecosystems Carbon Report and the Harvested Wood Products Carbon Report. This research and reporting provide a vital linkage with the flow of carbon out of forest pools to utilization. Work like the FECR and the HWP is being conducted in a manner comparable to neighboring state partners, providing a necessary mechanism for tracking carbon flows and utilization regionally.
- Scenario Planning and Management Projections – The Department is currently collaborating with the PNWRS, and the other signatories of the Pacific Temperate Forest MOU in a co-production effort to model the benefits and consequences of alternative forest management scenarios for carbon mitigation. There is ongoing, broad-level stakeholder involvement, with outreach to those most impacted. This work is part of a long-term initiative within the PNWRS that includes numerous staff from various natural resource agencies and organizations. With completion of this work, the Department will be able to present projected impacts of various forest management scenarios and the implications for forest carbon. It is anticipated that this work will be completed within the next few years with a variety of intermediate products along the way.

Additional monitoring work that is ongoing or anticipated in the future include:

- Scenario-driven analysis and evaluation of differential outcomes as a function of production and processing transitions related to implementation of climate-smart forestry principles and practices. Potential analyses to consider economic, ecologic, and or social analysis of second-order effects of changes in fiber supply, social and ecosystem service value of forests and long-term resilience benefits as well as the potential of increased losses (beyond wood fiber) to wildfires precipitated by climate change, management, and composition. These analyses will provide value by informing climate and practice driven transitions, accommodate negative externalities, and address other possible unintended

consequences to traditionally disadvantaged communities and communities with high intergenerational poverty issues.

- Accounting of forestry-related carbon impacts. To make management decisions related to reducing emissions, the emissions of the possible actions need to be established. This would include estimates ranging from post-harvest pile burning, broadcast burning for restoration and climate change resilience efforts, the emissions from operations, and fleet emissions including during fire suppression. Having a full accounting, and identifying where there is room for improvement, will help the Department and the sector recognize the areas to focus on. It will also show where there is space to work with sibling agencies to reduce emissions (e.g., DEQ for smoke management or ODOT for transportation).
- Quantify carbon stocks, fluxes and use in Oregon's forest carbon pools using the standards of the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change.
- Continue to produce the Oregon Forest Ecosystem Carbon Inventory Report on a biennial basis.
- Continue to produce the Oregon Harvested Wood Products Carbon Report on a five-year cycle.
- Continue to produce the Forests, Farms, and People: Land Use Change on Non-Federal Land in Oregon on a five-year cycle.
- Continue implementing an urban forestry inventory to quantify the climate benefits of Oregon's urban and community forests.
- Continue to actively participate and implement the Memorandum of Understanding on Pacific Coast Temperate Forests, sharing and exploring advances in forest-related science and data collection to better understand how forests are responding to changes in climatic conditions.
- Monitor effectiveness and implementation of new climate-centered forest practices policies (statutes, rules, and voluntary measures).
- Look at decomposition rates in different management scenarios/methods and disturbance types vs utilization mechanisms.
- Assess regeneration after wildfire for areas impacted at different fire return intervals, severities, and locations to consider the impacts of a changing climate.

Incorporation of Climate Change and Climate Change Impact in Agency Planning Processes

Climate change needs to be a foundational consideration in all agency planning processes. From the top levels (Forestry Plan for Oregon, Agency Strategic Plan, Forest Action Plan) to the day-to-day plans (Annual Operating Plans, Implementation Plans, etc.), climate change should inform the work that is prioritized. Resources should be specifically dedicated to adaptation, mitigation, and resilience work. Leadership and management at all levels of the organization need to work to institutionalize the climate tools at their disposal, from species selection to fire planning, and ensure that their staff are equipped to appropriately implement climate-smart principles and practices throughout the agency.

Encourage Low-Carbon Impact Materials in Oregon

Work to encourage use of low-carbon impact materials and processes by working with sibling agencies, through incentives and support within and between other sectors, and by providing carbon-impact accounting for harvested wood products. Having the embedded carbon footprint available to end product users will support using long-lived, low-embodied carbon and allow consumers to make educated and informed decisions about the products that they choose.

Specific actions included in this are:

- Support the continued growth and adoption of mass-timber construction to substitute for high-carbon building, such as concrete and steel.
- Support the development of a wide variety of market-based solutions to support the use of low-value material from active management and increased forest health in face of changing climatic conditions. Market opportunities include:
 - Use of low-value white wood species as feedstock for mass plywood
 - Use of low-value white wood species as feedstock for cross-laminated timber panels to be used in modular mass-timber structures
 - Renewable hydrogen and renewable natural gas manufactured from woody biomass
 - Biochar
 - Export wood pellets as a direct displacement for coal-fired electricity
- Continue to educate, inform, and engage the architectural, engineering and construction community about the carbon and forest sustainability benefits of building with long-lived wood products and mass timber.
 - Maintain and strengthen partnership with the Tall Wood Design Institute

- Support the development of cost effective and permittable mobile biochar technology to decrease carbon emissions and increase carbon sequestration of forest slash.
- Demonstrate the use of low-carbon building materials, mass timber and long-lived wood products across the Department's built environment.
 - Conduct LCA analyses of all future buildings and substantive remodels to ensure lowest possible carbon impact on future construction projects.
- Support a transition to lower transportation and processing emissions from the forestry sector by incentivizing the use of low-carbon fuel alternatives manufactured from low-value woody biomass. Fuel examples include renewable natural gas and renewable hydrogen fuel cells.

Future Work Needs

Below is a selection of the multiple needs for the Department to work on at different time scales (not in any priority rank). These needs are generally administrative or planning related as opposed to the more resource focused Supporting Actions. Work to address many of these needs has already begun and others are in the planning stage or have been identified for further work. The timeline for each varies, but the length of time needed is generally less than the supporting actions listed previously. Overlap does exist between short and long-term needs.

Near Term (begin or complete within one biennium)

- Incorporate diversity, equity, and inclusion goals in decisions made at the agency and Board of Forestry. Including requirements of EO 20-04 and SCR 17 (2021), among others, in decision-making.
- Request Department of Justice assessment of Measure 49 impact on implementation of climate goals.
- To the extent practicable, utilize alternative species or seed zones to adapt to a changing climate envelope and the impacts of that on mitigation efforts.
- Clearly and concisely prioritize landscapes for restoration and resiliency treatments that may include protection of climate refugia (SB 762 and 20-Year Plan).
- Integrate climate change in the complete and coordinated fire response strategy.
- Align budget requests and priorities to cope with a changing climate. Build requests to increase staffing capacity to meet the needs presented with additional climate focus.
- Purchase electric vehicles and install electric charging infrastructure at all ODF locations.
- Incorporate more remote work for personnel where appropriate.
- Wholesale Department Carbon Footprint and Monitoring for facilities and vehicle fleet (see Appendix A and below).

ODF EO 20-04 STRATEGIES	FACILITIES PROGRAM UPDATE (2021)
<p>Reduce building energy and electrical consumption through technological and personal action (e.g., power sensors, shut off lights and computers off when not needed).</p>	<ul style="list-style-type: none"> • <u>Building Modernization</u> → on-going installation and calibration of energy efficient building systems (e.g., lighting, HVAC, envelope, occupancy sensors, etc.) <ul style="list-style-type: none"> ○ Maintenance and repair projects. ○ Capital renewal projects. ○ Utility incentivized upgrades. • <u>Strategic and Sustainable Facilities Investments</u> → the implementation of the department’s <u>F</u>acilities <u>O</u>perations and <u>C</u>apital <u>I</u>nvestment <u>A</u>ccount (FOCIA) that focuses on all long-term facilities maintenance and capital renewal needs, including all sustainable building systems. • <u>Capital Construction/Improvement</u> → compliance with new Building Code energy reduction provisions as applicable. • <u>Building Performance and Data Mgmt.</u> → annual building energy consumption monitoring and reporting to the Legislature via the Oregon Dept. of Energy: <ul style="list-style-type: none"> ○ Reporting via the Department of Energy’s (Federal) Energy Star “Portfolio Manager” database platform. ○ Includes the tracking of: <ul style="list-style-type: none"> ▪ Estimated <u>G</u>reen <u>H</u>ouse <u>G</u>as (GHG) emissions on energy use of ODF’s buildings, as part of the compliance with EO 20-04. ▪ Estimated building <u>E</u>nergy <u>U</u>se <u>I</u>ndex (EUI). • <u>Focused Sustainable Facilities Mgmt.</u> → Salem HQs campus buildings have been enrolled in the <u>E</u>nergy <u>T</u>rust of <u>O</u>regon’s (ETO) <u>S</u>trategic <u>E</u>nergy <u>M</u>anagement Program (SEM) for direct building energy performance engagement. • <u>Sustainable Facilities Planning</u> → engaging in master planning efforts as applicable increase facilities efficacy and reducing facilities/ground footprints where feasible. • <u>Facilities Mgmt. Capacity and Enhanced Building Data Mgmt.</u> → staff capacity increase: <ul style="list-style-type: none"> ○ The addition of one Operations/Policy Analyst 3 (OPA3) to assist in the collection and management of facilities performance data. ○ The addition of one Construction Project Manger 2 (CPM2) to assist in the implementation of facilities modernization projects. • <u>ACTION ITEM PLACEHOLDER</u> → Continuation of the periodic Administration Division Newsletter or Facilities Bulletin to message sustainable building occupant behavior (TBD).

Long Term: (continues beyond one biennium)

- Incorporate diversity, equity, and inclusion goals in decisions made at the agency and Board of Forestry.
- Consider using alternative species or seed zones to adapt to a changing climate envelope and the impacts of that on mitigation efforts.
- Clearly and concisely prioritize landscapes for restoration and resiliency treatments that may include protection of climate refugia.
- Consideration of climate change in the complete and coordinated fire response strategy.
- Align budget requests and priorities to cope with a changing climate.

Supplemental Information

Urban and Community Forestry

- Oregon's climate adaptation framework identified Risk #1 Increase in average annual air temperatures and likelihood of extreme heat events. “Heat waves will result in increased deaths and illness among vulnerable human populations. The elderly, infants, chronically ill, low-income communities, and outdoor workers are the main groups threatened by heat waves.”
- Vivek Shandas and others of Portland State University have shown that lower-income areas of the Portland Metropolitan area have lower air quality because of lack of urban trees.
- Hoffman and others showed 94% of 108 studied urban areas display consistent city-scale patterns of elevated land surface temperatures in formerly redlined areas relative to their non-redlined neighbors by as much as 7 C, with an average difference of 2.6 C.

[Forestry Plan for Oregon](#)

USFS Climate Adaptation Partnerships

- [Blue Mountains](#)
- [Columbia River Gorge National Scenic Area, Mount Hood National Forest, and Willamette National Forest](#)
- [Oregon Coast](#)
- [South Central Oregon](#)
- [Southwestern Oregon](#)

[IPCC Sixth Assessment Report: The Physical Science Basis](#)

[Oregon Climate Change Research Institute 5th assessment](#)

[Forest Ecosystem Carbon Report](#)

[Harvested Wood Products Report](#) and [Sawmill Energy Report](#)

[Oregon Department of Justice Statutory Authority Analysis on the Board of Forestry's Authorities around Climate Change](#)

[Statewide Climate Adaptation Framework](#)

- [Equity Blueprint](#)

[Natural Hazard Mitigation Plan](#)

[100-Year Water Vision](#)

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Appendix A



Oregon Department of Forestry

Sustainability Report

2018



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Preface

Sustainability is at the core of the Department of Forestry (ODF) and is executed throughout our four primary businesses. ODF provides fire protection for 16 million acres of forestland statewide, manages 800,000 of state-owned forestlands, implements the Forest Practices Act to ensure environmental stewardship while producing wood products on private and county-owned working forests, and partners with federal land managers to increase the pace, scale and quality of restoration on federal lands.

ODF Mission

“To serve the people of Oregon by protecting, managing, and promoting stewardship of Oregon’s forests to enhance environmental, economic, and community sustainability.”

Policy and direction for ODF is set by the Legislature and Board of Forestry which defines forest sustainability as:

“Forest resources across the landscape are used, developed, and protected at a rate and in a manner that enables people to meet their current environmental, economic, and social needs, and also provides that future generations can meet their own needs [ORS 184.421].”

Sustainability is carried out in ODF’s day to day implementation of policies and programs that promote sustainable management of Oregon’s public and private forests. This 2018 update to our 2016 Sustainability Plan¹ encompasses both our mission of sustainability in forest management and in the activities and policies that guide the operation of our facilities. In our 2016 Plan, ODF identified four short-term and four long-term goals. The sections below provide an update on each of those goals and include two additional long-term goals.

Short-Term Goals

1. Conduct a Fire Program Review

The 2016 Fire Program Review Committee recommended focusing on three areas in creating a more sustainable fire program: sustainable funding, organizational resources and structure, and reevaluating certain wildfire policies. We have furthered this work by:

- a. In 2017, we developed a policy option package for continued **coordination with rangeland fire protection associations** to protect the Oregon’s rangeland and preserve habitat for sensitive species like Sage Grouse. We received funding for a full time position to support coordination with the RFPAs and additional funding for equipment and training for the associations.

¹ ODF 2016 Sustainability Report.

https://www.oregon.gov/das/Facilities/Documents/SustPln_ODF_2016.pdf

- b. ODF's 2019-2021 **Agency Request Budget includes an agency-wide policy option package** asking for additional staff across the agency to more sustainably support our fire protection efforts during fire season while maintaining agency workload.
2. Sustain Water Quality through Forest Practices
 - a. The Department recently **began two studies testing the effectiveness of riparian rules** to protect water quality and stream habitat. We will bring the results of these studies to the Oregon BOF for them to assess the sufficiency of these rules.
 - b. The Department just **completed a 5-year contract, monitoring the compliance with Forest Practices Act** rules. Overall compliance rates were high.
 3. Increase Water Conservation at ODF Facilities
 - a. Facilities staff has begun the second phase of a multi-phased **landscape rehabilitation project to replace non-native species with more drought resilient native species** plants and shrubbery at its Salem HQs. A plan developed by a landscape architect gave direction in achieving balance between sustainability while still maintaining the design spirit of the historical grounds.
 - b. Facilities has **implemented the Department of Energy's Portfolio Manager** to more effectively manage and evaluate ODF's 400+ building/structures portfolio with respect to water consumption in order to meet or exceed the mandated savings as per the Governor's Executive Order 15-09. Challenges still exist during fire season which creates a higher demand on our facilities and resources.
 - c. Facilities is encouraging the **installation of water meters** at numerous field offices that are accessing well water for consumption. Having meters in place where well water is being drawn will help put perspective on actual consumption in lieu of estimated consumption.
 - d. As part of a statewide effort to increase awareness and to garner more support, and to encourage building occupant engagement, the Salem-Facilities Unit has **developed a quarterly newsletter (Appendix B)** to provide useful information on how occupants can contribute and be more sustainable with respect to the use of our buildings and operations, but also give them tips and tools that they can use in their private lives also.
 4. Increase Energy Conservation and Sustainable Practices at ODF Facilities
 - a. Building on the advice from the Sustainability Board in 2016, (see attached Board plan acceptance letter in Appendix B), the Salem Facilities Unit has **formed an Energy Team** that meets regularly to discuss energy savings strategies, and to develop sustainability related content for the quarterly newsletter that is shared with all ODF staff. The long-term objective is to further expand on this Energy Team by developing an agency Green Team that will represent a more overarching and comprehensive sustainability mission beyond just energy and water conservation.
 - b. **Increasing the use of LEDs and de-lamping** existing fixtures if cost-effective and acceptable payback schedules exist.
 - c. The agency has **completed a master plan/space planning study** to evaluate current Salem Campus HQs and the Fire Cache and Motor Pool operations programming functions and needs. The objective is to implement a more sustainable office layout that not only incorporates more sustainable measures such as reducing the use of task

lighting, it will also enhance occupant health and more efficiently facilitate programming needs.

- d. The Department has **completed a feasibility study on the placement of electric vehicle charging stations** at the Salem Main Campus compound, and at the Tillamook Forest Interpretive Center and adjacent Homestead Wayside. The implementation of charging station infrastructure is expected to begin with the Salem HQ Campus in 2019.
- e. Through a partnership with DAS, the Department was able to complete facility condition assessments of over 300 of its facilities. The objective of this data collection project is to help the Department strategically **plan for deferred maintenance and capital improvement and renewal** projects; including sustainability upgrades such as external and internal lighting upgrades, adding insulation to building perimeter and floor systems and roof assemblies, and upgrading plumbing fixtures to lower gallons per minute flow rates.
- f. The Department was able to secure a policy option package during the 2017 legislative session to **relocate the aging Toledo unit office** to another location. To reduce costs and promote agency partnerships, ODF is pursuing a co-locate project with ODOT to further realize efficiencies.
- g. In 2016 ODF's Facilities Unit has **enrolled in the Energy Trust of Oregon's Strategic Energy Management Program (SEM)** with the Dept. of Corrections, Dept. of Transportation, Oregon Liquor Commission, and the Dept. of Administrative Services to name a few. To date ODF has received \$16,000 in incentive monies, due to the implementation of multiple energy efficiency measures. The Salem-Facilities Energy Team has consistently participated in monthly meetings since 2016 with the SEM group to further enhance technical skillsets.
- h. Staff capacity has been added to the Salem-Facilities unit in 2018-20 to **assist our field offices with energy conservation upgrades** and consultation services with respect to lighting and other energy related building systems.

Long-Term Goals

1. Energy Conservation

- a. Facilities: ODF is in the process of **developing a data-driven building portfolio management system** that will facilitate long-term strategic capital planning for its facilities statewide. Phase I of this data-driven process, which included the physical assessment of the majority of ODF's buildings/structures, has been completed. Phase II consists of the implementation of a building asset portfolio software system that will provide the necessary data to develop a long and short term plan to tackle deferred maintenance, capital improvement and renewal needs, capital construction needs, and building system sustainability upgrades.
- b. Motor Pool: ODF's Central Motor Pool Program is an **active member of the State's Fleet Management Advisory Committee (FMAC)**, where the state owning fleet agencies collaborate and collectively report to DAS and DEQ our efforts in meeting the Governor's goal of converting 20 percent of the State's large fleets to alternative fuel vehicles. DAS compiles all the data and submits the report on behalf of all the agencies.

2. Green Chemistry Initiative

- a. Facilities: ODF ***follows the State's Sustainability Guidelines for consumable products*** that are on the state's Price Agreement Policy for all Janitorial Services.
- b. Motor Pool: As an active member of the FMAC, we have identified the Governor's green chemistry initiative on the committee's work plan and collectively report to DAS our fleet greenhouse gas emissions in response and reporting of the Governor's Executive Order 06-02. The data is used by the Department of Energy for their response to the Energy Information Administration survey and the Energy Policy Act survey regarding alternative and renewable energy. ODF also continues to ***procure equipment that complies with California emission standards.***

3. Forest Management Plan for State Forests

- a. ODF owns and manages state forestland and the Board of Forestry oversees these forests to achieve Greatest Permanent Value which requires the forests to provide a range of economic, environmental and social benefits. In coordination with the Board of Forestry, ODF staff are developing a new management plan for State Forests in west Oregon, that improves financial viability and increase conservation outcomes.

4. Forest Practices Act Rule Policy Review

- a. The Department and the BOF are currently conducting a rule analysis process to ***assess whether specific management guidelines should be developed for the marbled murrelet under the Forest Practices Act.*** The marbled murrelet is a small seabird that nests in old, large trees and is listed as threatened under both the federal and state Endangered Species Acts.
- b. The Department and the BOF also ***initiated an effectiveness monitoring project in the Siskiyou geographic region.*** This project will assess sufficiency of streamside rules to meet desired future conditions, and stream temperature and shade. The assessment is based on scientific literature.

Additional Goals to 2016 Report

5. Landscape Resilience to Reduce Fire Risk

The third recommendation component of the Fire Program Review addresses forest management policies on both public and private land. Forest management practices can impact fuel conditions that dictate the manner in which wildfire burns across the landscape. Forest management policies enable proactive mitigation of wildfire risk. This includes implementing treatments to reduce buildups of hazardous fuels and increase landscape resilience to wildfire. Treatments include harvesting timber and creating policies and public support for increased use of prescribed burning as a management tool.

In the 2017 legislative session, ODF received permanent funding for the **Federal Forest Restoration Program (FFRP)**. The goals of this program are to increase the pace, scale and quality of restoration on federal forests. FFRP uses state funds to engage with and assist local forest collaboratives to reach agreement on the scope and scale of treatments and to partner with the US Forest Service to increase the pace of project-level planning and implementation. ODF is **utilizing the Good Neighbor Authority** as an extension of this work to bring additional capacity to implement restoration projects.



6. Climate and Carbon Policy

ODF is working with the Governor's Office of Carbon Policy on two workgroups to inform the policy discussion to establish a statewide carbon policy and to identify opportunities for climate adaptation investments in natural and working lands. As part of this work, ODF is partnering with the US Forest Service Research Station to produce an **estimate of carbon storage and flux in Oregon's forests and in harvested wood products**.

Internal Practices and Policies

- To increase awareness and encourage occupant engagement, the Facilities Energy Team has developed a quarterly newsletter that focuses on sustainability. The fall 2018 newsletter will mark the fourth edition released to date.
- Salem-Facilities Unit continues to apply sustainable best management practices when engaging in operations and maintenance and capital improvement/renewal projects. These include: motion sensor lighting throughout the buildings, flexible lighting desk lighting options, and exterior offices utilize natural light from large office windows.
- Encourage the utilization of recycled products when they are available for items ranging from copy paper to pens.
- Printers are set to automatically print documents two-sided to conserve paper and most documents are now scanned or emailed, reducing paper use.
- Staff are encouraged to transfer packages to and/or from Salem to our field offices whenever possible to reduce postage costs.
- ODF continues to offer staff sustainable work options including telecommuting, efficiently designed work schedules, and job-sharing where possible. Many employees participate in ride-sharing options. ODF has its own agency policy on telecommuting and is in alignment with the DAS statewide policy.
- ODF has its own agency policy on Equal Employment Opportunity, Affirmative Action and Diversity as well as agency policy on Principles of Conduct and Working Guidelines to continue to educate and encourage upholding the public trust, expectations of professional workplace conduct and workplace safety.

- ODF participates in several outreach efforts including a variety of in-state and out-of-state career fairs.
- ODF is a sponsor of the 2018 Oregon Annual Diversity Conference.
- The Department continues to support minorities, women, emerging small businesses, disabled service veteran owned businesses, and disadvantaged business enterprises in its procurement practices. The majority of our procurements are globally advertised on the ORPIN system, which is an effective means of notifying the Governor's Certification Office for Business Inclusion and Diversity (COBID) contractors of our contracting opportunities.

External Practices and Goals

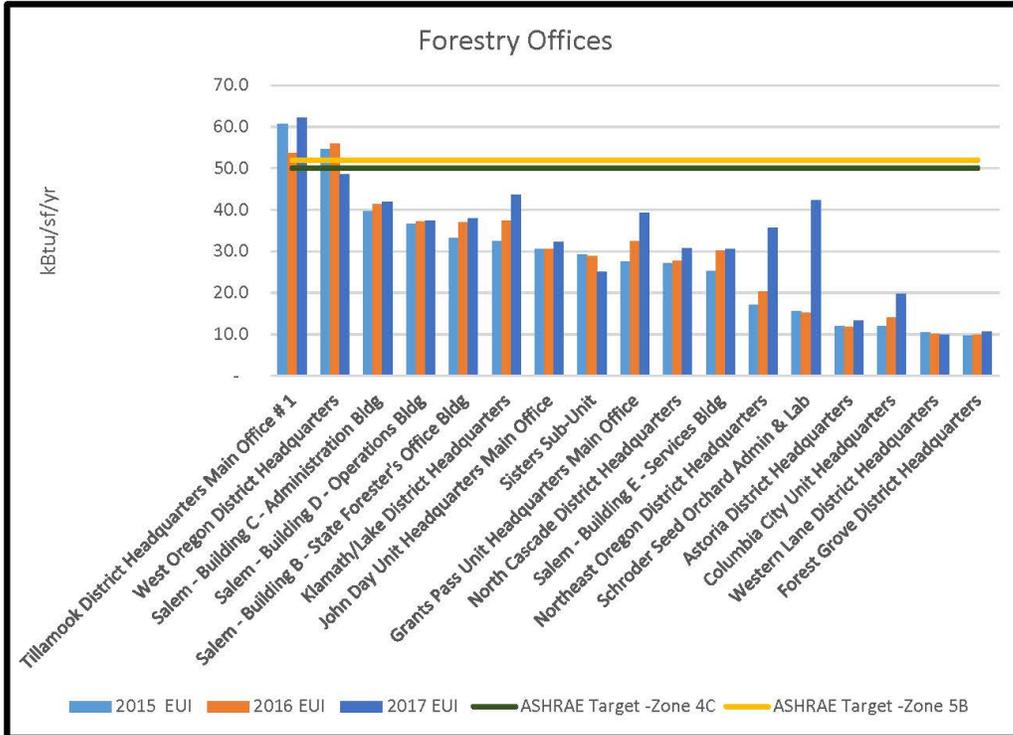
- The Department is working with the Environmental Justice Task Force to integrate Environmental Justice concerns into our agency programs, policy work, and decision making. This involves increasing the engagement of underrepresented communities (minority, lower income, elderly, disabled, etc.) in the areas where the work of the agency could impact their lives. The goal is to assure meaningful participation, equal opportunity for input and equitable outcomes.
- It is the policy of the Department to promote and enhance government-to-government (G2G) relationships with Oregon's tribes during the development and implementation of programs that may affect tribes. Our intent is to strengthen intergovernmental relations, ensure the capacity to address possible concerns, and enhance the exchange of information and resources. We also are seeking to engage a broad group of the Department's staff in an effort to build and retain G2G knowledge and resources for the future. We recently created a G2G Workgroup to facilitate the creation of an environment for continued learning, communication, and for strengthening our implementation of the G2G and cultural resource protection procedures.
- Continue to make improvements on our Electronic Notification Systems for administering the Forest Practices Act.
- Continue to support and promote the use of mobile devices for Stewardship Foresters to conduct both forest practices and industrial fire inspections on their mobile devices while in the field further increases efficiencies in FPA administration.
- Initiated the live stream of Board of Forestry meeting to increase accessibility and reduce unnecessary associated travel.
- Provides employment including many seasonal positions in many rural communities across the state through a program with the Department of Corrections
- The Salem Auto shop continues to utilize recycled oil as its primary heat source reducing energy load across the entire building.
- Wireless Radio Communications program utilizes solar power across the state, where possible to offset the energy load at mountain top communication sites.
- A comprehensive depiction of ODF's equity, diversity and inclusion practices will continue to be documented on ODF's Affirmative Action Plan.
- The Department's mission is to serve the people of Oregon by protecting, managing, and promoting stewardship of Oregon's forests to enhance environmental, economic, and community sustainability. Toward that end, all of our major programs focus on sustaining the full range of values derived from Oregon's forests including protection of 16.2 million acres of

Oregon's forestlands, ensuring proper implementation of forest practices, and managing state owned forestland for a broad range of values.

Appendix A

Resource Conservation – Energy

The information below is a summary of energy consumption data entered reported by the Department. Annual building energy use for 2017 is summarized in the tables and graphs below. The graphs show annual building EUI and compare it to national targets for similar-type high performance buildings. These are denoted by the yellow and green lines. The data tracks each building’s energy use (EU), square footage, and EUI.



Energy Consumption (Buildings > 5,000 ft ²)		
2015 Baseline energy use	Total energy use for 2017	Comparison to Baseline
8,299.31 Million BTU ³	9,523.84 Million BTU ³	14.8 % increase in energy use compared to baseline year ^{1,2}
¹ Annual energy use may be affected by various factors including weather variations, changes to operational hours, and occupancy changes, among other factors. The increase in fire during the last three fire seasons have added additional strain to our facilities with respect to increased occupancy and operational hours. ² The overall Forestry Energy Use Index (EUI) for the total energy consumption is low when compared to the typical EUI for similar type buildings in the northwest region, which ranges from 33 to 50 kBtu/ft ² /yr for vehicle shop/repair and government buildings respectively. ODF’s aggregate EUI for 2017 is <u>29.3 kBtu/ft²/yr</u> . ³ BTU = British Thermal Unit.		

Resource Conservation – Energy, Continued

National ASHRAE EUI¹ Targets

The table below contains ODF's performance compared against typical regional occupancy EUI¹ targets.

Space Types	ASHRAE EUI targets	
	Western 4C ¹	Eastern 5B ¹
Government office	<u>50</u>	52
Lab	179	187
Hospital/Inpatient Health	135	126
Nursing Home/Assisted Living	84	88
Vehicle shop/Repair	<u>33</u>	35
Vehicle storage/maintenance	14	15
Restaurant/Cafeteria	156	163
Library	61	64
Lodging/Public Services (Prison/Incarceration)	93.2 ²	-
ODF	Year 2000: 32.6 Year 2017: 29.3	N/A
¹ kBTU/ft ² /yr ² USDOE Portfolio Manager (CBECs, not ASHRAE target)		

Resource Conservation – Water

The information below is a summary of water consumption data reported by ODF to the Oregon State Water Resources Department.

1. The data reported reflects totals for water year cycles spanning from October through September.
 - a. Baseline year begins Oct-2014.
 - b. Water years 2015/16 and 2016/17 are compared to 2014/2015.
2. Data metric totals reflect units in gallons.
3. Data includes essential and non-essential consumption.
4. Further refinement(s) of data is needed to account for the increase in the use of utility resources due to fire events from typical year round business operations - regression analysis.
5. Further investigation is needed to:
 - a. Separate water consumption totals from what are deemed essential facilities such as fire operations buildings and structures, and typical administrative buildings.
 - b. Account for well water consumption, especially guard stations (designated as essential facilities). An increase in fire activity can abnormally skew the data when compared to typical non-essential use. It is important to emphasize that applying a typical FTE to fixture count estimate is not feasible, nor accurate, due to the inability to account for increases in water use directly tied to fire-fighting applications. The installation of meters is being evaluated - typical challenges include cost(s) and FTE capacity. The Dept. is scoping the use of meters to help facilitate accurate readings of consumption.
6. Percentage increase/decrease in consumption for respective water years compared to the 2014/15 baseline year are listed in the following table:

Water Year	2014/15 ¹	2015/16 ¹	2016/17 ¹
Total (Gal)	14,123,984	13,977,250	14,011,126
Water Year	2014/15	2015/16	2016/17
Use Compared to Baseline Water Year 2014/15	0.00%	98.96%	99.20%
Savings Compared to Baseline Water Year 2014/15	0%	-1.04% (savings)	-0.80% (savings)
¹ Water Year = Oct - Sept			

7. Salem-Facilities has implemented the Department of Energy’s Portfolio Manager to more effectively manage and evaluate ODF’s 400+ building/structures portfolio with respect to water consumption in order to meet or exceed the mandated 15 percent savings as per the Governor’s recent Drought Executive Order. Challenges still exist with the higher frequency in fires in recent years, which creates a higher demand on our facilities and resources such as increased use and longer operating hour

The Oregon Department of Forestry Climate Change and Carbon Plan

Transportation

Metric	Reporting Period	Statewide Totals	Agency Totals	Change from Previous Report	Progress Towards Goal	Statewide Goal Met	Agency Goal Met
Gallons of fuel used ¹	Jan-Dec 2017	7,404,423	501,211	-14,493	Alignment with all policy elements: Met/In Process	In process (EO 03-03, 4.a)	No ²
GHG emissions from fuel use (lbs/CO ₂)	Jan-Dec 2017	146,365,317	10,446,254	-443,913	Alignments with all policy elements: Met/In Process	In process (EO 03-03, 4.a & EO 06-02 2.c.iii)	No ²
<p>¹includes biodiesel 2%, biodiesel 5%, biodiesel 20%, CNG, Diesel, E85, & E10.</p> <p>²The Department has and continues to collaborate with DAS and other owning state agencies represented within the State's Fleet Management Advisory Committee (FMAC) towards meeting the goals as a state. We are committed to purchasing high efficiency Flex Fuel vehicles; however, there are two factors that prevent Forestry from achieving individual agency targets: 1) Infrastructure and Decentralization - Salem DAS is our only source for E85 fuel statewide, the majority of the purchased Flex Fuel Vehicles cannot use E85 due to their remote locations throughout the states, 2) Fire and Forest Management activities are the driving factor of the type of vehicles utilized, mileage, and fuel usage. The 2013, 2014, 2015, 2016 and 2017 fire seasons substantially increased mileage and fuel usage from June thru October. These activities consumed major amounts of fuel and served to rocket the total fuel consumption and GHG outputs.</p> <p>Since 2014, ODF Motor Pool has again been steadily increasing the share of annual new vehicle purchases with Flex Fuel and Bio Diesel capable vehicles in its replacement cycles. These Flex Fuel & Bio Diesel capable motors are also just now declining in option cost to the point they are almost at the level of standard equipment and justifiable to cost. Over the next few years, we anticipate these alternative fuel motors will become virtually standard equipment in our new vehicles and the infrastructure to procure the fuel will be expanded to our primarily rural locations. This will bring us closer and closer to ultimate compliance.</p> <p>Currently, the E-85 (Ethanol) fuel needed for ODF Fleet vehicles capable of burning Ethanol is only available at the Salem DAS Fleet Fuel Island, and Sequential Fuels Retail outlet just south of Eugene on I-5. Very few of our ODF Fleet can get this fuel, so unleaded is the only means of fuel available. As outlets for E-85 increase, ODF Fleet will patronize these fueling locations for E-85.</p> <p>In closing, ODF Fleet is managing its fleet toward the goal of GHG/CO₂ reductions, and will have increasing success as more E85 vehicles truly replace the non E 85 vehicles. Toward this, more outlets for E 85 need to enter the retail market as well. Major Wildland Forest Fires are a variable that cannot be predicted or controlled, but can be understood as to their effect. ODF's primary mission drives our equipment needs and aspect of our Fleet operations into consideration.</p>							

The Oregon Department of Forestry Climate Change and Carbon Plan

Procurement

Report progress and alignment with statewide policies regarding sustainability in procurement and purchasing.

Metric	Reporting Period	Statewide Totals	Agency Totals	Change from Previous Report	Progress Towards Goal	Statewide Goal Met	Agency Goal Met
Sustainable Purchasing: Printer paper	2018	Average % recycled:	% recycled content in purchases: ???	N/A	2020 Goal (100% recycled for paper purchased)	In process (EO 12-15)	In Process
Sustainable custodial supplies#	2018	#Agencies in alignment:	Alignment: Yes	N/A	Alignment with all policy elements: Met/In process	In process (EO 12-15, DAS 107-011-010, D.1 & D.2)	Yes
Green Chemistry*	2018	#Agencies in alignment:	Alignment: Yes	N/A	Alignment with all policy elements: Met/In process	In process (EO 12-15, DAS Policy 107-009-0080 , EO 12-05)	Yes

*The Executive Orders and Policies relating to these metrics contain many elements of which vary in requested level of action ("review", incorporate, establish"). The agency has reviewed these elements and reported on current alignment and success as relevant. Further details on alignment and areas needing further development are detailed in the agency Sustainability Plan.

Motor and Equipment Pool

The target is:

- No increase in vehicle emissions using the year 2006 baseline thru 2014
- Reduce to 10% below 2006 levels by 2020
- Reduce to 75% below 2006 levels by 2050

We have not met the target. Compared to a 2006 baseline, GHG emissions were 16.5% for 2017. Annual change in GHG emissions has declined in two subsequent years.

Year	Gallons	Total GHG Emissions	Annual Change in Emissions	Annual ±% change in Emissions	Emissions compared to 2006 Baseline
2006	505,067	10,454,019		n/a	n/a
2007	507,230	10,541,229	87,210	0.8%	0.8%
2008	510,425	10,608,646	67,417	0.6%	1.5%
2009	474,817	9,892,885	(715,761)	-6.7%	-5.4%
2010	311,761	8,051,833	(1,841,052)	-18.6%	-23.0%
2011	416,571	10,917,611	2,865,778	35.6%	4.4%
2012	446,288	11,683,955	766,344	7.0%	11.8%
2013	482,544	12,631,936	947,981	8.1%	20.8%
2014	508,913	13,325,412	693,476	5.5%	27.5%
2015	564,804	14,787,099	1,461,687	11.0%	41.4%
2016	507,810	13,170,134	(1,616,965)	-10.9%	26.0%
2017	501,211	12,182,004	(988,130)	-7.5%	16.5%
Average				2.3%	

Appendix B

Sustainability Awareness

Agency Quarterly Newsletters:



We would like to introduce to you the first edition of the Salem Campus Facilities Newsletter titled "Work Bench". Our intent is to give you an opportunity to take a peek into our dynamic world of Facilities Management by establishing a platform that will allow us to connect with you beyond the Facilities Help Desk.

We will highlight many Facilities-related topics. An ongoing theme that you will discover in this first issue and subsequent editions will be sustainability. The objective is to deliver a clear, concise, and-of-course fun message on a quarterly basis in order to inform you on all things sustainability in and around Facilities Management. This includes providing you with energy and water savings tips, building energy consumption updates, current and future projects, and so much more.



L to R: Chris Stevens, Paul Kovacs, Sam Hoover, Michelle Cleland, Earl Hockney, Michael Biber, Jeremy Baker, Emily Wall, Julie Wip

One notable mention is that the Salem Facilities Unit has recently created an Energy Team to develop a Strategic Energy Plan for the Salem Campus. This team will continuously be looking for ways to improve building systems by building to many energy and water conservative projects as possible. We hope that this and future newsletters convey will also encourage you to join us in this endeavor because building occupant engagement is one of the biggest factors in helping us realize this goal.

The more energy and water we conserve, the more money and resources we save, and the more we lessen our impact on the environment. We consider this a winning formula. And welcome you to join us on this journey.

Your Facilities and Property Team:

- Chris Stevens - Facilities Director and Project Unit Manager
- Michael Biber - HVAC and General Maintenance
- Jeremy Baker - Facilities Coordination and General Maintenance
- Michelle Cleland - Electrical and General Maintenance
- Earl Hockney - Insulation, Common Building, Materials, and General Maintenance
- Sam Hoover - Property Control Inventory
- Paul Kovacs - Schematic Planning
- Andy Hill - Developmental program at property control and assembly
- Julie Wip - Administrative Support and Mailroom



Welcome to our Winter/Spring newsletter. This edition continues the discussion on sustainability - this time we focus on water conservation, recycling, and sustainable landscaping. This is also a good time to remind everyone that Governor Brown issued Executive Order No. 13-09 (click [back](#)) in 2013 which directed state agencies to plan for readiness to drought, with a goal of reducing all agency non-potable water consumption by 25 percent on or before December 31, 2020. Similar to energy conservation - building occupant engagement is a big factor in helping us meet this goal. Also, Emily Wall, COO's new Property Coordinator, has contributed some great information on E-Recycling. We hope you find this information useful.

Finally, we are also saying goodbye to two team members, Sam Hoover (retired Property Coordinator), and Michelle Cleland (Facilities Energy Technician). Both will be greatly missed - Your Facilities/Property Team

Comings and Goings

Farewell Michelle!
Our resident electrical specialist, Michelle Cleland, has returned to the private sector to begin the next chapter of her life. She was with us less than two years, but she completed several energy-saving projects in her short time here that equate to dollars saved perpetually for the Department. These included replacing the parking lot lights with LEDs, and improving the lighting throughout several buildings on the Salem campus. She was also involved in several projects in the field, including communication site, the Tillamook Forest Center, and a couple of the Camps. We will miss her sense of humor and her impressive professional talents and expertise. Good luck Michelle!

Happy Retirement Sam!
Sam Hoover, our Property Coordinator, has retired after nearly 40 years with the State. For almost 20 years, he was responsible for keeping track of all of ODF's assets across the state, from actual real estate down to the computer on your desk. He also led the agency's Surplus Property Program and ensured that we are adequately insured each year in the event of loss or damage. In post-retirement, his plans include rock climbing, participating in Society for Creative Anachronism (SCA) tournaments as "Cesar the Merchant" (see photo), stargazing (with his 400-ft telescope), golf playing, fishing, and spending quality time with his wife and two daughters. Farewell Sam!

Welcome Emily!
Emily Wall has been selected to fill Sam's impressive shoes. She has worked for the agency for several years in many capacities, including office specialist, health screener, and engine operator. Most recently, she completed a developmental assignment as a Supply Specialist 2 here at COF Salem-Forestry, helping everything there is to know about Sam's job. Emily is also an equestrian aficionado - she enjoys riding and training her two mustangs, Casey and Brock. Please welcome Emily as she settles into her new role!

E-Waste Recycling

Did you know that there are sub-contractors near your office that will pick-up your E-Waste? If you are within 100 miles of one of these addresses, you don't have to bring your old CPUs, laptops, printers, etc. to Salem for processing. If you are outside of the 100-mile radius of any of these locations, you may use a local E-waste recycling center as long as you document who you did not utilize our contract with Garten Services.

Contractor Location: Garten Services 3336 Industrial Way NE Salem, OR 97308	Sub-contractor Location: Southern Oregon ASP/RE 1200 Washington Blvd. Grants Pass, OR 97626	Sub-contractor Location: Opportunity Foundation of Central Oregon 835 E. Hwy. 216 Redmond, OR 97756
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Salem Projects

Landscaping:
- Irrigation usage has been reduced by over 60% since the Governor's Executive Order on Drought Conditions has been implemented.
- We are in the beginning stages of a Salem campus landscape rejuvenation project with a focus on more drought-tolerant species.

Compass parking lot lighting:
- One of our many lighting upgrades we've been working on over the last year and a half has been changing out all exterior lighting to LED. We've worked with Energy Trust of Oregon to bring the costs of installation down substantially. With the lower wattage of these fixtures and lamps, we're saving an investment in between three to six months. These improvements have already paid for themselves in energy savings. Our exterior lighting power consumption on campus has gone from 325,500 kWh (\$4,204.80) per year to 15,677 kWh (\$1,254.16), a 70% reduction. That's a cost savings realization of almost \$3,000 a year.

Did you know . . .

Watts are a measure of power. Watt-hours are a measure of energy. The easy analogy for power vs. energy (watts vs. watt-hours) is to compare them with speed vs. distance (miles-per-hour vs. miles). Speed is an immediate measure - how fast are you going at a given instant. Distance is the cumulative effect of speed being over a period of time.

Similarly, watts measure the immediate rate, or speed, at which energy is converted from one form into another. We call this rate **power**. Watt-hours measure the cumulative effect of power acting over time. We call this cumulative effect **energy**.

Just like we know that a 60 mph speed maintained for 1 hour will give us a distance traveled of 60 miles, we know that a 60 watt power draw maintained for 1 hour will give us an energy use of 60 watt-hours.

Turning off your computer at night can save a lot of energy and money!
This is an example of how much energy is being used if you walk away from your computer at the end of the day without turning it off.

A desktop CPU running idle with screensaver consumes about 0.82 kWh
Energy usage for overnight: 5pm - 9am, 16 hours (given an eight hour work day) = 0.082 x 16 = 1.312 kWh
Energy usage over five working day overnights = 1.312 x 5 = 6.56 kWh
Energy usage over the weekend = 0.082 x 48 = 3.936 kWh
One working week energy usage = 6.56 + 3.936 kWh = 10.496 kWh
Energy usage over one year = 10.496 x 52 = 545.792 kWh
Average energy cost per kWh = 0.08 cents
Annual energy cost for one desktop CPU = 545.792 x 0.08 = \$43.66 per CPU left on per year.
That isn't even counting monitors!

Ask Facilities
If you've always wanted to know what Facilities does, or why we do something, now is the time to ask! Submit your questions to the Facilities Help Desk [here](#) and we'll publish the answer in an upcoming Work Bench Newsletter release.

Fun Facts
- An oil supertanker's fuel mileage is 30 ft per gallon.
- It is physically impossible for pigs to look up at the sky.
- Butterflies taste with their feet.

Just a reminder, for those of you on the Salem Campus, if you need assistance from Facilities, please enter a ticket into the Facilities Help Desk system [here](#). This helps us prioritize and keep track of requests so we can help you more quickly and efficiently.

State Inventory due March 30

Remember folks, your 2018 State Inventory is due by COB March 30, 2018. Inventory forms were sent out earlier this year. Please return all inventory forms (signed and dated), along with pictures of each item in an electronic format to 2600 State St, Salem, OR 97310 - email Emily Wall: emwall@odf.gov or emwall@oregon.gov or (503) 945-7242.

How much water does it take to produce our food?

Food	Portion	Gallons of Water
Orange juice	1 cup	49
Yogurt	1 cup	28
Beef (steak)	8 ounces	1,232
Chicken	8 ounces	330
Almonds	1 ounce	25
White rice	2 cups	25
White bread	1 slice	11

How much water does it take to produce our water?

Category	Percentage
Earth's Water Distribution	
ocean water	96.5%
glaciers and other ice	1.74%
ground ice & permafrost	0.022%
groundwater	1.64%
lakes (fresh)	0.007%
lakes (saline)	0.000%
soil moisture	0.001%
atmosphere	0.001%
rivers	0.0002%
swamps	0.0000%
other	0.032%

ODF Administrative Site Field Work

- ODF office space utilization survey responses from the districts have been 100%! This Storage Space Utilization Survey responses from the districts are above 95% to date. - Big Thanks YOU to the field.
- Work is underway to complete the annual re-certification for ODF-Communications Operations at BSA & USFS communication site facilities statewide.
- Work towards the completion of the disposition of ODF's Peavy Real Property continues; supplemental appraisal work is currently underway.
- The Tillamook Forest Center Pavilion Construction Project broke ground last December. This is a very exciting project to be part of. Keep track of progress via webcam by following this link - [click here](#).



Fun Facts

- An octopus's eye is bigger than its brain.
- The amount of energy Americans use doubles every 20 years.
- The largest recorded snowflake was in Fort Kochi, Morocco, in 1857. It was 15 in. wide and 8 in. thick!

Recycled Chips

The grounds crew is taking all the branches from the annual tree pruning here on campus and creating arborist chip mulch with them. The use of arborist chips as mulch has been shown to have many benefits for urban trees and shrubs. Benefits include moisture retention, temperature moderation, and weed control; when compared to the common mulches used in the Pacific Northwest. Because they are not of uniform shape, size, or composition, they can resist compaction and decomposition when compared to other mulches. This is a great way to continue to improve our sustainable landscaping practices here on campus.

Salem Campus Landscape Rejuvenation Project

I would like to shed some light on a new project that Facilities is starting. The Salem campus landscape is 15 years old this year, and is beginning to show signs of maturity; in some instances, like the beautiful trees that's a wonderful thing; in others, like overcrowded and overgrown hedges and shrubs, not so much. Starting with Building 7, and working our way around campus, we are about to begin a landscape rejuvenation project with an emphasis on access to building exterior and utilities. We will be planting a wider variety of native, colorful, and drought-tolerant plants, all while keeping within the spirit of the original landscape design. Some areas will hardly be touched, while others will see a substantial change. Because of the larger scope of this project it will be broken down into smaller phases, allowing us to complete the work with our regular crew while still being able to perform our usual duties. This will be an exciting time for our beautiful campus. I can't wait to get my hands dirty - EARL

Sustainability Awareness – cont.

Resource Conservation & Sustainability Awareness – Agency Quarterly Newsletters



Time is flying – the year is almost half over and summer begins shortly. Summer means warmer temperatures and more challenges to keep our buildings sustainably conditioned, and most important of all, keeping ODF feeling comfortable. So, to help achieve this goal and still conserve energy, there are some tips for all of us on page two. Also, the Salem Property Unit will be rolling out its very own [ENERGY SAVING POINTS](#) soon. The goal is to increase accountability, streamline the processes, add checks and balances, and ensure that all of our users customers have a better experience – can't wait, it's getting to be fun...and so always, sustainability is still our primary focus. The agency recently submitted its annual water consumption report, and overall the agency is saving more, but we can still improve. So, in the spirit of water conservation, you will find some useful tips in this edition. Stay safe, healthy, hydrated, and keep on having fun – your facilities-property team

Who's In?

For many years you may have seen someone besides Earl manning the Salem Campus and 3-acre operations compound. Well, that would be Robert Henry. Robert comes to us as a temp through the Galt Foundation. He began with us back in 2007, and since then has spent his summers, and lately most seasons, assisting Earl with lots of different tasks.

Property & Surplus

Need better, newer, or safe furniture for your fire crews? Ask Property / Surplus if there are any available pieces in the warehouse. Also, now is the time for spring cleaning. If you have unused furniture or you taking up space, make an appointment to deliver it to Salem Surplus. Do you have unused electronic equipment? If yes, please check out the Winter/Spring 2018 Edition of the Facilities Work Bench for listings of unused electronics. If you have questions or need more information, contact: Emily Hall at 503-945-7342 or 971-701-0742 or odf-property.support@oregon.gov.

Statewide Projects and Activities

- Currently completing lease details for the installation of wildland fire camera detection systems at privately owned communication sites in Central Oregon and Southwest Oregon Districts.
- New rent valuation apparatus for eleven ODF employee rental housing locations have been completed, and the annual ODF Rental Housing Report is underway and being prepared for submission by July 1. We extend our appreciation to the field for their assistance!
- ODF water consumption data has been submitted to the Governor's Office as mandated by [Executive Order 2015-09](#), requiring agencies to conserve water.
- ODF energy use data for 2017 has been submitted to the Oregon Department of Energy ([ODES.276.900-2017](#)).
- A study of administrative usage of floor space in field locations is in progress, as required by [Executive Order 2015-02](#).
- ODF Facilities has just transferred ownership of an old power-type valve used in various locations formerly located near Skapetone Lake in the Clatsop State Forest. This wonderful example of an ancient construction is on display at [Gallatin Lake County Park](#), just south of Astoria. Known as the Unwigan Cabin, it is completely hand-hewn with dovetailed outside corners from very large and clear old-growth cedar logs.

Fun Facts

- Most elephants weigh less than the tongue of a blue whale – 10,000 lbs!
- The most shrouded forest in the U.S. is in the Smoky Mountains in Tennessee.
- The Shepherd's Flat Wind Farm in eastern Oregon is the largest wind farm in the U.S., supplying electricity to southern California.

Statewide Project Highlight – TFC Pavilion

Construction of the Forest Education Pavilion at the Tillamook Forest Center is nearing completion. As you can see in the photos, the pavilion will have plenty of windows to provide visitors and student groups with a panoramic view of the forest as they participate in many of the forest education classes and other events that will be hosted there. The Forest Education Pavilion will be a valuable addition to the Tillamook Forest Center, which can host around 50,000 to 60,000 visitors during any given year – WOW!!! If you would like to keep track of the progress via webcams, please click on this link [here](#).

Keep It Cool!

It's the season (no, not that season when we finally get to enjoy the outdoor air and not scrape it from our windshields. That time when we are compelled to bring outside air indoors and enjoy the new smells like fresh-cut grass and flowers. For an office building, the spring and fall seasons can present excellent opportunities to use this outside air (OSA) for "free cooling" (we've all about free anything, especially when it involves energy right!). The best way to use this OSA is with our common sense, especially in the morning hours when it's cooler and hopefully not too humid. As building occupants however, we need to be good stewards of this free energy when our windows are open, by closing them when the OSA is warmer than the indoor air, or when the cooling units are on, which is usually by noon. It's also a good idea to close window shades/blinds when we leave for the day, especially for the weekend. So, beware!!! – Michael will be actively engaged in making sure that all of us are playing our part to ensure that we conserve as much energy as possible.

Landscape Facts/Tips:

- Outside water use accounts for 40-50 percent of residential water usage in the summer months.
- Reduce the amount of grass with patios and decks. The reduction of grass within a landscape will aid in water conservation.
- Select native trees, shrubs, and plants for your landscaping, as these species will require less water.
- Use mulch to retain water around trees, shrubs, and plants.
- Irrigate lawns in the early morning, completed by 10:00 a.m. to avoid evaporation. Install timers on irrigation systems whenever possible to ensure the water turns off on time. Watering during the heat of the day can result in a loss of up to 50 percent.
- Do not water during windy periods, as this increases the evaporation rate.

Water Conservation Tips:

- Install cold flush valves on toilets to reduce the amount of water used for liquid waste. Most models use 1.1 gallons of water for liquid waste and 1.6 gallons for solid waste.
- For toilets with tanks, in lieu of replacing the flush valve, you can place a 1/2 gallon jug full of water in a toilet tank to save 3 1/2 gallons per flush.
- Replace aerators on sink faucets with low-flow aerators (1.1-1.5 gallons per minute).
- Use commercial car washes that capture, clean, and recycle the used water instead of hand washing your vehicles wherever possible.
- If you do hand wash your vehicles, do so during the coolest parts of the day, prior to 11:00 a.m. and after 6:00 p.m.



It's all about the time it takes us to reach goals and begin preparing for the change of season in the world of facilities. In this edition we will be highlighting some new things and celebrating an important milestone for one of our great buildings. We hope you enjoy this newsletter. Stay safe, healthy, and keep on having fun – your Facilities-Property team.

She's back!!!

It's time to let you know that Michele Christ has returned to Salem facilities. After completing her work getting the newly constructed Amazon distribution center in Salem all wired up, Michele has rejoined the team as an electrical 3 on a Great ID assignment. In this capacity, Michele is able to use her license to its full potential and complete work such as wire electrical installations, remodels, energy conservation upgrades, and much more. She is excited about the opportunity to serve the Salem Campus, as well as work with our partners in the field to provide the best in-house electric services she can. To help facilitate this, Salem Facilities will be rolling out a standard electrical services ticket system in October, through the already established RACE Ticket system, similar to T and Paveco. Michele can be reached at (503) 945-1277, or via email at michelle.christ@oregon.gov if you have any questions. Welcome back Michele, we are fortunate to have you back.

New HVAC Technology on Campus

In the spirit of our technology-forward approach as well as the weather, Facilities has wanted to introduce some new technology that will provide a safe and more energy efficient operation with respect to our facilities. However, that was not the case with our largest building, 3 and D. Our building occupants are very important to us, and whenever we use new measures to ensure that our building environments are safe, healthy, and able to meet the needs of our occupants, that brings us tremendous amount of satisfaction. In this specific case we have decided to take a new approach to our building systems in order to reduce or even eliminate the need for Facilities staff to handle hazardous materials that include the use of hazardous, hot, and caustic. This new system will also provide a more efficient means to reduce the amount of piping of all water and piping it with new water service lines as well. The piping is required to be installed in a way that is able to detect leaks in the piping over time. We are very excited to see the growth of habitats during the summer months that can cause significant issues. This new system will generate a real-time signal of 150 mph that is injected into the water up to 40,000 times per second, automatically

Celebrating 80 years!

The State Forester's Office Building (SFOB) celebrates its 80th birthday this Saturday, December 21st to the public. Open to the public from 10:00 a.m. to 4:00 p.m. on the property of the Oregon Department of Forestry, 10000 at a cost of \$19,100.

The SFOB was named for business in 1938. Constructed with "reclaimed" landscaping flagstone walkways, sandstone-clad stone walls, and stream banks, a grand chimney, and a multitude of Oregon wood species used to finish the interior office, the SFOB was entered into the National Register of Historic Places on April 15, 1987. As named in the National Register, the building "meets the criterion of exceptional significance as the outstanding example of Depression era facilities in the national park system on state ownership."

Designed in the style of a rustic lodge, the SFOB was built following a fire that destroyed the original Oregon State Capitol and the nearby office that it housed in 1935. When the Capitol was reconstructed, plans did not include room for the Department of Forestry, prompting a new location and facilities. Before programs were introduced to pet people during the Depression, which also provided the impetus for the construction of the SFOB. Once opened to business, it has housed the State Forester's Office and other administrative program offices of the Department of Forestry.

To this day, offices are finished in a variety of woods that were donated by private timber companies. Small pieces in the walls of each office identify the wood species and the donor. Many of these companies no longer exist and significant timber harvest can be found in the structure finishes. The ceilings and some Douglas-fir and noble fir, hemlock, port Orford cedar, and western red cedar, SPA spruce, ponderosa and sugar pine, western yew,

western juniper, and tamarack. The Oregon hardwoods used were Oregon myrtle, bigleaf maple, golden chinkapin, madrone, Oregon white oak, red alder, arbutus. To add unusual effects, crown-of-thorns and some shrubby and succulent woods were also used. The new provided workers to construct the main office, built the morning walls, and to construct a much larger extension of the historic main building in the future. The historic structure was restored by member Resource Group Partners, Oregon.

ODF Statewide Water Consumption Data

Water Year (FY)	2014-15	2015-16	2016-17
Total (G)	14,123,964	13,777,256	14,011,216
Use compared to previous year (%)	-	-2.4%	1.9%
Change in consumption (G)	-	-345,708	233,960
Change in consumption (G) per year	-	-1,967,368	-1,733,408

In an effort to comply with the Governor's issued Resolution to Enforce Executive Order No. 12, daily, that all state houses in the reduction of non-essential water use within our all of our facilities, Salem facilities, equipment, the following water conservation measures:

1. Landscape Irrigation: Limit landscape irrigation.
2. Bathroom: Install water flow discs in sink faucets and install faucet aerators. Repair leaks faucets and toilets.
3. Lunch and Break Rooms: Install water flow discs in sink faucets and install faucet aerators. Repair leaks faucets.
4. Building Maintenance (leaking/cracking windows): Reschedule exterior cleaning services and limit to be safe.
5. Dishable Dishes: Direct central contractor to be mindful of water usage.
6. Monitor existing Water Systems: Conduct regular water audits to identify leaks in the existing plumbing and irrigation systems.

We do appreciate your commitment to help ODF save water, and to help be as sustainable in our operations as possible. If you have any questions on ways we can help your facilities or occupants save (e.g. power, messaging, technical, etc.), please contact Paul Kolovich at (503) 945-2480.

Agency Recognition

ODF is recognized in Oregon Business Magazine's October 2018 issue due to its 2-year participation in Energy Trust of Oregon's Strategic Energy Management Program.

These organizations work with Energy Trust of Oregon to engage their staff in getting more from their energy. They successfully incorporate strategic energy management practices to reduce their operating costs.

We congratulate them for their ongoing commitment to improving energy efficiency.

OREGON ENERGY LEADERS

American Assets Trust • Blue Mountain Community College • Kaiser Permanente • Bend Park & Recreation District
High Desert Museum • Oregon Zoo • Bend-La Pine Schools • Cayuse Technologies • City of Milwaukie
Pendleton Convention Center • Multnomah County • Centennial School District • City of Bend • City of Portland
Crook County School District • Fred Meyer • Legacy Health • Linn County • Columbia Bank • City of Talent
Corvallis School District • Mary's Woods at Maryhurst • Mt. Hood Community College • Medford School District
Multnomah Athletic Club • Adapt • Salesforce • OHSU West Campus • Meals on Wheels People
Salem Health • Oregon Episcopal School • Multnomah Education Service District • Portland General Electric
Oregon Department of Administrative Services • Oregon Convention Center • North Clackamas School District
Confederated Tribes of the Umatilla Indian Reservation • 173rd Fighter Wing, Kingsley Field; Oregon Air National Guard
Oregon Food Bank • Oregon Department of Corrections • Oregon Department of Forestry • Clackamas County
Oregon Department of Transportation • TriMet • Portland Community College • Parkrose School District
Portland Public Schools • Touchmark Living Center • Umpqua Community College • Oregon Shakespeare Festival
Oregon Liquor Control Commission • Goodwill Industries of the Columbia Willamette • Columbia Sportswear Company
City of Gresham • OHSU Tuality Healthcare • Port of Portland • Washington County • Willamette View
Concordia University • Hillsboro School District • Tualatin Hills Park & Recreation District • University of Portland
Wildhorse Resort & Casino • VA Portland Health Care System • NW Natural • Summit Medical Group of Oregon

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2016 Sustainability Plan - Board Acceptance Letter



Oregon
Kate Brown, Governor

Department of Administrative Services
Chief Financial Office
155 Cottage Street NE U10
Salem, OR 97301
PHONE: 503-378-3106
FAX: 503-373-7643

May 16, 2016

Doug Decker, Director
Department of Forestry
2600 State St, NE
Salem, OR 97301

Re: Agency Sustainability Plan Presentation

Dear Director Decker,

On May 13, 2016, your agency's Sustainability Plan was presented to the Oregon Sustainability Board (OSB) by Chris Stewart, Satish Upadhyay, and Peter Daugherty. The OSB was impressed with the presentation and plan. We also appreciated the hospitality for our meeting in your lovely board room and enjoyed meeting members of your executive team at the presentation.

The OSB formally accepts the report, with a suggestion for an expanded role in staff participation: sustainability is obviously rooted in your core mission, and expanded participation by your staff may be an effective addition to your impressive "bricks and mortar" improvements. The OSB recommends looking for opportunities in your practices and internal operations, such as creating a green team and/or adding sustainability into policies.

In addition, the OSB celebrates that Forestry has re-joined the Interagency Sustainability Coordinators Network and has taken an active role with the new plan. We appreciate the good work of Chris Stewart and Satish Upadhyay in bringing the important voice of your agency back to the table for discussion and to share best practices.

The Board appreciates the time and effort that was put into this plan update by your agency and looks forward to your next plan update in 2018.

Sincerely,

John D. Miller

John D. Miller, Chair
Oregon Sustainability Board

cc Chris Stewart, Sustainability Coordinator
Satish Upadhyay, Administrative Services Division Chief
Peter Daugherty, Private Forests Division Chief
OSB Members
Governor Kate Brown